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DECLARATION

I, MAELEKANYO CHRISTOPHER TSHILONGAMULENZHE, student number 44663854, do hereby declare that this thesis entitled, “**An integrated learning programme management and evaluation model for the South African skills development context**”, is my own work, and that all the sources that I have used or quoted have been indicated and acknowledged by means of a complete list of references. This thesis has not been previously submitted, in part or in whole, for any other degree or examination at the University of South Africa or any other university.

I further declare that ethical clearance to conduct this research had been obtained from the Department of Industrial and Organisational Psychology, University of South Africa, and permission was obtained from the organisations that participated.

SIGNATURE

MAELEKANYO CHRISTOPHER TSHILONGAMULENZHE

DATE

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MAY GOD BLESS YOU ALL

SUMMARY

AN INTEGRATED LEARNING PROGRAMME MANAGEMENT AND EVALUATION MODEL FOR THE SOUTH AFRICAN SKILLS DEVELOPMENT CONTEXT

by

MAELEKANYO CHRISTOPHER TSHILONGAMULENZHE

SUPERVISOR: Prof. Melinde Coetzee
DEPARTMENT: Industrial and Organisational Psychology
DEGREE: DCom (Industrial and Organisational Psychology)

The general aim of this research was (1) to develop a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context, and (2) to develop a valid and reliable measure comprising the elements and dimensions of the theoretical model.

The research used a non-experimental cross-sectional survey design. Data were collected from a sample of 652 respondents comprising learning and development managers, learning and development assessors/facilitators/moderators, skills development officers/providers and apprentices/learners.

The sample was drawn from organisations representing 5 Sector Education and Training Authorities (SETAs) and the South African Board for People Practices (SABPP). A self-administered questionnaire was developed for the purposes of this research and its psychometric properties were rigorously scrutinised in accordance with the existing scale development protocols and scientific conventions.

Exploratory factor analysis was conducted to establish the factorial structure of the new Learning Programme Management and Evaluation (LPME) scale. The factorial structure was confirmed using confirmatory factor analysis. Further statistical tests conducted include structural equation modelling, multi-group structural equivalence, Pearson product moment correlations, multiple regression analyses and tests for significant mean differences.

The findings of this research confirmed an 11 dimensional structure LPME scale. The research confirmed the structural equivalence of the LMPE scale for males and females and type of learning programme. Age, education and occupation were found to be significant

predictors of the LMPE sub-scales. This research contributed a valid and reliable LPME scale for the effective management and evaluation of occupational learning programmes in the South African skills development context. To this end, the research provides recommendations for practice and future studies.

KEY TERMS

Human Resource Development; Skills development; skills shortage; occupational learning system; occupational learning programme; learnership; apprenticeship; management; training management; project management; quality management; training evaluation.

CHAPTER 1

SCIENTIFIC BACKGROUND AND CONTEXTUALISATION OF THE RESEARCH

This research seeks to contribute to the development of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African workplace. Furthermore, based on the theoretical model, the research seeks to develop a valid and reliable measure comprising the elements and dimensions that make up the conceptualised holistic and integrated theoretical model, and which could be used in practice to enhance effective management and evaluation of occupational learning programmes in the South African skills development context. This chapter outlines the background and motivation for the research and thereafter presents the research problem and the research questions. The chapter also outlines the research aims, hypotheses and potential contributions thereof, followed by a discussion of the meta-theoretical framework underpinning it. Thereafter, the research design and methodology applied are briefly discussed. To this end, an outline of the chapters is presented, followed by a chapter summary.

1.1 BACKGROUND TO AND MOTIVATION FOR THE RESEARCH

The focus of the research is on occupational learning programmes which are an important pathway towards effective skills development in South Africa. It is now widely accepted that skills in the workforce are a critical determinant of global competitiveness (Kruss, Wildschut, Janse Van Rensburg, Visser, Haupt & Roodt, 2012). In a time of global economic recession, debt crises and burgeoning unemployment, skills and capabilities are even more significant. Major forces driving changes in the world of work, such as globalisation, the knowledge economy and rapid advances in technology, have implications for skills demand and human resources development and training (McLean & Wilson, 2009). Countries have to develop their technological capabilities to increase their share of knowledge-intensive and complex activities which require higher skills levels in order to meet the technological demands of specific sectors (Kruss *et al.*, 2012). The competitive edge results from firms' capability to absorb, use, adapt and build on new technologies, which in turn, relies on national systems of education, training and skills development. Developing countries such as South Korea, Malaysia and Singapore have successful skills development systems, which are the outcome of good strategies for education, skills and capability development (Kruss *et al.*, 2012).

According to Kruss *et al.*, (2012), the national capability to learn is based on, but goes beyond formal education systems, to include a wide range of government policies and coordinated skills development institutions and funding mechanisms. Whether a country advances in skills formation to promote comparative advantage, or avoids deep recession in the current global context, depends largely on the national system for experience-based skill and technological learning (Kruss *et al.*, 2012). To meet the skills needs of economies, societies, and individuals, it is evident that national skills development systems must be:

- *Effective*: offering meaningful, quality skills development that avoids time-consuming and irrelevant training;
- *Efficient*: avoiding high costs and inefficient provision;
- *Competitive*: to counter supply-driven tendencies;
- *Flexible*: technically able in the short term to change the scope and direction of training outputs, if necessary; and
- *Responsive*: designed to meet the changing demands of the market and needs of the economy (Johanson & Adams, 2004).

1.1.1 Education and training reforms in South Africa

The education, training and development profession in South Africa has sustained far-reaching organisational, structural and policy reforms to date. These reforms have in many ways changed the landscape for learning both institutionally and in the workplace, for example, the restructuring and rationalisation of the Further Education and Training (FET) colleges; and the mergers and incorporations of higher education institutions (USAID, 2009). The latest major change in the skills development field is the introduction of the Occupational Qualifications Framework (OQF), which is managed by the Quality Council for Trades and Occupations (QCTO) (NSDH, 2010).

The QCTO plays an important role in the qualifications dispensation of the diverse and differentiated post-school learning system in South Africa (DHET, 2010c). This new body assumes responsibility for the quality assurance and standard setting of workplace-related learning within the National Qualifications Framework (NQF), which has a direct impact on occupational learning programmes and strategies in both the public and private sectors. The QCTO recognises the need for all occupational learning to build on general knowledge and theory, and provides for linkages and partnership with both public and private provider systems (DoL, 2008a). Occupational learning in the form of learnerships and

apprenticeships, is an important mechanism that has been established to fast track the development of employees, offer current and potential employees the opportunity to acquire accredited qualifications, and serve as an entry point for young people into jobs (National Treasury, 2011).

The new demands in terms of employability, re-training, life-long learning, personal growth and flexibility, transferability and mobility are imminent (McLean & Wilson, 2009). Thus, the rapid pace of workplace change today necessitates timely provision of effective occupational learning opportunities in order to prepare workers with new skills and to re-train existing employees (McLean & Wilson, 2009). Opportunities to learn increase when individuals participate more fully in the activities of the workplace. Such opportunities are important for the acquisition of both occupationally-specific competence and the ability to learn through work (Tolley, Greatbatch, Bolton & Warmington, 2003).

Occupational learning programmes are a necessary intervention in South Africa today in view of the high rate of youth unemployment. High youth unemployment means young people are not acquiring the skills or experience needed to drive the economy forward (National Treasury, 2011). About 42 per cent of young people under the age of 30 are unemployed compared with less than 17 per cent of adults over 30. A number of explanations for high unemployment amongst youth are given, including the fact that employers look for skills and experience and they regard unskilled, inexperienced jobseekers as a risky investment (National Treasury, 2011).

There is considerable evidence that young people are disadvantaged in the labour market in South Africa (National Treasury, 2011). The shortfalls in the education system constrain the prospects of young people, leaving them ill-equipped for the workplace, and in many cases without basic competencies. Young people also lack work experience, which provides critical on-the-job learning and training; contact with the job market; and the potential to develop networks (an important factor in improving employment prospects). Experience is vital, and a young person with some work experience is in a far better situation than one without (National Treasury, 2011). To increase their employability, young people need to acquire skills that are adaptable and relevant to the demands of today's societies. This requires that individuals possess a combination of knowledge, practical, social skills and positive attitudes and the ability to adapt to rapidly changing work environments (McLean & Wilson, 2009).

The QCTO is the coordinating body for occupational learning in South Africa (DoL, 2008b) and it integrates most activities that were performed independently by each Sector Education and Training Authority (SETA) in the previous NQF dispensation that was regulated by the repealed South African Qualifications Authority Act 53 of 1995. These include, for example, quality assurance, programme and qualification design, and standard setting. In view of the extensive legal mandate given to the QCTO, it is necessary that a generic, valid and reliable measure for the effective management and evaluation of occupational learning programmes be conceptualised. This measure could potentially be applied across SETAs to ensure the effective management and evaluation of occupational learning programmes. The measure may potentially provide an understanding of the interrelationship between the various dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context.

The measure is necessitated by the need for an integrated and coherent approach towards occupational learning programme management and evaluation with a view to effectively promoting the alignment of skills development goals with the needs of the workplace, and with the broader growth needs of the country's economy (DHET, 2010a). It is very important to ensure that occupational learning programmes are managed and evaluated effectively in order to achieve the goals of the National Skills Development Strategy (NSDS) III (2011-2016). The next sub-section discusses the South African skills shortage situation.

1.1.2 The South African skills shortage situation

South Africa faces a critical challenge of skills shortages, which is a serious threat to economic growth and employment creation (Arvanitis, 2006; Hermann, 2008; Lamont, 2001; SAIRR, 2008). Du Toit (2012) and Goga and Van der Westhuizen (2012) regard the situation as a paradox of skills shortages in the workplace and high levels of unemployment. The challenge of the skills shortage has become increasingly obvious, because of increased investment in public infrastructure over the past few years, laying bare the fact that although the funding for the infrastructure is there, there is lack of skilled people to construct this infrastructure (Sebusi, 2007).

However, the skills shortage is not unique to South Africa. Many other countries such as Brazil and India also have expanding economies creating demand for skilled people (Townsend, 2006). Consequently, South Africa must be viewed within the developing world context. Like many other countries, South Africa is facing a myriad socio-economic

challenges manifesting in a wide range of forms such as unemployment, skills shortages, and insufficient human development. To deny that South Africa faces a critical skills deficit is to deny the past, ignore the present, and jeopardise the future (Hermann, 2008). For four consecutive years since 2007, skills shortage in South Africa has been singled out as an obstacle to economic growth by private sector organisations (Grant Thornton, 2007; 2008; 2009; 2010), and this has serious implications for a wide range of the South African government's macro-economic plans and priorities.

Critical skills shortages exist in South Africa across the high and semi-skilled spectrum, ranging from managers and professionals, to artisans and technically trained workers (Goga & Van der Westhuizen, 2012). Management skills, for example, have been identified by Mantashe (2007) as a critical skills cluster in short supply in the economy and this requires immediate attention if South Africa is to realise its medium to long-term strategic objectives. It could easily be supposed that within the context of skills shortages, unemployment in South Africa should have been addressed by now. However, it is well known that a mismatch exists between the types of skills that are available and those demanded by the economy (Goga & Van der Westhuizen, 2012).

The majority of unemployed people are poorly educated and do not hold the skills that employers need in a technologically advanced economy. Consequently, skills development has been highlighted as a priority for government strategy, and in view of the recent global economic turndown, it is even more imperative that the South African economy retains a qualified labour force in order to promote new economic activity and development (Janse Van Rensburg, Visser, Wildschut, Roodt & Kruss, 2012). However, in order to address this paradox of skills shortages in the midst of high unemployment, the South African government has initiated policy interventions that focus on building a skills base that can provide the different industries with the level and kind of skills that they need to ensure economic growth (du Toit, 2012).

The National Skills Development Strategy (NSDS) is one such policy interventions. The NSDS was introduced with the specific purpose of addressing the structural deficiencies that exist in the South African labour market and developing a workforce that is skilled, mobile, and can respond to the modern economic milieu (du Toit, 2012). The NSDS is under-pinned by three key pieces of legislation: the Skills Development Act, 1998 (amended in 2008) (Republic of South Africa, 1998a; Republic of South Africa, 2008a); the Skills Development Levies Act, 1999 (Republic of South Africa, 1999); and the Employment Equity Act, 1998. These Acts have different purposes: the Skills Development Act introduced implementing

agents for the NSDS; the Skills Development Levies Act established a funding system; and the Employment Equity Act is used to determine the performance of the implementing agents and whether they provide skills development support to members of all social groups equitably. SETAs are one of the key implementing agents of the skills development legislation.

There are 21 SETAs in South Africa, which currently cover 21 sectors of the economy. One of the SETAs' most important functions is the development of Sector Skills Plans (SSPs) which contain information on scarce and critical skills shortages in each sector (Goga & Van der Westhuizen, 2012). While SETAs have the responsibility for ascertaining skills shortages, they also bear the responsibility for marketing scarce and critical skills in their relevant sectors in order to attract students/learners/graduates/employees into scarce skills occupations. The SSPs are compiled using the Workplace Skills Plans (WSPs) and Annual Training Reports (ATRs) submitted by enterprises to the relevant SETAs. The WSPs, in particular, identify skills shortages at the firm level and these, together with other sectoral studies, indicate the scarce skills within a specific sector and the economy as a whole (Singizi, 2007).

Sector skills planning by SETAs is an important activity for identifying the skills requirements of each sector and for the successful implementation of the NSDS. The NSDS is implemented in phases of 5 years each. The first phase of the NSDS (NSDS I) was implemented from 2001 to 2005. The second phase of the NSDS (NSDS II) was launched in 2005 and came to an end on 31 March 2011. The third phase of the NSDS (NSDS III) was launched in February 2011 and runs from April 2011 to March 2016. The NSDS III has eight key goals, one of which is to increase access to occupationally directed programmes (NSDS III, Goal 2) (DHET, 2011). This is mainly because South Africa's pool of intermediate skills, especially artisan skills, is too low to support national and sector development and growth. It is this goal (NSDS III, Goal 2) which makes this research fundamental and practically relevant in the South African skills development context. The next sub-section distinguishes between a scarce and a critical skill.

1.1.2.1 Distinction between a scarce and a critical skill

The DoL (2006b) defines scarce skills as an absolute or relative demand, either current or in the future, for skilled, qualified and experienced people to fill particular roles, professions, occupations or specialisations in the labour market. The definition differentiates between scarce and critical skills. More specifically, scarce skills are considered relatively easy to

identify and are measured in terms of an occupation or qualification, while critical skills refer to specific generic capabilities within occupations, for example, management skills, teamwork, and other “soft” skills. Furthermore, the DoL (2006b) identifies two types of scarcities, namely absolute and relative scarcities. Absolute scarcities refer to the lack of an absolute number of skilled people in the labour market, while relative scarcities point to situations in which people exist in the labour market to fill the position, but they are not ‘suitably skilled’, for instance, they may not have sufficient project management experience, they may not want to work in rural areas, or they do not fulfil equity considerations (DoL, 2006b). The next sub-section discusses the state of occupational learning programmes in South Africa.

1.1.2.2 Occupational learning programmes as pathways for addressing the skills shortage challenge in South Africa

Occupational learning programmes (OLPs) are at the centre of the current research project. However, analysing their role as a mechanism for addressing skills shortages is fundamental in the South African context, hence vocational and occupational certification via learnership and apprenticeship programmes at the core of the new skills creation system. Despite this, the concern in the current research is to examine the effectiveness of these two occupational learning pathways from a management and evaluation perspective. This research took cognisance of the fact that policy concerns regarding a skills crisis, that South Africa is not producing enough of the right levels and kinds of skills to support global competitiveness and economic development have intensified over the past five years (Janse Van Rensburg *et al.*, 2012), thus making the project very timely. Brief descriptions of learnerships and apprenticeships are presented next.

a) Learnership

Learnerships were introduced in South Africa as part of a new skills development dispensation, intended to address the limitations of the traditional apprenticeship system (Mummenthey, Wildschut & Kruss, 2012). A learnership is a work-based learning programme that leads to a nationally recognised qualification directly related to an occupation, for example an accountant, construction worker, health care worker, IT technician, motor mechanic or community-care worker.

According to Mummenthey *et al.* (2012), the learnership pathway system is comprehensive and includes qualifications at the basic skills (National Qualifications Framework (NQF)

levels 1-3), intermediate skills (NQF level 4) and high skills (NQF levels 5 – 8) levels, and it aims to enhance skills upgrading for the employed (18.1 learners) as well as provide vocational education and training for the young unemployed (18.2 learners). The aim is to provide a recognised occupational qualification, achieved through structured institutional learning and applied competence developed through workplace experiential learning. Learners have to attend classes at a college or training centre to complete classroom-based learning, and they also have to complete on-the-job training in a workplace, whether a firm, government department or small business (Mummenthey *et al.*, 2012).

b) Apprenticeship

An apprenticeship is a non unit standard-based registered qualification, which was until 2008, governed by sections 13 - 29 of the repealed Manpower Training Act No. 56 of 1981 (Mummenthey *et al.*, 2012). Since 2008, apprenticeships have been governed by the Skills Development Act, as amended. An apprenticeship comprises the integration of workplace and institutional learning and culminates in a national qualification at the appropriate level (N1 – N6). It involves both on and off-the-job training. Most apprentices have a contract with their sponsoring firm, and work in that firm, learning while they do so, while the off-the-job component is supplied by learning providers (Mukora, 2009), typically private training companies, employers themselves or FET colleges.

c) Distinction between a learnership and an apprenticeship

A steady decline in the number of apprentices in South Africa, the growing concern about the quality of workplace training and the technical skills produced, and limited access to the apprenticeship system in terms of race, gender and sector, informed the development of the new more 'modern' system of learnerships, instituted from 2001 under NSDS I. Learnerships became a key mechanism of the new skills creation system, with large scale investment via the National Skills Fund (NSF), largely supported by employer levies (DoL, 2003).

The learnership system differed from the traditional apprenticeship system in that it operated across all sectors and all skills levels, not only on the intermediate level or artisanal skilling (NQF Level 4). The learnership system also included basic level skilling (NQF levels 1 to 3) and high level skills (NQF levels 5 to 8), incorporating traditional professional internship training programmes in fields such as accountancy (DoL, 2003). The learnership system aimed to provide a recognised occupational qualification achieved through structured institutional learning and applied competence, developed through workplace experiential

learning. The new system was intended to address the shortcomings of the traditional apprenticeship system in this regard, particularly the lack of structured workplace learning (Kruss *et al.*, 2012).

Shifting policy priorities have shaped the learnership system in complex ways over a concentrated, very short period of time (Janse Van Rensburg *et al.*, 2012). However, regulations governing apprenticeships remained in place with the introduction of learnerships, but the relationship between the two was not clearly defined. The apprenticeship system continued to decline in importance as a skills development mechanism in South Africa through the 1990s and early 2000s (Janse Van Rensburg *et al.*, 2012). A period of economic growth in the mid-2000s made it evident that there was a critical shortage of artisan skills that neither the new learnership nor the traditional apprenticeship system was addressing. With the government's Joint Initiative for Priority Skills Acquisition (JIPSA) as a catalyst, from 2006, attempts were made to revive the apprenticeship system as a specific mechanism to produce scarce and critical intermediate level skills, and to address the shortage of artisans (Mukora, 2009). The JIPSA, formed in March 2006, promoted the expansion of intermediate artisan and technical skills as an imperative for the growing economy.

Furthermore, JIPSA "had to recognise and deal with the legacy of skills underdevelopment amongst the majority of South Africa's citizens, caused by the systematic denial of opportunities to black South Africans to acquire skills under apartheid" (Presidency, 2010, p. 3). It became clear that the apprenticeship pathway had many valuable attributes, and in many respects was very successful in providing sufficient numbers of qualified and competent artisans. The policy call then arose for the revival of the apprenticeship system as one of the key pathways for the provision of artisanal skills. The resultant shifts centred on a new policy landscape for national recognition of artisan qualifications, and agreement on the articulation of different learning pathways, legislatively enacted in a series of amendments to the Skills Development Act (2008) (Janse Van Rensburg *et al.*, 2012). The amended Skills Development Act uses the overarching concept of 'learning programmes' - agreements registered with a SETA, which could take the form of a learnership, an apprenticeship, a skills programme or any other prescribed learning programme that includes a structured work experience component (Republic of South Africa, 2008a). However, for the purposes of this research as highlighted earlier, only learnerships and apprenticeships are the key focus.

The new learnership system and the revived apprenticeship system are inserted into a complex and increasingly bureaucratized qualifications and quality assurance infrastructure.

They are administered by the SETAs, which are in effect a set of newly created institutions that have yet to develop capacity to drive skills development (Marock, 2008). The SETAs have suffered failures such as bureaucracy, rigid and inefficient management, low standards, a lack of information on student needs and firm demand, and in a few key sectors have been plagued by corruption. Their capacity to conduct skills planning and demand forecasting to inform sectoral and national strategies is generally not strong enough (Janse Van Rensburg *et al.*, 2012). In the next sub-section, a discussion of challenges pertaining to the management and evaluation of occupational learning programmes in South Africa is presented.

1.1.3 Challenges regarding the management and evaluation of occupational learning programmes in South Africa

SETAs have a legal mandate to promote occupational learning programmes and oversee their implementation (Republic of South Africa, 2008a). Janse Van Rensburg *et al.* (2012) note that the new skills development system in South Africa has not yet had sufficient time to mature. There are a number of challenges pertaining to management and evaluation of occupational learning programmes across SETAs. A 2008 review of SETAs showed that the skills development system suffers from weak reporting requirements, underdeveloped capacity, lack of effective management, and inadequate monitoring and evaluation that limit the ability of these institutions to serve as primary vehicles for skills development (Marock, Harrison-Train, Soobrayan & Gunthorpe, 2008). Some of these challenges are presented below to illuminate the scale and depth of the problem that the current research seeks to investigate.

A number of challenges have been raised regarding the co-ordination and management of National Skills Fund (NSF) training projects for the unemployed in South Africa (du Toit, 2012). The challenges are: timing and delays created by challenging co-ordination and project management (beneficiaries were reported to have 'lost hope' when training did not commence on time); the questionable quality of training in some instances; insufficient monetary compensation of beneficiaries; lack of ongoing mentoring to support self-employment of beneficiaries (beneficiaries expressed the need at some level for ongoing mentoring with self-employment enterprises, after the formal training was completed); the high cost of transport (absorbing most of the stipends trainees received); late payment of stipends; and conditions of placement ignored (du Toit, 2012).

These challenges are indicative of the fact that both the learnership and apprenticeship pathway systems in specific sectors do not operate optimally. According to Kruss *et al.* (2012), the most negative, and deeply problematic aspect relates to the kinds of skills and capabilities imparted, which vary widely between sectors and occupations. There is not a strong enough alignment between SETAs, education and training providers and firms in determining and regularly updating curricula frameworks and assessment standards so that they match industry demand, and particularly, so that they keep up with shifting global technological developments. The institutional and structural arrangements between education, the labour market, the production system and other social and economic institutions do not always facilitate appropriate, responsive and up-to-date development of skills and capabilities that will enhance global competitiveness.

Another major problem relates to a lack of reliable and valid data that regularly monitored access to, progress through and completion of learning programmes, or tracked transitions to the workplace of those who completed learnerships and apprenticeships (Kruss, *et al.*, 2012). This is a general problem across the SETA system in South Africa, where data on skills development and vocational education and training is woefully inadequate. A comprehensive and centralised database of the population of learnerships and apprenticeships is not easily available. Each SETA maintains its own records, and SETAs use a variety of data formats and fields. The inconsistencies and on-going data anomalies point to the need for better data management by each SETA as well as improved coordination and monitoring of submissions (Kruss, *et al.*, 2012).

In terms of legislation, SETAs are the custodians of occupational learning programmes in South Africa, meanwhile, skills development providers are the operational agents for the successful implementation of these programmes. Hattingh (2009) argues, however, that despite all the efforts spent on the training systems and processes for improving the quality of training, too much of the training is done badly in South Africa, and this undermines the credibility of skills development. In many cases quality assurance by SETAs has been reduced to meeting bureaucratic compliance requirements that have little to do with the quality of provision (DHET, 2012).

A detailed analysis of both the learnership and apprenticeship systems suggests that although these systems are increasing access and contributing to the development of skills at all levels, there is a perception of lack of preparedness in critical skill areas, and in some of the sectors studied (Kruss *et al.*, 2012), the skills imparted are outdated and do not keep up with the technological cutting edge. Furthermore, there were indications by firms in the

metal sector, that some of the curriculum content as well as trade tests date from the 1950s (Kruss *et al.*, 2012). The concerns with out-dated curriculum content and trade test have been reiterated in relation to both the apprenticeship and learnership routes.

A Case Study of MERSETA, '*Assessing the impact of learnerships and apprenticeships under NSDS II*' (Mummenthey *et al.*, 2012), reveals a lack of structured and sufficiently monitored practical work-exposure as well as full exposure to the trade, particularly in the case of apprenticeships in the workplace. Respondents in this study revealed that there are often no proper workplace training schedules in place and that some apprentices are not allocated mentors or supervisors. Furthermore, the study reveals that there is no consistent standard for internal quality measures on the side of the providers. The importance of internal quality assurance is dependent on a specific institution. It is of concern that there is no common minimum quality standard for learning in the sector. Equally significant, respondents emphasised an urgent need to regulate exposure to the workplace. A minimum standard of practical experience needs to be in place and this must be implemented and monitored according to consistent structured assessment standards. Only once these are in place, can skills be transferred between workplaces (Mummenthey *et al.*, 2012).

Furthermore, the MERSETA study reveals that due to the current difference in standards across the different occupational learning routes, there is no consistent procedure to implement training (Mummenthey *et al.*, 2012). This significantly impacts on the uniformity and reliability of the outcome, resulting in confusion amongst providers and workplaces. Some respondents in this study also lamented that quality checks are superficial, that is, those who are tasked with quality control only check policies and procedures, but do not thoroughly check what is actually happening during training. The primarily paper-based checks (sometimes adding learner interviews) are insufficient and are "completely missing the point" (Mummenthey *et al.*, 2012, p. 40).

In general, reported shortcomings in the curriculum, flaws in the integration of theory and structured work-experience, poor assessment standards and a lack of alignment raise serious concerns about the quality of artisanal training in South Africa. This is where the real gap between official maps and the actual navigations of individuals through a pathway system becomes clear. Individuals with formal certification but without the requisite skills and capabilities will not allow firms to absorb or adapt new technologies and keep up with the global technological cutting edge. The extent to which skills certification translates to skills and capabilities in the workplace is a real test, and this is a critical challenge facing the South African occupational learning system (Mummenthey *et al.*, 2012), hence the present

research which is a baseline endeavour to plug these persisting management and evaluation deficiencies by providing the necessary practical tools (model and measure) for effective management and evaluation of occupational learning programmes.

The evidence above is indicative of the complexity of managing and evaluating a system in which a multitude of stakeholders is involved. Occupational learning programmes are comprised of different stakeholders (learners, skills development providers, employers) with various expectations, functions or roles which have to be managed effectively. In addition, the physical environment within which these programmes are implemented, the resources required and administrative processes that must be complied with must be effectively managed. However, since these programmes tend to be implemented in multiple stakeholder environments (Davies & Farquharson, 2004), they could best be managed as projects at various levels (De Jager, Hattingh & Huster, 2002). The project management approach is also supported by the DHET (DHET, 2012).

In the context of the current research, the concepts of 'management' and 'evaluation' of occupational learning programmes are operationalised to involve environmental scanning, processes management, resources management, providing support to stakeholders where necessary, quality management, learning programme design and development, monitoring of progress and measuring the extent to which the programme has contributed towards the achievement of the goals of both the sector and the National Skills Development Strategy III. An occupational learning programme is deemed successful if the learner achieves competence within stipulated periods; if the learning programme has led to an increase in productivity levels of learners; if the current employees have been able to progress in their careers; and if the learners have found placement following their involvement in the occupational learning programme (FASSET, 2004).

Owing to the scale and depth of the foregoing management and evaluation challenges and the perception of the Department of Higher Education and Training (DHET) that the SETA system is continuing to repeat errors on a regular basis (DHET, 2012), the present research proposes an integrated management and evaluation framework that is pertinent and necessary to effectively address these challenges, and to ensure that the occupational learning system is implemented effectively. This research further notes the importance of the need for constant re-alignment and adaptation of processes and policies from all stakeholders for the successful implementation of the new occupational learning system (Bamber & O'Shea, 2009; Davies & Farquharsons, 2004; Mumenthey, 2008).

1.2 PROBLEM STATEMENT

The purpose of this research is to contribute towards the development of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context, and to develop a valid and reliable measure comprising the elements and dimensions of the theoretical model for practical use in South African workplaces to assess the effectiveness of occupational learning programmes. Occupational learning programmes are proclaimed as a pioneering method of overcoming skills shortage in South Africa, as their design obliges a number of stakeholders (SETAs, learners, skills development providers and employers) to coordinate both theoretical and practical vocational education and training (De Louw, 2009). These skills development interventions require active participation of all key stakeholders for effective implementation, management and evaluation.

The efficacy of occupational learning programmes is reliant on the contribution of all key stakeholders from policy implementation to learner beneficiaries. Best practice dictates that strategies relating to human resources and specifically human resource development (HRD) are enhanced when all stakeholders are able to offer their contribution and perceived opinions with regard to the efficacy of occupational learning programmes (Skinner, Saunders & Beresford, 2004). However, Lundall (2003) maintains that occupational learning programmes are fraught with inefficiency and have a long way to go in order to prove themselves in terms of teaching and learning excellence and quality.

A 2012 *Technical report on learnership and apprenticeship population databases in South Africa* (Janse van Rensburg, *et al.*, 2012) reveals details of completion rates for learnerships and apprenticeships and shows a 65% completion rate for learnerships and a 36.8% for apprenticeships in the year 2010. The findings indicate that more than half of the learners registered for apprenticeships struggle to complete them compared to just over 30% of the learnership population. This is a serious challenge that the current research is attempting to contribute a solution to, by investigating the possible and underlying management and evaluation weaknesses that are making the learnership and apprenticeship systems less effective.

Prior to this research, no valid and reliable measure for the effective management and evaluation of occupational learning programmes existed in South Africa. Nevertheless, the following key problems seem to exist in the South African occupational learning system:

- (1) Challenges with regard to incoherent and inconsistent implementation of occupational learning continue to persist and this is evident in the literature (Grawitzky, 2007; Kraak, 2005a; Mumenthey *et al.*, 2012).
- (2) Both the learnership and apprenticeship pathways are not operating optimally in South Africa (Kruss *et al.*, 2012).
- (3) The concept of 'Occupational Learning Programme' is still new in the South African skills development landscape, and SETAs and other stakeholders (skills development providers, employers, learners) are not clear regarding the elements and dimensions that comprise effective management and evaluation of occupational learning programmes.
- (4) There is no existing holistic and integrated management and evaluation model found in South Africa to date for occupational learning programmes.
- (5) There is no existing measure found to date in South Africa to assess the effectiveness and efficiency of management and evaluation practices with regard to occupational learning programmes.

The fore-mentioned challenges coupled with the persistent skills shortage problem in the South African workplace, despite unprecedented policy interventions by government, has prompted the current research. Considering the importance of occupational learning programmes as a vehicle for addressing the skills deficit in South Africa, this research seems very important and profound.

The model to be developed will provide a simplified understanding of the elements and dimensions that comprise the effective management and evaluation of occupational learning programmes; and the measure will enhance management and evaluation practices pertaining to occupational learning programmes in South African workplaces and may potentially be used by SETAs and the QCTO to monitor the effectiveness of occupational learning programmes. It is envisaged that the application of the new tools (model and measure) will help stakeholders in the skills development context in South Africa to manage and evaluate occupational learning programmes effectively in order to achieve the goals of the NSDS III and to improve the level of skills in the country.

1.3 RESEARCH QUESTIONS

In view of the foregoing, the research questions as set out below were formulated in order to guide the literature review and empirical study.

1.3.1 Central research question

What theoretical elements and dimensions should inform the effective management and evaluation of occupational learning programmes in the South African skills development context?

1.3.2 Research questions with regard to the literature review

Research question 1: How does the literature conceptualise occupational learning programmes?

Research question 2: How does the literature conceptualise the principles of the effective management and evaluation of occupational learning programmes?

Research question 3: How are occupational learning programmes currently managed and evaluated in the South African skills development context according to the literature?

Research question 4: What are the elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes within the context of the new occupational learning system in South Africa?

Research question 5: What are the international best practices regarding the effective management and evaluation of occupational learning programmes and how do these compare with the identified elements and dimensions of the theoretical model?

Research question 6: What are the final elements and dimensions of a holistic and integrated model for the effective management and evaluation of occupational learning programmes based on the literature review?

1.3.3 Research questions with regard to the empirical study

The empirical questions that this research investigated are set out below.

Research question 1: Based on the literature review, how can the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context be empirically operationalised into a valid and reliable Learning Programme Management and Evaluation (LPME) scale?

Sub-question 1.1: What are the psychometric properties of the newly developed LPME scale?

Sub-question 1.2: What is the nature of the interrelationships between the sub-scale dimensions of the newly developed LPME scale?

Research question 2: Do the sample sub-groups (gender and type of learning programme) differ significantly in terms of the factorial structure of the LPME scale?

Research question 3: Do the biographical characteristics of the sample significantly and positively predict the various sub-scale dimensions of the LPME scale?

Research question 4: How do the sample sub-groups (age, gender, educational achievement, type of learning programme and occupational position) differ in terms of each sub-scale dimensions of the LPME scale?

Research question 5: What are the conclusions, limitations and recommendations emanating from the empirical study?

1.4 AIMS OF THE RESEARCH

From the above research questions, the aims, as set out below, were formulated:

1.4.1 General aim of the research

The general aim of the research is to identify and conceptualise the elements and dimensions of a holistic and integrated theoretical model, and to develop and refine a measurement scale for the effective management and evaluation of occupational learning programmes in the South African skills development context.

1.4.2 Specific aims of the research

In view of the literature, the following specific aims are formulated for this research:

1.4.2.1 Specific aims with regard to the literature review

The specific aims emanating from the literature review are as follows:

Research aim 1: To conceptualise the occupational learning programme;

Research aim 2: To conceptualise the principles of effective management and evaluation in the context of occupational learning programmes;

Research aim 3: To investigate the current management and evaluation practices pertaining to occupational learning programmes in the South African skills development context according to literature;

Research aim 4: To identify and conceptualise the elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes within the context of the new occupational learning system in South Africa;

Research aim 5: To analyse international best practice regarding effective management and evaluation of occupational learning programmes and how this compares with the identified elements and dimensions of the theoretical model; and

Research aim 6: To conceptualise the final elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes based on the literature review.

1.4.2.2 Specific aims with regard to the empirical study

The specific aims that will guide the empirical investigation are as follows:

Research aim 1: To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable LPME scale;

Sub-aim 1.1: To assess the psychometric properties of the newly developed LPME scale;

Sub-aim 1.2: To assess the nature of the interrelationships between the sub-scale dimensions of the LPME scale;

Research aim 2: To assess the sample sub-group (gender and type of learning programme) differences in relation to the factorial structure of the LPME scale;

Research aim 3: To determine whether the biographical characteristics (age, gender, education, type of learning programme and occupation) of the sample significantly and positively predict the various sub-scale dimensions of the LPME scale;

Research aim 4: To investigate whether the sample subgroups (age, gender, educational achievement, type of learning programme and occupational position) differ in terms of each sub-scale dimensions of the LPME scale; and

Research aim 5: To formulate the conclusions, limitations and recommendations emanating from the empirical study.

1.5 RESEARCH HYPOTHESES

Welman, Kruger and Mitchell (2008) define a hypothesis as a tentative assumption or preliminary statement about the relationship between two or more things that needs to be examined. It is a conjectural statement of relationship between two or more variables (Kerlinger, 1986). According to Murtaza (2012), the word hypothesis is derived from the Greek words 'hypo' which means under, and 'tithemi' which means place, and is characterised by the following features:

- It is a tentative proposition.
- It has unknown validity.
- It specifies the relation between two or more variables.

The hypotheses formulated for the purposes of the present research are depicted in Table 1.1 and are aligned with the research aims. All statistical procedures that will be carried out to test these hypotheses are also indicated in Table 1.1. These statistical procedures will be discussed in detail in Chapter 4 (Empirical Study) and the results of statistical analyses will be presented in Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

Table 1.1

Empirical Research Aims and Hypotheses of this Research

Research aim	Research hypotheses	Statistical procedure
<p>Research aim 1: To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable LPME scale.</p>	<p><i>Ha(1):</i> The LPME scale is an 11 dimensional construct consisting of strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment.</p>	<p>Factorial validity (Exploratory Factor Analysis - EFA) Chapter 5</p>
<p><i>Sub-aim 1.1:</i> To assess the psychometric properties of the newly developed LPME scale.</p>	<p><i>Ha(2):</i> All sub-scales of the LPME scale (strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment) are valid across all persons in terms of item fitness, unidimensionality and bias.</p>	<p>RASCH Analysis Chapter 5</p>
	<p><i>Ha(3):</i> All sub-scales of the LPME scale (strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment) are reliable (Cronbach Alpha $\geq .70$).</p>	<p>Reliability Analysis Chapter 6</p>

Ha(4): The LPME sub-scales show a good fit with the measurement model. Confirmatory Factor Analysis (Structural Equation Modelling) Chapter 6

Sub-question 1.2: To assess the nature of the interrelationships between the sub-scales of the LPME scale. Pearson Product Moment Correlations Chapter 6

Research aim 2: To assess the sample sub-group (gender and type of learning programme) differences regarding the factorial structure of the LPME scale. Structural equation modelling Multi-group CFA Chapter 6

Research aim 3: To determine whether the biographical characteristics (age, gender, educational achievement, type of learning programme and occupational position) of the sample significantly and positively predict the various sub-scales of the LPME scale. Multiple regression analysis Chapter 6

Research aim 4: To investigate whether the sample sub-groups (age, gender, educational achievement, type of learning programme and occupational position) differ in terms of each sub-scale of the LPME scale. Tests for significant mean differences Chapter 6

1.6 STATEMENT OF SIGNIFICANCE

This research is relevant and significant to the current South African occupational learning landscape which is in a reforming state. It will add value in terms of its theoretical, empirical and practical contributions.

1.6.1 Theoretical level

At a theoretical level, this research will serve as a baseline study that contributes towards understanding the impact of management and evaluation practices on the effectiveness of occupational learning programmes. The research will conceptualise the concept of the occupational learning programme, and the principles of effective management and evaluation in the context of occupational learning programmes. Further, the research will investigate the current management and evaluation practices pertaining to occupational learning programmes in the South African skills development context by examining the relevant literature. The elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes will be identified and conceptualised within the context of the new occupational learning system in South Africa. It is expected that the theoretical model developed in this research will guide further research projects aimed at understanding the phenomenon under inquiry.

1.6.2 Empirical level

The present research will operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable Learning Programme Management and Evaluation (LPME) scale. The psychometric properties of the newly-developed LPME scale will be assessed, including the nature of the interrelationships between the sub-scale dimensions of the LPME scale. The LPME scale to be developed will be a significant tool for assessing and enhancing the effective management and evaluation of occupational learning programmes in South African workplaces. No valid and reliable measure was found to exist in South Africa to date which focuses on the effective management and evaluation of occupational learning programmes. Therefore, this research is original, novel and pioneering in its nature, because it will develop a model and a scale for learning programme management and evaluation in the South African skills development context.

1.6.3 Practical level

Practically, the findings of this research will steer change in the current management and evaluation practices regarding occupational learning programmes. Skills development practitioners and other occupational learning stakeholders (SETAs, QCTO, skills development providers, and skills development managers) will be empowered by the tools developed in this research (model and measure) which can be effectively used to manage and evaluate occupational learning programmes in South African workplaces.

1.7 RESEARCH ASSUMPTIONS

Research assumptions refer to basic principles that are assumed to be true without verification or proof and form the cornerstone of scientific research. They are accepted as a necessary starting point for research (Neuman, 2000; Polit & Hungler, 1995). All concepts contain assumptions, namely, statements about the nature of things that are not necessarily observable or testable (Neuman, 2000). Therefore, identifying the assumptions on which a concept is based deepens one's understanding of that concept. Certain assumptions are made in the current research in order to deepen an understanding of the concept of 'management and evaluation' of occupational learning programmes.

1.7.1 Working assumptions

A review of the relevant literature led to the formulation of a set of working assumptions relevant for assisting in answering the questions pertaining to this research. These assumptions are as follows:

- a) A valid and reliable measure comprising the dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes is positively related to the successful implementation of the occupational learning programmes and is likely to address the management and evaluation challenges identified in the present research.
- b) Stakeholders are not likely to be aware of the importance of the dimensions of a holistic and integrated theoretical model as descriptors of the effective management and evaluation of occupational learning programmes in the South African skills development context.
- c) Stakeholders are not likely to be aware of the importance of a valid and reliable measure for the effective management and evaluation of occupational learning programmes in South African workplaces.

- d) Stakeholders are not likely to be aware of the implications of the dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context.

1.7.2 Theoretical assumptions

The following theoretical assumptions serve as basic underlying truths from which the theoretical reasoning proceeds in this research:

- a) SETAs differ widely in how they support, manage and evaluate occupational learning programmes.
- b) Effective management and evaluation practices are important for the successful implementation of occupational learning programmes to ensure that the goals of the NSDS are achieved.
- c) Workplaces differ widely in how they support, implement and manage occupational learning programmes.
- d) Occupational learning improves when all key stakeholders are active participants in the process of managing and evaluating the effectiveness of occupational learning programmes.

1.7.3 Methodological assumptions

Methodological assumptions are beliefs concerning the nature of social science and scientific research. Methodological beliefs are more than methodological preferences, assumptions, and presuppositions about what ought to constitute good research. There is a direct link between methodological beliefs and the epistemic status of research findings (Mouton & Marais, 1996). The following main epistemological assumptions are the methodological assumptions that affect the nature and structure of the research domain and these relate to methodological choices, assumptions and suppositions that make for good research.

1.7.3.1 Sociological dimension

The sociological dimension conforms to the requirements of the sociological research ethic that makes use of the research community for its sources of theory development. Within the bounds of the sociological dimension, research is the experimental, analytical, exploratory, and explanatory process, since the issues that are being studied are subject to both quantitative or qualitative methods and analysis (Mouton & Marais, 1996). This research relies on people as its unit of analysis and uses a mixed methodology incorporating both the quantitative and qualitative analysis of constructs and concepts as described in this chapter.

1.7.3.2 Ontological dimension

Ontology is the reality that researchers investigate. It relates to the study of human activities and institutions whose behaviour can be measured. The ontological dimension asks what 'reality' is and what can be known about 'reality' (Mouton & Marais, 1996). This research seeks to contribute towards the development of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context. Furthermore, the research seeks to develop a valid and reliable measure based on the elements of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context. From an ontological point of view, the researcher appreciates that reality is an open window, which needs the triangulation of observations and that, it is not fully apprehendable due to system complexity and human limitations.

1.7.3.3 The teleological dimension

This dimension suggests that research should be systematic by nature and goal-directed. It is important therefore to state the problem being investigated and relate it to the research goals (Mouton & Marais, 1996). The research goal is explicit in this research, namely to develop a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes, and also to develop a valid and reliable measure based on the elements and dimensions comprising effective management and evaluation of occupational learning programmes.

Practically, in terms of the teleological dimension, this research will make a valuable contribution to the bodies of knowledge of Industrial and Organisational Psychology and Human Resource Development by developing a reliable and valid measure based on the

dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes. The researcher is guided by the 'modified objectivist' principle which allows involvement in the discovery process, with the aim of maintaining objectivity.

1.7.3.4 The epistemological dimension

Epistemology focuses upon the relationship between reality and the researcher and how knowledge about that reality becomes known to the researcher (Denzin & Lincoln, 1994; Orlikowski & Baroudi, 1991; Parkhe, 1993). According to Mouton and Marais (1994), this dimension relates to the quest for truth. A primary aim of research in the social sciences is to generate valid findings that approximate reality as closely as possible. The epistemological dimension interrogates the relationship between the enquirer and knowledge. This research attempted to achieve truth purely by relying on the accounts of research participants. The views, values and intentions of research participants as presented in their own accounts were respected and recognised as valid data.

1.7.3.5 The methodological dimension

Methodology describes the technique used by researchers to investigate reality (Healy & Perry, 2000). Methodological assumptions are beliefs concerning the nature of social science and scientific research. Methodological beliefs are more than the methodological preferences, assumptions and presuppositions about what ought to constitute sound research (Mouton & Marais, 1996).

Since this research has adopted a hybrid of critical realism and positivism as a philosophical framework, an appropriate research method must be selected that is congruent with the tenets of these paradigms and therefore likely to produce the desired results. According to Egbo (2005), critical realism does offer a middle ground for quantitative and qualitative researchers, allowing for the possibility of paradigmatic border-crossings. This view is supported by Healy and Perry (2000) who argue that within a critical realism framework, both qualitative and quantitative methodologies are seen as appropriate for researching the underlying mechanisms that drive actions and events.

The phenomenon under inquiry in this research appeared to necessitate the hybridisation of methods, and so, an empirical, non-experimental and cross-sectional exploratory descriptive design was used in order to achieve the aims of the current research.

1.8 PARADIGMATIC PERSPECTIVE OF THE RESEARCH

Paradigm comes from the Greek word '*paradeiknyai*'- to show side by side – and is a pattern or example of something. The word connotes the ideas of a mental picture or pattern of thought (Shtarkshall, 2004). Henning, Van Rensburg and Smith (2004) define a paradigm as a theory or hypothesis, a paradigm is rather a framework within which theories are built, that fundamentally influences how one sees the world, determines one's perspective, and shapes one's understanding of how things are connected. Holding a particular worldview influences one's personal behaviour, one's professional practice, and ultimately the position one takes with regard to the subject of one's research.

A paradigm encompasses a set of linked metaphysical assumptions about the world, the individual's place in it, and a range of possible relationships to that world and its many parts (Deshpande, 1983; Guba & Lincoln, 1994). Paradigms represent basic belief systems that guide the investigator and deal with first principles or ultimates (Denzin & Lincoln, 1994; Guba & Lincoln, 1994). Paradigms define for the researcher what it is they are about to research and what falls within and outside the limits of legitimate research (Guba & Lincoln, 1994).

A paradigm about the nature of reality is crucial to understanding the overall perspective from which the research is designed and carried out (Krauss, 2005). It is thus the identification of the underlying basis that is used to construct a scientific investigation; or, a loose collection of logically held together assumptions, concepts, and propositions that orientates thinking and research (Bogdan & Biklan, 1982). This research is in the field of Industrial and Organisational Psychology, and will adopt both the critical realism and positivism paradigms. The paradigmatic perspective comprises a description of the intellectual climate and the market for intellectual resources.

1.8.1 The intellectual climate

Since this research is focused on the development of a theoretical model and a valid and reliable measure for the effective management and evaluation of occupational learning programmes, the literature review and empirical investigation are presented from both the critical realist and positivist paradigms respectively. Further, a brief discussion of the methodological paradigm encapsulating this research is also presented.

1.8.1.1 *Critical realism*

Given the need to discover the 'real world' (Denzin & Lincoln, 1994; Godfrey & Hill, 1995), a realism approach is most suitable for this research. In contrast to interpretivist analyses that investigate reality through perception, critical realism allows the researcher to discover reality, albeit imperfectly, through observable and unobservable structures and mechanisms that underscore events and experiences (Bhaskar, 1978; Guba & Lincoln, 1994; Merriam, 1988; Perry & Coote, 1994).

Realism research assumes that perception is a window into reality from which a picture of reality must be triangulated with other people's perception of that reality (Perry, Riege & Brown, 1999), and that the nature of this reality exists independently of any one person (Magee, 1985). This triangulation is operationalised through a critical evaluation of how closely these perceptions represent the 'real world' in order to substantiate any knowledge claims forwarded by the researcher (Hunt, 1990). According to Guba and Lincoln (1994), critical realists view reality as being shaped by social, political, cultural, economic, ethnic and gender values. Overtime, this reality is assumed real. This worldview approach is appropriate when areas under investigation are deficient in theory and lack well-defined and tested constructs and principles (Parkhe, 1993; Perry, 1998).

Therefore, in order to attain a real, albeit imperfect, picture of occupational learning programme management and evaluation in South Africa, inductive and deductive elements were combined in this research to provide the data necessary for triangulation (Perry, Reige & Brown, 1998). This research is undertaken with a certain purpose in mind: in the quest for knowledge that could serve as a basis for policy action or improve existing management and evaluation practices pertaining to occupational learning programmes. Therefore, since research is an important way for policy development and practice improvement, critical realism, with the priority it assigns to agency, voice, real-life experience, inclusion and change, provides a useful framework towards studying the phenomenon under inquiry.

While the literature review in this research will provide a much-needed critical analysis of the existing policy framework, practice and experiences focusing on the development of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes, the empirical investigation will contribute towards the development of a valid and reliable measure of the dimensions that comprise a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context.

The experiences and perspectives of key stakeholders in the skills development sector in South Africa are critical for this development task, hence the choice of critical realism as a philosophical paradigm for the literature review. Bhaskar (1986) attributes *a priori* reality to the accounts and reasons people use in explaining their experiences since those reports are ontologically real, and therefore, constitute valid data that are not subordinate to those acquired in the natural sciences. Consequently, individual accounts are important in the generation of theory if praxis is the goal of the inquiry (Egbo, 2005).

Research that follows a critical realism paradigm seeks to change the social world through the identification and deconstruction of operational social structures, including attitudes, values, ideologies, and discursive practices that oppress people (Corson, 1997; 1991). Subsequently, such research has considerable potential in South Africa if it is geared towards improving the implementation of education and training policies, and management and evaluation practices at all levels of the education and skills development systems. Critical realism recognises that perceptions have certain plasticity and that there are differences between reality and people's perceptions of reality (Bisman, 2002). According to Egbo (2005, p. 275), the following are the main propositions of this paradigm:

- Research participants' reasons and accounts constitute valid scientific data and, when such reports are available for consultation, people's worldviews and the non-human entities that create influential structural forces in their lives become evident.
- Due to the human capacity for reflexive self-monitoring, people's accounts and reasons also reveal what they believe about those worldviews.
- Using people's accounts as prime data exposes not only what they value but also things that oppress them.
- In exposing oppressive social structures (policies, institutions, etc.), researchers are morally compelled to use evidence from the data to replace undesirable social practices (poor management, poor evaluation) with more desirable ones.
- Emancipation (resulting from critical consciousness) should be the goal of social scientific enquiry.
- Researchers can only understand and transform the social world if they are able to identify the structures that affect people's lives.

As Dobson (2002) alludes, a critical realist agrees that the knowledge of reality is the result of social conditioning and, thus cannot be understood independently of the social actors involved in the knowledge derivation process. In practice, research that is informed by critical

realism is concerned with transforming both macro and micro-level structures in society. For example, at the macro-level, researchers can work towards exposing and analysing dominant policies that support oppressive social structures as well as use the knowledge generated to engender far-reaching reforms (Egbo, 2005). In a critical realist philosophy, the task of understanding human behaviour is through empathy and interpretation, not friction and control. In short, this means seeing and interpreting things through the lenses of the research participants.

1.8.1.2 *Positivism*

The empirical phase in this research will be presented within a positivist research framework. Positivism assumes that there is only one truth, an objective reality that exists independent of human beings (Sale, Lohfeld & Brazil, 2002). Therefore, in positivism, an apprehendable reality is assumed to exist, driven by immutable natural laws and mechanisms. Knowledge of the “way things are” is conventionally summarised in the form of time and context-free generalisations, some of which may take the form of cause-effect laws (Guba & Lincoln, 1994, p. 109). Research can, in principle, converge on the “true” state of affairs.

The basic posture of this paradigm is argued to be both reductionist and deterministic (Hesse, 1980). The investigator and the investigated “object” are assumed to be independent entities, and the investigator is thought to be capable of studying the object without influencing it or being influenced by it (Guba & Lincoln, 1994, p. 110). The investigator’s role is to explain, predict or control (manipulate). When influence in either direction (threats to validity) is recognised, or even suspected, various strategies are followed to reduce or eliminate it. “Inquiry takes place as through a one way mirror” (Guba & Lincoln, 1994, p. 110). Positivism strives to be unbiased, reliable and rational. Values and biases are prevented from influencing outcomes, so long as the prescribed procedures are rigorously followed. The goal is to measure and analyse causal relationships between variables within a value-free framework (Denzin & Lincoln, 1994).

Techniques to ensure this include randomisation, blinding, highly structured protocols, and written or orally administered questionnaires with a limited range of predetermined responses. Questions and/or hypotheses are stated in proposition form and subjected to empirical tests to verify them; and all possible confounding conditions are carefully controlled (manipulated) to prevent outcomes from being improperly influenced (Denzin & Lincoln, 1994). In this research, the sample will be selected at random; a self-administered

questionnaire will be used with clear instructions and predetermined responses; and hypotheses will be stated and scientifically tested.

The choice of both the critical realism and positivism frameworks in this research is necessitated by the fact that they both permit a process of discovery in which theoretical constructs may be scientifically and objectively tested and resultant predictive and explanatory theories pertaining to occupational learning programme management and evaluation practices may be attained.

1.8.1.3 Methodological paradigm

The methodological paradigm focuses on the manner in which researchers can go about finding out whatever they believe can be known (Guba & Lincoln, 1994). This involves the actual methods and techniques used in the research, including the underlying principles and assumptions regarding the use of these methods and techniques. It should be noted that not just any methodology can help the researcher to find answers to questions related to his/her inquiry. According to Guba and Lincoln (1994), the methodological question cannot be reduced to a question of methods; methods must be fitted to a predetermined methodology. Therefore, the methodological paradigm used in this research is congruent with the research paradigms described in sub-section 1.7.1. The following methodological aspects will be considered in this research:

- (1) Research methodologies are often classified as either qualitative or quantitative. This research will adopt a mixed-methodology, which integrates both the qualitative and quantitative approaches.
- (2) The literature review will follow a qualitative approach focusing on literature relevant to the constructs of this research (management, evaluation and occupational learning programmes). Both classical and recent sources of literature will be used.
- (3) The empirical study will follow a quantitative approach. The new measure to be developed will be subjected to rigorous statistical analysis in order to ensure that it complies with the established scientific conventions in terms of validity, reliability, fit, unidimensionality and bias.

1.8.2 The market of intellectual resources

The market of intellectual resources refers to the collection of beliefs that have a direct bearing on the epistemic states of scientific statements (Mouton & Marais, 1994). For the purpose of this research, meta-theoretical statements, the theoretical model and conceptual descriptions of the main constructs are presented below.

1.8.2.1 *Meta-theoretical statements*

The meta-theoretical statements represent an important category of assumptions underlying the theories, models and paradigms of this research. In the disciplinary context, this research focused on Industrial and Organisational Psychology as a field of application (Mouton & Marais, 1996). Meta-theoretical statements are presented on the following:

a) *Industrial and Organisational Psychology*

This research is undertaken in the context of Industrial and Organisational Psychology, which is conceptually described as the application of psychological principles, theory and research to the work setting. It includes an investigation of the factors that influence work behaviour such as socio-cultural influences, employment-related legislation, personality, gender, race/ethnicity and life span development (Landy & Conte, 2004). This research will develop a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context. Furthermore, the research seeks to develop a valid and reliable measure of the dimensions that comprise a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes.

The focus of this research is relevant to Industrial and Organisational Psychology as a discipline, since the industrial psychologist recognises the interdependence of individuals, organisations and society, and the impact of factors such as increasing government influences, growing consumer awareness, skills shortages and the changing nature of the workforce. An industrial psychologist facilitates responses to issues and problems involving people at work by serving as an advisor and catalyst for business, industry, labour, the public, academia, the community and health organisations. An industrial psychologist is a scientist who derives principles of individual, group and organisational behaviour through research; a consultant and staff psychologist who develops scientific knowledge and applies

it to solve problems at work; and a teacher who trains in the research and application of Industrial and Organisational Psychology (Landy & Conte, 2004).

Thematically, this research seeks to develop a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes, and to develop a valid and reliable measure of the dimensions that comprise a holistic and integrated theoretical model for effective management and evaluation of occupational learning programmes in the South African skills development context.

b) Personnel Psychology

Within the field of Industrial and Organisational Psychology, the study of Personnel Psychology pays attention to processes and strategies that relate to the acquisition, provisioning and maintenance of human capital. This research is central to Personnel Psychology as it deals specifically with issues of human resource development in the workplace.

c) Organisational Psychology

Organisational Psychology is a discipline of psychology, which focuses on how the behaviours and attitudes of people are influenced by the organisational contexts within which they are employed (Muchinsky, Kriek & Schreuder, 2005). This research is central to Organisational Psychology as it examines management and evaluation practices in organisations from a systems perspective.

1.8.2.2 *Theoretical model*

A theory is an abstract generalisation that presents a systematic explanation of relationships between phenomena. It includes principles for explaining, predicting and controlling phenomena (Neuman, 2000; Streubert & Carpenter, 1999). A theory can also be defined as “a systematic abstraction of reality that is deliberately designed and created for a specific purpose” (Chinn & Kramer, 1995, p. 20). A theoretical model (also called a conceptual framework) provides collections of assumptions, concepts, and forms of explanation. The purpose of a model that describes the concepts of the ‘management’ and ‘evaluation’ of an occupational learning programme is to organise these concepts in a systematic pattern to represent the perceptual experiences of individual properties and to make the concepts more meaningful (Camp, 2001). The literature on skills development and occupational

learning programmes will be presented from a Personnel Psychology perspective, whereas, the literature pertaining to management and evaluation theory will be presented from an Organisational Psychology perspective. Various systems, frameworks and models of skills development, management and evaluation provide a solid theoretical foundation for this research, and these systems, frameworks and models will be discussed in detail in Chapter 2 (Skills Development and the Occupational Learning System) and Chapter 3 (Training Management and Evaluation Models). Towards the end of Chapter 3, a holistic and integrated theoretical model for this research will be presented.

1.8.2.3 Conceptual descriptions

The following conceptual descriptions served as points of departure for discussions in this research:

a) Occupational learning programme

An occupational learning programme in the context of this research is a legally regulated learning programme, which includes a structured work experience component (Van Rooyen, 2009). The programmes which are subject to investigation in this research are the apprenticeship and learnership which are offered within the South African skills development system.

b) Management

In the context of this research, occupational learning programme management is conceptualised as a process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human and physical) to ensure that the objectives of an occupational learning programme are achieved (Trewatha & Newport, 1976).

c) Evaluation

Occupational learning programme evaluation in this research is conceptualised as a systematic process of collecting descriptive and judgemental information on the programme's components (e.g. context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcome (Stufflebeam, 2003). The primary focus of occupational learning programme evaluation is on

the utilisation of the evaluation outcomes by the relevant stakeholders in order to improve the programme's effectiveness.

1.8.2.4 Central hypothesis

The central hypothesis of this research is that the Learning Programme Management and Evaluation (LPME) scale is an 11-dimensional construct consisting of strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment. These dimensional constructs work together to ensure the effective management and evaluation of an occupational learning programme. The LPME scale is a valid and reliable measure for the South African skills development context. This research further hypothesises that demographic variables of respondents such as age, gender, educational achievement, type of learning programme and occupation will significantly and positively predict the various sub-scale dimensions of the LPME scale.

1.9 RESEARCH DESIGN

Research designs are used by researchers to answer research questions. McMillan and Schumacher (1997) refer to a research design as the plan and structure of an investigation that is used to obtain evidence in order to answer the research question or questions. On the other hand, Terre Blanche and Durrheim (1999) indicate that a research design guides the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. They try to simplify this description and say that a research design is simply a bridge between research questions and the implementation of the research.

Research design (in the context of a doctoral thesis) is not just a work plan. It is the most significant element of the research process. It functions as a tool that enables the researcher to ensure that the evidence obtained provides accurate answers to the questions under investigation as clearly and as unambiguously as possible (De Vaus, 2001). Thus, in order to convincingly answer the questions under investigation in this research, it is necessary to obtain relevant evidence, and a good research design should lead to this requisite evidence. According to De Vaus (2001, p. 9) "obtaining relevant evidence entails specifying the type of evidence needed to answer the question, to test a theory, to evaluate a programme, or to accurately describe some phenomenon. Thus, when designing research, the researcher

needs to ask: given this research question or theory, what type of evidence is needed to answer the question (or test a theory) in a convincing way"? Research design addresses this logical problem and not a logistical one (Yin, 1989). Therefore issues of sampling, method of data collection (that is, questionnaires, observation, document analysis), and design of questions is subsidiary to the matter of what evidence the researcher needs to collect (De Vaus, 2001).

Most decisions about how the research is executed and how the respondents are approached, as well as when, where, and how the research is completed are made during this step. Mouton (1996, p.107) indicates that a research design is like a route planner providing a set of guidelines and instructions on how to reach the goal that has been set, and has two main purposes:

- (1) Firstly, to solve the research problem by developing a strategy for obtaining empirical data that will answer the question or hypothesis posited.
- (2) The second purpose is to eliminate or minimise the contamination of results by extraneous variables.

The design and methods utilised in this research are forthwith discussed. It is important to note that the phenomenon under inquiry in this research is still new in South Africa and appears to necessitate the hybridisation of methods. As a result, a non-experimental cross-sectional survey design was used in order to achieve the aims of this research. This research design was chosen for the present enquiry because it allows predictions in a large sample with limited resources. If an issue of investigation is new and little or nothing has been reported on it, the design is exploratory in nature (Neuman, 1997, p. 19). An analysis of the literature reviewed for this research showed that no comprehensive studies have been conducted to examine the management and evaluation practices with regard to occupational learning programmes in South Africa. Furthermore, there is no evidence were found to exist in the literature which shows the existence of a theoretical model and a valid and reliable measure for the effective management and evaluation of occupational learning programmes in the South African skills development context.

The research design selected has to be congruent with the tenets of the research paradigm chosen and therefore likely to produce the desired results. As a result, the researcher chose a combination of critical realism and positivism as paradigms for this research. Critical realism does offer a middle ground for quantitative and qualitative researchers, allowing for the possibility of paradigmatic border-crossings (Egbo, 2005, p. 276). This is furthermore

supported by Healy and Perry (2000) who attest that within a critical realism framework, both qualitative and quantitative methodologies are seen as appropriate for researching the underlying mechanisms that drive actions and events.

The research design followed in the present research represents the conceptual structure within which the research will be conducted and is important to provide for the collection of relevant information with minimal expenditure of effort, time and money. Consequently, the researcher took the following aspects into consideration when deciding on the appropriateness of the design chosen:

- The research problem under investigation;
- The purpose of the research;
- The methods of data collection adopted;
- The population and sample for the research;
- The data collection instrument; and
- Data analysis techniques.

Uys and Basson (1991, p. 38) indicate that an exploratory descriptive research design has the following characteristics which were also applicable to this research:

- It is a flexible research design that provides an opportunity to examine all aspects of the problem being investigated.
- It strives to develop new knowledge.
- The data may lead to suggestions of hypotheses for future studies.
- It is usually a field study in a natural setting.

1.9.1 Types of research relevant to the current study

Research is defined as “a systematic process of collecting, analysing and interpreting information (data) in order to increase understanding of the phenomena about which researchers are interested or concerned” (Leedy & Ormrod, 2005, p. 2). Welman, Kruger and Mitchell (2008) define research as a process that involves obtaining scientific knowledge by means of various objective methods and procedures. Research can be used to explore, describe or explain the phenomenon. Consequently, the following types of research are discussed with reference to their relevance in the current research, namely, exploratory, descriptive and explanatory.

1.9.1.1 Exploratory research

Exploratory research is appropriate when problems have been identified, but our understanding of them is quite limited (Yegidis & Weinbach 1996, p. 92). According to Bless and Higson-Smith (2000, p. 41), the “purpose of exploratory research is to gain a broad understanding of a situation, phenomenon, community or person” and the “need for such a study could arise from a lack of basic information in a new area of interest”. This research seeks to develop a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes, and a valid and reliable measure of the elements and dimensions that comprise the effective management and evaluation of occupational learning programmes for the South African skills development sector.

South Africa is a country facing acute skills shortages, and a quest for a solution to this challenge contextualises this research as relevant, and therefore it is considered to be exploratory. The researcher will use an exploratory strategy of enquiry (Documents Analysis and Expert Review) to come to an understanding of elements and dimensions that relate to the effective management and evaluation of occupational learning programmes in the South African skills development context. This is a necessary build-up for the development of the new measuring instrument which will be used in this research. The exploratory factor analysis results will be reported in Chapter 5 (Research Results: Exploratory Factor Analysis).

1.9.1.2 Descriptive research

A descriptive strategy of enquiry will also be used as part of the research design for this research. This strategy will provide the researcher with an opportunity to look with intense accuracy at the phenomenon under investigation. This type of research is aimed at investigating the full nature of the phenomenon, the manner in which it is manifested, and the other factors to which it is related. Neuman (1997, p. 20) argues that exploratory and descriptive research often come together in practice. Descriptive research, however, presents a picture of specific details of a situation, social setting or relationship by focusing on how and why questions (Mouton, 2001, p. 54). Descriptive research may have a basic or applied research goal and can also be qualitative or quantitative in nature (Fouché, 2002, p. 109). In every case, descriptive research is employed to provide an empirical picture of a situation by examining that situation as it is. Descriptive statistics will be reported in Chapter 4 (Empirical Study) to present the profile of the sample used in the current research.

This research will follow an applied research goal which is aimed to develop an integrated theoretical model and a valid and reliable measure for the effective management and evaluation of occupational learning programmes in the South African skills development context. Robson (1993, p. 10) classifies this type of research as “real world enquiry” with an emphasis on the substantive or practical importance of research results, solving problems and developing and testing programmes, interventions and services.

1.9.1.3 Explanatory research

According to Mouton and Marais (1996), explanatory research aims to indicate causality between variables or events. It attempts to clarify why and how there is a relationship between two or more aspects of a situation or phenomenon. This type of research is used in cases where the researcher goes beyond showing the difference between variables by indicating the magnitude of the difference and where any correlations between variables exist. An attempt will be made in this research to determine the relationship between the various sub-scale dimensions of the LPME scale and whether biographical characteristics of the sample (age, gender, educational achievement, type of learning programme and occupation) significantly describe or explain the sub-scale dimensions. The direction of the relationship will be discussed with reference to the research sub-groups such as age, gender, educational achievement, type of learning programme and occupation.

1.9.2 Research approach

In this research, a mixed methodology will be followed, meaning that an integrated research design that comprises elements of both qualitative and quantitative research approaches will be used. In other words, the design chosen for this research must allow for the application of both the qualitative and quantitative research methods (De Vos, Strydom, Fouche & Delpont, 2002, p. 365). The next sub-sections discuss the qualitative and quantitative research methodologies, and present the arguments in of favour of a mixed methodology.

1.9.2.1 Qualitative research methodology

The qualitative approach is less dominant in this research and will be applied in the theoretical phase. Qualitative research focuses on phenomena that occur in natural settings and involves studying phenomena in all their complexity aiming to portray the issues in their multifaceted form (Leedy & Ormrod, 2001). According to Neuman (1997), the qualitative approach captures and discovers meaning once the researcher becomes immersed in the data. Creswell (2003) defines qualitative study as an inquiry process for understanding a

social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting. Denzin and Lincoln (1994) approach the phenomenon as multi-method involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings and they attempt to make sense of or interpret phenomena in terms of the meanings people bring to them.

In the present research, the qualitative methodology will be applied during the theoretical phase (literature review) in order to assist the researcher with the collection, analysis and interpretation of material and documents that are relevant to achieve the aims of the research. This methodology is aimed at discovering patterns in the documents after a serious analysis of the research topic. Employing a qualitative approach by conducting a thorough and comprehensive literature review in the current research will allow the researcher to:

- Understand management and evaluation of an occupational learning programme as more holistic and complex constructs;
- Identify the elements and dimensions that comprise a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes; and
- Construct a holistic and integrated theoretical model for the effective management and evaluation of an occupational learning programme.

1.9.2.2 Quantitative research methodology

The quantitative methodology is dominant in the current research. This methodology is guided by a positivist paradigm based on the assumption that social reality has an objective ontological structure and that individuals are responding agents to this objective environment (Morgan & Smircich, 1980). Quantitative research in general terms is implemented to address questions regarding relationships among measured variables with the purpose of explaining, predicting and controlling phenomena that will generalise to other persons and places (Leedy & Ormrod, 2001). A quantitative research methodology is a deductive approach founded on the formulation and verification of hypotheses using a scientifically accepted procedure (Frankfort-Nachmias & Nachmias, 1992). It is drawn to test and establish the validity of theoretical propositions formulated in previous studies (Blumberg, Cooper & Schindler, 2005) and it relies heavily on experimentation and measures, which are

hypothetically tested (Patton, 1990). A quantitative research methodology attempts to uncover the relevance of data to a problem numerically by quantifying results from the study.

This methodology concerns the collection and analysis of numerical data and the application of statistical tests (Collis & Hussey, 2003). It is often drawn to establish the validity of theoretical generalisations or propositions as they exist in social science and or business studies literature (Cresswell, 1994). It is used by social science researchers because of its ability to predict the cause and effect of a given problem (Cassell & Symon, 1994). It is used by researchers given the belief that it produces reliable data, which can be quantified and generalised. Employing a quantitative approach in the current research will allow the researcher to:

- State the research problem in a very specific and definable set of terms;
- Specify clearly and precisely the independent variables and the dependent variables;
- Follow the original set of research questions and aims;
- Achieve a high level of reliability of collected data due to a larger sample size;
- Formulate and test the research hypotheses using valid and reliable statistical techniques; and
- Arrive at more objective conclusions for the research by minimising subjectivity of judgement.

Table 1.2 depicts the key differences and similarities between the quantitative and qualitative research approaches as identified by Burns (2000, pp. 6-7).

Table 1.2

Differences and Similarities Between the Quantitative and Qualitative Research Approaches

Element	Quantitative research approach	Qualitative research approach
Key characteristics	<ul style="list-style-type: none"> • <i>Control</i>: this is the most important characteristic of this approach because it enables the researcher to identify the causes of his/her observation. Control is an absolute essential because without it, the cause of an effect cannot not be isolated. • <i>Operational definitions</i>: the constructs of the research must be clearly defined by the steps or operations used to measure them. Such a procedure is necessary to eliminate any confusion in meaning. • <i>Replication</i>: to be replicable, the data obtained in a research process must be reliable. • <i>Hypotheses testing</i>: this approach requires the systematic creation of a hypothesis and subjecting it to an empirical test. 	<ul style="list-style-type: none"> • Events can be understood adequately if they are seen in context. Thus, the researcher immerses him/herself in the setting. • The contexts of an enquiry are not contrived; they are natural. Nothing is predefined or taken for granted. • No agency voice. Qualitative researchers want those who are studied to speak for themselves, to provide their perspective in words and other actions. • The researcher attends to the experience as a whole, not as separate variables. The aim is to understand experience as unified. • There is no one general method, since specific methods are appropriate to specific contexts. • Qualitative research entails appraisal about what was studied.
Strength	<ul style="list-style-type: none"> • Precision – through quantitative and reliable measurement. • Control – through sampling and design. • Ability to produce causality statements, through the use of controlled experiments. • Statistical techniques allow for sophisticated analyses. • Replicability. 	<ul style="list-style-type: none"> • Because of close researcher involvement, the researcher gains an insider's view of the field, and this allows him/her to find issues that are often missed (such as subtleties and complexities) by the scientific, more positivistic enquiries. • Qualitative descriptions can play an important role of suggesting possible relationships, causes, effects and dynamic processes. • Because statistics are not used, but rather more descriptive and narrative responses, qualitative research might be of particular benefit to the practitioners as they could turn to qualitative reports in order to examine forms of knowledge that might otherwise be unavailable, thereby gaining new insights. • Qualitative research adds flesh and blood to social analysis.

Weaknesses

- Because of the complexity of human experience, it is difficult to rule out or control all the variables.
- Because of human agency, people do not all respond in the same ways as inert matter in the physical sciences.
- The mechanistic ethos of this approach tends to exclude notions of freedom, choice and moral responsibility.
- Quantification can become an end in itself.
- This approach fails to take account of people's unique ability to interpret their experiences, construct their own meanings and act on these.
- This approach leads to the assumption that facts are true and the same for all people all of the time.
- Quite often, this approach produces banal and trivial findings of little consequence due to the restriction on and the controlling of variables.
- This approach is not totally objective because the researcher is subjectively involved in the very choice of a problem as worthy of investigation, and in the interpretation of the findings.

Relevance to present research

- The researcher will control the influence of extraneous variables by using the correct research design and sampling technique.
- The researcher will state the research hypotheses to allow for statistical testing.

Similarities

- Appropriate statistical techniques will be utilised during data analysis.
- Whilst quantitative research may be mostly used for testing theory, it can also be used for exploring an area and generating hypotheses and theory.
- Similarly, qualitative research can be used for testing hypotheses and theories even though it is mostly used for theory generation.
- Qualitative data often includes quantification (e.g., statements such as more than, less than, most, as well as specific numbers).
- Quantitative methods (e.g. questionnaires) can collect qualitative data through open-ended questions.
- The underlying philosophical positions are not necessarily as distinct as the stereotypes suggest.

1.9.2.3 Arguments for using mixed methodology

Having explored the two common research approaches in terms of their philosophical assumptions, differences and similarities, it is important to address the arguments given for combining the qualitative and quantitative research approaches in a single study. Combining qualitative and quantitative research methods in a single study is widely practiced, and there are several viewpoints as to why the two research approaches can be combined.

- (1) The two approaches can be combined because they share the goal of understanding the world in which people live (Haase & Myers, 1988). King, Keohane and Verba (1994) claim that both qualitative and quantitative research share a unified logic, and that the same rules of inference apply to both.
- (2) The two approaches are thought to be compatible because they share the tenets of theory-ladenness of facts, fallibility of knowledge, indetermination of theory by fact, and a value-laden inquiry process (Sale *et al.*, 2002). They are also united by a shared commitment to understanding and improving the human condition, a common goal of disseminating knowledge for practical use, and a shared commitment to rigour, conscientiousness, and critique in the research process (Reichardt & Rallis, 1994). Casebeer and Verhoef (1997) argue that people should view the qualitative and quantitative research approaches as part of a continuum of research with specific techniques selected based on the research objective.
- (3) Clarke and Yaros (1988) note that combining the two approaches is useful in some areas of research when the complexities of the phenomenon under inquiry require data from multiple perspectives.
- (4) Miles and Huberman (1984) claim that researchers should not be preoccupied with the qualitative-quantitative debate because it will not be resolved in the near future, and epistemological purity does not get the research done.
- (5) Leedy and Ormrod (2001, p. 103) note that qualitative and quantitative research methods are not mutually exclusive and it is not unusual for quantitative researchers to report on qualitative aspects of their research.
- (6) Plante, Kiernar and Betts (1994) argue that non-experimental quantitative data is not collected in a vacuum, but in a specific environment or context with its own network of

personal and procedural interactions and relationships. The quantitative measurement of data is nestled in these surroundings of routine activity and it is a description of these surroundings that requires a qualitative approach to observing phenomena. A combination approach is often the only way to adequately encompass human beings in their full complexity.

- (7) Mouton and Marais (1990) argue that a single research approach is limited in investigating phenomena in social science that are often tightly enmeshed.
- (8) By adopting an approach of convergence and complementarity, De Vos, Strydom, Fouche and Delport (2002) believe that greater insight into human nature and social reality may be attained.
- (9) Posavac and Carey (1989) also suggest that mixing the two traditions may often be the best approach to providing a fuller and more comprehensive study in social sciences.

None of these arguments adequately address the underlying assumptions behind the philosophical differences between the two research approaches. However, Howe (1988; 1992) makes an interesting argument which suggests that researchers should forge ahead with what works. Truth, he states, is a normative concept, like good. Truth is what works. This appears to be the prevalent attitude towards mixed method research. Closely tied to the arguments for integrating the two research approaches are the reasons given for legitimately combining them. Two reasons for this are prevalent in the literature:

- (1) To achieve cross-validation or triangulation – combining two or more theories or sources of data to study the same phenomenon in order to gain a more complete understanding of it (Denzin, 1970); and
- (2) To achieve complementary results by using the strength of one method to enhance the other (Morgan, 1998).

The first reason maintains that the two research approaches are interdependent (combinant), while the second maintains that they are dependent (additive). In the current research, both reasons were given equal consideration in justifying the choice of a mixed-methodology. The literature review will be carried out qualitatively in order to understand the research phenomenon, the context and other underlying theoretical issues relevant to the

research. The literature review process will pave the way for the construction of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes. The empirical phase will be carried out quantitatively and will rely on the qualitative outcomes in terms of the theoretical model which will be constructed. Until such time that the elements and dimensions of the theoretical model are clearly identified, the process of operationalisation of the new measure will not be possible. Further, the item generation and development stages will rely on the literature review phase. Therefore, in the present research, the combination of the two approaches to achieve the research aims is justifiable theoretically and empirically, hence the adoption of a mixed methodology.

1.10 DESCRIPTION OF THE RESEARCH VARIABLES

The variables as set out in the sub-sections below will be investigated in this research.

1.10.1 Independent variables

The general aim of the research is to identify and conceptualise the elements and dimensions of a holistic and integrated theoretical model, and to develop and refine a measurement scale for the effective management and evaluation of occupational learning programmes in the South African skills development context. Therefore, the independent variables are the elements and dimensions (administrative processes, environmental scanning, policy awareness, stakeholder inputs, quality assurance, observation and problem solving, monitoring and evaluation, learning programme design and development, learning programme specifications, occupational competence and strategic leadership) that comprise the effective management and evaluation of an occupational learning programme, as well as the sub-group variables such as age, gender, educational achievement, type of learning programme and occupation.

1.10.2 Dependent variables

The dependent variable in this research is an occupational learning programme. This variable is conceptualised and discussed in detail in Chapter 2 (Skills Development and the Occupational Learning System). The LPME sub-scale dimensions also act as dependent variables that are predicted or explained by the sample sub-group (age, gender, educational achievement, type of learning programme and occupation) which are independent variables.

1.11 VALIDITY AND RELIABILITY

The researcher must put in a concerted effort to ensure that the research process enhances the validity and reliability of the research findings. The sub-sections below describe how validity and reliability will be promoted in this research.

1.11.1 Validity

Validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration (Babbie, 2005). The validity of a study is defined as “the degree to which it measures what it is supposed to measure” (Pallant, 2007, p.7). Kumar (2005) suggests that validity is also about being able to justify every question in a survey tool, and ensuring the questions meet the study’s objectives. The aim of the research design is to plan and structure the research project in such a way that the validity of the literature review and empirical investigation is ensured in terms of the research variables (Mouton & Marais, 1996).

According to Terre Blanche and Durrheim (2002), both internal and external validity are important and desirable for research to achieve its aims and comply with established scientific conventions. For research to be internally valid the constructs must be measured in a valid manner and the data measured must be accurate and reliable. Ensuring validity requires making a series of informed decisions about the research questions, the purpose of the research, theoretical paradigms that are used in the research, the context within which the research takes place and the research techniques used to collect and analyse data (Terre Blanche & Durrheim, 2002). The following types of internal validity, as set out below, will be observed in this research.

1.11.1.1 Face validity

Face validity refers to that quality of an indicator that makes it seem a reasonable measure of some variable (Babbie, 2005). According to Healy and Perry (2000), face validity refers to how well the research design appears to offer a process that will facilitate the data acquisition within the research agenda. A discussion of how this will be applied in the current research will be presented in Chapter 4 (Empirical Study).

1.11.1.2 *Content validity*

Content validity refers to the degree to which a measure covers a range of meanings included within a concept (Babbie, 2005). A discussion of how this will be applied in the current research will be presented in Chapter 4 (Empirical Study).

1.11.1.3 *Criterion-related validity*

Criterion-related validity is the degree to which a measure relates to some external criterion (Babbie, 2005). Healy and Perry (2000, p. 125) define criterion validity as the validity of “generative mechanisms and the contexts that make them”. A discussion of how this will be applied in the current research will be presented in Chapter 4 (Empirical Study).

1.11.1.4 *Construct validity*

Construct validity is the degree to which a measure relates to other variables as expected within a system of theoretical relationships (Babbie, 2005). It testifies how well the results obtained from the use of the measure fit the theories around which the test is designed (Cooper & Emory, 1995; Sekaran, 2003). It is concerned with how well information about the theoretical constructs is measured by the research. A discussion of how this will be applied in the current research will be presented in Chapter 4 (Empirical Study).

The sub-sections below describe how validity and reliability will be promoted in this research.

a) *Validity with regard to the literature review*

The following will be done in this research to ensure validity of the literature review:

- All reference material used will be acknowledged.
- A central research question which is aligned with the purpose of the research will be formulated.
- Existing and relevant theories and models will be used to guide both the theoretical and empirical phases of the research.
- Conceptual descriptions of all relevant concepts and constructs used in the research will be provided as they are seen theoretically and will be used empirically.
- A comprehensive literature search in the library and on the internet will be conducted, using search engines and databases.

- The most recent and relevant literature sources will be used; although classical and contemporary mainstream research sources will also be referred to if they are relevant to the conceptualisation of the constructs of this research.
- The literature search will be aligned to the research topic, the research problem and the research aims.

b) Validity with regard to the empirical study

The following will be done to ensure validity of the empirical phase of this research:

- Established scale development protocols will be followed in developing a new measure to ensure compliance with face, content, criterion and construct validity.
- The research measure will be subjected to a process of expert review before using it for data collection.
- Inputs from the expert review process will be used to refine the measure.
- The psychometric properties of the new measure will be evaluated in terms of construct validity and the researcher will be guided by existing scientific parameters.
- The constructs of this research will be measured in a valid manner.
- Efforts will be made to ensure that the data collected is accurate, and is accurately coded and appropriately analysed to ensure content validity.
- The researcher will ensure that the findings of this research are based on the data analysed to ensure content validity.
- The researcher will ensure that the final conclusions, implications and recommendations are based on the findings of the research.

1.11.1.5 *Reliability*

According to Gillis and Jackson (2002, p. 712), reliability is determined by the “extent to which, on repeated measures, an indicator yields similar readings”. It refers to the ability to show that should another researcher repeat this research, he or she should expect to attain similar results (Emory & Cooper, 1991; Sekaran, 2003). In other words, reliability is concerned with the stability and consistency of measurement during the research process and is central to the replicability of this research in the future (Cooper & Emory, 1995; Sekaran, 2003; Zikmund, 2000). In this research, reliability will be maximised through a series of cross-checks built into the research design (Kvale, 1996).

From a quantitative point of view, a reliable measure is one that provides results that are relatively free of error (Hussey & Hussey, 1997; Schwab, 1999; Zikmund, 2003). Researchers determine the reliability of an instrument by assessing three different types of reliability (Schwab, 1999). First, they measure internal consistency reliability, which refers to the similarity of item scores obtained on a measure that incorporates multiple items. Secondly, they determine the interrater reliability of the measurement process. Thirdly, they examine stability reliability, which refers to the longitudinal consistency of results. In this research, the following will be done to promote internal consistency and interrater reliability of the research and its findings:

- The researcher will observe all the ethical principles that this research has outlined.
- Respondents will be treated anonymously and will be informed of the purpose of the research.
- Respondents will be requested to consent to their participation and will also be free to discontinue.
- Permission to conduct the research will be sought from the target organisations
- The new measure will be reviewed by experts in the field.
- Appropriate statistical techniques that are congruent with the aims of this research will be used to analyse the data.
- Exploratory factor analysis will be conducted on the data to determine the factor structure and the sub-scale dimensions of the new measure.
- The new measure will be rigorously scrutinised for compliance with the psychometric requirements (e.g., Rasch analysis, Cronbach Alpha test for internal consistency).

1.12 UNITS OF ANALYSIS

The broad area of investigation in this research is in skills development, and more specifically in occupational learning. Consequently, the following categories of units of analysis can be distinguished, namely, individuals, groups and organisations. For the purposes of this research, the units of analysis are subgroups, based on age, gender, educational achievement, type of learning programme and occupation. The population and sample of this research is described in Chapter 4 (Empirical Study).

1.13 ETHICAL CONSIDERATIONS

Ethics is a set of moral principles, which refers to the quality of research procedures with regard to their adherence to professional, legal and social obligations to the research

participants (Polit & Hungler, 1995; Strydom, 1998). Babbie and Mouton (2004) emphasise the importance of the management of these ethical principles which describe acceptable and unacceptable behaviour in research. Research integrity is of great importance in any research (Streubert & Carpenter, 1999). The procedures to be followed in this research will adhere to all the ethical requirements that are necessary to ensure ethical responsibility. Ethically guided decision-making serves as the standard and the basis for this research. This research is aimed to contribute to the body of knowledge on training management/human resource development, specifically on occupational learning programmes, and it is therefore theoretically and financially justifiable. To ensure that the research meets the ethical requirements, the following ethical principles will be adhered to:

- The research will be conducted competently within recognised parameters under the guidance of an experienced supervisor.
- Experts in the field of research will be consulted to ensure a scientific research process.
- Both recent and classical sources will be used to analyse and describe the phenomena.
- As many primary sources will be consulted as possible.
- The sources used will be referred to where necessary.
- Appropriate approval will be obtained from organisations who were involved in the research process.
- Informed consent will be obtained from the research participants.
- Anonymity will be assured for research participants where possible.
- Confidentiality will be assured for research participants where anonymity is not possible.
- The researcher will ensure that no physical, emotional or social harm is done to participants.
- Research participants will be informed of further use and protection of the personally identified data during the analysis and dissemination of results.
- The researcher will not interfere with, manipulate or fabricate any data to suit himself.
- An opportunity will be provided for obtaining appropriate information about the nature, results and conclusions of the research by the reporting of the research process and findings in the form of a thesis, conference proceedings and journal articles.

1.14 DELIMITATIONS OF THE RESEARCH

The nature of this research dictates that some limitations of scope have to be set. As the research data will be drawn exclusively within South Africa, the first delimitation is national scope. The second delimitation is the context in which the research will be undertaken, that is, the skills development context. There is no evidence as yet of an empirical investigation of the proposed research problem that has been conducted in South Africa. The findings of this research may not be generalisable across international settings.

Furthermore, in this research no attempt will be made to manipulate or classify any of the information, results or data, based on family or spiritual background. Also not included in any classification process are factors of disability or illness, either physical or psychological. This research is intended as a baseline research that restricts its focus to develop a holistic and integrated theoretical model, and a valid and reliable measure based on the dimensions that comprise a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context. This baseline information will be useful in future for other researchers so they can address other issues relating to occupational learning programmes in particular and skills development in general. The selected research approach is only intended to gather the relevant data that contributes towards the development of a holistic and integrated theoretical model and a valid and reliable measure for the effective management and evaluation of occupational learning programmes in the South African skills development context.

1.15 RESEARCH METHOD

The proposed research will follow a triangulated design that will take place in two phases as outlined below and as depicted in Figure 1.1, and each phase contains a series of steps that will be followed.

1.15.1 Phase 1: Literature review

A theoretical analysis and exploration of literature will be conducted to gain insight into the phenomenon under inquiry. This analysis will take place in the steps as set out below.

1.15.1.1 Step 1: Documents analysis

A review of relevant scholarly articles, research reports and books will be conducted in order to follow the on-going discourse pertaining to the phenomenon under inquiry in this research. This will be followed by an extensive review of policy documents (including relevant legislation) relating to skills development, the QCTO and SETAs. All the constitutions, documents and select pieces of data from SETAs (annual reports, list of registered learning programmes and learners' data) will also be reviewed during this step.

1.15.1.2 Step 2: Conceptualisation of constructs

The major constructs of this research will be conceptualised based on the review in step 1. Furthermore, the processes of management and evaluation of occupational learning programmes in South Africa will be investigated based on SETAs reports and relevant scholarly articles.

1.15.1.3 Step 3: Development of a holistic and integrated theoretical model

The outcomes of step 1 and step 2 will be used to identify the elements and dimensions that are relevant to enhancing effective management and evaluation of occupational learning programmes. Thereafter, the applicable dimensions will be grouped under each element in order to develop a theoretical model. A theoretical model to be developed will be guided by the existing theoretical models which are relevant to the phenomenon under inquiry.

1.15.2 Phase 2: Empirical Study

The development and revision of a draft measure for the effective management and evaluation of occupational learning programmes was undertaken based on the literature review and guided by existing scale development protocols and scientific conventions. Detailed discussion of the steps to be followed during the development of a measure will be presented in Chapter 4 (Empirical Study). The results of validity and reliability tests will be presented in Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). The steps that will be followed during the empirical phase of the research as shown in Figure 1.1 are briefly described below.

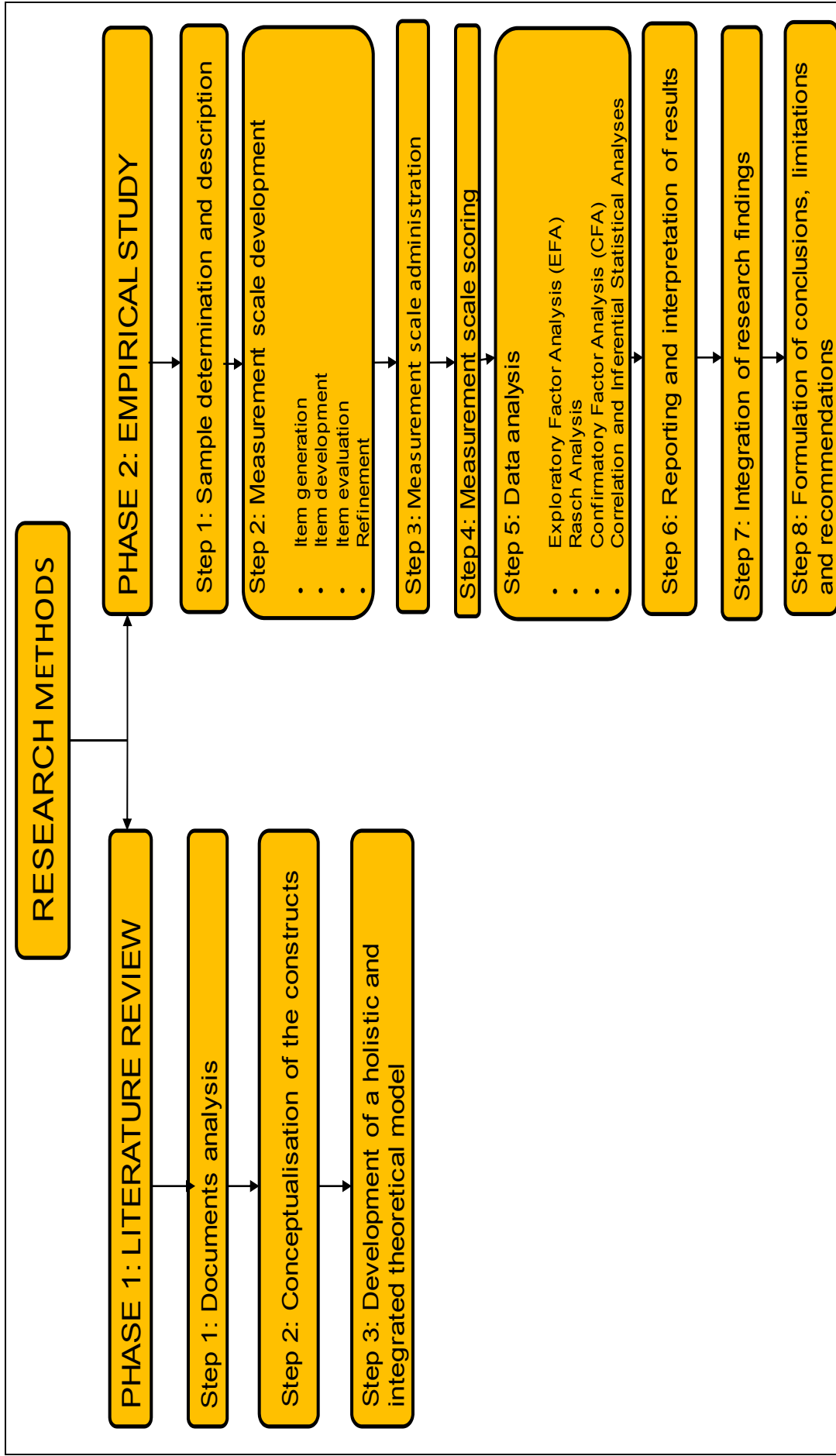


Figure 1. 1. Phases of the research methods followed in this research

1.15.2.1 Step 1: Sample determination and description

The sample of this research will be drawn from a population comprised of skills development professionals and apprentices/learners. SETAs and the South African Board for People Practices (SABPP) databases will be used to determine the sample.

1.15.2.2 Step 2: Measurement scale development

The development of a measurement scale will take place in line with the existing scale development protocols and this will be discussed in detail in Chapter 4 (Empirical Study). The following sub-steps will be followed during the development of a measurement scale:

a) Sub-step 2.1 Item generation

The process of generating items will be guided by the aims of the research to ensure content validity. The literature review phase will be used as a basis for item generation.

b) Sub-step 2.2: Item development

A potential set of items will be identified for inclusion into the measure if they are relevant to the construct under enquiry.

c) Sub-step 2.3: Item evaluation

A pool of items will be evaluated to confirm that they measure the construct under enquiry (Construct validity).

d) Sub-step 2.4: Refinement

In this sub-step, items will be revised if they are not properly worded to enhance content validity. Items will also be examined to ascertain whether they are appropriately structured bearing in mind the target population.

1.15.2.3 Step 3: Measurement scale administration

A draft measurement scale will be administered to a pool of skills development experts for further content analysis and validation of items. The outcomes of this process will be used for further refinement of the measurement scale. After this process, the final version of the

measurement scale will be administered on the target sample. Permission will be sought from the target organisations and respondents will be requested to consent to their participation.

1.15.2.4 Step 4: Measurement scale scoring

The returned questionnaire will be recorded and screened for completeness (missing values and inappropriate responses). Items will be coded in preparation for capturing on a spreadsheet for further statistical analysis.

1.15.2.5 Step 5: Data analysis

The data will be captured on SPSS computer package (Statistical Package for Social Sciences, Version 20) (IBM, 2011) for ease of transfer into other software to be used for statistical analysis, such as Winsteps (Version 3.70.0) (Linacre, 2010) and Analysis of Moment Structures (AMOS, Version 20) (Arbuckle, 2011). The following statistical computations will be carried out:

a) Sub-step 5.1: Exploratory factor analysis (EFA)

In this sub-step, the Kaiser-Meyer-Olkin measure of sample adequacy, the Bartlett's test of sphericity and the principal component analysis (PCA) method of factor extraction will be carried out.

b) Sub-step 5.2: Rasch analysis

The Rasch analysis will be carried out to examine the person/item separation indices, reliability analysis, person-measure targeting, item fit, unidimensionality and item bias.

c) Sub-step 5.3: Confirmatory factor analysis (CFA)

Confirmatory factor analysis will be conducted to confirm the dimensional structure of the LPME scale in terms of its internal consistency reliability, model fit (Structural Equation Modelling (SEM)) and structural equivalence. Prior to these analyses, data will be checked for missing values, outliers and multicollinearity.

d) Sub-step 5.4: Correlation and inferential statistical analyses

Correlational statistical computations such as Pearson product moment correlations and inferential statistical procedures such as multiple regression analysis, test for normality of distribution, and tests for significant mean differences will be carried out.

1.15.2.6 Step 6: Reporting and interpretation of results

The results of this research will be reported and interpreted in Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

1.15.2.7 Step 7: Integration of research findings

The integration of both the theoretical and empirical findings of this research will be presented in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

1.15.2.8 Step 8: Formulation of research conclusions, limitations and recommendations

The conclusions, limitations and recommendations of this research will be presented in Chapter 7 (Conclusions, Limitations and Recommendations).

1.16 CHAPTER LAYOUT

This section provides a conceptual outline of the chapters of this research.

Chapter 2: Skills Development and the Occupational Learning System

This chapter discusses the global models for skills development and the skills development systems in other countries, including South Africa. Furthermore, the chapter discusses the South African occupational learning system, including its elements, its historical evolution and reforms that led to its introduction. Towards the end, the chapter provides theoretical integration based on experiences of different countries. The chapter ends with a summary.

Chapter 3: Training Management and Evaluation Models

This chapter discusses the theory and models pertaining to training management and evaluation. Various models of quality management and training evaluation are discussed.

The theoretical integration is provided as well. The chapter discusses the elements and dimensions of a holistic and integrated theoretical model that has been developed, followed by a chapter summary.

Chapter 4: Empirical Study

This chapter describes the empirical aspects of this research. Firstly, the sample is described and the research design followed is discussed. Secondly, the process followed in the development of a research measure (Learning Programme Management and Evaluation - LPME) is described. Thirdly, the methods followed during both the exploratory and confirmatory phases of the research are discussed. The chapter ends with a summary.

Chapter 5: Research Results: Exploratory Factor Analysis

This chapter presents and interprets the results of exploratory factor analysis. It outlines the process followed during factor extraction as well as a detailed presentation of the Rasch analysis results. The Rasch analysis results include person/item separation indices, reliability analysis, person-measure targeting, item fit, unidimensionality and item bias. The chapter concludes with a summary.

Chapter 6: Research Results: Confirmatory Factor and Inferential Analyses

This chapter presents and interprets the results of confirmatory factor and inferential analyses. These results include the test for internal consistency reliability, intercorrelations, confirmatory factor analysis (structural equation modelling), structural equivalence, multiple regression analysis, test for normality of distribution and tests for significant mean difference. This chapter also provides an integration of the findings in line with the research aims and research hypotheses. In other words, the interpretation focuses on whether or not the empirical research aims were achieved, and whether or not the research hypotheses were supported by the findings. The chapter concludes with a summary.

Chapter 7: Conclusions, Limitations and Recommendations

In this chapter, conclusions are drawn based on the findings and aligned with the aims of the research. The limitations of the research are presented. Finally the recommendations for future research are proposed and an evaluation of the research is done. The chapter ends with a summary.

1.17 CHAPTER SUMMARY

This chapter presented the background to and motivation for this research. The research problem and questions were outlined, followed by the research aims, propositions and hypotheses. The potential contributions of this research in theoretical, methodological and practical terms were described. A discussion of the paradigmatic stance and the research approach followed was presented. Towards the end, the chapter provided ethical considerations and the delimitations of the research. Finally, the methods followed and an outline of subsequent chapters in this research were presented.

The next chapter (Chapter 2: Skills Development and the Occupational Learning System) discusses the theory pertaining to skills development and the occupational learning system.

CHAPTER 2

SKILLS DEVELOPMENT AND THE OCCUPATIONAL LEARNING SYSTEM

This chapter addresses the first research literature aim, namely: *to conceptualise the construct of the occupational learning programme*. The global skills development models were first discussed and the skills development systems of other countries, including that of South Africa, are highlighted. The South African occupational learning system, including its origins and the reforms that led to its introduction, are discussed. The elements of the South African occupational learning system are outlined in this chapter. The chapter also reviews the experiences of different countries in the implementation of the apprenticeship system. The implications of these experiences for the South African occupational learning system are examined. The chapter concludes with a summary.

2.1 GLOBAL MODELS OF SKILLS DEVELOPMENT

The modern workplace is characterised by the increasing need to renew approaches to workforce skills development in order to address the current skills shortages in an environment with an ageing workforce, declining numbers of youths and increasing competition for workers with the right skills (NCVER, 2008). In September 2001, the so-called "Declaration on skills development" was formulated and ratified at the Interlaken Conference on "Linking work, skills and knowledge" held from the 10 to 12 September in Switzerland (Rwambulla, 2003). According to Rwambulla (2003), one of the purposes of the declaration was to send a strong signal to all stakeholders globally that skills development was a key development issue.

Clearly, improving the national skills set is a vital policy issue for all countries (Kuruville, Erickson & Hwang, 2001). The reason for this is that in most if not all countries, there are patterns of underinvestment in skills (Brunello & De Paola, 2004). This underinvestment has been attributed in different countries to a range of factors, including the following (Keating, 2009):

- structural imperfections in labour markets and resultant disincentives for investments in skills;
- dependence upon immigration;
- disincentives caused by the poaching of skilled workers among enterprises;
- the education and training background of employers;

- the lack of wage incentives for workers to invest or cost disincentives for employers to pay for skills;
- the short-term characteristics of the finance markets that discourage long-term investments in skills;
- a trend towards small firm sizes;
- overregulated labour markets; and
- voluntarism in the absence of legislated compulsion to invest in training and cost pressures in short-term product cycles.

The underinvestment in skills is largely influenced by a wide variety of labour market and industry structures and cultures in different countries, as well as different structures and cultures of formal education and training systems. Raffe (2006) on the one hand, argues that industry and labour markets and education and training systems have some degree of interrelatedness. Offe and Ronge (1981), on the other, submit that these systems are partially autonomous of each other because they also have partially autonomous relationships with both the state and civil society. Consequently, countries around the world have used diverse and often fairly dynamic strategies to influence their skills markets. For example, countries have:

- Induced employers to invest in skills development through the imposition of levies or taxation incentives or have adopted a voluntary approach and encouraged a social commitment.
- Used labour market regulations to force industry to employ skilled labour, or alternatively, used deregulated labour markets to allow greater industry flexibility and labour market mobility as a means of encouraging the hiring of skilled labour.
- Planned the supply of skills through formal training systems or adopted a more market-driven approach as a means of directing the supply of skills (Keating, 2009, p. 3).

The challenge that remains, however, is to explain and reconcile the apparent contradictions in strategies used by and within different countries. Nevertheless, in the age of globalisation, with its high premium on labour productivity and the supply of and industry match for skills, there should be some common strategies for the supply of skills emerging from countries, albeit mediated by local circumstances.

Ashton and Sung (2000) highlight two major models for developing skills in industrialising nations, namely the Anglo-Saxon and the Asian Tigers models. In a book published by the

International Labour Office (ILO) (Ashton & Sung, 2002), they subsequently highlighted a third, the Germanic model, which is also included in the discussion below. This is in acknowledgement of the fact that much of the debate around the world today concerns the most appropriate framework within which skills development should take place. The debate is polarised between those who advocate a “market approach or the Anglo-Saxon model; those who favour a social consensus or social partnership or the Asian Tiger’ model; and those who champion the Germanic’ model (ILO, 1998). The sub-sections below discuss each of these three models of skills development.

2.1.1 The market approach or Anglo-Saxon model

The market approach or Anglo-Saxon model is based mainly on human capital theory (Becker, 1964) which suggests that because individuals benefit from general (or transferable) training, and companies benefit from more company-specific training, the arrangements for each should be handled separately (Mincer, 1989). Individuals should be responsible for undergoing general training, while companies should provide specific in-house training. In this model, the labour market is the principal mechanism in matching supply skills with the demand for skills (DTI, 2006). For example, if there is a skills shortage in IT, then companies that required these skills will pay a premium for them. Hence a larger number of people will be attracted to the industry and the excess demand will be eliminated. The Anglo-Saxon model is suited to countries in which the process of industrialisation has been in operation for an extended period of time (Ashton & Sung, 2000) and in which there is an efficient labour market.

The market approach is typified by so-called “Anglo-Saxon” nations such as the USA, Canada, the UK, Australia and New Zealand, even though there are variations between them in the way skill development activities are undertaken (Crouch, Finegold & Sako, 1999; Middleton, Ziderman & Van Adams, 1993). The principal argument in favour of this approach is that it maximises the choices open to individuals instead of placing institutional pressure on employers to provide training for all their workers (Hall & Lansbury, 2006).

According to this model, employers have autonomy in both the range of working practices and the way in which they are introduced (Ashton & Sung, 2002). This means that new practices such as teamwork, performance-based pay and, most importantly training, are seen as being part of the managerial prerogative. Trade unions do have an influence on the level of managerial discretion, but essentially, training is voluntary. This leaves the government little scope for action and the role played by the government is thus only to

intervene in market failures such as unemployment and to encourage employers and individuals to voluntarily enhance skills through programmes such as “Investors in People” (Ashton & Sung, 2000).

Arguably, however, this model has a number of drawbacks. Firstly, there is a delay between the point of excess skills supply or skills demand and subsequent equalisation. Anglo-Saxon countries are therefore invariably confronted by a skills shortage at the peak of a business cycle, which creates a bottleneck in the labour market, restricting the process of economic growth (Ashton & Sung, 2000). According to Hall and Lansbury (2006), this bottleneck tends to perpetuate skills shortages when there is a buoyant economy. Consequently, Anglo-Saxon countries fail to adopt a long-term approach to maintaining and enhancing workforce skills.

The skills shortages experienced at the peak of a business cycle may be prolonged, especially in countries with limited access to education or, for whatever reason, in which the market does not perform optimally. Such a situation will cause an increase in unemployment or underemployment in times of an excess supply of skills, and companies may not be able to find competent employees in times of excess demand. Furthermore, companies are prone to retrench workers during economic recessions or tolerate high labour turnover in boom times instead of seeking to retain skilled workers on the basis that they have invested in their development (Hall & Lansbury, 2006).

Secondly, there is no encouragement for the development of specific soft skills such as planning, numerical and communication skills (Ashton & Sung, 2000) because employers focus only on job-related skills. Ashton and Sung (2002) comment that when financial markets generate pressure on companies to maximise immediate returns, such companies are more likely to dismantle costly training programmes in order to increase short-term profits, and this invariably reduces the supply of skills in the future.

Thirdly, no comprehensive national strategy has been established in countries that follow the Anglo-Saxon model to ensure that comprehensive skills development is provided for the workforce as a whole (Hall & Lansbury, 2006). Furthermore, firms tend to be driven by short-term pressure and are more likely to be willing to pay high wages for those with skills in demand instead of investing in longer-term skills development. This may result in widespread poaching by the so-called “free-riding” employers (Acemoglu & Pischke, 1998; 1999; Crouch, 2005). In the absence of institutions that serve to resolve (or ameliorate) the

free-riding dilemma and other conditions where markets operate imperfectly, under provision of training occur.

The market model therefore leads to a fragmented approach to skills formation in which each of the parties tends to act independently. Nevertheless, there is clear evidence that most economies that have pursued a market approach have experienced chronic underinvestment in skills, persistent but poorly understood skills shortages and continuing strong growth in lower-skilled, lower-paid employment without clear paths or development opportunities (Hall & Lansbury, 2006).

Problems aside, this model has proven to be relatively successful in the UK, Australia and the USA. The skills base in the UK, for example, showed continuous growth throughout the 1990s, leading some analysts to speak of a "skills revolution" (Ashton & Sung, 2000). Australia, in particular, has been able to overcome the bulk of the above-mentioned drawbacks, and Ashton and Sung (2002) recognise that country as the most successful proponent of this strategy. The next section discusses the social partnership approach to skills development.

2.1.2 The social partnership approach or the Asian Tiger model

The Asian Tiger model is the converse of the Anglo-Saxon model. It is characterised by a high level of government involvement in matching the supply of and demand for skills in the labour market (DTI, 2006). This is relevant for countries that need to industrialise in a shorter period because it supplements the operation of the market. This strategy made it possible for the Asian Tiger countries to move from low- to high-skill economies, that is, higher value-added economies.

The Asian Tiger model is a consensus and partnership-driven approach to skills development and requires strong cooperation between the social partners (employers, trade unions and government) at company, industry or national level (Hall & Lansbury, 2006). In instances where this approach is adopted, the objective is to develop a strong skills base across all sectors of the economy. The emphasis is on shared training schemes and pooled resources between companies, subsidised by government training schemes.

In the Asian Tiger model, the government fulfils the role of driving skills development by matching the demand for and supply of skills, using policy to manipulate both. With regard to generating demand for skills, Ashton (2005) explains how Singapore initially operated

according to a low-skill strategy, taking advantage of its relatively low labour costs, and then moved to a high-skill economy after achieving full employment and an increase in labour costs. At both points, the government used policy to create an attractive environment for multinational corporations (MNCs) to invest in Singapore. In other words, the corporations that initially required low skills were incentivised to invest, and once labour costs began to increase, they implemented policy to attract MNCs that required a higher skills level.

At the point of full employment, which began to push up labour costs, the Singapore government had two options: it could either implement measures to control the cost of labour or move to a more value-added strategy. South Korea adopted a similar policy but instead of attracting MNCs, it formed its own giant organisations referred to as *Chaebol* (DTI, 2006).

Taiwan, however, used a combination of state-sponsored organisations (which were later privatised) and small medium-sized enterprises. The common factor in the three strategies is that the three governments were able to facilitate the demand for skills. However, this is pointless unless there is a corresponding change in the supply of skills. In all three countries, the supply of skills was tightly controlled to ensure that the skills base was developing in line with the government's strategy. Below is a summary of the initiatives implemented over an extended period in the above-mentioned three Asian countries (Ashton, 2005, p. 26; Ashton & Sung, 2000; Ashton & Sung, 2002):

- (1) All three countries centralised the control of education.
- (2) There was increased government expenditure on education.
- (3) Academic streaming was introduced (Singapore).
- (4) The minimum number of school years increased to ten years in Korea, nine years in Taiwan and ten years in Singapore.
- (5) There was a focus on vocational training in all three economies in the form of vocational secondary schools, and later technical and technological higher learning centres. This provided the initial (low-skill) base of artisans for the labour-intensive manufacturing, but the institutions were subsequently expanded and developed in order to focus on higher value-added skills.
- (6) All three limited the entrance to academic institutions, enabling the governments to generate skills in the areas in which they were required. Even when the "flood gates" to the universities were opened in the 1980s, the number of mathematics, science and engineering students was still strictly controlled. There is a strong need for science and engineering students in a higher-value added economy in these countries. In 1984, for example, 47% of Taiwanese undergraduates, 70% of master's students and 74% of

PhD students were enrolled in the fields of science and engineering (Ashton & Sung, 2000).

- (7) Companies were encouraged to provide training by means of government subsidies, as well as consultants who were also subsidised by the government.
- (8) Singapore discouraged the use of low-cost labour by imposing a levy on companies that utilised unskilled labour and using that money to fund other training initiatives.

However, for the system to work, all three governments established “super ministries”, which ensured that the specific demands of the country’s industries informed all decisions about the number of young people leaving the educational system at each level, as well as the types of skill to be acquired (Ashton & Sung, 2000). In their study, Ashton, Brown and Lauder (2003) expanded this concept of government intelligence to skills development. They highlighted Singapore’s Economic Development Board (EDB), which has outposts throughout the world and whose purpose is to identify changing trends in skills, technology and organisational practices required to compete in the chosen clusters and then feed that into their system. The fact remains that government administration has to be incredibly efficient to maximise this strategy.

The national systems of training have been criticised as being too expensive, difficult to administer and not sufficiently sensitive to the needs of individual enterprises (Crouch, 2005). However, the lack of a national approach makes it more difficult for employees to move across industries and to relocate during an economic recession. For these reasons, a national approach appears to be more effective in integrating the interests of the various parties or stakeholders (Hall & Lansbury, 2006). The ILO’s World Employment Report (ILO, 1998) outlines three advantages of the consensus and partnership-driven approach to skills development.

First, the social partners have incentives to use their influence in joint regulatory bodies to broaden the scope of training. This can help to correct market failures in relation to employer-initiated training, particularly underinvestment in occupational skills that are likely to be more general and portable.

Second, there is likely to be greater commitment to training goals, which employers may seek to evade in other circumstances.

Third, employer bodies and trade unions are likely to provide useful training services to their members, which support and add value to jointly supported skills development activities.

However, the declining levels of membership and coverage among both employer organisations and trade unions in many countries may weaken the support for tripartite approach to skills development.

2.1.3 The Germanic model

The Germanic model lies somewhere between the two previously discussed systems (DTI, 2006). Under this model, the market drives skills development to some extent, but an extensive legal framework for industrial relations and training is in place to limit the discretion of managers (Ashton & Sung, 2002). This includes a form of company finance derived from cross-holdings and house banks, which places pressure on companies to secure the long-term survival of the organisation (Ashton, 2005).

In addition, industrial relations institutions such as works councils are involved in discussions about, say, staff reductions, and thus ensure that there is always a need for employers to adopt a long-term view on business. In the field of training, employers and trade unions are bound to enforce the apprenticeship system, which ensures high levels of skills formation and a sharing of the costs of training (Ashton, 2005).

This model has two important points, as explained below.

- (1) The first point has to do with ensuring that all stakeholders are represented in business decisions. Hence managers have less freedom to try to maximise short-term profits at the expense of human resources. Ashton and Sung (2002) argue that the legislative framework has been instrumental in generating trust between workers and employers by placing constraints on the actions of the managers, which leads them to be as concerned with the welfare of their employees as the returns to the shareholders. Similarly, the South Korean *chaebol* ensured employees' lifetime employment, which meant that there was continuous training and development (Ashton, 2005).

The legislation in Germany seeks to fulfil a similar role for all companies in the country. In other words, because there is a culture of trust and a long-term orientation, companies are more likely to invest in developing their workforce. The drawback is that it is not that flexible because state, employers and unions are required to reach consensus on the issues. For example, it took relatively long for the new ICT trades to be incorporated into the apprenticeship system (Ashton & Sung, 2002).

- (2) The second point refers to the German apprenticeship model. Employers and unions are bound together to enforce the apprenticeship system, which ensures high levels of skills formation that are relevant to the industry, and to share the costs (Ashton, 2005). Many countries, including South Africa and Singapore, have implemented variations of the German apprenticeship model.

In the light of the strength and weaknesses of the three global models discussed above, it is worth noting that each nation in the world has its unique challenges and circumstances, but the long-term solution to all of these is skills development. All national systems have their peculiar qualities, but the question of skills development is relevant to all types of economies, both developed and developing. Table 2.1 provides a summary of the key aspects of each model. In the following sections, the skills development systems of two developed countries (Singapore and Australia) and two developing countries (India and South Africa) will be discussed. These countries have made a considerable effort in putting together a comprehensive system to develop the skills of their workforce.

Table 2.1
Comparison of Global Skills Development Models

MODELS	ANGLO-SAXON MODEL	ASIAN TIGER MODEL	GERMANIC MODEL
Countries	Australia, New Zealand, Canada, the USA and the UK	Singapore, South Korea and Taiwan	Germany, Switzerland, Austria and Denmark
Main characteristics	<ul style="list-style-type: none"> The focus is primarily on the labour market to balance the supply of and demand for skills in the economy. The assumption is that the labour market could deliver a high-skills society. Individual employees are responsible for acquiring general training, while companies provide specific "in-house" training. There is reliance on user choice and contestable funds for skills development. Government only interferes when there are market failures (say unemployment). 	<ul style="list-style-type: none"> This model adopts a view that the development of skills and consequently the economy can be accelerated by means of the government controlling the supply of and demand for skills. An active labour market policy exists, which involves all the social partners (government, trade unions and employers) in both dialogue and decision-making concerning the design and delivery of skills development system. 	<ul style="list-style-type: none"> Skills development activities are to some extent market driven. All participants (government, unions and employers) are tightly integrated into the process of determining the need for and delivery of qualifications and training for various occupations in the different industry sectors.
Government's role	<ul style="list-style-type: none"> Government only interferes when there are market failures (say unemployment). 	<ul style="list-style-type: none"> State authoritarianism prevails in that government is highly involved in matching the supply of and demand for skills in the labour market. 	<ul style="list-style-type: none"> Government provides an extensive legal framework for industrial relations and training in order to limit the discretion of managers. This is a planned model but one that integrates levels of government and the social partners and links the institutional structures of vocational education and training with the economy. Trade unions enjoy legal rights to participate in training decisions.
Trade unions' role	<ul style="list-style-type: none"> The influence of trade unions is at the level of managerial discretion. 	<ul style="list-style-type: none"> Trade unions play an active role and are an important partner in skills development. 	<ul style="list-style-type: none"> Trade unions enjoy legal rights to participate in training decisions.
Weaknesses	<ul style="list-style-type: none"> There is often a delay between the point of excess skills supply or skills demand and the subsequent equalisation. The development of specific soft skills such as planning, numeracy and communication is not encouraged in this system because employers focus mainly on job-related skills. There is a lack of a comprehensive national skills development strategy, resulting in a fragmented approach to skills formation. 	<ul style="list-style-type: none"> There is limited applicability in a larger and more diversified economy and in a liberal democratic social and political climate. Government inefficiencies may render this approach ineffective. This approach may be too expensive, difficult to administer and not sufficiently sensitive to the needs of individual enterprises. 	<ul style="list-style-type: none"> The system and especially the supporting labour market structures are regarded as too rigid as economies become more globalised and knowledge based. It lacks flexibility in the types and locations of skills. It can have a negative impact upon the quality of education and weaken the platform for the development of high-order and generic skills. This highly planned and pathways-based system is not conducive to the development of the generic skills that underpin flexibility and innovation in the workforce. It relies heavily upon complex and multiple planning functions that lack flexibility. There is a longer process of partial obsolescence of the training system that is oriented to the formation of mostly occupational and middle-level skills in the context of the growing importance of higher-level skills.
Strengths	<ul style="list-style-type: none"> Stakeholders adopt a voluntary approach to skills development in order to meet their skills needs. There are unlimited opportunities and higher wages for highly skilled employees and those engaged in further training and development. 	<ul style="list-style-type: none"> It has the capacity to increase the demand of skills and in particular to increase the skills levels demanded. There is a strong skills base across all sectors of the economy. There is a comprehensive national system of skills development, which effectively integrates the interests of all social partners. Social partners have incentives to use their influence in joint regulatory bodies to broaden the scope of training. There is greater commitment to training goals, which employers may seek to evade in other circumstances. Employer bodies and trade unions are likely to provide useful training services to their members, which support and add value to jointly supported skills development activities. 	<ul style="list-style-type: none"> It has the ability to produce a large volume of intermediate skills. The historical strength of the system is its base of shared training culture. All stakeholders are represented in business decisions, thus limiting managers' freedom to maximise short-term profits at the expense of human resources. Employers and trade unions are bound together to enforce the apprenticeship system which contributes significantly to intermediate skills formation.

2.2 SKILLS DEVELOPMENT SYSTEMS

Although there is agreement that most developing nations need to focus on skills development in order to meet the challenges in and from international markets, there is considerable disagreement regarding the strategies nations should follow to upgrade workforce skills (Kuruville & Chua, 2000). The next sections provide country-specific details of the strategies followed to develop workforce skills. The countries discussed are Singapore, Australia and India.

2.2.1 Singapore

Singapore is a small country with virtually no natural resources (Ashton, 2005; Osman-Gani, 2004). Arguably, this country has become one of the most developed countries in Asia primarily because of its strong emphasis on developing human resources and for continuously making significant investments in its human capital. Perhaps more than any other country, Singapore has undergone a deliberate, planned and successful process of economic development designed to place itself strategically in a global economy (Keating, 2009). Today, this country is a modern city-state, an advanced developing economy and global centre for industry, business, finance and communications. The country is a unique case that exemplifies the benefits of national human resource development policies and strategies. Consequently, its steering of its skills development system has been unusually centralised and strongly linked to its industry development strategies (Keating, 2009).

Singapore follows a social partnership approach to skills development (Pattayanunt, 2009) based on cooperation between employers, trade unions and government (Osman-Gani, 2004). According to Osman-Gani (2004), Singapore's policy of workers' training and retraining to upgrade them with skills for the economic restructuring in the early 1980s was possible only with the acceptance and cooperation of the unions. This country is the best-known prototype of a nation that has consistently succeeded over time to upskill its workforce (Kuruville & Chua, 2000). The skills development system surely contributes to Singapore's consistent top ranking in comparative surveys of human resource development (Beaton, 1996; BERI, 1999; IMD, 2000; World Economic Forum, 2000). The country has had the highest per capita expenditure on education in Asia over the past two decades (World Development Report, 1997; Osman-Gani, 2004). Studies of skills development in Singapore suggest five key features that characterise this country's successful skills development system (Kuruville, 2007, p. 130).

The first is the tight coupling between economic development strategies and skills development policies. The government was able to mould its national human resource policy to provide the skills necessary for each phase of economic development (Kuruvillea *et al.*, 2001). Upskilling thus became a continuous and expanding process based on economic development needs. A key element facilitating this linkage is the institutional structure that places the EDB at the centre of the effort in that it is responsible for both economic and skills development (Ashton *et al.*, 2003; Kuruvillea & Chua, 2000; Kuruvillea *et al.*, 2001). This mechanism allows the linkage to be tightly coupled. This is in sharp contrast to the experience of most developing nations, where the responsibility for economic development rests with the economics or commerce ministry while responsibility for skills development rests with the education ministry, and there is often little interaction between the two.

The skills and technology transfer model is the second characteristic of the Singapore system. This model effectively linked skills development to foreign investment and private sector participation (Kuruvillea & Chua, 2000). It provides significant incentives for foreign investors to establish training centres in collaboration with the state, while guaranteeing them the right to hire the training centre graduates (Kuruvillea, Erickson, & Hwang, 2002). This ensures that foreign investors do not face a skills shortage in a tight labour market by giving them some control over the supply of skilled people and incentives such as land, buildings, tax relief and, in some instances, preferable market access and licensing (Kuruvillea *et al.*, 2001). This approach of cost sharing with foreign investors and the Singapore government (through the EDB) was successful not only in generating skills in the short run, but also in creating centres of training for transferable skills (or general human capital) by harnessing foreign companies' unique expertise.

The third characteristic of the Singapore system was the creation of the Skills Development Fund (SDF) in 1984 (Kuruvillea, 2007; Kuruvillea *et al.*, 2001; Osman-Gani, 2004). To date, this institution has been touted as a model for many other countries, including South Africa. The essential element of the SDF system is that it represents the government's efforts to pass on responsibility for skills upgrading to the private sector (Kuruvillea & Chua, 2000). The SDF legislation requires employers to contribute 1% of the gross salary of all employees earning more than S\$1 500 per month to the skills development fund and allows them to recoup 80% of their contribution by requesting training grants for skills development (Kuruvillea, 2007; Kuruvillea *et al.*, 2002). Companies could apply for grants to train workers in order to buy more modern equipment, expand or establish training facilities or provide training overseas. The training grants are structured to provide training for skills in demand. Companies with training plans covering over 50% of the workforce can receive larger grants, but companies

continuing to use low-skilled workers in low-cost operations are penalised by increasing their labour costs. The introduction of the SDF EasyNet, a web-based application system, enabling companies to complete all SDF transactions (including grant applications), has reduced the turnaround time of applications for grants from seven to three weeks (Kuruville & Chua, 2000).

However, in order to encourage the use of the SDF, National Training Awards were introduced, which recognise companies' commitment to workforce training as determined by satisfying nationally established training criteria for a particular year (Kuruville *et al.*, 2002). The EDB and a tripartite advisory council, with representatives from the government, industry and trade unions, manage the SDF. The council establishes the guidelines for SDF application approvals, formulates the terms and conditions for grants and loans, determines the amount of financial assistance to be awarded to the applicants, and handles appeals from rejected applicants.

Attention to long-term skills development through the reform of education policy is the fourth characteristic of the Singapore system. The government has continuously improved the education system to meet Singapore's human resource needs (Kuruville, 2007). In 1979, the government introduced the new education system to improve the quality of primary school. It also revamped education policy again in 1990 to increase the creativity in school children by changing the structure of examinations and adding project-based methods of evaluation, more research and term papers, and other methods to encourage learners to "think outside the box" (Kuruville, 2007; Kuruville *et al.*, 2002).

The final and perhaps most important characteristic of the Singapore system is the lines of communication and structure of interaction that enable the system to work efficiently. The EDB under the Ministry of Trade and Industry (MTI) became the architect of the technology transfer model. The EDB works with other agencies such as the Productivity and Standards Board (PSB), the Institute of Technical Education (ITE) and other industry-specific bodies such as the Precision Engineering Institute (PEI), to meet the skills demands of foreign investors (Kuruville *et al.*, 2002).

The National Manpower Council (MNC) facilitates interaction between the MTI, the Ministry of Education and the Ministry of Manpower, allowing them to coordinate their work (Kuruville, 2007). The NMC retains the overall responsibility for matching demand for and supply of skills in the economy. The PSB focuses on productivity improvements in industries and companies and points those companies in the direction of appropriate skills training

institutions (Kuruvillea *et al.*, 2001; 2002). Owing to a strong tripartite system in Singapore, employers, labour and government representatives sit on the boards of most of these public institutions and this provides a channel to keep the training and skills development programmes focused and relevant. The strong coordination of administrative departments, the variety of institutions and policies included in the system and the feedback loops built into the process suggest a national and coordinated effort to improve workforce skills in Singapore.

In 2003, Singapore established the Workforce Development Agency (WDA) (Osman-Gani, 2004), whose mandate was to develop national standards for Workforce Skills Qualifications (WSQ). The WDA funds a large number of centrally designed and tightly targeted programmes for employers and workers (WDA, 2010). The WSQ is a national credentialing system to train, develop, assess and recognise individuals with the competencies required by companies (Singapore, 2010). Based on the national standards developed by the WDA in collaboration with various industries, WSQ comprises industrial/sectoral frameworks.

The launch of the WDA was followed by the implementation of the Employment Skills System (ESS) in 2004. In 2005, the Singapore WSQ system was launched. This system comprised three frameworks, namely the Retail Framework, the Financial Industry Competency Standards Framework and the Training Framework. Industry players, training institutions and unions work together in the Industry Skills and Training Council (ISTC) to identify the skills required and develop each industry-specific WSQ (Singapore, 2010).

A strong quality assurance framework underpins the WSQ. From competency standards development, training providers' accreditation to awarding WSQ qualifications, stringent criteria are applied to ensure the best standards of delivery. By the year 2006, five WSQ sectoral frameworks had been developed, covering tourism, food and beverage, precision engineering, landscape and service excellence. During the same year, the first Continuing Education and Training (CET) centre was established, namely the Singapore Institute of Retail Studies (SIRS). Ten WSQ frameworks were developed in 2007 covering a wide variety of professional fields such as aerospace, security, healthcare support and trade-specific workplace safety and health for marine workers (Singapore, 2010).

During 2008 and 2009, the prime minister announced the CET master plan; the number of CET centres doubled from 19 to 42; about 96 new companies adopted the WSQ for their in-house training; and three National CET Institutes were established (Singapore, 2010). There are currently 48 CET centres all over Singapore delivering WSQ frameworks. Some 280 000

workers have benefited from WSQ quality training, with 671 216 Statements of Attainment (SOAs) issued. In 2009, there were 24 WSQ frameworks in Singapore which were recognised by the industries for enhancing the competitiveness of the workforce. For each framework, an ISTC is set up to drive the development and validation of skills standards, assessment strategies and training curriculum for the industry (Singapore, 2010). The discussion below focuses on the Australian system.

2.2.2 Australia

According to Hall and Lansbury (2006), Australia's approach to training and skills development has traditionally, and appropriately, been classified as an example of a market approach. The country followed the traditional system of Vocational Education and Training (VET) which was based on the regulation of a relatively narrow range of traditional apprenticeships with off-the-job training being provided by state-owned and operated Tertiary and Further Education (TAFE) colleges. Generally, post school, non-university education and training was left to the market.

However, towards the end of the 20th century, Australian trade unions started agitating for the stronger recognition of skills and skills development pathways for employees outside the traditional skilled trades (Hall & Lansbury, 2006). This progressive intent of skills development initiatives was taken over by the increased aggressive neoliberal reform agenda pursued by employers at that time. While the unions focused on the architecture of the new training and skills system, Australian employers were busy taking advantage of the opportunities afforded by labour market deregulation and industrial relations decentralisation (Hall & Lansbury, 2006).

Training clauses in collective agreements came to increasingly resemble vague statements, while employer expenditure on structured training stagnated and then started to decline (Hall, Buchanan & Considine, 2002). Skills formation in the traditional trades was severely compromised by the collapse of the apprenticeship system, precipitated by a combination of global competitive pressures on Australian manufacturing and the withdrawal of state instrumentalities from their traditional role as sponsors of large numbers of apprentices (Toner, 2003).

According to Buchanan, Watson and Briggs (2004), the Australian government introduced a number of key reforms in response to calls for increased flexibility in the skills development system. These include, *inter alia*, encouraging competition between private training providers

and TAFE colleges and vocational training institutes; a real-term reduction in funding for TAFE; the introduction of flexible "new apprenticeships" that could be completed on the job; and the introduction of competency-based training with highly flexible training packages (Buchanan *et al.*, 2004).

However, because of this recent history, the training and skills development systems in Australia are in a difficult predicament. According to Mitchell (2009), Australia has a poor record in skills formation. This view supports an earlier finding by Hall and Lansbury (2006) that Australian employers continue to report fairly pronounced skills shortages. For example, in 2004, the Australian Industry Group called for 21 000 extra skilled trades people and the Australian Chamber of Commerce and Industry claimed that 25% of the employers that were surveyed reported problems in attracting apprentices. The Business Council of Australia has referred to a "widening chasm between VET sector policies and practices and companies' skills development needs" (Loble, 2005).

Skills development is a challenge that Australia, along with other countries in the Anglo-Saxon and neo-liberal mould, are clearly failing to meet (Mitchell, 2009). There is clear evidence that the success of societies with high skills development capacity is underpinned by institutional arrangements that place national, collective interests at the forefront. According to Mitchell (2009, p. 5), high-skills countries such as Germany, Japan and Singapore have institutional arrangements, which include a significant role for the state in creating the social underpinnings of high skill formation, including the following:

- Social cohesion and cooperation between societal players.
- Value-adding instead of competing on the basis of cost reduction.
- Continuous investment in new skills, particularly communication and problem-solving skills that support collaboration and innovation.
- Coordination to produce system coherence.
- High skills diffusion throughout the labour force as opposed to a polarisation of high and low skilled workers.
- Social inclusion in the benefits of a highly skilled society.

Australia performs poorly in most of these areas (Mitchell, 2009). Successive Australian governments and employer bodies have undermined high skills formation for over 30 years by their efforts to minimise the size and role of the state (Mitchell, 2009). The neoliberal era has been defined, in part, by the increased precariousness of work and the centrality of an

active employment strategy, which has undermined the development of institutions conducive to high skills development. However, in response to the problems and weaknesses of the current skills development system in Australia, at least some policy makers are considering alternatives to the virulent market approach that has characterised training and skills policy over the past two decades (Hall & Lansbury, 2006). User choice, flexible traineeship, workplace-based training and competency-based training have not provided a solution.

It is apparent that the problems confronting the skills development system in Australia are complex and that the solution does not lie simply in fine-tuning the formal VET system. The problems are caused by the changing role of the state, the changing role of and demands placed on the community sector, changing demographics and educational experiences impacting on the nature of labour supply, and perhaps most critically, the changing nature of labour demand – especially the ways in which companies are sourcing, developing and deploying skills (Buchanan & Hall 2003).

Mitchelle (2009) strongly indicates that a National Skills Development (NSD) framework should be created to address the skills problem facing Australia. Accordingly, most of the Australian workers who are underutilised have relatively low education and skill levels. Mitchell (2009) also mentions that the current skills will have to be updated to meet the challenges and requirements of the newly emerging green industries in Australia.

While many of the policy problems highlighted above may well be amenable to a series of interventions based on a social partnership approach, it is currently highly unlikely that Australia will revert to a social partnership approach at national level because of weakened trade unions, fragmented employer organisations and a conservative government (Hall & Lansbury, 2006). The political conditions for a viable level of cooperation between the social partners in Australia are lacking. The next section deals with the Indian system.

2.2.3 India

The Indian Ministry of Labour and Employment (2009) flagged skills as a key driving force for the economic growth and social development of any country. However, prior to February 2009, the skills development situation in India could not in fact have been described as a system because there were few connections between policies and institutions and little uniformity of purpose (Kuruvilla, 2007). There were problems of fragmentation and duplication in the provisioning of education, training and development services. In addition,

there had been hardly any evaluation of how all of the education and human resource development policies were being coordinated (Kuruvilla, 2007).

India has always had a skills surplus for its development needs (Kuruvilla, 2007). Owing to its export substitution industrialisation policy, India did not face a serious labour shortage. In fact, given the lack of opportunities in India, many Indians left for the USA in search of advanced degrees and better economic opportunities. Hence the prevailing wisdom was that India's problem was not a lack of higher-level skills development institutions, but a shortage of primary education (Kuruvilla, 2007).

However, the explosive growth of software outsourcing in the early 1990s and Business Process Outsourcing (BPO) during the early 2000s turned this argument around (Kuruvilla, 2007). Skills shortages began to loom in several areas of the software outsourcing sector. By 2005, shortages of trained personnel appeared in data warehousing and in several IT-related fields. The total estimates for human resource demand in software services and BPO industry in 2009 were 2 125 000 and the human resource supply was estimated at 885 000, yielding a labour supply shortfall of 1 240 000 (Kuruvilla, 2007).

The current capacity of skills development in India poses many challenges, and to address this gap, there has been a growing recognition of the need for structured systemic solution through inclusive growth (Ministry of Labour and Employment, 2009). Recognising the importance of increasing and diversifying the skills-building capacity in the country, the Indian government took a step forward by approving the first national policy on skills development in February 2009. This may be because the Indian economy is widely expected to grow at sustained high rates over the next few decades and emerge as the second largest economy by 2050 (Palit, 2009).

The National Skills Development Policy (NSDP) has set the target of achieving 500 million skilled people in the country by the year 2022. The emphasis is on institution-based skills development through polytechnics, industrial training institutes (ITIs), vocational training centres, apprenticeship training, training for self-employment and entrepreneurial ventures, addressing the training requirements of retired persons and expansion of the outreach of e-learning and distance learning (Department of Labour, 2009; Palit, 2009).

According to Palit (2009), the newly established National Skills Development Corporation (NSDC), comprising distinguished technical professionals, will set up industry-specific skills councils. The corporation is instrumental in forging skills development initiatives by involving

the private sector through public-private partnerships (PPPs). Efforts have already been made to establish 1 500 ITIs and 5 000 skills development centres through the PPP mode. The new policy is expected to set standards for competency-based qualifications and certificates on nationally approved criteria (Department of Labour, 2009; Palit, 2009). The increase in skills development capacity to 15 million per annum will not only enable India to equip new entrants into the workforce with the right skills, but also create a surplus of skilled workers in the country (Palit, 2009). This is expected to act as a vital strategic asset in India's quest for sustained high growth.

The implementation of the NSDP is expected to substantially increase opportunities for foreign technical training providers (Palit, 2009). One such opportunity is the bilateral Comprehensive Economic Cooperation Agreement between India and Singapore, which provides an enabling framework for collaboration. The NSDP attempts to address the skills mismatch in the economy from the larger perspective of the vision of "inclusive growth" illustrated in the Eleventh Five-Year Plan (Palit, 2009). The policy proposes the establishment of a Skills Development Initiative (SDI). The initiative will empower all individuals through improved skills, knowledge, nationally and internationally recognised qualifications to gain access to decent employment and ensure India's competitiveness in the global market (Department of Labour, 2009; Palit, 2009).

The main aim of the SDI is to increase the employability of the workforce and to ensure that workers are able to adapt to variations in technological applications and new demands arising in the labour market. The key objectives of the NSDP are to:

- Create long-term opportunities for skills development for all, in particular, the youth, women and disadvantaged groups.
- Encourage stakeholders to own skills development initiatives.
- Develop a high-quality skilled workforce relevant to current and emerging employment market needs.
- Establish flexible delivery mechanisms responsive to a wide range of needs of diverse stakeholders.
- Facilitate effective coordination between ministries, the central government, state governments and public and private skills providers (Department of Labour, 2009, p. 8; Palit, 2009, p. 10).

The SDI is aware that it needs to not only increase the country's capacity to impart skills, but also to do so in a dynamically efficient manner. Skills building is not a static process. As the labour market requirements change, following changes in the modes of production, individual skills need to be upgraded for the workforce to remain relevant and employable. Thus, skills development needs to foresee and rapidly respond to emerging changes.

The policy has envisaged an elaborate institutional architecture for addressing its imperatives. The Prime Minister's National Council on Skills Development (NCSD) is the apex body for overseeing skills development in India. A National Skills Development Board (NSDB) under the Planning Commission and the NSDC (Palit, 2009) follows the council. As highlighted earlier, the NSDC has been established as a corporation under the Indian Companies Act of 1956 and is responsible for industry or sector-specific skills councils. The latter are expected to analyse and project existing and future skills development requirements in different industries.

Based on these analyses, the industry-specific skills plans will focus on competency standards, necessary qualifications, examination and certification processes and accreditation of institutions (Palit, 2009). To stimulate and support reforms in skills development and to facilitate nationally standardised and acceptable, internationally comparable qualifications, a National Vocational Qualifications Framework is to be established.

The NSDC will comprise a body of reputable and experienced skills development professionals drawn from different disciplines. Unlike the NCSD and the NSDB, which include ministries and executives that are essentially expected to discharge coordinating functions, the NSDC is expected to fulfill a more direct role in skills development. The NSDP is indicative of a major shift in thinking among key actors in India in order to develop a long-term skills development framework, and to move the country into the high-skills equilibrium. However, it is hoped that the institutional assemblage earmarked to fast track the successful implementation of this radical policy will be effective in order to realise the policy imperatives.

Table 2.2 provides a summary of the key aspects of the three major skills development systems discussed above.

Table 2.2

Summary of the Key Aspects of Various Skills Development Systems

	SINGAPORE	AUSTRALIA	INDIA
Key elements	<ul style="list-style-type: none"> Autonomous government intervention through direct measures such as central skills planning and management of training providers. A high level of integration between economic development strategies and skills development policies. The skills and technology transfer model, which effectively link skills development to foreign investment and private sector participation A skills development fund. Education policy reforms to meet the country's human resource needs. Clear communication lines and structures of interaction enabling the system to work effectively. 	<ul style="list-style-type: none"> Minimal direct government intervention and the market generate the demand for training - market forces thus determine the skills needs of the economy' Devolution of authority for a range of decisions to training providers, and the associated removal or reduction of regulations. Use of financial and other mechanisms to stimulate the demand for skills by employers and workers in the economy; for example, the creation of more choices between training programmes offered by providers, encouragement of individual investments, vouchers and learning accounts. Reforms in education policy to increase flexibility in the skills development system. An active employment strategy. 	<ul style="list-style-type: none"> An export substitution industrialisation policy. A National Skills Development Policy. A strong institutional architecture to support skills development. An industry-specific skills plan.
Key structures	<ul style="list-style-type: none"> An Economic Development Board; a Productivity Standards Board; a Council for Professional and Technical Education; a National Manpower Council; and an Institute of Technical Education. 	<ul style="list-style-type: none"> An Australian National Training Authority, an Industry Skills Councils and Industry Training Advisory Bodies. 	<ul style="list-style-type: none"> A National Skills Development Corporation; Industrial Training Institutes; a National Council on Skills Development; a National Skills Development Board; a Skills Development Initiative; and Industry Skills Councils.
Framework	<ul style="list-style-type: none"> A Workforce Skills Qualifications Framework. A Quality Assurance Framework. 	<ul style="list-style-type: none"> An Australia Qualifications Authority. A National Training and Qualifications Framework. 	<ul style="list-style-type: none"> A National Vocational Qualifications Framework. A Quality Assurance System.
Other modes	<ul style="list-style-type: none"> Apprenticeships 	<ul style="list-style-type: none"> New apprenticeships; flexible traineeship; workplace-based training; and competency-based training. 	<ul style="list-style-type: none"> Apprenticeships

2.3 THE SOUTH AFRICAN SKILLS DEVELOPMENT CONTEXT

South Africa has an interesting and unique history of workforce skills development. However, there is consensus that in order to achieve growth and development, South Africa requires a multipronged skills development strategy that targets high-, intermediate- and low-level skills development simultaneously in a differentiated manner (Ashton, 2004; Kraak, 2005a; Kraak, Lauder, Brown & Ashton, 2006; McGrath, Badroodien, Kraak & Unwin, 2004; Young, 2005).

Owing to the country's history, no single model of skills development is suitable for implementation in South Africa (DTI, 2006), but rather an amalgamation of the three global models discussed earlier, taking what is relevant and proven from each in order to maximise skills development. The National Skills Development Strategy is a well-conceived strategy with the potential to move South Africa forward in the monumental task of addressing the country's skills shortages. However, the applicability of the three models in the South African context is examined below, and the optimal combination proposed.

The adoption of the Anglo-Saxon model in South Africa is not likely to achieve notable gains in skills development and a value-added production (DTI, 2006). The most significant reason would be the inefficiency of the labour market. An analysis of a number of Sector Skills Plans (SSPs) indicated that across sectors in the South African economy, there is a disparity between the skills needs of the industry and the skills provided by training institutions.

The Anglo-Saxon model assumes that a shift in demand of skills will automatically be followed by the necessary shift in the supply of skills. In the current South African context, that is proving not to be the case via market adjustment. In addition, the literature indicates that the presence of high unemployment is deemed to be a failure of the market (Ashton & Sung, 2000; 2002). South Africa has the higher rate of unemployment and an inefficient labour market, although the failings of the market may be the result of distortions caused by the apartheid policies of the past. It is therefore clear that workforce development cannot be left entirely to the vagaries of the market (Ashton *et al.*, 2003).

However, the internal democratic pressure in South Africa might not allow the same level of autonomy possessed by the Tiger governments (Ashton & Sung, 2000). Hence it would be more realistic to implement a combination of the Germanic and the Asian Tiger models. The following are some of the steps taken by countries benchmarked against South Africa – steps that have already been implemented in South Africa:



- (1) South Africa has a central control over education.
- (2) Government has a strong commitment to education as indicated by the fact that the country has the highest expenditure as a percentage of GDP.
- (3) There is a skills development levy to incentivise companies to invest in training.
- (4) Vocational training institutions are in place and there is a focus on the National Skills Development Strategy (NSDS).
- (5) There are learning programmes.
- (6) The Investors in People Programme is in place (DTI, 2006, p. 56).

Nevertheless, the sections below provide a chronological background on South Africa regarding skills development initiatives, triumphs and tribulations that preceded the historic policy reforms witnessed in the post-apartheid era.

2.3.1 Skills development pre-1994

Historically, South Africa's education and training systems were described as a low-skills training regime that was largely shaped by racial segregation in the labour market and social discrimination in the education system and larger society (Badroodien, 2005). Contemporary literature reveals that skills development in South Africa had been influenced by a wide range of factors and challenges for a long time (McGrath & Badroodien, 2006).

Myriad factors played a significant role in shaping skills development during the period of industrialisation in South Africa, particularly in the second half of the 19th century. Examples are the arrival of Lanarkshire miners (McGrath, 1996) and "Nightingale" nurses (Deacon, 1997). Formal training for whites also emerged in the 1800s, but was strongly influenced by British working practices and colonial attitudes, especially regarding race (Behr, 1988).

The apartheid government was established in 1948, and began to formulate and implement racially exclusive and discriminatory laws, which placed Africans, Coloureds and Indians on the periphery and curtailed their labour and socioeconomic rights. This caused widespread tensions in broader political circles, which filtered through to the workplace. Arguably, the apartheid government faced the worst forms of resistance and pressure for change from the opposition structures in the 1960s and 1970s.

Pressure for reform began to build up in the period from the late 1970s to the early 1990s, mainly in response to new labour market requirements associated with economic modernisation and the collapse of influx control (Badroodien, 2005). Another significant

contributing factor that influenced reform was the intensification of political struggles in education and the workplace (Kraak, 1987). Until the 1970s, skills needs in South Africa were largely resolved by the immigration of skilled whites from European countries (McGrath & Badroodien, 2006).

The problem of skills shortage during this period appears to have been compounded by the intensity of apartheid policy, which sought to maintain racial privilege for whites and restrict education, training and skilled work for Africans, Coloureds and Indians. Most fundamentally, Africans were regarded as temporary sojourners in White South Africa (Southall, 1980). There is clear evidence that the participation of these groups in mainstream economic activities was severely constrained by continued inequalities in access to education, training and skilled work and resources until 1994 (McGrath, 2004).

The post-1976 era was characterised by catastrophic waves of resistance and uprising by the marginalised black communities, leading to the apartheid government adopting a reformist stance towards labour issues. This impetus for reform culminated in the appointment of three state Commissions of Inquiry in the period 1977 to 1981. The reforms of these three Commissions – the Riekert Commission (Republic of South Africa, 1979), the Wiehahn Commission (Republic of South Africa, 1981a; Wiehahn, 1982) and the De Lange Commission (HSRC, 1981) – had a powerful impact on the apartheid labour market.

The three joint investigations of training by the Human Sciences Research Council and the National Training Board (NTB) (HSRC/NTB, 1984; 1989; 1991) were equally important in triggering education and training policy reforms in South Africa. Black workers were accorded permanent residence rights to stay in the urban areas of the former “White South Africa”. They were also granted trade union rights. Finally, through the De Lange Commission, blacks were granted improved access to formal schooling, technical colleges and enterprise training in South Africa’s urban areas (Kraak, 2008b).

During 1990, the unbanning of the African National Congress (ANC) and other political parties and other formations, and the release of political prisoners ushered in a new era in thinking about the democratic and non-racial alternatives in all aspects of policy formation in South Africa. The National Training Strategy Initiative (NTSI) was convened in 1993 under the auspices of the then NTB, and produced its main discussion document in April 1994 (Carton & King, 2004; NTB, 1994).

The significance of this initiative lied not only in its timing (the month of the first democratic elections in South Africa) and substance, but also in the effective participation of key stakeholders representing organised labour, organised business, the then technikons and various working committees. This gave legitimacy to the process and to its proposals for change, which in many respects, complemented those of a separate policy initiative, established by the ANC, which culminated in the production of the Implementation Plan for Education and Training (IPET) in May 1994 (NTB, 1994).

The NTSI document is one of the earliest full expressions of the new vision of training, but of the notion of an “integrated approach to education and training” in South Africa (Bird, 1992; Bird & Elliot, 1993; Carton & King, 2004). The vision for a new approach to education and training was set in terms of the following:

South Africa needs to develop a “human resource development system in which there is an integrated approach to education and training and which meets the economic and social needs of the country and the development needs of the individual” (NTB, 1994, p. 6). It went further in articulating the core principles upon which such a system would be built and assessed. These included the principles of integration, relevance, coherence and flexibility, standards, access, legitimacy, recognition of prior learning (RPL) and guidance of learners (Bird & Elliot, 1993; Carton & King, 2004; DoL, 1997). With reference to the RPL, the NTSI document proposed that education and training should, through assessment, give credit to prior learning through formal, non-formal and informal learning and experience.

Of particular significance in South Africa were for the reasons for the history of education. Learners had been denied access to one or other of the formal, non-formal and informal learning systems, and had had to learn in some other way, say, through experience or by means of correspondence in another country. This principle accepts that no person entering the learning situation is without learning, and it aimed to measure and give credit for that prior learning. The IPET document derived its focus mainly from the principle that individuals have the right to access to lifelong learning (NTB, 1994). These documents (NTSI and IPET) laid a solid foundation for education and training policy formulation in South Africa to date.

However, Kraak, Paterson, Visser and Tustin (2000) have indicated that the dramatic decline in enterprise training from the 1980s provided a formidable challenge to the new democratic government after 1994 with respect to increasing the numbers of people trained in the South African economy and providing work opportunities for those previously excluded.

Nevertheless, the industrial training regime in South Africa prior to 1994 was characterised by the following:

- An extremely poor track record in educational provision derived from the racially exclusionary provision of poor primary, secondary and tertiary education to most African, coloureds and Indian South Africans.
- A poor track record of enterprise-based training across industries.
- The absence of any systematic linkages between education and training providers and industry and commerce.
- Obsolescence of much of the equipment, curricula, course materials and training methodologies of many provider institutions.
- The exclusion of Africans, coloureds, Indians and women from most specialised training, particularly at the intermediate- to high-skill levels, which were still white and male dominated.
- The absence of qualification pathways that promoted portability and progression.
- The predominance of short and informal training courses, with many addressing only the narrow enterprise-specific needs of employers.
- The low quality of the Training of Unemployed Persons scheme provided by the former Department of Manpower and the lack of links between such training and employment opportunities.
- The failure of firms to recognise the importance of training in the new global competitive environment (DoL, 1997, pp. 6-13).

Most of these factors contributed significantly to a series of education and training policy reforms that took place in South Africa after 1994.

2.3.2 Skills development post-1994 to 2008

Skills training policies in South Africa after 1994 focused on creating an institutional environment that would facilitate expanded investment in education and training (Badroodien, 2005). According to Carton and King (2004), skills revolution became a crucial part of the reconstruction of South Africa. South Africa has thus achieved much in a way of transformation since 1994 (Akoojee, Gewer & McGrath, 2005).

The pace of reforms in education and training policy witnessed since the dawn of democracy has largely been determined by the greater goals of reconstruction and development, a central pillar of which is human resource development. The challenge faced by the country

then was to create an education and training system that would ensure that people are able to realise their full potential in the society as a basis and prerequisite for the successful achievement of all other goals in the reconstruction and development programme. To meet this challenge, the new government chose the path of transformation, including the development of the National Qualifications Framework (NQF), which arguably constitutes the most comprehensive and complex component of curriculum transformation in the education and training system since the birth of apartheid in 1948.

The origins of the NQF can be traced back to the NTSI and IPET projects, which were launched in 1992 and 1993, and which have substantially shaped numerous policy and legislative developments in education and training, including the White Papers on Education and Training of 1995 (DoE, 1995); the Higher Education Act (Republic of South Africa, 1997); the Further Education and Training Act (Republic of South Africa, 1998b); the Skills Development Act (Republic of South Africa, 1998a); the Skills Development Levies Act (Republic of South Africa, 1999); the Skills Development Amendment Act (Republic of South Africa, 2008a) and the National Qualifications Framework Act (Republic of South Africa, 2008d).

Skills development has been identified as a crucial intervention for accelerating social and economic development (Akoojee *et al.*, 2005). The publication in March 1997 of the Green Paper on Skills Development Strategy for Economic and Employment Growth in South Africa proposed a new approach to skills development, which complements the formal education system (DoL, 1997). It linked skills formation to the requirements of a growing economy and extends education and training to people both in and outside formal employment. The document's primary concern was industry-based training, improving the intermediate level skills base of the country and labour market training for target groups (including the unemployed, retrenched workers, youth, women, people with disabilities and people in rural areas) (DoL, 1997).

This Green Paper made provision for a new system of learning, referred to as learnerships, for young and unemployed people wishing to join the labour market (DoL, 1997). It located the approach to skills development within a broader policy context and was to be guided by the national priorities. It related to macroeconomic, industrial, labour market and science and technology policies. The implementation of the skills development strategy was to be supported by proposals for effective coordination at national level as well as a consolidated set of sectoral training intermediaries, which were to support enterprise, pre-employment and target group education and training (DoL, 1997).

Discussions and feedback on this Green Paper culminated in the Skills Development Act (Republic of South Africa, 1998a) and the Skills Development Levies Act (Republic of South Africa, 1999). These two Acts form a vital core in transforming workplace training in South Africa. The Skills Development Act (Republic of South Africa, 1998a) provides an institutional framework to devise and implement national, sector and workplace strategies to develop and improve the skills of the South African workforce. It integrates those strategies within the NQF; it provides for learnerships that lead to recognised occupational qualification; and among other things, provides for the financing of skills development by means of a levy grant scheme and a National Skills Fund. Provision is made for the funding for skills development in the Skills Development Levies Act (Republic of South Africa, 1999). All employers with an annual payroll in excess of R500 000 are liable to pay 1% of their payroll towards skills development.

The Skills Development Act (Republic of South Africa, 1998a) has been the primary legislative instrument used to introduce the new training system in South Africa. The skills legislation aims to shift the economy on to a growth path founded on the empowerment of workers into a skilled labour force, rather than the low-skill, low-wage model pursued under apartheid. It also aims to increase training expenditure by companies to counter their traditional failure to invest in human resource development (Bird, 2001). At the core, this legislation provides for an institutional architecture comprising SETAs. These multipartite bodies are charged with the responsibility of distributing the financial grants acquired from a 1% levy grant scheme aimed at promoting enterprise training in large and small firms operating in both the formal and informal economic sectors (Kraak, 2008a). Besides SETAs, the Act proposes the establishment of a number of other institutional frameworks and strategies to ensure that key objectives are met. These include the National Skills Authority, the Skills Development Planning Unit and the National Skills Development Strategy (NSDS) (Grawitzky, 2007).

Arguably, the new system of training did record some successes (DoL, 2006a; Kraak, 2008a). For example, 95 503 small, medium and micro enterprise (SMME) employers benefited from skills development support. A cumulative total of 6 306 557 workers out of a total workforce of 10, 8 million people embarked on structured learning programmes during phase 1 of the NSDS. There was also an increase in the number of government departments submitting workplace skills plans, and a corresponding growth in training expenditure, reaching 1,84% of overall personnel expenditure in government in 2004/2005

(DoL, 2006a) – well above the 1% of payroll prescribed by the Skills Development Levies Act (Grawitzky, 2007).

However, as pointed out by Kraak (2008a, pp. 11-16), the implementation of the new Skills Development Framework and attempts to integrate education and training were marred by some of the following problems:

- The key element of the new education policy discourse was the idea of a single, unified and integrated regulatory system of education and training. The reality is that the integration of education and training has never really happened. There should be one integrated framework for academic, vocational and occupational learning. This framework is necessary to bridge the traditional divides between education and business, between academics and trainers, between theorists and pragmatists and between discipline-based learning and skills development. Arguably, the quest for integration may be possible to achieve going into the future because of the creation of the new Ministry of Higher Education and Training, which has taken over the responsibility for skills development in South Africa.
- Sector agreements between SETAs, FET colleges, higher education institutions and employers were regarded as crucial mechanisms for implementing the NSDS. Poor progress in this area has been recorded. This poor record is most strongly indicative of the failures of a truly integrated commitment to education and training in South Africa. The migration of the SETAs and FET colleges from the Department of Labour and provinces respectively into the new Higher Education and Training Ministry may smooth relations going into the future.
- Capacity problems prevented the new skills development regime from effectively managing and steering a large new institutional assemblage comprising SETAs, National Standard Bodies (NSBs), Standard Generating Bodies (SGBs) and Education and Training Quality Assurance Bodies (ETQAs). Evidence also emerged in some sectors of the undue involvement of SETA boards in the day-to-day management of SETA work (Grawitzky, 2007).

In some cases, SETA ETQAs and SGBs ran into problems with the Council for Higher Education (CHE) when trying to design and accredit learning programmes above NQF level 4, with the CHE refusing to recognise them. This created a glass ceiling for workers who found that they could not easily progress beyond the FET sector. Arguably, the creation of Communities of Expert Practices to replace NSBs and SGBs may ameliorate relations across the board in terms of standards of qualifications, design and accreditation of

programmes, and so forth. Myriad operational problems have also bedevilled the SETA structure. For example, many SETAs have suffered extremely high staff turnover, especially at senior levels, and this has affected morale and institutional capacity. Some SETAs had three to four CEOs in the first five years of their existence (Grawitzky, 2007).

These problems were viewed as wide, deep and more serious. They called for a system-wide review, new thinking and serious consideration being given to the reforms and formulation of the skills development and NQF legislations respectively. Following this intense exercise, the Skills Development Act was amended in 2008 to provide anew for the functions of the National Skills Authority to provide anew for the composition of the National Skills Authority, and the functions of the SETAs and to provide clarity on the continuation of apprenticeships training; and among other things, to provide for the Quality Council for Trades and Occupations (QCTO) (Republic of South Africa, 2008a).

The aim of the QCTO is to address the lack of uniformity on quality assurance between SETAs and provide centralised oversight of quality assurance in trades and occupations. The new NQF Act (Republic of South Africa, 2008d) was also enacted to ensure integration of education and training. This new legislation poses exciting challenges for education and training provision in South Africa. It has a huge influence on all education and training sectors, that is, the General and Further Education and Training, Higher Education and Training and occupational learning.

2.3.3 Skills development in 2008 and beyond

The year 2008 was marked by significant changes in the education and training sector in South Africa. A number of important Acts were amended and new legislation enacted. The following Acts were promulgated:

- (1) the Skills Development Act: the Skills Development Amended Act – 1 December 2008 (Republic of South Africa, 2008a).
- (2) the GENFETQA Act: General and Further Education and Training Quality Assurance Amendment Act – 9 January 2009 (Republic of South Africa, 2008c).
- (3) the Higher Education Act: the Higher Education Amendment Act – 27 November 2008 (Republic of South Africa, 2008b).
- (4) the National Qualifications Framework Act – 17 February 2009 (Republic of South Africa, 2008d).

A key change emanating from the above legislative changes is the establishment of the three Quality Councils to manage three sub frameworks that fall within a single National Qualifications Framework (NQF) and are coordinated by the South African Qualifications Authority (SAQA). These sub frameworks are as follows:

- (1) Umalusi – NQF levels 1 to 4 (schooling, e.g. ABET, Grade R – Grade 12).
- (2) Higher Education Quality Council – NQF levels 5 to 10.
- (3) Quality Council for Trades and Occupations (QCTO) – NQF levels 1 to 10 (e.g. electricians and plumbers).

The new Skills Development Amendment Act (Republic of South Africa, 2008a) introduced the QCTO with a view to coordinating learning towards occupational competence.

The functions of the QCTO are as follows:

- It will ensure that learning programmes are developed to address specific scarce and critical skills.
- It will manage and coordinate qualifications in the occupational qualifications framework in terms of development, provision, assessment, quality assurance and impact.
- It will develop qualifications to be certified as National Occupational Awards or National Skills Certificates.
- The new approach to quality assurance (QA) will ensure that QA permeates all activities and is not seen as a separate function.
- Qualifications will be developed with three areas of learning: knowledge and theory, practical skills and work experience. Outcomes will be specified in unit standards (knowledge standards, practical standards and work experience standards).
- Regarding assessment, the council will introduce an external, nationally standardised assessment for each occupational qualification as a prerequisite for certification.
- Twenty-three SETA ETQAs will merge into one and the accreditation process will also be simplified.

Additional changes effected by the Skills Development Amendment Act (Republic of South Africa, 2008a) are as follows:

- (1) Learning programmes include a learnership, apprenticeship, skills programme or any other prescribed programme including a structured work experience component.
- (2) The revised SETA functions include the following:
 - to develop sector skills plan;
 - to establish learning programmes;
 - to approve skills plans;
 - to allocate grants, promote learning programmes and register agreements for learning programmes;
 - to perform any other function delegated to it by the QCTO; and
 - to liaise with provincial offices, labour centres, the National Skills Authority (NSA) and skills development forums.

Until such time that the QCTO delegates powers and functions to the SETA, a SETA ETQA will remain accredited by SAQA and continue to perform all functions (e.g. accreditation of providers).

- (3) Administration will be handled by establishing a Skills Development Planning Unit.
- (4) Established labour centres will:
 - provide information to workers, unemployed and employers;
 - assist workers and other categories of persons to find placements;
 - assist workers and other categories of persons to start income-generating projects; and
 - help workers enter, say, learning programmes.
- (5) Artisan development will involve the following:
 - (a) A National Artisan Moderation Body will be established to monitor the performance of accredited artisan trade test centres; moderate tests; develop and maintain a national databank of trade tests; moderate trade tests; develop and maintain a databank for national artisan trade assessors and moderators; record artisan achievements; determine appeals against tests; and recommend certification of artisans to the QCTO.
 - (b) As far as trade tests are concerned, an artisan qualification can only be obtained if a trade test was administered and certified by an accredited trade test centre. A person

may only undergo a trade test on completion of a learnership or an apprenticeship and the accredited trade test centre has certified that the person has acquired sufficient prior learning in that trade. The accredited trade test centre may also require a preliminary evaluation to determine adequate experience and knowledge. The QCTO will issue the certificate.

Additional changes relevant to this research will be discussed in subsequent sections.

2.3.4 The National Skills Development Strategy (NSDS)

The Skills Development Act (Republic of South Africa, 1998a) makes provision for the drafting of an NSDS, which assesses overall progress in meeting the objectives of the legislation. The NSDS is supposed to provide a broad national framework within which skills development will take place – cutting across SETAs and other institutional structures such as the NSF (Grawitzky, 2007). It speaks directly to the training-related aspects of the HRDSSA and has more specific targets and principles than the HRDSSA.

The NSDS is a broad stakeholder-driven expression of national principles, priorities, objectives and success indicators to guide skills development. The NSDS guides the strategic planning of the Department of Higher Education and Training, the National Skills Fund, the SETAs and related agencies. This strategy has been developed through a consultation process organised by the National Skills Authority (NSA), a body established to advise the Minister of Higher Education and Training through representatives from business, labour, government, civil society and skills development specialists. It has been formulated in five-year plans: the first ran from 2001 to 2005 (NSDS I) and the second from 2005 to 2010 (NSDSII), while the third is running from April 2011 to 2016 owing to a year's extension given by the new government administration which assumed office in April 2009. The discussion below focuses on these national strategies in order of their succession.

2.3.4.1 *The NSDS I (2001–2005)*

In February 2001, the Minister of Labour launched the first NSDS, which was based on legislation promulgated to advance the process of skills development in South Africa (Lundall, 2003). This was mandated in the Skills Development Act (Republic of South Africa, 1998a) and its implementation provides guidelines on the spending of levy income required under the Skills Development Levies Act (Republic of South Africa, 1999). This legislation provides the basis for the establishment of a cost-effective and high-quality skills

development system, which supports economic growth, employment creation and social development and is responsive to national and individual needs (DoL, 2002). The strategy was intended to radically transform education and training in South Africa by improving both the quality and quantity of training to support increased competitiveness of industry and improved quality of life for all South Africans (DoL, 2004). The importance of the strategy was that it shifts the focus to target setting, monitoring and evaluating the process of skills development in South Africa, as explained by the Department of Labour: “The NSDS identifies the priorities for skills development and provides a mechanism for measuring progress. It also charts the way forward for the Department, the SETAs and other key institution” (DoL, 2002, p. 7).

The mission of the NSDS was to equip South Africa with the skills needed to succeed in the global market and to afford individuals and communities opportunities for self-advancement to enable them to play a productive role in society (DoL, 2001).

The NSDS I was formulated to address the following:

- To overcome the structural rigidities and inequalities inherited from the apartheid era.
- To ensure South Africa’s competitiveness in the global economy.
- To transform the labour force from a low skills base to one committed to high- quality lifelong learning.
- To ensure that the labour market is better equipped to deal with the consequences of poverty and disease in the workforce.
- To improve the employability of the country’s labour force by implementing a skills development strategy in partnership with employers, workers and communities.

The strategy took forward the objectives of the Skills Development Act (Republic of South Africa, 1998a) by providing clear and focused objectives and success indicators for achievement by March 2005. The strategy had five objectives, 12 success indicators and three equity targets. It was believed that the achievement of these objectives and targets would move the country significantly forward towards the overall objectives of the skills development legislation.

These objectives are listed below:

- Developing a culture of high-quality lifelong learning.

- Fostering skills development in the formal economy for productivity and employment growth.
- Stimulating and supporting skills development in small businesses.
- Promoting skills development for employability and sustainable livelihoods through social development initiatives.
- Assessing new entrants into employment (Coetzee, Botha, Kiley & Truman, 2007, p. 8; DoL, 2004, p. 2; Lundall, 2003, p. 4).

Some of the successes of the NSDS were recorded as early as 2002 in a synthesis report released by the Department of Labour. For example, by the second quarter of 2002, 8 995 learnership agreements had been registered in which the agreement formed part of the contract of employment (Lundall, 2003). This synthesis report indicated that the registration of apprenticeship agreements was taking place in sectors where artisans were still a significant component of the skilled labour force. A total of 88 410 learnerships among unemployed learners (18.2 category) in the four-year period of the first phase of the NSDS exceeded the target set of 80 000, and together with the indentured apprenticeship enrolments of 21 237 during the same four-year period, give a grand total of 109 647 learners at the intermediate skills level (Kraak, 2008a).

The total number of employed worker (18.1 category) learnerships increased from 28 529 in 2003/2004 to 45 813 in 2004/2005 – a 62% increase (DoL, 2004). More significantly, during this period, 15 466 employed workers applied to write the trade test to become artisans based on section 28 of the Manpower Training Act 56 of 1981. Section 28 workers are older employees who are not indentured for an apprenticeship, but because of their previous work experience, are granted permission to proceed directly to the trade tests, and on passing, they become artisans. Collating this data brings the total number of learnerships and apprenticeships during the first period of the NSDS to 170 926. This was a significant achievement. Despite all the achievements with the new training system in South Africa, a number of problems have surfaced. Akoojee *et al.* (2005) indicate that whilst there are challenges with the apprenticeship system as stated by Marks, McMillan and Ainley (2004), the learnership system also has challenges. According to Akoojee *et al.* (2005), in South Africa, learnerships should be accessible to the previously disadvantaged and responsive to the identified needs, as well as being able to equip participants with skills for self-employment. In a critical reflection of the challenges facing the first NSDS, the following problems were highlighted:

- The quantitative data on skills development activities provided by some of the SETAs could not be verified and/or validated, resulting in skewed results.
- It was not easy to trace learners to confirm their employment placement status.
- There was a need to develop an information system that would effectively provide the requisite information all at levels of implementation for all stakeholders to access (DoL, 2006a, pp. 76-77).

According to Kraak (2008a), the observations that many of the performance outputs of the NSDS were difficult to evaluate and verify are an important governmental admission of a significant weakness in the current training system. Many commentators have either rejected or contested some of the successes of the NSDS, as described earlier (Baatjies, 2008; Maree, 2006). At the core of the problems with the NSDS, Kraak (2005b) found that there has been little monitoring and evaluation of the success and impact of learnerships in South Africa. In addition, Smith, Jennings and Solanki (2005) found little mention of either monitoring or evaluation of learnerships by SETAs. They further found that other SETAs have failed woefully, and are not in a position to either administer the learnership or monitor the performance of learners during the skills development phase.

Besides the data problems and monitoring and evaluation challenges already highlighted in this research, criticisms of the new training regime from various interest groups have been vociferous. Various SETAs have been criticised for poor governance and financial management (Lundall, 2003; Kraak, 2004b, 2005b; NACI, 2003; Smith *et al.*, 2005). This criticism has come from diverse groups ranging from employer bodies, journalists, political parties, and at times, even the then Minister of Labour himself (Mdladlana, 2005). Nevertheless, the implementation of the NSDS is the responsibility of the National Skills Fund (NSF) and the SETAs. However, monitoring and evaluating the impact of the NSDS is an ongoing process aimed at identifying lessons emerging from implementation, and using them to improve on service delivery.

2.3.4.2 *The NSDS II (2005–2010)*

The NSDS II marked a culmination of a process of consultation that commenced in 2003, with the National Skills Authority (NSA) constituency consultation process and presentation of their views on the NSDS 2001 to 2005 during the 2003 Skills Conference (DoL, 2005). The NSDS II provided the aggregate performance indicators of the skills development system that were to be used as a basis to formulate performance indicators through legally binding service level agreements between the Department of Labour and SETAs and for

projects funded under the NSF. The vision of the NSDS II was “skills for sustainable growth, development and equity”. The mission was to contribute to sustainable development of skills growth, development and equity of skills development institutions by aligning their work and resources to the skills needs for effective delivery and implementation (Coetzee *et al.*, 2007; DoL, 2005; Erasmus, Loedolff, Mda & Nel, 2010).

The principles of the NSDS II were as follows:

- Support economic growth for employment creation and poverty eradication.
- Promote productive citizenship for all by aligning skills development with national strategies for growth and development.
- Accelerate equity in the country (broad-based black economic empowerment and employment equity).
- Support, monitor and evaluate the delivery and quality assurance systems necessary for the implementation of the NSDS.
- Advance the culture of excellence in skills development and lifelong learning (Coetzee *et al.*, 2007, p. 9; DoL, 2005, p. 2; Erasmus *et al.*, 2010., p. 62).

The objectives of the NSDS II were as follows:

- Prioritise and communicate critical skills for sustainable growth, development and equity.
- Promote and accelerate quality training for all in the workplace.
- Promote employability and sustainable livelihoods through skills development.
- Assist designated groups, including new entrants, to participate in accredited work-integrated learning and work-based learning programmes to acquire critical skills to enter the labour market and self-employment.
- Improve the quality and relevance of provision (Coetzee *et al.*, 2007, pp. 10-13; Erasmus *et al.*, 2010, pp. 62-67).

2.3.4.3 Challenges experienced during the NSDS I and NSDS II

The NSDS is a framework for sector skills planning in South Africa. However, the effectiveness and efficiency of the NSDS I and NSDS II towards upgrading the national workforce and improving the competitiveness of the economy have consistently been questioned. Criticisms relate to a lack of sectoral understanding, insight and analysis, poor labour market intelligence, rigid focus, strategy formulation and design flaws, technical

deficiencies, weak research culture, irrelevant indicators and measurement deficits, to list a few. Clearly, there are lessons to be learnt from the mistakes of previous strategies. Rasool (2010, pp. 3-13) examined a number of mistakes from which lessons can be learnt from the previous strategies. Some of these mistakes are discussed briefly below:

a) Poor understanding of strategy constraints

The custodians, crafters and implementers of NSDS I and NSDS II failed to understand the limits of strategy. There appeared to be a simplistic belief over the last decade that achieving numerical targets contained in the strategies would somehow translate into the elimination of skills shortages across the economy. Indeed, targets were largely met but the country continues to suffer from chronic skills shortages. For example, the performance reports of most SETAs and the Annual Reports of Department of Labour boasted that NSDS targets were achieved year-on-year, yet skills shortages continued to expand and intensify over the strategy cycles.

b) Lack of credible research

The lack of a credible research agenda to support the strategies appeared to be a glaring deficiency in the formulation of NSDS I and NSDS II. The strategies, fashioned and approved by organised business, labour and government representatives, were not informed by iterative research. Crafting any strategy, whether industrial or skills development, is essentially an analysis-driven exercise, informed by research. Decisions about what should be contained in a skills development strategy should, of necessity, be informed by data gathering and analyses of the macro- and micro-economic environments, labour market dynamics, major policy pronouncements and sectoral studies. This mind-set was conspicuously lacking in NSDS I and NSDS II. Without rigorous research, the positions taken in the strategy cannot be justified or defended. In other words, the strategy is reduced to a collection of speculative, untested assumptions and is exposed to the inevitable risk of irrelevance.

c) Poor policy and programme integration

NSDS I and NSDS II had not factored other important strategies of government into its framework. These include, but are not limited to the Human Resource Development Strategy for SA, National Industrial Policy Framework, Customised Sector Programmes (CSPs), Science and Technology Strategy, National Strategy for the Promotion of Small Business

and Black Economic Empowerment (BEE) Strategy, and so on. There is thus a vital need for integration between skills planning, economic planning and industrial planning. This means that various government departments and industry partners should calibrate their efforts towards creating a skilled workforce.

d) Lack of flexibility

NSDS I and NSDS II appeared not to recognise that industries are organised differently in terms of economic structure, employment and wages, markets, technology, skills profiles and work organisation. Likewise, the manners in which they respond to external shocks are different, as are, indeed, their linkages with each other. A “one size fits all approach” with a common set of performance indicators for different economic sectors simply does not work. SETAs and the industries they represent should be enabled to respond rapidly to new skills demands brought about by fast-changing market conditions, competition, economic restructuring, advancing technologies and process and product improvements and new legislation. Such flexibility would also enable SETAs to focus their resources on skills that have maximum impact on their industries rather than spreading resources across a quantum of interventions, much of which may well be peripheral to the immediate or strategic needs of their respective industries.

e) Lack of labour market intelligence

A major shortcoming of the previous strategies was its failure to understand the dynamism of the labour market and economy. This was demonstrated by issuing 5 year targets at the outset as if the labour market and economy is constant. This lack of sophistication in the strategy cycle is indicative of poor state of labour market intelligence. Moreover, poor analytical skills among policy-makers, planners, public officials and employees of labour market institutions to make sense of statistics have exacerbated the situation. As a consequence, the nature, scale and severity of skills shortages were often miscalculated, misunderstood, and misused often resulting in bad policy choices and concomitant high levels of wastage.

The quality of labour force statistics in SA is generally poor and occupational statistics are of even poorer quality. In many situations, these statistics are available only in highly aggregated form such as senior officials, managers, professionals, technicians, labourers, and so on. When the diagnostic capacity of state agencies for analysing labour supply and demand is weak, it exposes public spending to the inevitable risk of over and under

investments. Similarly, Kraak's (2008a) critical reflection of the problem of poor labour market intelligence highlighted the following problems which marred the NSDS I and II:

- The quantitative data provided by some of the SETAs could not be verified and/or validated, resulting in skewed results.
- It was still not easy to trace learners to confirm their employment placement status.
- There was a need to develop an information system that could have effectively provided the requisite information at all levels of implementation for all stakeholders to access. (DoL 2006a, pp. 76–77).

f) Misconception of technical expertise

NSDS I and NSDS II did not differentiate between the technical process of strategy design and development and the political function of verifying the relevance of NSDS I and NSDS II for legitimacy and accountability. Under this arrangement, strategy formulation consumed considerable time, energy and costs without necessarily resulting in an effective and efficient strategy. It is important to ensure participation of stakeholders (organised labour and business) during the strategy formulation process to ensure buy-in and the democratisation of the process itself. However, placing too much emphasis on representativity and not enough on technical ability and research expertise exposes the strategy to irrelevance. Furthermore the principle of stakeholder involvement must be related to the issue of capacity, specialisation, mandating and reporting. More suitably qualified and technically competent people should participate in the strategy formulation process.

g) Performance targeting and operational fatigue

The NSDS I and II had set several nationally-defined performance indicators which had to be met by each SETA. This obsession with meeting targets had produced certain unforeseen effects. Firstly, there was a definite performance indicator 'fatigue' as practitioners within the SETA system have had to chase these items at the expense of others areas of work. Secondly, Grawitzky (2007, p. 29) argues that the current mechanisms to measure SETA performance – which were all national targets –inadvertently led to a neglect of sectoral needs and activities. SETAs were required to deliver against the requirements of a national agenda – the NSDS – and were not measured as strictly with regard to delivery against their own Sector Skills Plan.

Grawitzky maintains that aside from this ‘overemphasis on the NSDS (which took insufficient cognisance of sector skill needs), the focus was very much on numerical targets with no measurement on impact and quality of learning’ (Grawitzky 2007, p. 29). Learning from the above mistakes, the NSDS III was conceptualised and its key elements that are applicable to the tenets of this paper are briefly discussed below.

2.3.4.4 The NSDS III (2011–2016)

The NSDS III was launched on 13 January 2011 (DHET, 2011). The newly established Department of Higher Education and Training is the custodian of the NSDS III.

The vision of the NSDS III is as follows: “A skilled and capable workforce that shares in, and contributes to, the benefits and opportunities of economic expansion and an inclusive growth path”.

The mission of the NSDS III is as follows: “To increase access to high quality and relevant education and training and skills development opportunities, including workplace learning and experience, to enable effective participation in the economy and society by all South Africans and reduce inequalities”.

a) Purpose of the NSDS III

The key driving force of this strategy is to improve the effectiveness and efficiency of the skills development system. This strategy represents an explicit commitment to encouraging the linking of skills development to career paths, career development and promoting sustainable employment and in-work progression.

The NSDS III seeks to encourage and actively support the integration of workplace training with theoretical learning, and to facilitate the journey individuals make from school, college or university, or even from periods of unemployment, to sustained employment and in-work progression. The emphasis is on training to enable trainees to enter the formal workforce or create a livelihood for themselves. The particular focus is on those who do not have relevant technical skills or adequate reading, writing and numeracy skills to enable them to access employment. Promotion of basic numeracy and literacy is a project led by the Department of Basic Education; DHET is primarily concerned with post-basic literacy and numeracy. Nevertheless, the two departments will need to cooperate closely on this front, but without confusing or conflating the leadership roles of these departments in their respective areas.

The NSDS III will seek to promote a skills development system and architecture that effectively responds to the needs of the labour market and social equity. The strategy seeks to establish and promote closer links between employers and training institutions and between both of these and the SETAs.

The National Skills Development Strategy III responds to the following pressing challenges that are affecting the ability of our economy to expand and provide increased employment opportunities:

- The inadequate skills levels and poor work readiness of many young people leaving formal secondary and tertiary education and entering the labour market for the first time. This is compounded by inadequate linkages between institutional and workplace learning, thus reducing the employability and work readiness of the successful graduates from FET and HET institutions, not to mention the many who enter the world of work without a formal qualification.
- The desperate plight of so many of the longer-term unemployed who lack basic numeracy and literacy, do not possess entry-level skills, and do not have the work experience and work-based training needed to enable them to seek and obtain work.
- Continuing skills shortages in the artisan, technical and professional fields that are fundamental to the development and growth of our economy.
- An overemphasis on NQF level 1 to 3 learnerships, with insufficient progression towards more appropriate (intermediate and higher) skills required for growth sectors in a knowledge economy. There is a need for much more substantial programmes that improve qualifications, support career pathing, promote greater flexibility and mobility and increase productivity.
- The failure of businesses in many sectors of the economy to equip their workforce to adapt to change as the economy becomes more knowledge based. When structural change occurs, too often the outcome is retrenchments instead of retraining and redeploying working people.
- Systemic blockages such as a lack of synergy between the various post-school subsystems (e.g. universities, FET colleges and SETAs); a lack of clarity in relation to the role expected of the various parts of the skills development system; inefficiency and waste; and the silo mentality, which prevents the partnerships and alignments needed to improve effectiveness.

- The absence of coherent strategies in economic and industrial sectors, compounded by the lack of systematic skills development to support and sustain growth and development.
- The urban bias of our economic development and therefore the urban bias in our skills development initiatives, resulting in the neglect of skills for rural development.

The NSDS III must contribute to the achievement of the country's new economic growth and social development goals. These goals are embodied in the strategic priorities of the new Medium Term Strategic Framework (MTSF) (DHET, 2010a), which are as follows:

- Speeding up growth and transforming the economy to create decent work and sustainable livelihoods.
- A massive programme to build economic and social infrastructure.
- A comprehensive rural development strategy linked to land and agrarian reform and food security.
- Strengthening the skills and human resource base.
- Improving the health profile of all South Africans.
- Intensifying the fight against crime and corruption.
- Building cohesive, caring and sustainable communities.
- Pursuing African advancement and enhanced international cooperation.
- Sustainable resource management and use.
- Building a developmental state, including improvement of public services and strengthening democratic institutions.

The NSDS III must examine the skills requirements of each of these priorities and, informed by the strategies that have been developed to take these forward, aim to support the development of the skills base on which the achievement of the MTSF goals will depend (DHET, 2010a). The NSDS III will operate concurrently with the first five-year term of the country's second HRD Strategy (the HRDSSA II). For the first time, the NSDS III will be executed in a new environment where public institutions of learning and institutions of the skills development sector are in one department. In addition, for the first time, workplace learning has become the visible supplement to institutional learning.

The NSDS III will be guided by and measured against the following seven key developmental and transformation imperatives:

- (1) *Race.* Despite the many advances made by the democratic government on the education and training front since 1994, the racial inequalities in our economy, including the racialised nature of our skills profile, have not changed in any significant way. The NSDS III will therefore have to prioritise confronting these racial inequalities, with a particular focus on providing previously (and currently) disadvantaged South Africans with more opportunities. This requires focused attention on skills provision for blacks in general and Africans in particular.
- (2) *Class.* In direct relation to racial inequalities, South Africa remains one of the most unequal societies in the world today. These social inequalities are also reinforced by a lack of access to skills by the overwhelming majority of our population, especially the workers and the poor. The NSDS III will therefore pay particular attention to skills provision in a manner that will significantly reduce these gaping social inequalities in our economy and society.
- (3) *Gender.* Ours is still a society that reflects huge disparities between men and women, including access to skills for effective participation in the labour market and society. This calls for particular attention to be paid to access to skills by women, especially black women, so that they can effectively participate in society as required by our constitution. In addition, all our skills development initiatives must contain specific programmes and strategies to promote gender equality in skills development, in employment and career development and in our economy as a whole.
- (4) *Geography.* Owing to the urban bias of our economic development, our country has not paid adequate attention to rural economic development and provision of skills for rural development. Given the fact that government has now prioritised rural development, our skills development system must increase its focus and attention on the production of skills for rural development. However, it is necessary to distinguish between the training of rural people and skills for rural development. The former has tended to train rural people only to enable them to migrate to the urban areas, whilst the latter will aim to train rural people for the development of the rural areas themselves.
- (5) *Age.* While all South Africans, youth and adults, must be given access to skills development, our young people are the most disadvantaged when it comes to access to education and training. For instance, the single largest category of unemployed

involves those under 35. Hence the NSDS III must pay particular attention to the training of our youth for employment.

- (6) *Disability.* Despite commitments from the NSDS I and II to increase opportunities for training and skills development for persons with disabilities, we are still far from achieving our goals in this regard. The NSDS III thus aims to significantly open up opportunities for skills training for people experiencing barriers to employment caused by various forms of physical and intellectual disability.
- (7) *The HIV and AIDS pandemic.* Given the threat of the HIV and AIDS pandemic for the future growth and development of our country, and its particular impact on the youth, all our skills development initiatives must incorporate the fight against this pandemic and management of HIV and AIDS in the workplace. We need to ensure that we do not train our youth and adults for the grave but for the workplace and effective participation in society.

The strategic areas of focus for the NSDS III (DHET, 2010a, pp. 11-21) are as follows:

- (1) *Equity impact.* South Africa is committed to the equality of all and recognises that too many people still suffer unfair exclusion in terms of class, race, gender, age, disability and HIV/AIDS. The NSDS III aims to contribute towards combating exclusion in terms of these dimensions.
- (2) *Code of decent practice.* South Africa's inclusive growth plans are endangered by a range of unethical practices such as fraud, corruption and "tenderpreneurship". Sectors need to find ways to advance the "code of decent practice". Skills development is a vehicle for challenging these unethical practices.
- (3) *Learning programmes for decent work.* The NSDS III should advance programmes that prepare people for full occupational competence as well as embed social understanding and social purpose. SETAs will be expected to refer to the four kinds of programmes they will advance, namely programmes to facilitate access, success and progression; professional, vocational, technical and academic learning (PIVOTAL) programmes; skills programmes and other non-accredited short courses; and programmes that build the academic profession and engender innovation.

- (4) *Programme delivery partners*. Because the NSDS III operates in a new environment, full partnerships between workplaces and institutions are expected to be forged. The emphasis should be, *inter alia*, on uplifting the capacity of public learning providers in areas such as infrastructure, curriculum and qualification design, learning material and even subvention of the wages of key staff members. The proposed architecture for the NSDS III is indicated in Table 2.3.

Table 2.3
Architecture for the NSDS III (2011–2016) (DHET, 2010a)

Vision	A skilled and capable workforce to support an inclusive growth path.	Funding levers	
		SETA	NSF
Ethical code	<i>Code for decent conduct</i>	SETA discretionary grants	NSF "catalytic grants"
Equity	<i>Address six key areas: class, race, gender, age, disability and HIV/AIDS.</i>		
Strategic objectives and impacts (for 5.3 measure the number who access, succeed to attain occupational competence or targeted competence, and those who find employment or generate employment after training).			
Strategic objectives and impacts (including measures)	5.3.1 Promote access, success and progression: <ul style="list-style-type: none"> – information and career guidance – RPL – educational base 	SETA discretionary grants	NSF "catalytic grants"
	5.3.2 PIVOTAL occupations	PIVOTAL grant (plus discretionary grants)	NSF "catalytic grants"
	5.3.3.1 Short courses for the employed.	WSP grant and discretionary grants	NSF "catalytic grants"
	5.3.3.2 Short courses for the unemployed.	SETA discretionary grants	NSF SDFW
	5.3.4 Build the academic profession and engender innovation.	SETA discretionary grants	NSF NRF bursaries
	5.4 Strengthen our own capacity and that of our delivery partners to enhance achievement of other strategic objectives. Measure improved success profile of institutions – as throughput, etc.	SETA discretionary grants	NSF "capacity building grants"

This architecture allows SETAs to prepare the final section of their SSPs with reference to each heading. They would have to ask themselves the following strategic questions:

- (1) How, in the context of our sector, will they contribute towards the achievement of the national equity goals?
- (2) How will they ensure that targeted learners are helped to overcome access, success and progression barriers?
- (3) Which programmes will they deliver in order to both meet their sectoral strategic goals and contribute towards the national priorities?

- (4) How can their sectors expand the number of PIVOTAL partnerships entered into by their member firms?
- (5) Who are their delivery partners and how can they contribute to the goal of expanding the capacity of their partners in general and the public providers in particular?

The NSDS III has the following pillars:

- There are sector strategies (aligned to government and industry development strategies), programmes and projects developed with and supported by sector stakeholders. The DHET will play a leading role in forging a closer working relationship and collective identification of skills development priorities, amongst all the key institutional players in our education and training system.
- Relevant sector-based programmes addressing the needs of unemployed people and first-time entrants to the labour market will be developed and piloted by SETAs, with rollout being planned, managed and funded, where appropriate, in partnership with the NSF. SETA funds will primarily be used to fund the skills development needs of employers and workers in their sector. However, the utilisation of SETA discretionary funds must be guided by the goals of the NSDS III.
- There are professional, vocational, technical and academic (PIVOTAL) programmes. These provide a full occupationally directed qualification. Such courses will normally begin in a college or university and would include supervised practical learning in a workplace as part of their requirement. The courses – especially for workers – could in some cases start in the workplace and then move to a college or university. The courses would culminate in an occupational qualification. PIVOTAL courses will normally be offered by arrangements between a SETA, an educational institution, an employer and a learner. Fundamental to the successful implementation of PIVOTAL programmes will be a model of cooperation between a SETA, a higher or further education and training institution and an employer. This will help ensure responsive curricula and courses.
- There are programmes that contribute to the revitalisation of vocational education and training, including the competence of lecturers and trainers to provide work-relevant education and training and promote occupationally directed research and innovation.
- There are incentives for training and skills development capacity in the cooperative, NGO and trade union sectors, including community and worker education initiatives, contributing to the effective training of youths and adults.

- There are partnerships between public and private training providers, between providers and SETAs and between SETAs, addressing cross-sectoral and inter-sectoral needs.
- There is an increased focus on skills for rural development to support government's prioritisation of rural development.

The strategy is informed and guided by other overarching government programmes, especially the Human Resource Development Strategy for South Africa, the requirements of the New Growth Path, the Industrial Policy Action Plan, the outcomes of the Medium-Term Strategic Framework, the rural development strategy and the new environment strategy, among other government priorities. It seeks a closer synergy between the world of work and our formal education system.

b) Goals of the NSDS III

The strategy places great emphasis on the relevance, quality and sustainability of skills training programmes to ensure that they impact positively on poverty reduction and inequality. NSDS III has set eight goals (DHET, 2011):

- Goal 1: Establishing a credible institutional mechanism for skills planning;
- Goal 2: Increasing access to occupationally-directed programmes, both intermediate level as well as higher level professional qualifications;
- Goal 3: Promoting the growth of a public FET college system that is responsive to sector, local, regional and national skills needs and priorities;
- Goal 4: Addressing the low-level of youth and adult language and numeracy skills to enable additional training;
- Goal 5: Encouraging better use of workplace-based skills development;
- Goal 6: Encouraging and supporting co-operatives, small enterprises, worker initiated, NGO and community training initiatives;
- Goal 7: Increasing public sector capacity for improved service delivery and supporting the building of a developmental state
- Goal 8: Building career and vocational guidance.

Table 2.4

NSDS III Goals, Outcomes and Outputs (DHET, 2011)

NSDS III (April 2011 – March 2016)	
Goals	Outcomes
Goals	Outputs
<p>Goal 1: Establishing a credible institutional mechanism for skills planning.</p>	<p>Outcome 1: National need in relation to skills development is researched, documented and communicated to promote effective planning across all economic sectors.</p> <p>Output 1: Capacity is established in the DHET to coordinate research and skills planning.</p> <p>Output 2: Sector skills plans are professionally researched, provide a sound analysis of the sector and articulate an agreed sector strategy to address skills needs.</p> <p>Output 3: Sector and nationally commissioned research and data are analysed, validated and captured in an integrated database that is accessible to stakeholders.</p>
<p>Goal 2: Increasing access to occupationally-directed programmes, both intermediate level as well as higher level professional qualifications.</p>	<p>Outcome 1: Middle-level skills needs are identified and addressed in all sectors.</p> <p>Output 1: SETAs research and identify middle-level skills needs in their sectors and put in place strategies to address them, particularly through the use of the public FET colleges and universities of technology working in partnership with employers providing workplace-based training.</p> <p>Output 2: Projects are established to address middle-level skills in each sector.</p> <p>Output 1: SETAs establish projects and partnerships to enable the relevant number of artisans for their sector to be trained in order to qualify and become work ready.</p> <p>Output 2: The national Artisan Development Project developed by JIPSA and now located in the DHET and M&E framework, is planned, managed and reported on, with interventions where blockages occur.</p> <p>Output 1: Sector skills plans identify the supply challenges in relation to high-level scarce skills gaps and set out strategies for addressing them.</p> <p>Output 2: Agreements are entered into between SETAs, university faculties and other stakeholders on appropriate interventions to support improved entry to priority programmes, increased work experience and experiential learning for students and access to postgraduate work.</p> <p>Output 1: Sector skills plans identify the focal areas for research, innovation and development.</p> <p>Output 2: Agreements are entered into between SETAs, university faculties and other stakeholders on flagship research projects linked to sector development in a knowledge economy.</p> <p>Output 3: Programmes are put in place that focus on the skills needed to produce research that will be relevant and have an impact on the achievement of economic and skills development goals.</p>
<p>Goal 3: Promoting the growth of a public FET college system that is responsive to sector, local, regional and national skills needs and priorities.</p>	<p>Outcome 2: 10 000 artisans per year qualify with relevant skills and find employment</p> <p>Outcome 3: High-level national scarce skills needs are being addressed by work-ready graduates from higher education institutions.</p> <p>Outcome 4: Relevant research and development and innovation capacity is developed and innovative research projects established.</p> <p>Output 1: The National Certificate (vocational) and N-courses are recognised by employers as important base qualifications through which young people can obtain</p>

additional vocational skills and work experience, entering the labour market with marketable skills and obtaining employment.

Outcome 2: Partnerships between the DHET, SETAs, employers, private providers and public FET colleges are resulting in increased capacity to meet industry needs throughout the country.

Outcome 3: The academic staff at colleges are able to offer relevant education and training of the required quality.

Outcome 1: A national strategy is in place to provide all young people leaving school with an opportunity to engage in training or work experience and improve their employability.

Outcome 1: Training of employed workers addresses critical skills, promoting improved productivity, economic growth and the ability of the work force to adapt to change in the labour market.

Outcome 1: Cooperatives supported with skills training and development expand and contribute to sector economic and employment growth.

Outcome 2: Partnership projects to provide training and development support to small businesses are established in all sectors and their impact reported on.

Outcome 3: Worker, NGO and community-based education programmes are supported and their impact measured and reported on.

Output 2: The programmes offered to meet industry needs, including those supporting apprenticeships and N-courses, are reviewed, updated and made available to and accessed by employers.

Output 3: A highly articulated system of qualifications between the FET and universities programmes is in place.

Output 1: The capacity of FET colleges to provide quality vocational training is reviewed. Each college has a strategic plan in place to build capacity and engage in skills development programmes, including programmes offered in partnership with employers.

Output 2: SETAs identify FET colleges with relevant programmes and put in place partnerships to offer vocational courses and work experience for college learners.

Output 1: The capacity of college educators to deliver programmes is reviewed. Skills development programmes, including work placement opportunities, are developed to meet the needs of the college educators.

Output 1: A DHET-led process, including stakeholders, develops a strategy supported by all stakeholders.

Output 2: A national database tracks training and work opportunities and reports on the implementation of the strategy.

Output 3: The DHET partners with stakeholders in the youth sector to put in place training and work experience projects for young people.

Output 1: SETA stakeholders agree on the provision of substantial quality programmes for employed workers and report on the impact of the training.

Output 2: Sector projects are put in place to address specific sector skills gaps.

Output 3: Cross-sectoral projects are established to address skills needs along local supply chains aimed at supporting local economic development.

Output 1: SETAs identify in their skills planning research, established and emergent cooperatives and their skills needs.

Output 2: Sector projects are established by sector stakeholders, supported by the NSF.

Output 3: A national database of cooperatives supported by skills development is established and the impact of training reported on.

Output 1: SETAs, through their skills planning research, identify the skills needs of small and emerging businesses in their sector and promote relevant programmes.

Output 2: Sector projects are developed that are piloted by SETAs and expanded through partnership funding.

Output 3: A national database of small businesses supported by skills development is established and the impact of training reported on.

Output 1: SETAs engage with trade unions, NGOs and community-based organisations in their sector and identify skills needs and strategies in order to address needs.

<p><i>Output 2:</i> SETAs establish quality pilot projects. <i>Output 3:</i> Stakeholders expand successful projects with support from the NSF.</p>		
<p><i>Output 1:</i> SETAs with responsibility for public sector training conduct an analysis and reflect on achievements and challenges. <i>Output 2:</i> DHET leads a discussion on the factors impacting on provision and publishes proposals on improving the institutional framework for public sector education and training. <i>Output 1:</i> Sector skills plans set out the capacity needs of relevant departments and entities. <i>Output 2:</i> Plans and funding arrangements are agreed upon between the relevant departments/entities and the SETAs, and are reported on.</p>	<p>Outcome 1: There is a thorough analysis of and reflection on the provision of education and training in the public sector and the contribution of the various role players. Outcome 2: Education and training plans for the public sector are revised and programmes are implemented to build capacity.</p>	<p>Goal 7: Increasing public sector capacity for improved service delivery and supporting the building of a developmental state.</p>
<p><i>Output 1:</i> Career guides are developed with labour market information from SETAs, addressing subsectors in their sector. <i>Output 2:</i> Sector stakeholders are engaged and programmes adjusted to meet the skills and qualification needs in order to promote comprehensive career development.</p>	<p>Outcome 1: Career paths are mapped to qualifications in all sectors and subsectors, and communicated effectively, contributing to the improved relevance of training and greater mobility and progression.</p>	<p>Goal 8: Building career and vocational guidance.</p>

Each goal in the strategy has attached to it outcomes and outputs that will be the basis for monitoring and evaluation of the NSDS's implementation and impact (DHET, 2011), and the corresponding outcomes and outputs of each goal are depicted in Table 2.4:

i) Goal 1: Establishing a credible institutional mechanism for skills planning

There is currently no institutional mechanism that provides credible information and analysis on the supply of and demand for skills. While there are a number of disparate information databases and research initiatives, there is no standardised framework for determining skills supply, shortages and vacancies, and there is no integrated information system for skills supply and demand across government (DHET, 2011).

SETAs play a vital role in gathering statistics and other relevant information on labour market skills needs and training provision. Their close contact with industry places them in an excellent position to document and communicate recent and emerging trends, as well as to develop solid baseline indicators. Such information is essential in planning to meet the country's skills needs and guiding investment in education and training provision.

South Africa, like all other countries, must seek to supplement its particular skills needs from elsewhere. While priority will be given to meeting the skills needs of our own population, there will be a need to import skills – particularly scarce skills needed for economic growth – from other parts of the world. Thus, the information gathered by the DHET, particularly from sector skills plans but also from independently commissioned labour market research, will be used on an on-going basis to advise the Human Resource Development Council, the Department of Home Affairs and other interested agencies on the country's skills priorities and the areas of particular shortages. Close communication with employers – and especially large private and public employers – will be of huge importance in this respect (DHET, 2011).

ii) Goal 2: Increasing access to occupationally directed programmes

(1) Intermediate level

South Africa's pool of intermediate skills, especially artisan skills, is too low to support national and sector development and growth. The workforce is not keeping up with the skills needed to remain competitive in an increasingly knowledge-based economy.

There is a need to ensure the continuous upgrading of skills in the workforce, to help ensure a measurable increase in the intermediate skills pool, especially in artisan, technician and related occupations, attributable to increased capacity at education and training institutions and increased workplace experiential learning opportunities. SETAs should play a prominent role in contributing towards these goals, especially through their discretionary funds (DHET, 2011).

The strategy seeks to encourage and support large corporate employers and state-owned enterprises to cooperate with the relevant education and training institutions by providing needed training equipment and experienced staff to address specific needs. Government is committed to a comprehensive curriculum review in colleges and universities of technology. Urgent measures will be instituted to enhance this cooperation and provide necessary equipment.

Workplace learning should be an integral part of all vocational programmes. Establishing effective partnerships between education and training systems and employers to provide for workplace training would ensure that skills have real labour market relevance and that young people have an early appreciation of and exposure to the world of work.

A particular focus of the NSDS III is on artisans. To facilitate the realisation of the above objectives with regard to the development of artisans, the DHET has established the National Artisan Moderating Body (NAMB) whose main statutory functions will include the following (DHET, 2011):

- setting standards for quality artisan training;
- monitoring the performance of and moderating accredited artisan trade test centres;
- developing, maintaining and applying a national databank of instruments for the assessment and moderation of artisan trade tests;
- developing and maintaining a national database of registered artisan trade assessors and moderators; and
- recommending certification of artisans to the QCTO.

The above functions of NAMB, working together with the QCTO, will go a long way to ensuring that artisan training is of a high quality and standard, and that all artisan training is subjected to a single national regime of quality assurance.

(2) Higher-level professional qualifications

Whereas the enrolment and participation rate in our university sector is higher than that of the vocational education and training sector, it is still not producing enough appropriately skilled and qualified people in disciplines central to social and economic development (DHET, 2011).

Access is a challenge. Access relates to the availability of places in relevant programmes, on the one hand, and to the constraints (social, academic, geographical and financial) facing the majority of disadvantaged university applicants, on the other.

The stakeholders will need to address the challenge of the low number of National Senior Certificate holders/high school graduates and those qualifying with a National Certificate (Vocational) at NQF level 4 who attain the required levels of competence in the identified priority areas. Post-school education opportunities, including bridging programmes and other options, require attention.

Our skills levy resources, especially the National Skills Fund, must strategically and programmatically support the production of priority skills in high-level occupationally directed programmes in the entire skills development pipeline, from universities and colleges to the workplace. In addition, the university sector must also find a way of systemically engaging in the identification of national development and economic needs, including engaging in other government processes such as IPAP2, the National HRD Strategy and the National Skills Development Strategy (DHET, 2011).

It is important to recognise the changing nature of work in what is becoming a global knowledge economy, within which South African enterprises are operating. The extent to which employers and workers benefit from the knowledge economy will be determined by our capacity to conduct innovative research and apply new knowledge in the workplace. This requires the development of research capacity, particularly research relating to building new knowledge linked to sector and national industrial plans. DHET, in collaboration with HEIs and SETAs, will be encouraging increased capacity to conduct research, as well as the establishment of sector-relevant research projects (DHET, 2011).

(3) PIVOTAL grant

Many of the professional areas of study combine course work at universities, universities of technology and FET institutions with structured learning at work. This is achieved by means of professional placements, work-integrated learning, apprenticeships, learnerships, internships, skills programmes and work experience placements. To address the critical needs for economic growth and social development, there must be improved access to and success at post-school learning sites alongside structured bridges to the world of work and quality learning in the world of work (DHET, 2011).

To give greater effect to these programmes and ensure greater employer participation, a PIVOTAL grant has also been incorporated into the NSDS III. Of the mandatory grant, 10% will be dedicated to this initiative. Employers who provide workplace-based opportunities can supplement the cost of the programme with the grant from the SETAs. The SETAs, in turn, are expected to ensure that 10% of the mandatory grants is ring-fenced to fund workplace-based training opportunities (DHET, 2011).

- iii) Goal 3: Promoting the growth of a public FET college system that is responsive to sector, local, regional and national skills needs and priorities

The public FET college system is central to the government's programme of skilling and reskilling the youth and adults. Its transformation is key to the integration of education and training and responding to the skills needs in our country. In recent years, FET colleges have been striving to make the transition from their former status as technical colleges to being responsive and vibrant post-school institutions for vocational education. Within a relatively short space of time, public colleges were merged from an inequitable assortment of 152 small individual colleges to 50 mega-institutions that which are multisite and diverse. Since then, the college sector has seen a large investment by the state through the recapitalisation process, which started in 2007. However, many challenges remain in expanding and improving capacity at FET colleges (DHET, 2011).

Another challenge is that there is limited research available that provides a nuanced picture of the colleges' systems and their strengths and weaknesses. Such research will be commissioned by the DHET. In addition, academics and research organisations are urged to identify their own research questions and conduct relevant research on the colleges and the skills training system in general. It is crucial that colleges offer a comprehensive range of programmes and measures to make learning environments more attractive, to increase

attendance, to improve (post-basic) literacy and numeracy and to increase throughput rates. Success in this will have the greatest long-term positive impact on young people's future prospects.

The strategy will purposefully support these institutions and help to build their capacity to ensure they take centre stage in skills development. The public further education and training institutions as well as universities and universities of technology should have the capacity to deliver skills for the new economy. In addition, the NSDS III encourages closer coordination and synergy between the public FET colleges and the SETAs, which should help strengthen these colleges and prioritise them in training provision (DHET, 2011).

FET colleges have a significant role in equipping their lecturers to meet industry needs. In the past, many college lecturers were qualified in the trades and occupations they were teaching but did not have appropriate teaching qualifications. In recent years, much has been done to address this situation. The current problem, however, is that although many lecturers having education qualifications, they lack occupational qualifications, relevant occupational work experience and industry contacts. Such a situation creates serious difficulties for FET colleges' efforts to align programmes to industry needs.

The new vocational programmes in colleges mark a significant move in vocational education towards high-level conceptual knowledge linked to practical application. These programmes have implications for college lecturers in terms of teaching, learning and assessment regimes. This makes it essential to nurture and develop professionals who can meet the challenge of the NCV and N-courses with the right combination of subject knowledge, pedagogy, workplace knowledge and experience. Hence a critical component of this skills strategy will be that of also focusing on upgrading college lecturers' qualifications to improve their pedagogical, vocational and technical skills and ensure that they are exposed to the latest developments and technology, both in the colleges and in industry. The DHET will work with HESA and the CHE to develop a strategy for improving academic staff's qualifications and teaching competence across all universities, universities of technology and colleges (DHET, 2011).

- iv) Goal 4: Addressing the low level of youth and adult language and numeracy skills to promote additional training

Language, literacy and numeracy skills are fundamental to improved economic and social participation, productivity and social inclusion. A high proportion of young people who exit

school before completing a senior secondary qualification stand little chance of participating productively in the economy. To illustrate the severity of the problem, there are approximately three million youths, aged between 18 and 24, who are not in employment, education or training, have a poor educational foundation and are poorly prepared to undertake further learning. If the age group is expanded to take into account the 16- to 18-year-olds who have dropped out of school and are not in training or employment as well as the 25- to 35-year-olds who have remained unemployed since leaving full-time education, the number is even higher (DHET, 2011).

These social strata of our society require a new landscape for post-school education and training, which in turn informs the NSDS III. The country cannot afford to overlook this challenge, and urgent and focused attention is required to address this problem. The DHET will establish institutional frameworks and programmes that will raise the education base of these young people to enable them to take on further learning and/or employment.

v) Goal 5: Encouraging better use of workplace-based skills development

South Africa is challenged by low productivity in the workplace, as well as slow transformation of the labour market and a lack of mobility of the workforce, which is largely the result of inadequate training for those already in the labour market (DHET, 2011).

The New Growth Path adopted by government calls for increased workplace training of workers already in employment in order to improve productivity and the overall growth and development of the economy.

To address this challenge, the NSDS III, through both the mandatory and discretionary grants of the SETAs, must support the training of employed workers, and encourage employers to expand such training, in an effort to improve the overall productivity of the economy and address skills imbalances in our workforce in particular and the labour market in general. Accordingly, the emphasis will be on the use of the levy grant system with investment into our overall skills agenda (DHET, 2011).

vi) Goal 6: Encouraging and supporting cooperatives, small enterprises, worker-initiated, NGO and community training initiatives

Skills development is not only about training people for employment, but should also empower people to create opportunities to make a living for themselves. Low levels of

education and training, as well as the lack of standardised, appropriate and accredited training, are key constraints to enabling people to create their own opportunities. They are also constraints in upscaling the contribution of cooperatives, which have historically played and continue to play a key role in providing sustainable livelihoods to the majority of South Africans. These cooperatives range from stokvels and burial societies to financial, trade and production cooperatives. The annual turnover of these cooperatives is estimated to run into billions of rand. Properly supported with adequate skills, these cooperatives can play a vital role, not only in the margins, but also in the very mainstream of the South African economy (DHET, 2011).

The NSDS III must support the training needs of the cooperatives, including relevant capacity building for the secondary, apex and cooperative movements as a whole. The Department of Higher Education and Training will work closely with the Departments of Trade and Industry, Economic Development, Land Reform and Rural Development and other relevant departments to support the training needs of cooperatives, and the DHET will support the DTI in the establishment of a Cooperative Training Academy to deliver customised skills development programmes to cooperatives. SETAs must also work with cooperatives operating in their sectors in order to maximise the economic role of these bodies (DHET, 2011). Similarly, the National Skills Fund will set aside dedicated funds to support education, training and skills development for properly registered cooperatives, with a particular focus on cooperatives for the unemployed, youth, women and people with disabilities.

In order to build an inclusive economy, financial and nonfinancial business support to small and micro enterprises has been part of the democratic government's programme. To ensure the sustainability of small enterprises, a key government agency, SEDA (Small Enterprise Development Agency), has prioritised the training of business support officers through the SEDA training academy. The FABCOS (Foundation of African Business and Consumer Services) Academy also seeks to train black business owners and franchisees. The DHET, in partnership with the DTI, will seek to develop and strengthen such dedicated skills development support programmes, in conjunction with the relevant SETAs (DHET, 2011).

Trade unions, their education programmes, as well as other worker-initiated training programmes and NGOs play a crucial role in the further education and training of workers in broader sectoral policy and capacity to effectively engage in the workplace and broader economy. Trade unions and worker education and training initiatives are able to use the critical networks of their organisations (e.g. shop stewards and union officials) to educate

their members and other workers to suit their needs in a manner that is also beneficial to the economy as a whole.

South Africa has a long history of worker education and training that needs to be supported and expanded. Worker-initiated education and training can contribute to a workforce that is better able to understand the challenges facing the economic sectors in which they operate. This would benefit the workplace, our economy and the developmental objectives of the country. The NSDS III will support NGO, community and worker-initiated skills development and training programmes. Likewise, the NSF will endeavour to support credible and quality worker skills development, education and training programmes (DHET, 2011).

vii) Goal 7: Increasing public sector capacity for improved service delivery and supporting the building of a developmental state

There have been significant advances in the transformation of the public service since 1994, particularly in relation to employment equity and the redirection of services to meet the needs of the majority of South Africans. However, the standard of service delivery is often below par. There are many views on the reason for this, but on one causal factor there is unanimous agreement - the capacity of the public sector lags far behind what is expected of it, and in many areas critical to the nation's needs, there are serious skills gaps. Achieving the goals of a developmental state requires a public service that is skilled and capable to deliver quality service efficiently (DHET, 2011).

Many efforts have been made to increase the skills levels of public service managers, officials and workers. Virtually all government departments participate in the relevant SETAs. However, they do not pay a levy to their SETAs, but contribute towards the 10% administration budget of the relevant SETAs. As the largest employer in the country, government needs to contribute to the skills development resources and ensure their skills needs are catered for in the SETA skills plans. Planning and implementation arrangements for skills development levy payment by government as well as capacity building for the public service will be reviewed by the DHET in cooperation with relevant departments including the DPSA, National Treasury and COGTA (DHET, 2011).

Historically and internationally, the public sector has played a significant role in education and training. For example, many state entities offered large numbers of apprenticeships. In many countries, municipalities also offer apprenticeships on a large scale. Similar observations can be made about the provision of ABET and for the development of high-

level skills such as planning, environmental management and engineering. However, in recent times in South Africa, the role of the state in driving skills development in these and other important areas has been below what is needed and inconsistent. It is essential for government to fulfil a key role in building skills for national development. The challenge of public sector capacity is taking on renewed importance because of the affirmation by government of the need for a developmental state, capable of intervening in the economy for the purpose of building an inclusive growth path. IPAP2 and the New Growth Path are ambitious plans that will require the development of particular skills in government. Similarly, achieving the priorities of government with regard to health, education and reducing crime, will require a skilled and capable public service (DHET, 2011). It is thus vital that SETA plans should be based not only on the needs of the sectors in which they have responsibility, but also on the needs of the government departments and entities that are engaged in sector economic and industrial planning.

viii) Goal 8: Building career and vocational guidance

There has not been much emphasis, particularly at school level, on career and vocational guidance for our youth. The result is that young people in particular may opt for a programme because it is marketed or there is financial aid. There is a lack of guidance to direct young people to programmes for which they have an aptitude, and which will provide training in areas needed in the economy (DHET, 2011). Our entire skills development system must dedicate the necessary resources to support career and vocational guidance, because this has proven to be a critical component in successful skills development initiatives worldwide. Both the SETAs and the NSF respectively must seek to build career guidance initiatives in their sectors and generally as a key component of the NSDS III.

2.3.5 Human Resource Development Strategy for South Africa (HRDSSA)

The HRDSSA I was an overarching plan to coordinate both private and public sector approaches to education and skills development (DoL, 2001). It sought to maintain the individual responsibility of each line ministry in the various parts of the human resource development system, while ensuring a common strategic focus and an enabling policy framework. The joint launch of the HRDSSA I on 23 April 2001 by both the Minister of Labour and the Minister of Education, reinforced the resolve to establish an integrated education, training and development strategy that would harness the potential of South Africa's young and adult learners. The HRDSSA I was aimed to coordinate education, skills development, the supply and demand forecasting of skills, employment growth and national

systems of innovation, research and development (NSDH, 2009). It endeavours to ensure effective coordination and integration of policies across government. The section below discusses the HRDSSA I, which was subsequently revised during 2007.

2.3.5.1 *Human Resource Development Strategy for South Africa (HRDSSA I) (2001)*

This strategy had its origins in the RDP, which declared the following as one of its key principles:

Our people, with their aspirations and collective determination, are our most important resources. The RDP is focused on our people's most immediate needs, and it relies, in turn, on their energies to drive the process of meeting these needs. Development is not about the delivery of goods to a passive citizenry. It is about active involvement and growing empowerment (DoL, 2001, p. 4; Erasmus et al., 2010, p. 60).

Following on from this statement, the development of human resources was identified as one of the five key programmes of the RDP. This strategy was deemed innovative, and attempted to ensure that South Africa meet the needs of its economy and a new democratic order. It signalled government's determination to give practical effect to this commitment to RDP. The strategy was underpinned by a set of institutional arrangements, including the SETAs, and the reshaping of further and higher education. The overarching goals of the strategy were ambitious, including an improvement in the Human Development Index for South Africa, a reduction in inequality and a higher position on the international competitiveness table (DoL, 2001, p. 4). The overall vision of the strategy was "*A nation at work for a better life for all*". Its key mission was "*to maximize the potential of the people of South Africa, through the acquisition of knowledge and skills, to work productively and competitively in order to achieve a rising quality of life for all, and to set in place an operational plan, together with the necessary institutional arrangements, to achieve this*".

The strategy consisted of the following five strategic objectives:

- Improving the foundations for human resource development.
- Improving the supply of high-quality skills (particularly scarce skills) which are more responsive to societal and economic needs.
- Increasing employer participation in lifelong learning.

- Supporting employment growth through industrial policies, innovation, research and development.
- Ensuring that the four strategic objectives of the HRD strategy are linked.

The HRD strategy was defined in terms of the concept of work, which refers to self-sufficiency, freedom from hunger and poverty, self-expression and full citizenship (DoL, 2001). However, to ensure success in effecting the change as indicated in the above objectives, the South African government qualified each element mentioned in the definition of HRD strategy. These were as follows:

- The aim is to end poverty and promote economic growth that will improve South Africa's ranking of 111 on the Human Development Index, which measures life expectancy, educational attainment and adjusted real income.
- The capabilities of people remain a limiting factor in the attainment of socioeconomic development.
- There is a belief that enhancing the general and specific abilities of all citizens is a necessary response to South Africa's current situation.
- Potential citizens need, among other things, knowledge and skills as well as the opportunities in which to apply their acquired knowledge and skills.

A schematic representation of the critical components of the HRDSSA I is presented in figure 2.1.

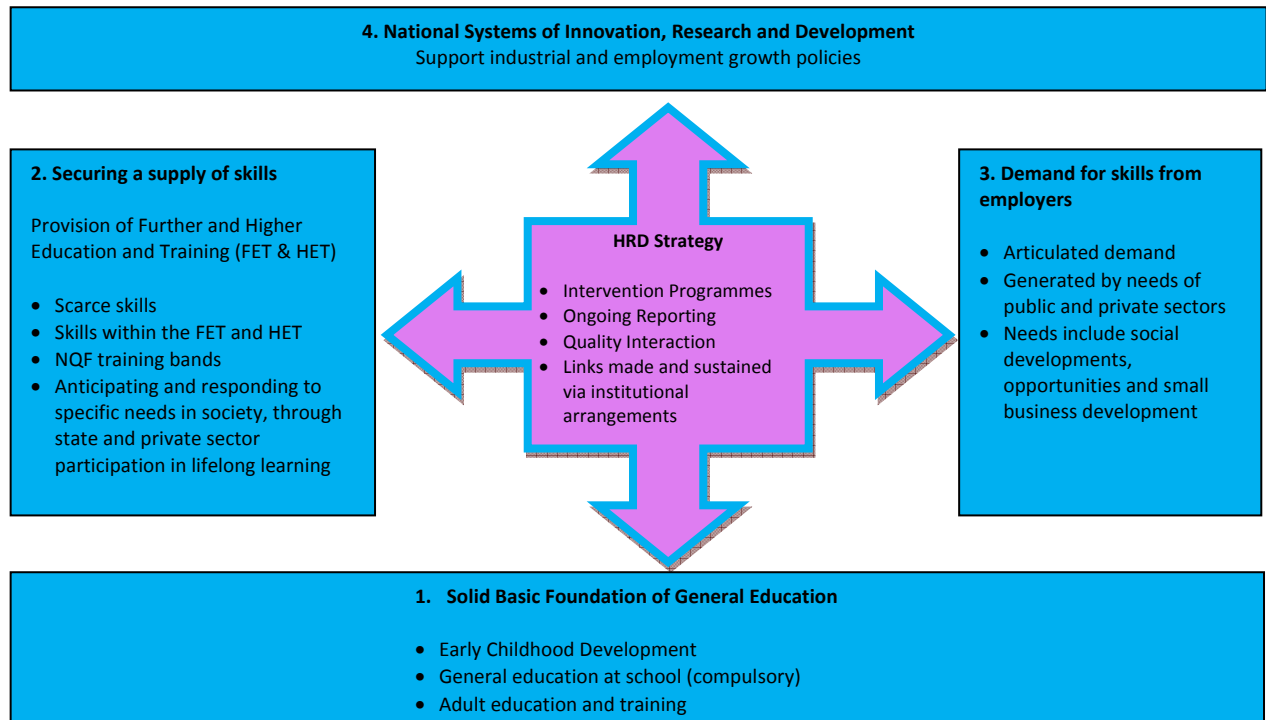


Figure 2.1. National Human Resource Development Strategy for South Africa I (DoL, 2001)

Achieving the objectives of the HRD depends on the effective coordination of the solid foundation, securing a supply of skills (especially scarce skills such as science, engineering and technology) and securing the demand for skills as well as a vibrant research and innovation sector that supports industrial and employment growth policies (DoL, 2001).

It is clear from figure 2.1 that the HRD performs a strategic role in ensuring that the necessary linkages between each of its component parts are maintained. A strategy of this kind requires cooperation and strategic engagement between government departments, employers and organised labour (DoL, 2001). Because of this strategy, an increased focus was apparent on the responsibility of both the Departments of Education and Labour towards the development and management of education and training policies, on the one hand, and skills development, on the other.

One of the key success indicators of the HRDSSA I is improvement in the Human Development Index (HDI) for the country. The HDI measures life expectancy, literacy, educational attainment and GDP per capita. It is used as a standard assessment of human development by the United Nations Development Programme and to classify countries into “developing” and “developed” categories (NSDH, 2009). Table 2.5 provides data comparing South Africa’s HDI with those of other countries.

Table 2.5

South Africa's Human Development Index (UNDP, 2009)

HDI value	Life expectancy at birth (years)	Adult literacy rate (% ages 15 and above)	Combined gross enrolment ratio (%)	GDP per capita (PPP US\$)
1. Norway (0.971)	1. Japan (82.7)	1. Georgia (100.0)	1. Australia (114.2)	1. Liechtenstein (85,382)
127. Tajikistan (0.688)	156. Malawi (52.4)	78. Saint Vincent and the Grenadines (88.1)	75. Saint Lucia (77.2)	76. Lebanon (10,109)
128. Namibia (0.686)	157. Uganda (51.9)	79. Dominica (88.0)	76. Mauritius (76.9)	77. Saint Lucia (9,786)
129. South Africa (0.683)	158. South Africa (51.5)	80. South Africa (88.0)	77. South Africa (76.8)	78. South Africa (9,757)
130. Morocco (0.654)	159. Cameroon (50.9)	81. Namibia (88.0)	78. Georgia (76.7)	79. Brazil (9,567)
131. Sao Tome and Principe (0.651)	160. Niger (50.8)	82. Sao Tome and Principe (87.9)	79. Egypt (76.4)	80. Macedonia (the Former Yugoslav Rep. of) (9,096)
182. Niger (0.340)	176. Afghanistan (43.6)	151. Mali (26.2)	177. Djibouti (25.5)	181. Congo (Democratic Republic of Congo) (298)

As indicated in Table 2.5, the 2009 HDI rating for South Africa was 0.683, which gave the country a ranking of 129th out of 182 countries in the world (UNDP, 2009), a quantum leap from being ranked 103 in 2001 at the time of the launch of the NHRDS 1.

2.3.5.2 *National Human Resource Development Strategy for South Africa (HRDSSA II) (2010–2030)*

The persisting skills development challenge in South Africa triggered a revision of an earlier initiative (HRDSSA I) to establish a Human Resources Development (HRD) umbrella framework to embrace both education and training and to improve the alignment between them. The first such initiative as reported earlier had taken place in 2001, but it failed to achieve articulation between education and training. Hence on the back of the Joint Initiative for Priority Skills Acquisition (JIPSA) initiative, in 2008, a process was initiated to formulate the HRDSSA II (DoE, 2008).

This revised HRDSSA II takes over and formalises many of the initiatives and structures fostered under the JIPSA, which ended in March 2009. This process culminated in the publication of a second draft HRD strategy at the end of 2008 on which public comments were requested during the December holiday period – the urgency clearly being prompted by the impending April 2009 election (Bird & Heitmann, 2009).

The previous South African government administration's Cabinet (2004–2009) approved the draft strategy in March 2009, and it was reviewed in order for it to be aligned with the

priorities, structure and the Medium Term Strategic Framework (MTSF) of the new government, which took office in April 2009. The new National HRD strategy 2010 to 2030 was unveiled in March 2010 by the Ministry of Higher Education and Training. This strategy begins by drawing on international lessons from the United Nations – quoting from the 1989 General Assembly resolution 44/213:

“... human resources development is a broad concept ... requiring integrated and concerted strategies, policies, plans and programmes to ensure the development of the full potential of human beings ... so that they may, individually and collectively, be capable of improving their standard of living” (United Nations Programme in Public Administration and Finance, 1995, p. 5, cited in DHET, 2010b, p. 8).

It then cites at length the overview of the evolution of perspectives on HRD in the UN General Assembly from the same source. In so doing, it clearly seeks authority as well as guidance for its proposed strategy. It also cites the UNDP’s Human Development Index (HDI), which is widely used to compare the level of human development between countries: “This index provides a useful measure of progress toward achieving greater levels of development within a country” (DHET, 2010b, p. 16).

It then analyses the detailed decomposition of South Africa’s 2005 HDI using the UNDP (2007) and UNESCO (2007) data – although, given the composition of the HDI, they did not then proceed to align proposed interventions with these measures – a matter which the international community may consider addressing by developing an HRD-specific index, with skills development overtly referenced. This HRD strategy goes on to identify a 20-year strategic framework, with associated 15 strategic priorities for improvement and a five-year MTSF with 8 commitments yet only 2 below, each associated with a set of indicators for monitoring and evaluation purposes. Whilst these indicators strive for improved levels of articulation, they do not build interdependency between the labour market and institutional mandates, as commitment 2 (strategic priority 2.1) illustrates:

Commitment 1: We will urgently overcome the shortages in the supply of people with the priority skills needed for the successful implementation of current strategies to achieve accelerated economic growth:

Strategic priority 1.1: To accelerate training output in the priority areas of design, engineering and artisanship that is critical to the manufacturing, construction and cultural industries.

Strategic priority 1.2: To increase the number of skilled personnel in the priority areas of design engineering artisans who are critical to manufacturing, construction and cultural activities through net immigration.

Strategic priority 1.3: To accelerate the number of new training graduates in priority economic sectors identified in ASGISA, the NIPF and IPAP.

Commitment 2: We will increase the number of appropriately skilled people to meet the demands of our current and emerging economic and social development priorities:

Strategic priority 2.1: To ensure that skills development planning is credible, integrated, coordinated and responsive to social and economic demands.

(a) To ensure that enrolment planning for Further Education and Training (FET)/Higher Education and Training (HET) is guided by a coordinated master scarce skills list:

- Lead responsibility: Department of Higher Education and Training.

(b) To ensure that planning for Sector Education and Training Authority (SETA) skills development is based on a coordinated master scarce skills list:

- Lead responsibility – Department of Higher Education and Training.

Strategic priority 2.2: To ensure that skills development programmes are demand led through substantive and systematic input from employers in the determination of skills demands for the country.

Strategic priority 2.3: To improve the employment outcomes of post-school education and training programmes.

Strategic priority 2.4: To ensure that FET and HET are responsive to the skills demands arising from South Africa's social and economic development imperatives.

The commencement date for the implementation of the HRDSSA II was 1 April 2010 (the beginning of government's 2010/2011 financial year) (DHET, 2010b). Arguably, Bird and Heitmann (2009) detected parallelism, which is evident in many of the indicators of the HRDSSA II. Therefore, whilst leaning in the right direction, the strategy still falls short of driving an "integrated, coordinated and responsive" system to education and training

challenges facing South Africa. However, with the transfer of the Skills Development Unit from the Department of Labour to the newly established DHET, this challenge of parallelism could be easily be addressed going into the future.

2.3.6 Alignment of the NSDS III (2011–2016) and the HRDSSA II (2010–2030)

Figure 2.2 shows how the NSDS III and the HRDSSA II are integrated. The DHET plays a custodian role for both the NSDS III and the HRDSSA II and draws advice from both the HRD Council (HRDC) and the National Skills Authority (NSA). The Human Resource Development Council was inaugurated in March 2010 and is the oversight body responsible for the HRDSSA II. However, SETAs are responsible for the implementation of the NSDS III. Each SETA is required to develop a Sector Skills Plan (SSP) within the framework of the NSDS. The successful implementation of the SSPs will determine the outcome of the NSDS III. The NSDS III is the overarching strategic instrument for skills development and guide sector planning, and is a significant component of the HRDSSA II. The success or failure of the NSDS III will ultimately determine the success or failure of the HRDSSA II.

The NSA draws inputs from various stakeholders including organised labour, organised business and organised community in order to determine the national skills development priorities. These priorities are then cascaded down to various sectors (SETAs) and are used as a basis to finalise the NSDS in order to determine sector skills planning. The same priorities are integrated with the MTSF strategic priorities, which form part of the HRDSSA II. At this level of integration, the HRDC is the coordinating structure and plays an oversight role in the implementation of the HRDSSA II priorities. The new occupational learning system in South Africa will be introduced and discussed in the next section.

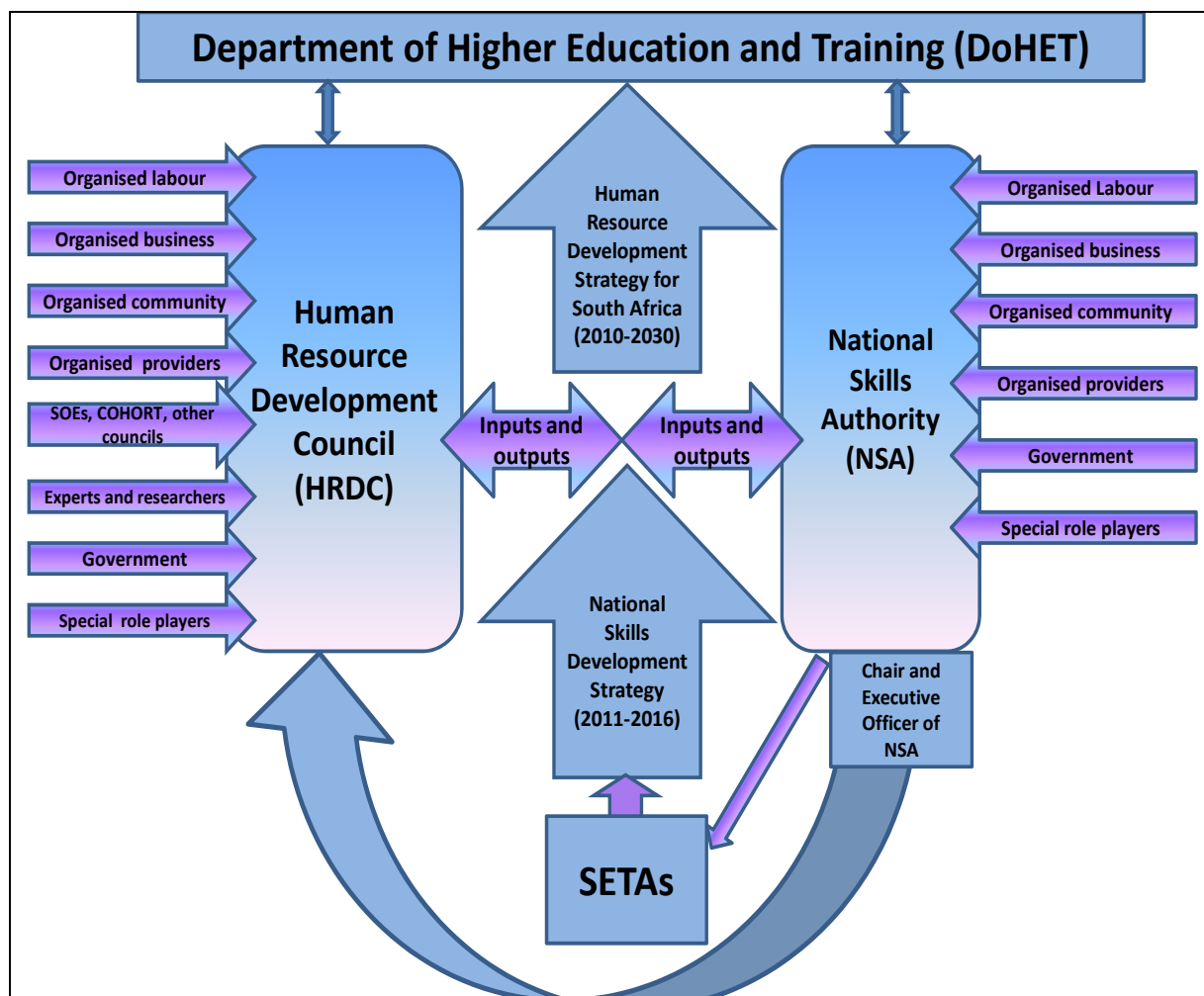


Figure 2.2. An integration of the NSDS III and HRDSSA II

2.4 SOUTH AFRICAN OCCUPATIONAL LEARNING SYSTEM

The new South African occupational learning system (OLS) represents the most advanced thinking and evolution of knowledge and experience of skills development in South Africa since the inception of the NQF in 1995. The new skills development system streamlines and simplifies training institutions and processes in the country. It aims to reduce wastage of time and resources, and focus the system on meeting the real-time skills demands of the labour market. The sections below discuss the occupational learning system and its key elements.

2.4.1 The development of occupational learning in South Africa

The year 1994 marked a watershed and complete revolution for the marginalised and discriminated communities in South Africa. Subsequent to this revolution, the country still faces deeply rooted social and economic problems (Vorwerk, 2005). It has to reduce the levels of poverty and unemployment; it has to restructure the education and training

systems; and it has to achieve employment equity and black economic empowerment targets at a rate that is faster than the slow and informal pace at which experience is normally accumulated for progression at work. In order to deal effectively with these problems, the country cannot wait for a new generation of learners to progress at a measured pace through formal education and training (Vorwerk, 2005). Innovation is required to tackle these problems. South Africa has introduced a new system of skills development known as occupational learning.

The Occupational Learning System (OLS) came into being as a result of the latest edition of reforms in skills development policy, an on-going project in the post-democratic South Africa. The purpose of the new approach is to integrate South Africans who have been disadvantaged by politics, financial constraints or social pressure into a learning system that accelerates the redress of past unfair discrimination in education, training and employment opportunities; and thereby contributes to the full personal development of each learner and the social and economic development of the nation at large (Republic of South Africa, 1995).

The recently enacted Skills Development Amendment Act (Republic of South Africa, 2008a) ushered in this new system of occupational learning in South Africa. This innovative way of learning was triggered by increasing pressure to integrate education and workplace training, something that proved difficult to achieve during the first two phases of the NSDS. According to Bird and Heitmann (2009), the NSDS was a closed system, whose implementation reach was circumscribed by the scale of levy funds collected and the inability of these funds to reach those public providers principally responsible for training in many of the critically scarce skills areas such as engineering.

On the reverse side, public provision was still predominantly supply led, without nuanced leavers to respond to demand. The disarticulation between the two had also hampered the delivery of apprenticeships resulting in a critical shortage of craft skills. The result is that key skills needs, including those for social development (such as civil engineers for local government), are critically in short supply in the South African economy.

Furthermore, there is clear evidence of a systemic disconnect between education institutions and training programmes, on the one hand, and employer expectations or labour market needs, on the other (Vorwerk, 2005). This disconnect requires the development of systemic linkages between the labour market and further and higher education in order to successfully address the issue of scarce skills and unemployment. The linkages will enable the learning

system to collect and provide information on skills needs, changes in occupational profiles, and the requirements for new occupations.

According to Vorwerk (2005), if education and training institutions were to be supplied with the information on the changing needs of the labour market, they would be in a better position to align their programmes with labour market needs, and the education and training provision would then become more responsive and relevant to the labour market. It is mainly for this reason that the OLS was conceptualised.

The OLS is a new approach to skills development focusing on job-related qualifications. However, in the post-democratic South Africa, the first major attempt to redesign learning to make it more relevant to the needs of workers and employers was legislated in 1995 with the repealed South African Qualifications Authority Act. This repealed legislation ushered in the NQF, which was subsequently followed by a set of skills development systems and structures broadly guided by the NSDS.

Despite the NQF, the NSDS, large budgets and the hard work of many people, South Africa still finds itself unsuccessful in meeting its need for skilled workforce, its need to transform that workforce and the need to provide basic services to its people (NSDH, 2009). The next section outlines the components of the OLS.

2.4.2 Components of the OLS

The OLS in South Africa consists of several components as depicted in figure 2.3 and discussed below.

2.4.2.1 *The labour market*

South Africa's labour market has undergone a transformation since 1994, with the emphasis on strategies eliminating the labour inequalities of the past and improving general working conditions for all South Africans. This labour market is characterised by an oversupply of unskilled workers and a shortage of skilled ones. It is the source of the demand for skills, and it is an end point for occupational graduates (NSDH, 2009).

It is a valuable source of information that provides insight into role players regarding the decline of certain occupations and changing skills needs in occupations. All this information

provides vital signals that role players should heed if they are to invest in relevant learning opportunities.

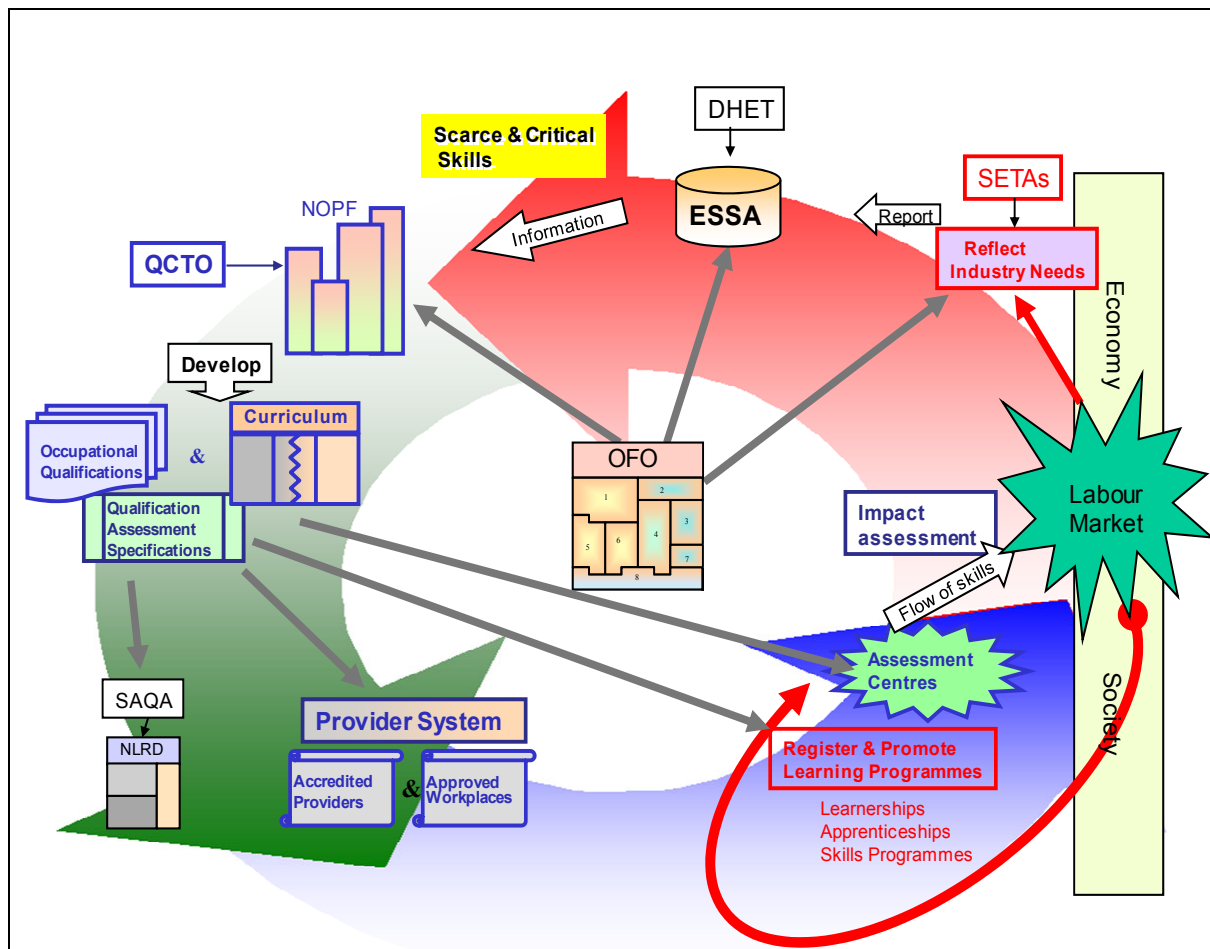


Figure 2.3. A demand-driven occupational learning system in South Africa (Vorwerk, 2009, p. 5; Vorwerk, 2010a, p. 12)

2.4.2.2 Reporting system and framework

This system and framework are essential to capture accurate, real-time data from the labour market and report on it in a language and format that facilitates the design and improvement of appropriate learning solutions (NSDH, 2009). The following are the system and framework for labour market data management in the new OLS dispensation in South Africa.

a) Employment Services South Africa (ESSA)

ESSA is an electronic application system deployed by the Department of Higher Education and Training that aims to facilitate employment (NSDH, 2009). All employers and private employment agencies are required daily to register job vacancies with ESSA as and when

they arise. Potential employees can register and search for job opportunities. The placement of individuals is also managed through the application system. As part of its mandate, ESSA is responsible for consolidating sector-based information coming from SETAs, which is itself consolidated from the individual workplace skills plans of organisations belonging to each sector. For example, in the banking sector, each bank will provide skills development information on its workplace skills plan, which is submitted to BankSETA. BankSETA then consolidates the information for subsequent referral to ESSA.

b) Organising Framework for Occupations (OFO)

The OFO is a skills-based coded classification system, which encompasses all occupations in the South African context (ISETT, 2007).

NSDS	NQF	OFO	OFO Major Groupings			
A D V A N C E D	10	5	1. Managers		2. Professionals	
	9					
	8					
	7	4	5. Clerical & Admin Workers	6. Sales Workers	4. Community & Personal Service Workers	3. Technicians & Trades Workers
	6					7. Machinery Operators & Drivers
I N T E R - M E D I A T E	5	3				
	4					
E N T R Y	3	2				
	2					
	1	1	8. Elementary Workers			

Figure 2.4. How the NQF links up with the NSDS and OFO (DoL, 2009c, p. 3)

The OFO is built on similar principles to those of the South African Standards Classification of Occupations (SASCO), which is familiar to all players through its use by Statistics South Africa (Stats SA) in October Household and Labour Force Surveys. It is a framework for categorising all occupations and groups of occupations from entry level to advanced levels of competence, and its purpose is to promote labour market dialogue through the establishment of a common language for talking about skills demand and supply (NSDH,

2009). This framework is cross-sectional so that snapshots of occupational supply and demand can be analysed at national level. It clusters specialisations within an occupation, which allows broad occupational problems and solutions to be more easily identified and understood. Figure 2.4 shows how the NQF links up with the NSDS and OFO.

The classification of occupations is based on a combination of skills level and skills specialisation, which makes it easy to locate a specific occupation in the framework (ISETT, 2007). A skills construct is used in the context of competency rather than a description of tasks or functions. Figure 2.5 indicates the various occupational groupings.

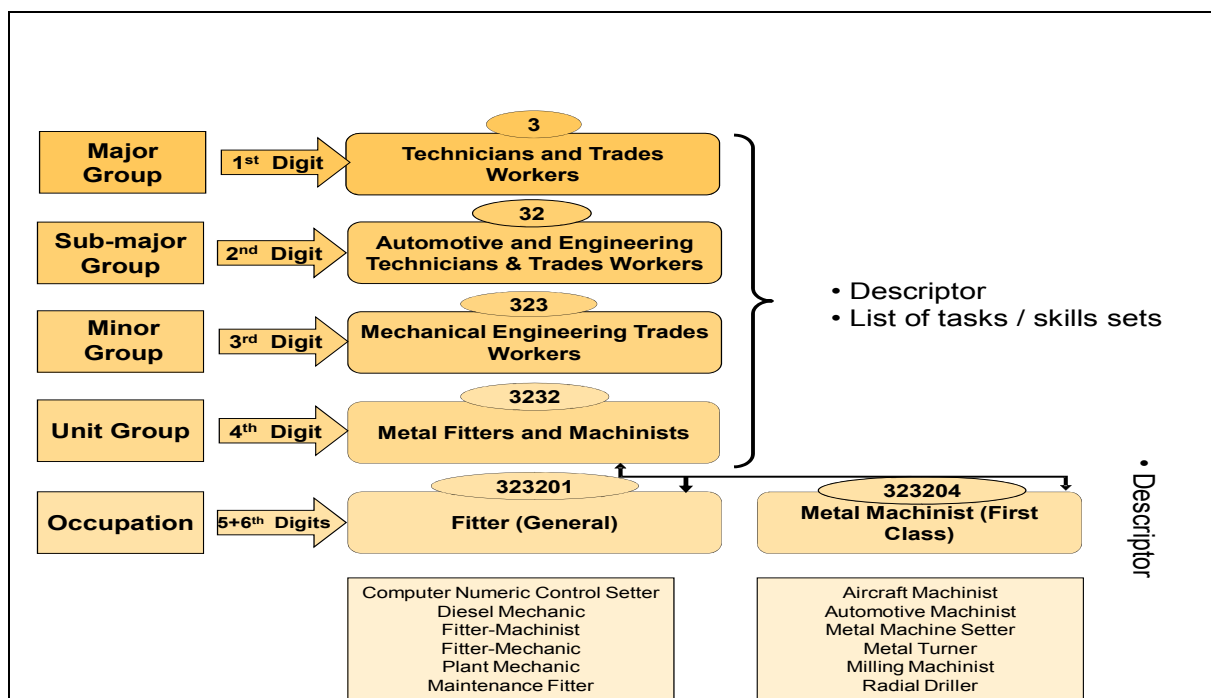


Figure 2.5. A clear description of an occupation in terms of the new OFO (DoL, 2007a, p. 7)

The skills level of an occupation is related to competent performance of the tasks associated with an occupation. A comparison can therefore be made between the skills level of an occupation and the general education level associated with that occupation on the NQF as well as with the entry, intermediate and advanced levels referred to in the NSDS, as illustrated in figure 2.4. The skills level of an occupation is a function of the field of knowledge required, the tools and equipment used, the materials worked on and the goods or services provided in relation to the tasks performed.

Based on skills level and skills specialisation, occupations are divided into major (one digit), sub-major (two digits), minor (three digits) and unit (four digits) groupings as illustrated in figure 2.5. Occupations (six digits) are subdivisions of the unit groups and further detailed

through specialisation and alternative occupational titles (ISETT, 2007). The OFO indicates that detailed level of specialisation by the use of the singular form at the occupation level, whereas all other groupings (major or units) are expressed in the plural. Figure 2.6 illustrates the value of aligning occupations to training interventions in terms of the new OLS.

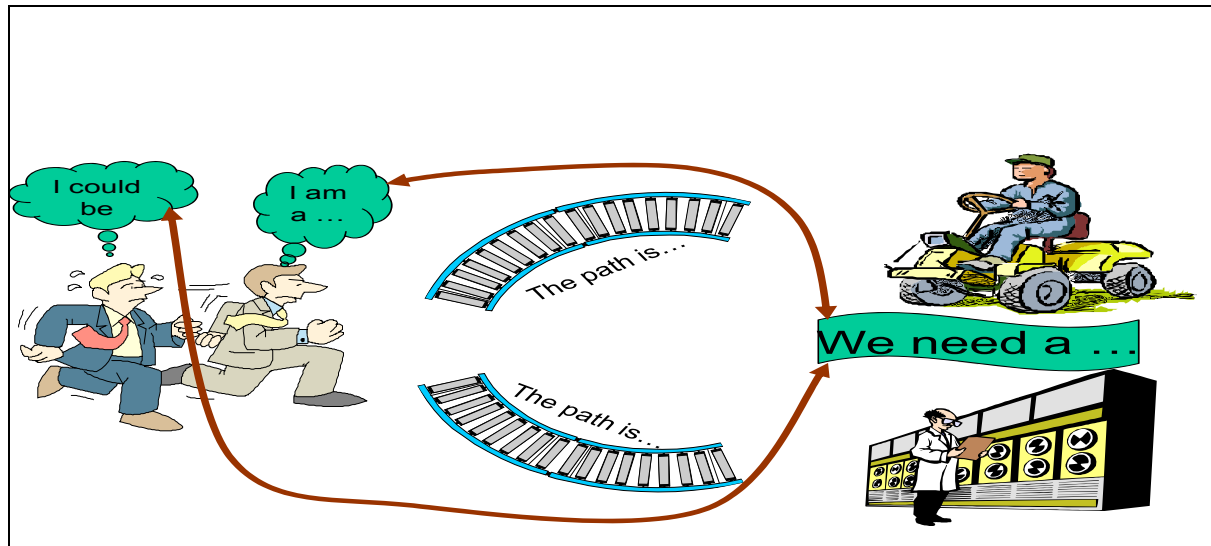


Figure 2.6. Linking industry needs to training interventions and job opportunities (DoL, 2007a, p. 10)

2.4.2.3 Planning and management systems

These systems are used to interpret the information gathered and structured by the reporting system and frameworks so that matching learning intervention can be designed (NSDH, 2009).

a) Occupational Qualifications Framework (OQF)

This is a new sub-framework in the NQF that provides a structure for designing, delivering and assessing learning that is highly responsive to the needs of workplaces and the social development sector in contrast to the other two qualification frameworks, which are focused on learning for foundational knowledge and skills, and academic or discipline-based knowledge and research (NSDH, 2009). The OQF covers all NQF levels with regard to all occupational qualifications and related skills sets. The details are provided in figure 2.7.

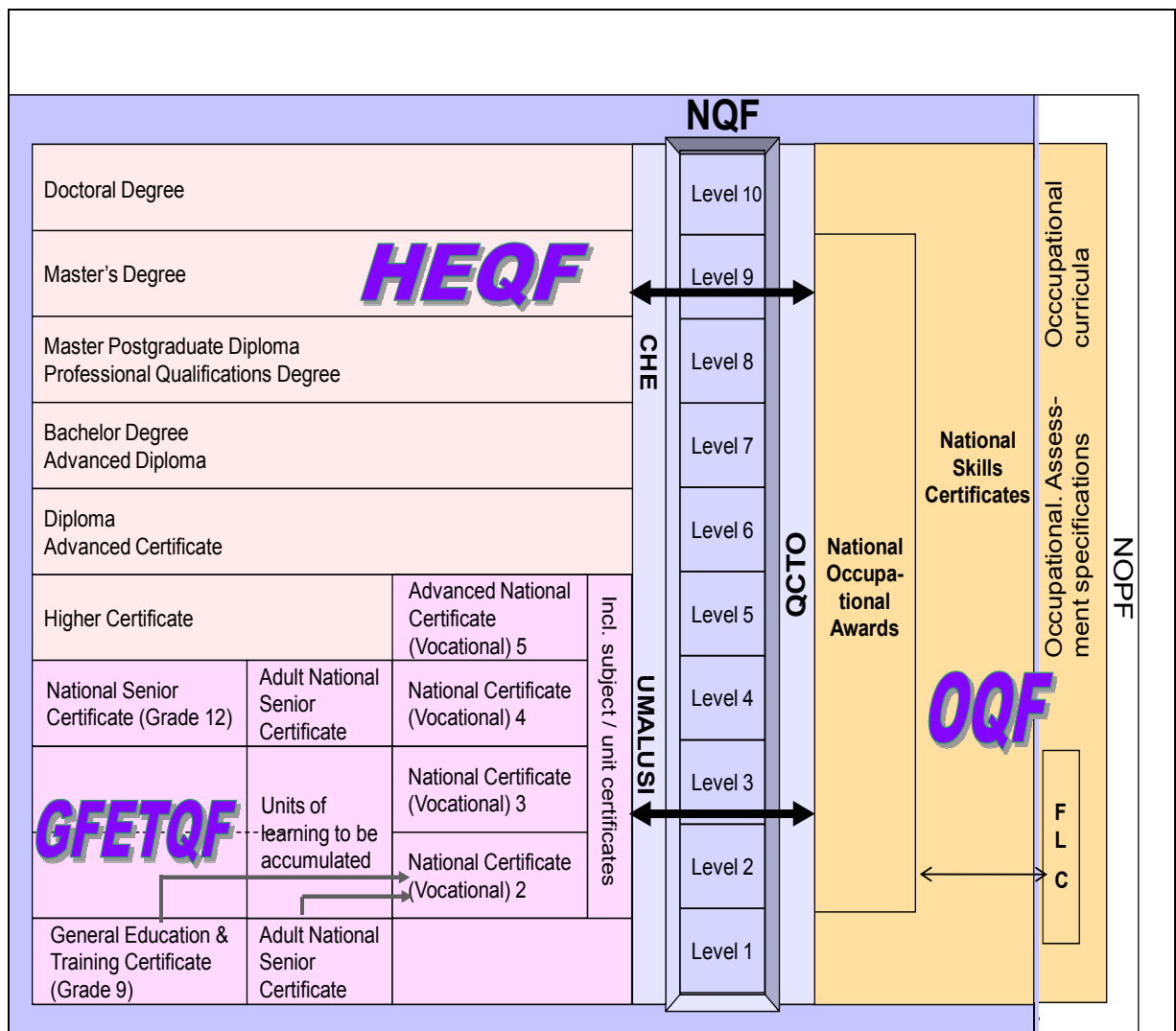


Figure 2.7. How the NQF is linked to the OQF (DHET, 2010c, p. 28)

b) National Occupational Pathways Framework (NOPF)

The NOPF is used to take the analysis provided by the OFO data and translate it into appropriate skills development strategies and interventions (NSDH, 2009). While the OFO interfaces with the labour market and helps to provide an understanding of occupational changes in the labour market, the NOPF interfaces with the NQF, and seeks to respond to the patterns and trends with matching skills interventions.

The NOPF is a mapping of the OFO data on to NQF levels, and the clustering of skills-related occupations, so that vertical progression (within occupations) and horizontal progression (across occupations) can easily be achieved. It allows for the simple translation of the data from the ESSA into appropriate skills development strategies and interventions.

c) Sector Skills Plans (SSPs)

By law, all SETAs are required to develop (SSPs) outlining their skills priorities and possible interventions to achieve these skills (Republic of South Africa, 1998b). SSPs combine the skills plans and training reports of individual member organisations in their sectors, consolidate them into a sectoral snapshot and add research to arrive at a strategic skills development plan for the various SETAs. This includes an analysis on skills supply, skills demand, critical and scarce skills and the challenges and opportunities that lie ahead.

2.4.2.4 *Learning systems*

These are used to take the data on skills needs and develop appropriate learning solutions to match them. Learning systems include the following:

a) Quality Council for Trades and Occupations (QCTO)

This is a quality assurance and standards-setting body responsible for occupational qualifications. It assumes overall responsibility for the quality assurance functions that were previously given to SETA ETQA bodies and professional bodies ETQAs, and may delegate some of these functions back to the SETA quality assurance divisions (NSDH, 2009). This body must collaborate with the other two quality councils to enable learners to move across the three sub-frameworks of the NQF. The primary function of the QCTO is to establish and manage its sub-framework (the OQF) to ensure quality in the design and development of occupational qualifications, and the delivery, assessment and certification processes required to develop occupational competence (Republic of South Africa, 2008a). Both functions must be performed in support of labour market skills needs. The other two quality councils are Umalusi (for General and Further Education and Training) and the Council for Higher Education (CHE) as indicated in figure 2.7.

b) Communities of Expert Practice (CEP)

CEPs are groups of expert practitioners who are currently practising in occupations and who will be convened to contribute to the development and quality assurance of occupational qualifications (Van Rooyen, 2009). Practitioners are involved in the quality assurance and standards-setting responsibilities of the QCTO to ensure that occupational qualifications remain relevant and responsive to the labour market skills needs. Working jointly with skills development providers and facilitators, they design and develop occupational qualifications,

curricula and qualification assessment specifications. They replace the SGBs that were central during the first NQF (NSDH, 2009). Practitioners participating in these processes must be knowledgeable about the current practice of their occupation.

c) Occupational qualification

An occupational qualification is a work-relevant qualification, which encapsulates the response of the OLS to labour market needs (NSDH, 2009). It represents the achievement of a planned combination of learning outcomes, which is intended to provide qualifying learners with the applied competence to practise an occupation and provide a basis for further learning. This qualification is designed by expert practitioners currently practising the occupation and is registered with the NQF. It combines knowledge, practical skills and work experience skills into a meaningful, integrated description of what it means to be competent in an occupation. It contains more detailed information relating to curriculum, delivery and assessment than previous kinds of NQF qualifications and therefore promotes a more consistent and credible kind of qualification.

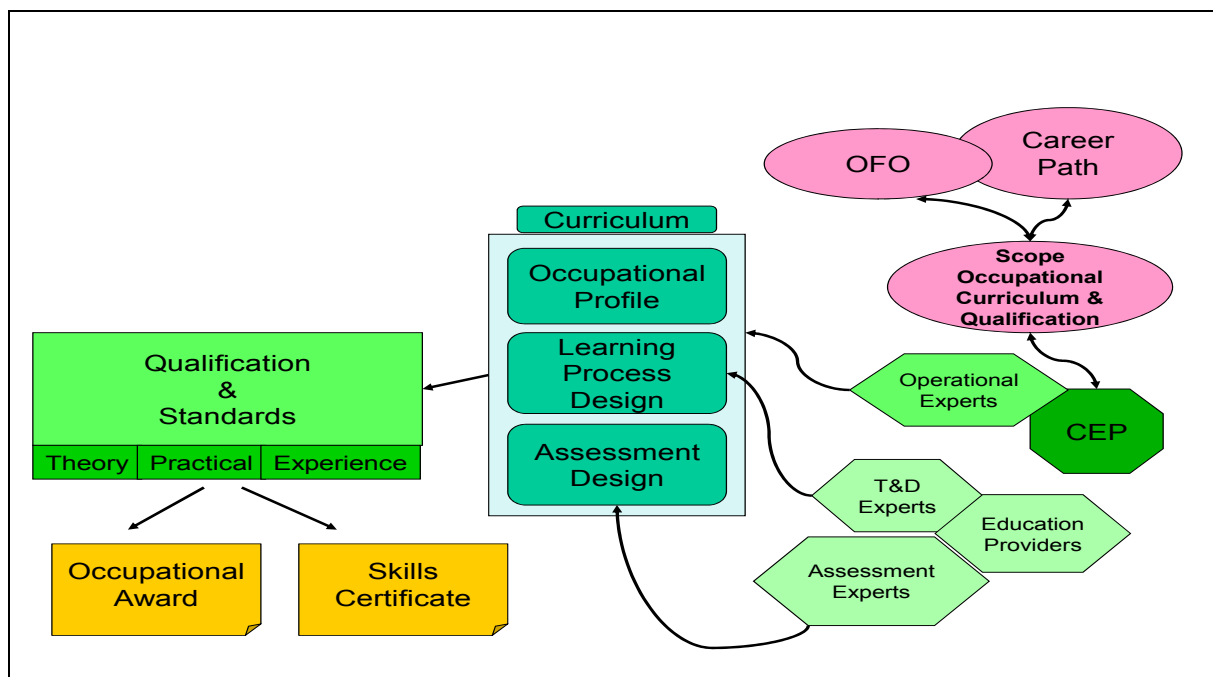


Figure 2.8. The process of qualification development under the new OLS (DoL, 2009b, p. 5)

There are two types of occupational qualifications issued in the OQF (Republic of South Africa, 2008a), namely National Occupational Awards and National Skills Certificates as indicated in figures 2.7 and 2.8. The National Occupational Awards certify achievements in terms of competence relating to a specific occupation, for example, Ships Master –

specialisation “Harbour Pilot”. In order to obtain the qualification, people with a National Occupational Award must have experience working in the occupation and proven competence in its workplace experience component, as well as its theory and practical components.

The National Skills Certificates certify a distinct occupationally related set of skills, for example, National Skills Certificate - Manage Loan Portfolios level 4. A clear illustration of the occupational qualifications development under the new OLS is provided in figure 2.8, while the subsequent structure of an example of an occupational qualification is illustrated in figure 2.9 and described below:

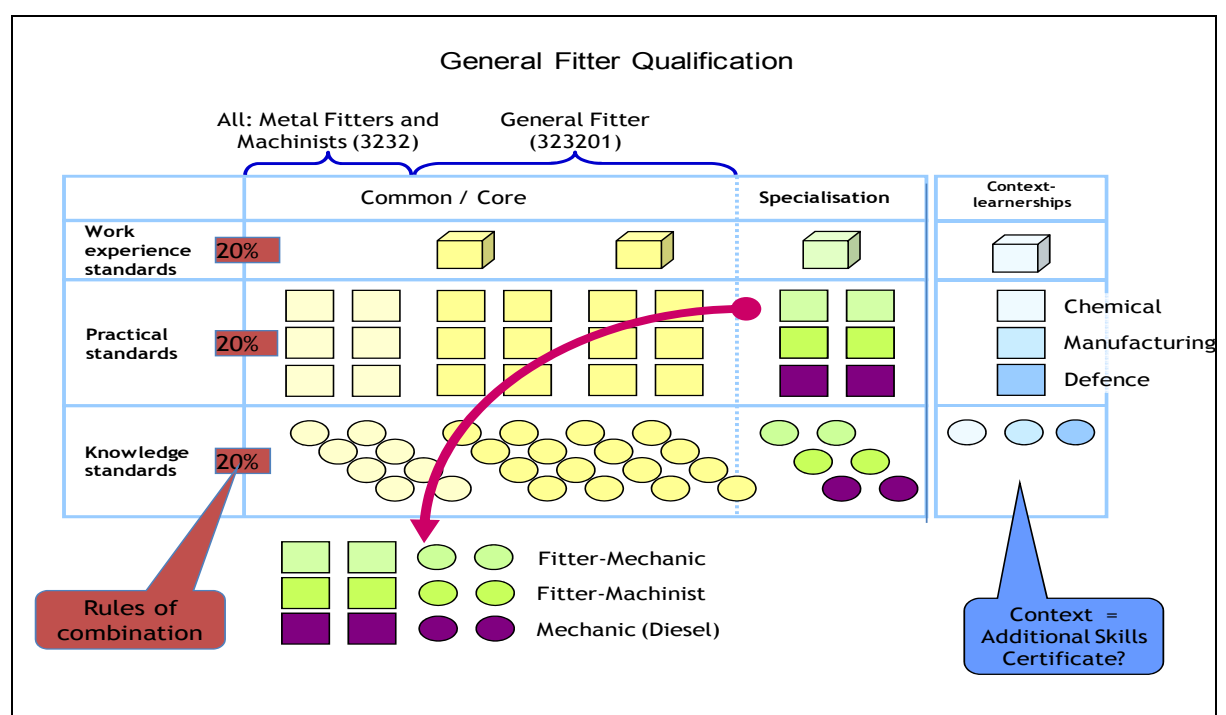


Figure 2.9. Structure of an occupational qualification (Vorwerk, 2010a, p. 43; 2010c, p. 11)

Each of the occupational qualifications must reflect three modes or forms of learning (DHET, 2010c; DoL, 2008b) as illustrated in figure 2.10:

- the acquisition of general knowledge and theory (plus specialised and contextual theory and knowledge);
- the acquisition of general and occupationally relevant practical skills; and
- the requisite work experience in an occupationally relevant context.

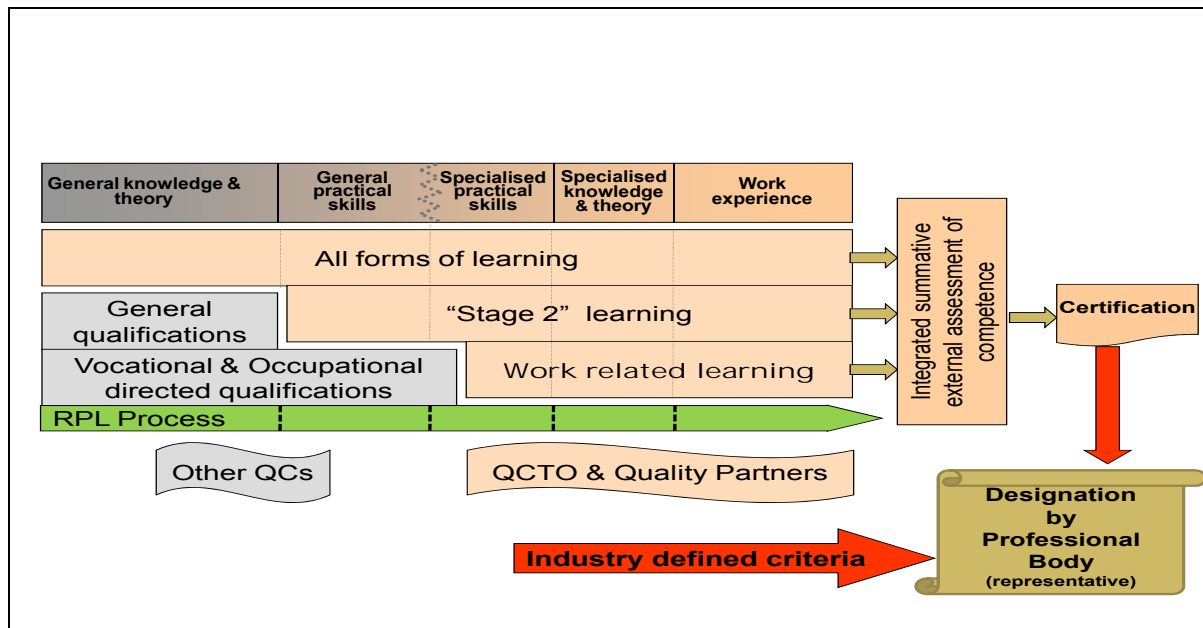


Figure 2.10. Scope of occupational qualification (DHET, 2010c, p. 6; Vorwerk, 2010a, p. 15)

The development of occupational qualifications and a curriculum is a systematic process involving multiple stakeholders. As indicated in figure 2.11, the process of occupational qualification development is initiated at industry level by constituents, SETAs or an association or professional body based on existing needs. An application for qualification or curriculum development is then forwarded to the QCTO, which sets the process in motion. Key stakeholders including a curriculum/qualification development facilitator, a qualifications development partner and an assessment quality partner are identified and become involved in the process (DHET, 2010c).

The curriculum/qualification development facilitator guides and directs various working groups, which are responsible for the development of an occupational profile, a learning process design and assessment specifications. These working groups collaborate with the CEPs. The result of this process is an occupational curriculum and qualification. The curriculum/qualification development facilitator, with inputs from CEPs, compiles and submits the development process report, including occupational curricula, qualification assessment specifications and occupational qualifications, to the qualification development partner. Thereafter, the qualification development partner registers the occupational curriculum and qualifications assessment specification on the NOPF, and this partner finally submits an occupational qualification to SAQA for registration.

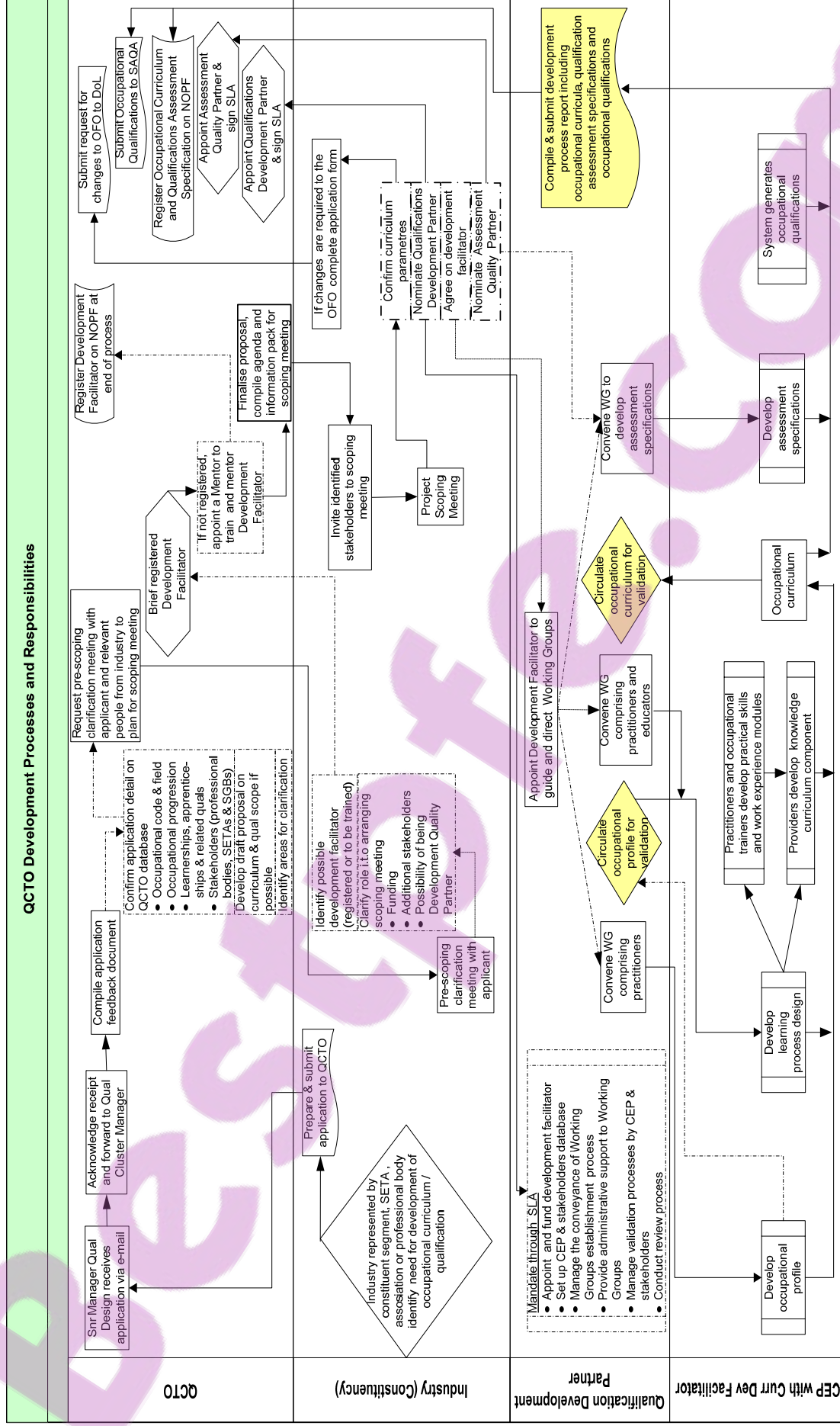


Figure 2.11. The QCTO qualification development processes and responsibilities (DHET, 2010c. p. 36)

2.5 AN OCCUPATIONAL LEARNING PROGRAMME

The sections below discuss the conceptualisation of the construct of occupational learning programme and the various types of programme.

2.5.1 Conceptualising an occupational learning programme

A learning programme includes a learnership, an apprenticeship, a skills programme and any other prescribed learning programme, which includes a structured work experience component (Republic of South Africa, 2008a; Van Rooyen, 2009). Learners participating in these programmes have to demonstrate sufficient foundational competence in communication and mathematical literacy in order to cope with the occupational learning demands and benefit from the learning process.

Additional language, mathematics knowledge and theory requirements in other subject areas are determined by the needs of each specific occupation and must be fit for purpose. These are incorporated in the common/core learning requirements of the qualification.

However, for occupational learning to achieve its stated objectives, certain learning opportunities, conditions and features need to be evident in the workplace. Learning opportunities in the workplace are affected by the characteristics of the workplace and the conditions of the work environment (Matthews, 1999). The nature of the workplace will determine how work is performed, what type of learning is required and how employees will receive the emphasis on continued workplace learning. Goal clarity, evaluation of learning outcomes, the interpersonal relationships between group members, the degree of isolation and collaboration between individuals and the level of involvement in decision making influence the type of learning that takes place and how (NBEET, 1994).

Closely related to the importance of learning opportunities is the view that workplace learning should take place in certain workplace conditions. Holliday (1994, p. 2) describes workplace learning conditions as “states of being, thinking or acting that promote, through their presence, processes of learning”. Conditions relating to individuals’ view of themselves and their relationship with others in the workplace are

viewed by Holliday (1994, pp. 2-3) as being particularly important for individual learning. The following five conditions are emphasised:

- Self – the individual’s need for a positive feeling about himself or herself as a person.
- Personal meaning – the individual’s ability to reach an understanding of himself or herself and his or her own learning.
- Action – the ability of the individual to develop, apply and measure the use of his or her own and other people’s ideas in the workplace, and to learn from the experience.
- Collegiality – the individual’s capacity to learn with and from colleagues both directly and indirectly.
- Empowerment – the ability of individuals to “feel a sense of ownership, autonomy, self-control and self-direction over their decisions and actions, including over the processes and outcomes of their learning”.

While the conditions outlined relate expressly to the classroom environment, they have equal relevance to other organisational settings.

2.5.2 Types of occupational learning programmes

In the sections below, the two types of occupational learning programmes, which are regulated by legislation in South Africa, are discussed. These programmes are the learnership and apprenticeship.

2.5.2.1 Learnership

A learnership is the most important innovation in the skills development field in the post-apartheid era (Kraak, 2008b). Much is expected of the new learnership system implemented in South Africa in 2001 as a key component of the NSDS (Visser & Kruss, 2009). A learnership is a centrepiece innovation of the new training system in South Africa and is aimed at overcoming the problems associated with the old apartheid training regime. This programme is similar in its objectives to the “modern apprenticeship” in the UK and Australian contexts and has strong links forged between

learners, employers, government and the SETAs. In comparison with an apprenticeship, a learnership is more ambitious and expansive in scope (Kraak, 2008a).

The responsibility for the implementation and management of learnerships lies with the SETAs (Visser & Kruss, 2009). As Davies and Farquharson (2004) and the Human Sciences Research Council (HSRC, 2008) indicate, the SETAs' performance during the NSDS I (2001-2005) was measured on how successful they were in transforming the skills base in their sectors through the implementation of targeted learnerships, and this criterion is applicable during the second phase of the NSDS (2005-2010).

A learnership is defined as a structured learning programme that leads to a qualification recognised by the NQF (Visser & Kruss, 2009). It is an integrated occupation-directed programme that combines learning at a training institution with practical, on-site experience and learning in a workplace. Learnerships must be related to a specific occupation and be registered by the relevant SETA with the DHET (Coetzee *et al.*, 2007).

Simply defined, a learnership is a route to a nationally recognised qualification (DoL, 1997) that relates to an occupation and consists of a structured learning component and practical work experience (De Jager, Hattingh & Hüster, 2002).

A learnership is a form of training that seeks to bridge the articulation gap between institutional and occupational learning. This programme includes a complex contractual agreement for a fixed period between the learner, the skills development provider and the employer. The contractual agreement provides a framework for formalising the relationship between these three parties in realising the qualification. Beyond the formality of the agreement, this relationship requires high levels of cooperation to ensure the smooth planning and operation of the learnership (Akoojee *et al.*, 2005).

Learnerships are located at the core of the government's macro strategy for skills development (NSDS). However, the challenges facing the achievement of holistic skills development through learnerships are threefold, as highlighted below.

Firstly, learnerships should be a response to an identified need. Secondly, and following on from the first, the strength of the learnership concept is that it should offer learners, who may not have had the exposure to meaningful educational opportunities as a result of apartheid, the opportunity to access education and training that will lead to relevant knowledge, skills and work experience for entry into the labour market. Thirdly, since many learnerships are offered in areas of the country where there is limited absorption potential in the formal sector, they need to equip the learner to create and sustain employment.

According to Akoojee *et al.* (2005), this implies that learnerships must move beyond the narrow confines of traditional apprenticeships and seek to build learners, from disparate levels of prior learning, to a situation of competence necessary for meaningful social and economic participation. This requires high levels of resource investment to provide sufficient support to learners, both in the institution and the workplace.

A learnership model was initially identified as a policy instrument that would move away from the provider-driven training system of the past, to a system aligned with and driven by the skills needs of a specific sector (DoL, 1997; Kraak, 2008a). Ultimately, learnerships were supposed to be an inclusive and diverse instrument, aimed at all skills levels, at all age groups and at all sectors, with differentiated functions; a redress function to develop foundational competences at low NQF levels for those who had not completed schooling; a technical and vocational function to develop general and specific competences at the intermediate skills levels; and in cooperation with higher education institutions, to develop specialised para-professional and professional competences.

Hence learnerships are not intended only for those who are already employed. There is also a strong commitment to learnerships for the pre-employed or unemployed. This is because the learnership system is meant to address the needs of vulnerable groups such as women, youth and those in the informal sector – a key social equity concern in South Africa (Visser & Kruss, 2009).

These different groups of learners are served by two broad categories of learnerships: existing employees are trained as part of the overall staff development of a company within section 18.1 learnerships, and those who are unemployed are trained through

section 18.2 learnerships. In both these categories, the employer commits to a period of employment during the time of the learnership, but not to subsequent employment. Those who are already employed will return to their jobs at the end of the learnership contract.

One of the unintended consequences of learnerships is that they were increasingly perceived to be initiated from the supply side, by private providers initiating programmes that could attract potential learners (Marock, 2007; Grawitzky, 2007; Kraak, 2008a). From a learnership monitoring and evaluation perspective, Kraak (2005b) found that little monitoring and evaluation work has been done on the success and impact of learnerships in South Africa.

In addition, in their analysis, Smith *et al.* (2005) found little mention of either monitoring or evaluating learnerships by SETAs. They also reported found that other SETAs have failed woefully, are not in a position to either administer the learnership or monitor the performance of learners during the skills development phase, and that they have set aside insufficient time to critically reflect on whether the learnerships are in fact achieving their overall objectives. Accordingly, SETAs are going to need to develop far more complex monitoring and evaluation systems to assess progress towards achieving the learnership objectives and outcomes (Smith *et al.*, 2005). However, Babb (2005) found that poor learner assessment skills and a vague understanding of the business case for implementation of learnerships are two of the main factors hampering the intended benefits of the programme – a situation exacerbated by unfaithful companies. She further mentions that sometimes a company will not have the wherewithal to properly assess candidates against their qualification framework – often because they do not have the time or capacity to recruit and train people.

In addition to the above and notwithstanding the fundamental and philosophical premise upon which the learnership concept was founded, which places more emphasis on workplace-based learning and assessment, Kunene (2007) found strong evidence of the fact that institution-based learning and assessment remain the dominant form of learning and assessment in the implementation of learnerships. Furthermore, he reported that little is done in terms of building the capacity of education and skills development providers to ensure that they adequately fulfill the requirements of learning and

assessment provision in a learnership context – hence the inconsistencies and shortcomings prevalent in occupational learning and assessment. There is an apparent lack of consistency in the approaches to establishing and developing a balanced and adequate learnership infrastructure for the skills development activities in South Africa (Kunene, 2007).

SETAs are responsible for administering and managing learnerships in order to respond to specific sectoral skills priorities (Visser & Kruss, 2009). However, there are on-going concerns about the inefficiency and ineffectiveness of SETAs' performance in the public perception (Grawitzky, 2007; Marock *et al.*, 2008) leading to calls for a review and restructuring of the entire SETA system by private sector organisations, civil organisations and opposition political parties. SETAs have experienced considerable difficulties and problems to date – such as the complexities of the implementation of the NSDS, lack of capacity in monitoring and evaluation and a lack of or poor quality assurance and management information system (Visser & Kruss, 2009; Kraak, 2008a). Letsoalo (2007b) for example, summarises the widespread claims of corruption and mismanagement by SETAs.

The calls for restructuring SETAs coincide with a one-year extension of the reaccreditation of SETAs and the implementation of the NSDS III to April 2011 by the new DHET created by the new government administration which came into office in 2009.

2.5.2.2 *Apprenticeship*

The theme of the workplace as a learning environment has a long history (Streumer & Kho, 2006). Possibly the best-known example in history is the mediaeval guild. Through a system of "practice makes perfect" under the supervision of a master, an apprentice was able to achieve the status of a journeyman. The journeyman could later acquire the position of master by submitting a "masterpiece" (Streumer & Kho, 2006).

Apprenticeship has been part of education and training in many countries, but its role has changed over time (Pattayanunt, 2009). Internationally, the apprenticeship system has been used as a strategy to develop skills. An apprentice works for an employer and

attends a training institution over a period of three to four years (Marks *et al.*, 2004). An apprentice is defined as “a person who is undergoing induction into a specific vocational sector, learning the appropriate technical skills and knowledge and absorbing the appropriate values and traditions” and “someone who is working towards a higher level of general qualification, maintaining a place in the community of learners, and avoiding social exclusion” (Hayward, Oancea & Wilde, 2008, p. 4).

Apprenticeship as a form of learning has developed over centuries and can be regarded as a form of vocational and occupational training, with different approaches to organisation in each country (Pattayanunt, 2009). Many countries view apprenticeships as a key component for skills development, with Australia and Germany leading in this regard (BVET, 2005; Keating, Medrich, Volkoff & Perry, 2002). Pattayanunt (2009) argues that apprenticeship is most relevant as a model of skills development and occupational learning in contemporary society if it is adaptable to the changing skills demands of the labour market in terms of types and levels, responds to mutual interests of the social partners and is efficiently regulated and standardised.

The outcomes of the apprenticeship system are difficult to measure, but some quantifiable measures such as the rate of apprenticeship activity, participation, completion and qualifications are widely used to evaluate the success of the system (Pattayanunt, 2009). Below is a discussion of the way different countries implement the apprenticeship system, with a particular focus on Singapore, Australia, India and a few African countries. A discussion on how the African countries implement the apprenticeship system is presented in this section in order to shed more light on Africa’s broad apprenticeship experience, since most of the countries included do not have a comprehensive skills development framework in place.

2.5.3 Apprenticeship experiences in different countries

The sections below discuss the experiences of different countries in the implementation of the apprenticeship system. Singapore, Australia, India and South Africa are discussed. Other African countries briefly touched on are Senegal, Ghana, Benin and Niger.

2.5.3.1 *Singapore's experience*

Singapore has an extremely robust apprenticeship system modelled along the lines of Germany's dual training system (Chee, 1992; Osman-Gani, 2004; Seng, 1996). In terms of this system, school leavers requiring technical/industrial skills, prior to joining the workforce, may apply for apprenticeship training provided by the Institute of Technical Education (ITE). The ITE is a major integral component of the total skills development infrastructure of Singapore. It is responsible for the provision and administration of skills training programmes for school-leavers and workers, as well as the administration of national skills certification and public trade test systems (Chee, 1992). The ITE provides skills training to school-leavers through the institutional training and apprenticeship modes.

Apprenticeship training is essentially industry based, with companies providing the substantial part of the training on the job and the ITE providing the necessary off-the-job training support. Chee (1992, p. 1) indicates that apprenticeships have become increasingly important for the expansion of skills training in Singapore. The following are some of the strengths of apprenticeship training:

- Apprenticeships can provide more occupational choices to match the diverse abilities and interests of school-leavers.
- Because it is industry based, an apprenticeship is more effective in meeting the specific needs of industries, especially where training through the institution mode would be neither practical nor cost effective.

Apprenticeship therefore has a significant role in the training infrastructure provided by the ITE. It is the ITE's objective to strengthen and develop it fully as a viable and effective system to complement institutional training. As a first approach in achieving this objective, the then Vocational Industrial Training Board (the predecessor of the ITE) initiated a major review of the apprenticeship system in Singapore in 1990 (Chee, 1992). Its aim was to strengthen the apprenticeship system by emulating certain features of the well-proven German Dual System. Following the review, the New Apprenticeship System (NAS) was launched in 1991, with the incorporation of the following new features:

- One of the stipulations is that industry trainers must be pedagogically trained besides having the relevant technical qualifications and industry experience. This is to ensure that companies provide quality and credible training to apprentices.
- Education in English and Mathematics is included as part of the training for apprentices who do not already possess the General Certificate of Education (GCE) "N" level qualification in these subjects. This is to enhance the trainability and future development of apprentices.
- In recognition of the key role employers play in enhancing the quality of training, higher levels of subsidy from the SDF are awarded to employers
- To provide for smooth progression from school to apprenticeship training, the National Service liability for school-leavers taking up apprenticeship is deferred to after completion of their apprenticeship.

a) Framework of the Singapore apprenticeship training

As discussed in detail by Chee (1992, pp. 2-4), the Singapore apprenticeship system follows the framework provided below.

The key components of the apprenticeship system are as follows:

(1) Training structure

The programmes offered under apprenticeship training lead to the National Technical Certificate Grades 2 or 3 (NTC-2 or NTC-3), as well as certification in specific trade areas (Seng, 1996). Depending on the trade area and the level of certification, the duration of apprenticeship is between one and three years.

All apprenticeship courses encompass the two key components of on-the-job and off-the-job training (Seng, 1996), which account for approximately 70 and 30% respectively of the total training duration.

- i) *On-the-job training (OJT)*. OJT is conducted at the company's premises under the supervision of qualified trainers. OJT is structured and backed by a comprehensive documentation and monitoring system. The list of tasks that the apprentice has to

learn on the job is documented in a logbook. The supervisor, who certifies the completion of each task in the logbook, closely monitors the progress of the apprentice in following the list of tasks.

The supervisor endorses completion of a task only upon the apprentice's achievement of the acceptable level of competence in the prescribed task. Through systematic planning of the various OJT tasks in the Master Schedule, the OJT requirements are timed to be accomplished within the specified duration of the apprenticeship.

- i) *Off-the-job training (Off-JT)*. The apprentice attends his or her Off-JT at an ITE institute or the company's training centre. In the case of the latter, the company has to be a designated approved training centre (ATC) of the ITE (for which the company has to meet stipulated requirements for staff and equipment in order to conduct training).

Off-JT at the ITE institutes is scheduled for one day a week, while that at the ATCs can be flexible, depending on the company's schedule. The apprentice is given both theory and practical lessons during Off-JT to complement his or her OJT component.

(2) Recruitment and placement

The ITE has a specific centre for the promotion, recruitment and placement of apprentices. Named the apprentice placement centre (APC), the centre serves as the bureau for companies and young people interested in apprenticeships. School leavers are informed of the training opportunities in apprenticeships through promotional talks conducted at the schools by ITE officers. Announcements are also made in the press during the intake points and applicants are invited to apply at the APC. Officers at the APC provide counselling to applicants on the training courses and places offered by companies. When the applicants have made their choice of the training programme and company, interviews are arranged at the companies. Depending on the outcome, the applicants would commence training or be offered further options should the interview be unsuccessful.

(3) Monitoring

From the point of placement of an apprentice with a company, the ITE begins a programme of monitoring that apprentice's progress for the full duration of his or her training.

ITE officers visit the company regularly, at intervals of about two to three months, to:

- Ensure that the training is in accordance with the training structure and on schedule.
- Monitor the apprentice's progress and performance through direct observation and dialogue with his or her supervisor.
- Attend to any matters pertaining to the performance and welfare of the apprentice.

Based on the observations made, the officers initiate the necessary follow-up with the apprentice, company or ITE headquarter departments accordingly.

(4) Legal considerations

Both the apprentice and the host company are subject to a legal obligation to each other as provided for under the apprenticeship contract. The requirements on the part of both the employer and apprentice are clearly specified, and both parties are required to honour them throughout the period of apprenticeship.

2.5.3.2 *Australia's experience*

Australia has been using the model of apprenticeship for a long time in order to provide much-needed skills. However, in 1985, the country introduced traineeships because of perceived limitations in the apprenticeship system. This model of traineeship was later integrated with apprenticeships as part of a more unified entry-level training system (Marks *et al.*, 2004). These pathways also had the potential to provide young people with skills and qualifications to assist in the transition to work and enhance their labour market outcomes. However, in 1998, new apprenticeships were introduced in Australia to form a single, integrated system of employment incorporating the formerly separate

apprenticeships and traineeships (McMillan & Marks, 2003). A study by McMillan and Marks (2003) found that in both 1999 and 2000, apprenticeships were extremely popular among learners who could not complete 12 years of schooling. Between 20 and 30% of early and later school-leavers were in apprenticeships in each of the years under consideration.

The new apprenticeship programme combines practical work with structured training to give young people a nationally recognised qualification and the experience they need to find the job they want. New apprenticeships are a great way to build a career in an increasing number of industries in Australia (McMillan & Marks, 2003). There is a wide range of industries to choose from, offering a significant rise in opportunities for students to train and work without having to leave their local area. Traditionally, apprenticeships took three to four years to complete and traineeships lasted for one to two years. These new apprenticeships are competency based. This means that it may be possible for a new apprentice to complete his or her training sooner if he or she has reached the skills level required. In some instances, it is possible to start a new apprenticeship while still at school (ILO, 2009).

New apprenticeships in Australia are covered by formal agreements known as “training agreements” or “contracts of training” (NCVER, 2008, p. 16). These agreements set out the training and supervision an employer must provide for the employee, as well as the employee’s obligations as a new apprentice. This arrangement is similar to learning programmes in South Africa in that stakeholders (learner, employer and training provider) must sign a learning programme agreement that spells out the roles and responsibilities of each stakeholder.

In the Australian model, training packages are designed by industry for industry, while in South Africa; skills development providers mainly design training packages. In Australia, training packages can be delivered on the job, off the job, or a combination of both. Off-the-job training is done with the TAFE colleges, and other approved training providers including schools and community training colleges.

For example, a typical training programme could involve two days of off-the-job training at TAFE, and three days on-the-job work and training each week. The employer

negotiates the pattern of training in consultation with the local training provider. More flexible arrangements to suit employer and employee have been introduced through new apprenticeships (ILO, 2009).

In some cases, off-the-job training is conducted by a so-called “block release” (ANTA, 2002). In block release, off-the-job training is conducted periodically throughout the year in a block form of one or more consecutive weeks. An example would be on-the-job training with an employer for five days a week, with off-the-job training taking place in a block of five consecutive days every six weeks.

Some new apprenticeships involve the completion of all training on the job. In this situation, an employer would provide both hands-on work experience and a structured training programme. In some instances, on-the-job training can be provided by a registered training organisation. The flexibility of this training makes it easier for students to stay in their local area and work for local employers, including family businesses (NCVER, 2008). In a school-based new apprenticeship, the training can be provided by either the school working with employers in a workplace, by the school working with a registered training organisation or even a combination of these.

Students undertaking a new apprenticeship would do the following:

- They would be enrolled as students at school.
- They would undertake a structured training programme based on industry-developed training packages, where they are available, or on courses or modules based on available industry or enterprise competency standards.
- They would be employed to do productive work.
- They would sign a training agreement (linked to an industrial award or workplace agreement) with an employer. This sets out the employer’s commitment to provide systematic training, and the new apprentice’s commitment to learn the trade or occupation. In South Africa, a learning programme agreement is linked to occupational awards as per the Skills Development Amendment Act (Republic of South Africa, 2008a).

- They would earn a senior secondary certificate, plus a nationally recognised qualification or statement of attainment issued under the Australian Qualifications Framework.

However, new apprenticeships in the traditional trades (including metal, electrical, electronics, automotive, food, construction and building, hairdressing, tailoring, watch making and blacksmithing) follow a more or less conventional pathway to formal qualifications and trade certificates. The apprentices sign a contract of training with an employer in which the employer promises to respect responsibilities to provide appropriate training and work for the apprentice and the apprentice promises to undertake the training and work as expected (NCVER, 2008). The employer may also include a group training company that hires out the apprentice to one or more businesses (host employers) for a fee.

In some cases, employers may wish to keep the apprentice for the entire duration of his or her apprenticeship; in other cases, apprentices are rotated to different enterprises during their apprenticeship. Apprentices complete a programme of training, which blends formal learning (often acquired through formal training courses delivered by registered training organisations off the job, and on-the-job training delivered by workplace supervisors) and informal learning, which occurs because of experience in the job. In some instances, learning which has occurred in non-formal learning programmes can be used to contribute to formal qualifications or components of qualifications (e.g., a first aid certificate).

A study by the National Centre for Vocational Education Research (NCVER, 2008) found that formal learning component help apprentices acquire relevant knowledge and theory, as well as providing opportunities or practical skills development in simulated workplace settings (such as college automotive workshops or hospitality functions room) as well as on the job.

The formal learning component is also acquired through engagement in daily work processes and interaction with peers and more experienced work colleagues. It also helps apprentices apply their skills and knowledge to real work situations and processes.

This neat combination of alternating off-the-job and on-the-job training applies to the bulk of apprentices, especially in the traditional trades (NCVER, 2008).

Similarly, the BVET (2005) indicates that apprenticeships in New South Wales grew significantly in the period 2004 to 2005. The Centre insists that participation in apprenticeships has to be maintained because it has been established that it is an effective approach to skills development. New South Wales is a state in Australia that has proven the popularity and effectiveness of the apprenticeship system of skills development.

2.5.3.3 India's experience

In India, formal apprenticeships were introduced through the Apprenticeships Act of 1961, which requires employers in notified industries to engage apprentices in specified ratios in relation to the workforce. The Act is administered by the Directorate General of Employment and Training (DGET) and pertains to apprentices in 254 industries (Palit, 2009). The Central Apprenticeship Council outlines the policies and different norms and standards of apprenticeship training in the country.

The minimum age for an apprentice is 14 and the entry requirements vary from levels 8 to 12 pass-outs, depending upon the training discipline (World Bank, 2006). The training modules vary between six months and four years, at the end of which apprentices are tested by the National Council for Vocational Training (NCVT). Successful candidates are awarded National Apprenticeship Certificates that are recognised for employment opportunities in government and semi government organisations (Mitra, 2002; Palit, 2009).

In the year 2000, there were 227 000 places for apprenticeship training in central or state enterprises and private sector enterprises in India, but only 165 000 or about 73% places had been taken up (Mitra, 2002). This could be a sign that the programme is demand driven and successful in India. Mishra (1993) supports this view and states that the apprenticeship system in India has been used to meet the requirements of skilled workers in industries. He further avers that participation in apprenticeship programmes can equip the already skilled workers with new practical knowledge or skills.

In 2006, about 20 800 establishments covered under the Apprenticeship Act of 1961 had a total capacity for training 240 256 apprentices. The capacity, however, was not fully utilised. A total of 172 747 people were trained, putting the capacity utilisation rate at 71, 9% (Palit, 2009). Apprenticeships in India are based on traditional technologies and ideas from previous generations, and the quality of training is only as good as the skills of the master and the master's willingness and ability to pass on those skills (Liimatainen, 2002; World Bank, 2006).

According to the World Bank (2006) report, there are four types of apprenticeships in India – depending on the apprentice's previous education and training. The Ministry of Human Resource Development is responsible for three of these: engineers with degrees may enter the system as "graduate" apprentices; engineers with diplomas may enter as "technician" apprentices; and vocational education graduates may enter as "technician (vocational)" apprentices. The DGET is responsible for the fourth type of trainees – those who have either attained a National Trades Certificate or who can demonstrate they have achieved equivalent entry prerequisites. The DGET trainees are simply known as "apprentices". The skill levels go from artisans to engineers, and the occupations include those in agriculture, business, commerce, health and paramedical, home science, humanities and engineering (World Bank, 2006).

2.5.3.4 Africa's experience

Africa also enjoys the benefits accruing from the apprenticeship system. Traditional apprenticeships are by far the most important source of skills training in Africa for the informal sector, with these apprenticeships concentrated in West and Central Africa (Filipiak, 2007; Haan, 2006; Johanson & Adams, 2004). Liimatainen (2002) estimates that up to 70% of urban informal sector workers in Africa have been trained through the traditional apprenticeship system.

a) South Africa

The South African apprenticeship system was introduced after the discovery of gold and diamonds during the second half of the 19th century. However, it was not until after the establishment of the Union of South Africa in 1910 that the apprenticeship system was

institutionalised and governed by legislation. The apartheid era apprenticeship system was regulated by the Manpower Training Act (Republic of South Africa, 1981b) and managed by the various Industry Training Boards, and was the means to developing an artisan skills base.

This system was a powerful labour market institution that trained large numbers of intermediate skilled white artisans and operated effectively right up until the mid-1980s. It catered for the highly structured and racially exclusive white occupational labour market for artisans and technically trained para-professionals such as technicians and technologists. For example, in the era of the great apartheid economic boom (late 1950s to early 1970s), almost all students at technical colleges were white apprentices who were sponsored by industry to study in mainly technical/engineering fields (Kraak, 2008b).

Reforms were introduced to the system in 1981 with the enactment of the Manpower Training Act (Republic of South Africa, 1981b). The aim of the Act was to modernise the system through the introduction of a competency-based modular training system and the devolution of the regulation of training to Industry Training Boards (Kraak, 2004a). The apprenticeship system remained strong until the mid-1980s when the graduation of artisans peaked at 13 500 in 1985 (Kraak, 2008b).

However, alongside the re-segmentation and partial deracialisation of the labour market from the 1980s onwards, severe problems had already set in, triggering a dramatic decline in apprenticeship indenturing in key economic sectors. According to Badroodien (2005), this collapse was critically informed by the impact of sanctions, labour unrest and the severe economic depression that hit the country during the mid-1980s and lasted well into the post-apartheid dispensation. The number of apprenticeships shrank from a high of 10 758 in 1991 to 3 129 in 1999.

From the period 2001 to 2005, 21 237 apprentices were registered by the Department of Labour, averaging out at 5 309 new apprentices per annum (DoL, 2006a). However, the 2005 figure falls far below the 10 758 recruits achieved in 1991. Government and business viewed this decline as a major skills crisis in South Africa. Of the total Further Education and Training (FET) college students of 373 000 (90% of whom were black) in

2004, only 5 309 were indentured as apprentices. This is in direct contrast to the college reality in the heyday of apartheid when the vast majority of college learners were white and indentured to become artisans in the national economy.

Modern-day apprenticeships are regulated by the Skills Development Amendment Act (Republic of South Africa, 2008a) and administered and managed by SETAs. The system of apprenticeship commits employers, learners, education and training institutions and the state to fulfil various obligations in the training process, which have been agreed to at sector level. The apprenticeship contract is a legally binding agreement that is normally structured in specific sector contexts and monitored and quality assured by SETAs, reflecting a social compact struck between employers, unions and individual learners/workers (Kraak, 2008b). This social contract often specifies the demarcation of work that only artisans can do, and the wage to be paid to apprentices in training and to qualified and experienced artisans.

According to Creamer (2009), a total of 5 730 metal industry apprentices are currently undergoing training in South Africa, the highest figure in ten years and comfortably ahead of the target of 5 000 set in 2008 by the Steel and Engineering Industries Federation of South Africa (SEIFSA). This is a considerable achievement, despite the effects of the recent recession, which had a disproportionately negative impact on the sector membership base. Of the ten-year high total of 399 000 jobs in the industry in February 2009 to 342 000 jobs in July, 57 000 jobs were lost in five months because of the global economic downturn (Creamer, 2009).

In other parts of Southern Africa, Haan (2006) reports that apprenticeships are less evident than in West and Central Africa, with youths sometimes described in the former merely as helpers. Still, in countries like Kenya, Tanzania and Zimbabwe, Haan (2006) reported a large numbers of youths who are acquiring skills in informal enterprises under the guidance of a master. In Kenya, an estimated 67 to 76% of entrepreneurs in the informal sector have been trained through the traditional apprenticeship system (Liimatainen, 2002). Traditional apprenticeships have almost disappeared in Angola because of the war, which has destroyed craft workers' professional networks, although the apprenticeship system is making a comeback in certain training schemes for traditional trades.

b) West Africa

Generally speaking, in West Africa, an apprenticeship in the informal sector consists of a private contractual arrangement between a parent or apprentice and a master crafts person who agrees to provide practical training in the workplace. The period of training ranges from several months to three or four years, and subsequent certification of the training in return for a fee or reduced earnings during the learning period (Haan & Serriere, 2002; Johanson & Adams, 2004; World Bank, 2008). Few apprentices start their own businesses immediately upon completing their apprenticeship.

The different forms of apprenticeship practised in West Africa have been analysed and described in great detail, the main distinction being between the Saharan system (no fixed duration and work output is more important than training) and the coastal sort (fixed duration, qualification and written contract) (College Cooperative Provence-Alpes-Méditerranée, 2000).

The field survey identified three main phases of traditional apprenticeship:

- An introductory phase, during which the apprentice watches the actions and conduct of the master craftsman and assimilates them into his or her behaviour.
- A phase devoted to instruction in the names of instruments and their use, with an opportunity to undertake simple and repetitive technical tasks.
- A phase entailing participation in more complex tasks and the production of finished objects; the apprentice also starts to supervise new arrivals and learns to negotiate with customers during this phase.

Progress from one phase to the next is at the discretion of the master artisan, which can lead to periods of training far exceeding four years.

i) Ghana

In Ghana, informal apprenticeship training originated as a means to reproduce skills in families or communities, but over the years, it has been modified to involve more formalised contracts, payments for training and fewer restrictions regarding access to

this training (Palmer, 2007). The Ghana Statistical Service, for example, reported 210 000 youths registered as apprentices in 2005, while in the same period, a much smaller number, just over 50 000 youths, was enrolled by public and private providers (Ghana Statistical Service, 2005; World Bank, 2008). Traditional apprenticeships are a source of skills for employment in both the formal and informal sector of Ghana. About 80 to 90% of all basic training comes from traditional apprenticeships, compared with 5 to 10% from public training institutions and 10 to 15% from nongovernment for profit and non-profit training providers (Atchoarena & Delluc, 2001). In recent years in Ghana, the rising concern over the large number of junior high school (JHS) graduates who are unable to access further formal education and training has led politicians and policy makers to demand a National Apprenticeship Programme (NAP). In 2008, ambitious plans were put in place to move towards a more regulated or formalised informal apprenticeship system (Palmer, 2009).

The President of Ghana commissioned a panel of academics and other educationalists in 2002 to examine the country's education system (Palmer, 2009). Some of the main recommendations of the President's Committee on Review of Educational Reforms (GoG, 2002) were adopted by government in its 2004 Education Reform White Paper (GoG, 2004a). One such recommendation was the creation of an apprenticeship stream as one of the post-basic education alternative tracks.

The 2004 White Paper pledged that government would "assume full responsibility for the first year of all approved apprenticeship programmes" (GoG, 2004a, p. 13). As a result, and by late 2007, policy makers were tasked with operationalising this pledge, and to do so quickly. Policy makers, but politicians in particular, were aware of the forthcoming election year of 2008 and initially hoped to have the NAP operational before the elections. However, the bodies that were originally intended to design and oversee the formalisation of apprenticeship in the country, the National Apprenticeship Training Board (NATB) and the Informal Sector Affairs Division of the Council for Technical and Vocational Education and Training (COTVET) secretariat, had not yet been created. Indeed the new COTVET Board, under which the NATB and the COTVET secretariat were to fall, had only just been inaugurated in November 2007. It was not until November 2008 that the executive director of the COTVET secretariat took up office,

with the rest of the secretariat to be appointed on a rolling basis during 2009. The NATB was still not in place in March 2009 (Palmer, 2009).

The intention is for the NAP to take JHS graduates and place them in one-year apprenticeships. One-year placements were planned to be both in informal enterprises with master craftspeople (similar to “regular” informal apprentices) and in formal vocational training institutes (institution-based apprenticeships). In accordance with the 2004 TVET Policy Framework (GoG, 2004b), the NAP is supposed to be industry driven or demand led. Crucially, this means that the government’s role, through the NATB (and before that the NVTI), must be that of a facilitator and that ownership of the NAP must be given to industry groups. Overall, many West African countries, such as Benin, Togo and Mali, are restructuring technical and vocational education and training systems and incorporating traditional apprenticeships. They are developing dual apprenticeship systems, where the craft enterprises that take on the apprentices share the responsibility for training with colleges (OECD, 2008).

ii) Benin

In Benin, the number of traditional apprentices increased by more than 10% per annum from 36 000 in 1979 to 145 000 in 1992. Benin has implemented a Technical and Vocational Skills Development (TVSD) reform in which the evolution of the traditional apprenticeship into a dual training system has become an integral part of the national training policy (OECD, 2008). In general, the apprenticeship in Benin consists of three phases: (1) passive observation of what workers and the master do; (2) partial involvement in practical work or production; and (3) total involvement and being held responsible for output (Haan & Serriere, 2002). The country has introduced a Vocational Skills Certificate (national diploma attesting the completion of an apprenticeship) to recognise the skills acquired through informal apprenticeship and has put in place a consultative mechanism involving the National Federation of Craft Workers, local craft worker groups and the relevant ministry to steer the process. The apprenticeship concludes with a completion ceremony to acknowledge the apprentice’s ability to exercise the trade in which he or she has been trained (Filipiak, 2007). Similarly, in South Africa, with the advent of the new reforms on training legislation in 2008, learners will be entitled to a National Skills Certificate once they successfully complete a learning

programme because it contains a structured work experience component (Van Rooyen, 2009).

However, with the introduction of dual apprenticeship system, a series of regulatory instruments has been developed in Benin. Certification is awarded using the assessment methods that maintain a balance between theory and practical skills (30 and 70% respectively). Again, this ratio of 30:70 between theory and practice is synonymous with the South African arrangement regarding the provision of learnerships. Learners in learnerships in South Africa must spend 30% of their time on the theory with the training provider and 70% in practice with the employer (HSRC, 2005; Marock, 2007).

iii) Niger

According to Haan and Serriere (2002), in Niger, the apprenticeship period, the selection of apprentices, the training content and remuneration are all based on tradition and on the master artisan's habits. The training itself is based on a clear, but unrecorded, organisation of tasks. It starts with the teaching of basic techniques before moving on to the use of instruments, and later, to more elaborate techniques. An apprentice tailor, for instance, will learn mending for the first six months, then move on to easy sewing jobs on a machine, and only at the end of the apprenticeship period, learn about cutting, without which he or she would be incapable of succeeding as a tailor. By teaching the essence of the trade at a later stage, masters ensure that their apprentices find it difficult to leave and set up their own businesses before the end of the training. The period of training varies according to the type of trade.

Taking into account the social and cultural habits of both the artisans and the population, Niger has started to embrace the concept of dual apprenticeship, which is based on the following principles: (1) it only takes apprentices who are 15 years and older; (2) it provides additional training and education throughout the whole apprenticeship period through a succession of three-, four- or six-month sessions, instead of doing it all at once; (3) it offers only one or two training sessions a week; and (4) the master must always agree to be involved (Haan & Serriere, 2002, pp. 100-102).

iv) Senegal

Traditional apprenticeship training has always been more important in Senegal as a mechanism to transfer skills and replicate the social organisation of production. It has played a particularly important role in passing on technical knowledge and skills in social groups or castes, especially jewellers, weavers, leather and wood workers. Historically, no apprenticeship fee was paid because this form of training was based on solidarity – between families and in social groups. This training broadly comprised three phases: (1) initiation, where the apprentice had to observe; (2) consolidation, where the apprentice was shown particular operations and sometimes received some kind of explanation about them; and (3) confirmation, where the apprentice could take his or her own initiative and thus further develop his or her skills. The second phase usually took up to two-thirds of the total apprenticeship period (Haan & Serriere, 2002, pp. 57-59).

In 2007, Senegal launched an informal education pilot scheme to reform traditional apprenticeship in three the following major priority sectors: auto mechanics, construction and clothing. A directorate for traditional apprenticeships was launched to oversee this project. The objective is to improve skills for master artisans and support the development of a specific traditional apprenticeship certificate recognised at national level.

As in Benin, the transformation into dual apprenticeship system in Senegal has the advantage of building on the existing skills of apprentices and craft workers, while improving their ability to master technological and qualitative changes affecting their products and services (OECD, 2008). The share of apprentices grew from 40% of the total workforce in the informal sector in 1980 to an astounding 70% in 1995 (Haan & Serriere, 2002).

An analysis of the situation in Senegal and Cameroon shows that the great majority of young people are trained through traditional apprenticeships outside the education system. Thus, 300 000 Senegalese young people are trained in craft workshops, whereas barely 10 000 are educated in vocational training centres. Benin was in the same situation until recently, although the current restructuring of the traditional apprenticeships system into a dual training system is changing this situation because

apprentices will acquire a qualification recognised by the formal training system (Filipiak, 2007).

For the majority of young people in Benin, Cameroon and Senegal, traditional apprenticeship offers the only means of acquiring the skills they need in order to exercise a trade. To a lesser extent, the system also exists in Morocco, where it is still the usual form of training for craft workers. In Cameroon, in contrast with a total public training capacity of about 14 000 trainees, traditional apprenticeship is said to enrol a total of 200 000 apprentices.

c) North Africa

Morocco and Tunisia also have programmes that focus on the introduction of apprenticeship contracts, setting remuneration levels, offering incentives to employers (in terms of exemptions for the payment of social security obligations), setting age requirements and introducing dual training between the place of work and specialised training institutions (OECD, 2008). The social security exemption is similar to a tax rebate in South Africa which is offered to employers each time they conclude a learnership agreement to train learners.

The main strengths of traditional apprenticeship in most African countries are its practical orientation, self-regulation and self-financing. Apprenticeship also caters for individuals who lack the educational requirements for formal training, serves important target groups (urban and rural) and is generally cost effective.

In many of these countries and business environments, apprenticeship has served the informal sector well but is proving to be too narrowly focused to cope with the increasing challenges of technical change, skills enhancement and wider markets (Ziderman, 2003). Efforts are needed to stimulate improvements in traditional apprenticeship training, as is the case in South Africa with the introduction of learnerships. To this end, the World Bank (2008) study on skills development in the informal sectors of sub-Saharan Africa found that there are few vigorous evaluations on the impact of apprenticeships in these countries.

2.5.3.5 Key lessons learnt from other apprenticeship systems and implications for the South African occupational learning system

Table 2.6 below provides a summary of key lessons learnt from the other systems discussed above, which are relevant to this research. South Africa can draw lessons from these experiences in formulating regulations to give effect to the skills development legislation (as amended), especially with the implementation of occupational learning programmes. For example, it is important, even for South Africa, that all industry trainers have some pedagogical training in order to understand adult learning principles, different learning and facilitation styles and the needs and circumstances of learners.

However, with the launch of the NSDS III scheduled for February 2011, and taking cognisance of the lessons learnt from the two previous phases of the NSDS, the management and evaluation of occupational learning programmes will take centre stage in the NSDS III. Learning from the Singaporean experience in managing the apprenticeships, SETAs will have to strengthen their monitoring and evaluation function.

Monitoring and evaluation are the key aspects of the success of apprenticeships in Singapore because this process begins when the programme commences. In South Africa, the level of monitoring and evaluation of occupational learning programmes must be enhanced and constant site visits may have to be introduced in this exercise since this is an area in which weaknesses have been identified in South Africa (as reported in the literature).

However, South Africa could also learn from Australia's experience of rotating apprentices at various workplaces for the duration of the apprenticeship. The exposure of apprentices to different business units or geographical locations may enrich the learning process by presenting them with different challenges under different circumstances. South African organisations that are diversified and/or decentralised geographically may have to take advantage of this window of opportunity.

Table 2.6

Key Lessons Learnt from the other Apprenticeship Systems

SINGAPORE	AUSTRALIA	INDIA
<ul style="list-style-type: none"> ▪ Pedagogical training of industry trainers. ▪ A dedicated centre for the promotion, recruitment and placement of apprentices (Apprentice Placement Centre). ▪ Programme monitoring right from the point of placement by the ITE. Officers of the ITE visit the host company every two to three months to monitor and evaluate the programme and the apprentice's progress. 	<ul style="list-style-type: none"> ▪ Negotiation by the employer in consultation with the training provider regarding the pattern of training. ▪ Industry designed training packages. ▪ Competency-based apprenticeships, thus reducing the duration of the programme if learners achieve competence early. ▪ Inclusion of a group training company that hires out apprentices to other businesses (host employers) for a fee, and rotation of apprentices to different enterprises during the programme. 	<ul style="list-style-type: none"> ▪ The Central Apprenticeship Council, which outlines policies, and different norms and standards of apprenticeship. ▪ Different levels of entry into different types of apprenticeships, thus appreciating the value of prior learning.

2.6 CHAPTER SUMMARY

This chapter discussed the three global skills development models followed by the skills development systems of various countries, including South Africa. The South African occupational learning system was examined on the basis of its origins and the reform process that led to its introduction. Furthermore, the elements of the South African occupational learning system were discussed. Later in the chapter, the experiences of other countries in the implementation of the apprenticeship system were reviewed. Understanding these experiences was an essential precondition to determine their implications for the South African occupational learning system.

Next is Chapter 3 which discusses in detail the training management and evaluation models.

CHAPTER 3

TRAINING MANAGEMENT AND EVALUATION MODELS

This chapter discusses the training management and evaluation theory that is relevant to the second literature aim of this research, namely: *to conceptualise the principles of effective management and evaluation of occupational learning programmes*. The concepts of management and evaluation are operationalised and discussed from an occupational learning perspective. Furthermore, the chapter also explains the constructs of management and evaluation from a systems perspective. The management framework, quality management and training evaluation models that are relevant to the aim of research are also dealt with. Thereafter, the theoretical integration of management and training evaluation models is highlighted, and the implications for occupational learning programmes explained. Towards the end of the chapter, a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes is discussed. An integrated discussion on how the literature aims of this research were achieved taking into account the literature discussed in chapter 2 (Skills Development and the Occupational Learning System) is presented, and the chapter concludes with a summary.

3.1 TRAINING MANAGEMENT THEORY

Effective management and evaluation are key factors that an organisation must take into serious consideration when planning to implement occupational learning programmes. Of particular significance to these programmes is the fact that they are multistakeholder-driven interventions comprising different groups with diverse interests. The key stakeholders are learners, skills development providers, employers and SETAs. Skills development providers are the operational custodians of occupational learning programmes. However, for these programmes to achieve their intended objectives, a comprehensive and effective management framework appears inevitable.

Bisschoff and Govender (2004) argue that skills development providers in South Africa lack this management framework. They criticised these providers for not being effective and for lacking in their ability to implement effective training programmes. Furthermore, they argue that these providers should improve their performance in these areas in order

to have a meaningful impact on skills development, particularly on occupational learning programmes in the workplace. These providers must ensure that occupational learning programmes are effectively implemented and managed. However, the process of implementing occupational learning programmes varies in principle from the traditional training offered in the workplace. An occupational learning programme is intended to help meet the skills gap in the workplace, at the same time affording the learner an opportunity to obtain credits towards a registered qualification. Employers should therefore ensure that occupational learning programmes meet the skills requirements and follow a structured, well-planned framework when entering into learning programme agreements with stakeholders (Hattingh, 2004).

Occupational learning programmes are vital because the success of these programmes is whether, at the end, the learners are able to apply in practice the skills they have learnt (DoE, 2003). Learners must be trained on how things are done, and this training should be undertaken in normal workplace conditions. They must also be taught the theoretical aspects of why things are done. They must, at various stages of the occupational learning programme, be assessed to see if (and how) they are progressing and (whether) they are able to perform the tasks they have been trained to perform. This assessment, in itself, must be structured so that it has a strong practical element (DoE, 2003).

Hence the management process of occupational learning programmes must include factors such as monitoring progress, supporting the stakeholders, quality management, resource management, programmes and material design and comprehensive analysis of the broader context in which these programmes are to be implemented. The next section focuses on the management framework underpinning this research.

3.1.1 Training management frameworks

The following five frameworks are employed locally and internationally to manage training in the workplace (Vollenhoven, 2007, p. 4):

- (1) Skills management based on the South African legislative framework requires a skills development provider to be registered and accredited through a relevant

SETA ETQA; to be qualified to manage skills development via policies, procedures, practices and review mechanisms; to develop, deliver and evaluate learning programmes to culminate in NQF credits or qualification; to link financial, administrative and physical resources; and to claim back skills levies via grants (SAQA, 2000a).

- (2) An internal management system for transforming organisations into learning organisations is required. Rhinesmith's (1996) framework for training providers to improve skills development focuses on developing key skills and characteristics through actively changing mindsets.
- (3) The cost benefit and return on investment framework measures the cost and benefits of developing skills (Birnbauer, 1986).
- (4) A quality performance management framework is required, which is similar to the learning programme agreement type framework offered by the South African skills development legislation (Kelly, 1996).
- (5) The project management framework for managing workplace training providers is required, which is similar to the skills development legislative framework (Duncan, 1996).

While all these management frameworks are significant to this research because they add value to the skills development legislative framework, the framework that this research adopts is project management. Project management stands out as the most effective tool for dealing with daily management issues such as time, cost, resources and risk issues (Govender, 2003).

Davies and Farquharson (2004, p. 182) indicate that occupational learning programmes tend to be implemented in multiple stakeholder environments, and similarly, according to De Jager *et al.* (2002), these programmes are best managed as projects at various levels. These researchers thus refer to the composition of diverse stakeholders with various roles and responsibilities, all of which have to be managed. However, the nature of this research necessitates that the term “management” be clearly conceptualised because it applies to occupational learning programmes.

3.1.2 Conceptualising the construct of management: an occupational learning perspective

According to Koontz and O'Donnell (1964, p. 1), "management is defined as the accomplishment of desired objectives by establishing an environment favourable to performance by people operating in organised groups". Trewatha and Newport (1976) define management as the process of planning, organising, actuating and controlling an organisational operation in order to achieve a coordination of human and material resources essential in the effective and efficient attainment of objectives. This definition mentions the coordination of people and resources. It complements what Davies and Farquharson (2004) refer to as multiple stakeholders. It also mentions resources that need to be managed. The management of occupational learning programmes includes both people and resources. Smit and Cronjé (1992) define management as a process or series of activities that give the necessary direction to an enterprise's resources so that its objectives can be achieved as productively as possible in the environment in which it functions.

The key elements that appear to run through the above definitions of management are objectives, resources, people and processes. Consequently, occupational learning programmes, by implication, have a huge administrative responsibility that requires effective management. Furthermore, these programmes have multiple stakeholders that must be organised, controlled and managed in a coordinated manner as well. However, in the context of this research, management refers to the process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human and physical) in order to achieve the objectives of an occupational learning programme. The section below provides a system's view of the construct of management

3.1.3 Systems approach to management

The management of occupational learning programmes is a complex task because of the nature of the programme itself and the diversity of stakeholders involved. However, an understanding of management from a system's perspective is essential. Koontz (1980) views a system essentially as a set or assemblage of things interconnected or interdependent, in order to form a complex unit. These things may be physical, as with

the parts of an automobile engine; they may be biological, as with the components of the human body; or they may be theoretical, as with a well-integrated assemblage of concepts, principles, theories and techniques in an area such as management. It is a collection of parts that are unified to accomplish an overall goal. If one part of the system is removed, the nature of this system is changed as well.

A system can be viewed as having inputs (e.g. resources such as raw materials, money, technology and people), processes (e.g. planning, organising, leading and control), outputs (e.g. products or services) and outcomes (e.g. enhanced quality of life or productivity for customers/clients). Occupational learning programmes must therefore also be viewed from a system's perspective since they draw inputs from the environment, transform them through various processes, generate outputs after transformation, and finally, achieve certain predetermined outcomes. Systems share feedback among each of these four aspects of the system. All systems, except possibly the universe, interact with and are influenced by their environments, although people tend to define boundaries for them so that they can see and analyse them more clearly.

The lengthy use of systems theory and analyses in physical and biological sciences has given rise to a considerable body of systems knowledge (Koontz, 1980). It comes as no surprise that systems theory has been found to be helpfully applicable to management theory and science. According to Koontz (1980), some scholars of management have long emphasised an arbitrary boundary of management knowledge – the theory underlying the managerial job in terms of what managers do. This boundary is set for the field of management theory and science in order to make the subject “manageable”, but this does not imply a closed systems approach to the subject.

By contrast, there are always many interactions with the system environment. Thus, when managers plan, they have no choice but to take into account such external variable as markets, technology, social forces, laws and regulations. When managers design an organisational structure to provide an environment for performance, they are influenced by the behaviour patterns people bring to their jobs from the environment outside the organisation. Since skills development providers are the operational custodians of occupational learning programmes, they have to take into account a myriad of environmental factors and issues that may affect the success of the

programme. Systems theory thus lays a solid foundation for understanding the management of occupational learning programmes in this research. The effect of systems theory in management is that it helps managers and trainers to look at the organisation more broadly. It enables managers and trainers to interpret patterns and events in the workplace – that is, by enabling them to recognise the various parts of the organisation, and, in particular, the interrelationships between the parts (Koontz, 1980).

3.2 PROJECT MANAGEMENT: AN APPROACH TO MANAGE OCCUPATIONAL LEARNING PROGRAMMES IN SOUTH AFRICA

For as long as humans have been undertaking complex tasks, project-oriented approaches towards getting work done have been central to individual and collective success. More recently, several human resource development (HRD) scholars have highlighted the importance of project management for HRD (Carder & Egan, 2008). Whether developing a system-wide strategic plan, enacting an organisation development intervention, producing new training curriculum or supporting individual on-the-job learning, HRD activities are generally organised into projects. HRD approaches and processes have been examined in terms of implementation of necessary steps to achieve HRD-related outcomes, but the management of the HRD process itself has been rarely explored.

Evidence from HRD practice and support from HRD scholars (Fuller, 1997; Gilley, Egglund & Gilley, 2002; Henderson, 2005; Krempf & Pace, 2001; McLagan, 1989; McLean, 2006) suggest the vital role of project management in HRD implementation, learning and performance. Some of the human resource aspects of project management include resource allocation (Archibald, 1976; Butler, 1973; Kerzner, 2001; Wilemon & Ciero, 1970), project team issues (Butler, 1973; Hodgetts, 1968), project management competencies (Casey, 1978; Gullet, 1972; Kerzner, 2001) and project management alignment of human resources, authority and leadership (Baker, Murphy & Fisher, 1983; Butler, 1973; Gullet, 1972; Hodgetts, 1968).

Human resource project management includes processes that organise and manage a project team such as those processes relating to human resource planning, acquiring the project team, developing the project team and managing the project team (PMI Global Standard, 2004). Project management research has focused on (1) human

resource issues, including competencies, leadership, responsibilities and incompatibility and misalignment of authority; (2) leadership; (3) career development; (4) organisation development; (5) project outcomes; and (6) quality management (Carden & Egan, 2008).

The Project Management Institute (PMI) defines project management as “the art of directing and coordinating human and material resources throughout the life of the project by using modern management techniques to achieve predetermined objectives of scope, cost, time, quality and participant satisfaction (PMI Standards Committee, 1987, pp, 1-4). Duncan (1996) defines project management as the application of knowledge, skills, tools and techniques to project-manage certain activities in order to meet or exceed stakeholder needs and expectations.

According to Duncan (1996), the project management processes involve a series of carefully planned activities to bring about specific results or outcomes that are linked either to the work of the project or to the product of the project. Processes are grouped according to the project phases, namely initiating, planning, executing, controlling or closing. A close relationship exists between the processes as they interact, overlap or succeed each other.

Many definitions of HRD (Weinberger, 1998; Woodall, 2001) and even more HRD books and articles frame HRD interventions as projects or emphasise processes and outcomes in a manner that aligns with project management (Swanson & Holton, 2001; Werner & DeSimone, 2006). There are numerous HRD activities and interventions requiring project managers and appropriate project management approaches (Fuller, 1997). De Jager *et al.* (2002) suggest that occupational learning programmes are best managed as a project at various levels. A project management system is a key element of HRD interventions (McLean, 2006). Gilley, Egglund and Gilley (2002) positioned project management as central to the success of HRD implementation.

Carder and Egan (2008) conclude that the development of a HRD project management conceptual framework is beneficial since there is a need for more narrowly organised research and theory building associated with project management in HRD contexts. The conceptual framework depicted in figure 3.1 is used to focus on the key steps or issues associated with project management of HRD. For the purposes of focus, HRD is

conceptualised in terms of an intervention which is consistent with HRD and related action research literature (McLean, 2006; Swanson & Holton, 2001; Werner & DeSimone, 2006) – HRD intervention development, HRD intervention deployment, HRD intervention implementation and HRD intervention evaluation.

The overall factors addressed in the conceptual framework focus on these process steps through consideration of relevant antecedents, process issues, outcomes proximal to the HRD intervention project, and distal outcomes associated with the scope of the project at the individual, group or organisational level. Overall, the conceptual framework is an introductory attempt to illustrate some of the key factors associated with HRD project management.

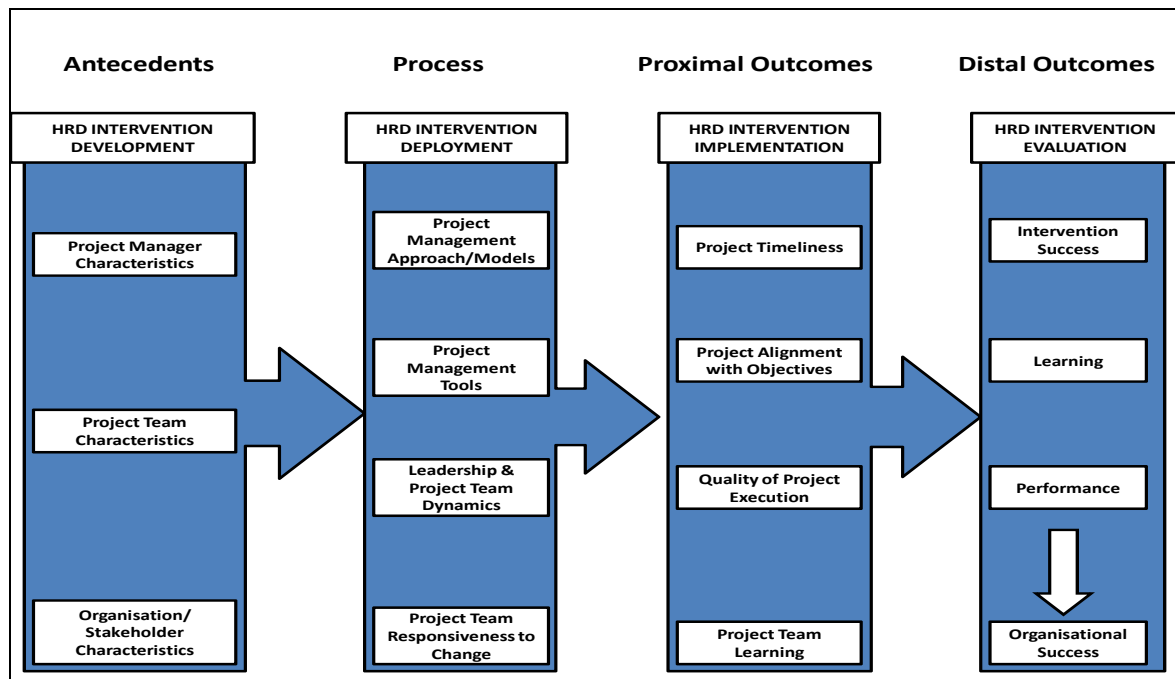


Figure 3.1. A conceptual framework for successful HRD project management (Carden & Egan, 2008, p. 328)

Since the focus of this research is on occupational learning programmes, the skills development provider takes operational custodianship of such programmes. It is significant that the skills development providers manage these programmes as a project and manage it well. The project management approach of skills development projects

funded by the SETA or NSF is also supported by the DHET as it enables projects to be conceptualised, planned, implemented and monitored. However, despite the positive spin-offs that may accrue from project management principles, the capacity of SETAs to project-manage these interventions remains questionable (DHET, 2012). The project management framework is valuable to the new, fast-paced, occupational learning workplace bound by time constraints (Bisschoff & Govender, 2004, p. 77). Many projects initiated in the workplace today are time bound in terms of commencement and end dates. Hence the life cycle of skills development interventions is provided in the skills development legislation.

For example, occupational learning programmes have a life cycle of at least 12 months. Annual workplace skills plans, annual training reports and annual implementation of skills interventions are the current legislative requirements for workplace training providers and have to be accounted for every 12 months. In addition, skills levies are paid over annually and skills grants claimed annually. Furthermore, the annual life cycle of skills development interventions must be broken down into the various skills processes and phases. Time management thus becomes a significant responsibility of skills managers and skills development providers (Bisschoff & Govender, 2004, p. 77).

According to project management principles, skills development providers must integrate skills development in any organisation by working with the SDF, assessor, other skills development providers, managers and learners (Bisschoff & Govender, 2004). This cooperation is also critical in implementing occupational learning programmes. Such programmes should therefore be integrated with other internal organisational projects. According to Bisschoff and Govender (2004, pp. 77-78), the following are the aspects of project management that are essential for the successful implementation of occupational learning programmes:

- (1) *Scope and time.* It is imperative that skills development providers define the scope of an occupational learning programme. The scope will identify the inputs, range, criteria, stakeholders and outcomes of the programme. Once the scope has been defined, the programme should be scheduled according to relevant times, dates and stakeholders. Time management is essential for effective, successful and sustained occupational learning programmes.

- (2) *Cost.* Costing an occupational learning programme is a necessary task before starting the programme. The cost of time, effort, resources and other factors for training learners must be calculated and budgeted for. Furthermore, the skills development legislation demands that a cost benefit analysis be completed in order to determine the benefits to annual training investments.
- (3) *Quality management.* Skills development providers, employers and learners must achieve quality standards of performance in the occupational learning programme. Effective skills development providers should strive to promote excellence and quality in the programme.
- (4) *Human resource provision.* Adequate human resources must be allocated and managed throughout the learning programme. This includes workplace mentors, supervisors and assessors. Effective skills development providers are those who value human resources as assets who need guidance, maintenance and support in order to prevent risks to the programme or people.
- (5) *Risk management.* Risk management is necessary for unforeseen crisis interventions, especially with regard to other stakeholders. Occupational learning programme risks must be identified, controlled, minimised and eliminated for the programme to succeed. Hence the appointment of key staff, resources and contacts for the programme must be carefully considered before commencing the programme. Skills development providers employing project management to manage dynamic skills development roles and responsibilities evade crisis management situations. Owing to the uncertain, rapidly advancing, legislation-driven workplace demands that managers and skills development providers face, they need to be innovative in improving occupational learning programmes.

Skills development providers and managers involved in occupational learning programmes must therefore incorporate sound management strategies, inputs, mechanisms, tools, techniques and outputs as solutions to occupational learning programme's management roles. The next section focuses on quality management, an element that is central to project management and the new occupational learning system in South Africa.

3.3 QUALITY MANAGEMENT IN THE SOUTH AFRICAN OCCUPATIONAL LEARNING SYSTEM

The South African skills development system is built around the quality management model at macro level, as depicted in figure 3.2. Quality management is encapsulated in the Cabinet's vision, which cascades down through intervention strategies developed by both the Ministry of Labour and the Ministry of Higher Education and Training (Vorwerk, 2010c).

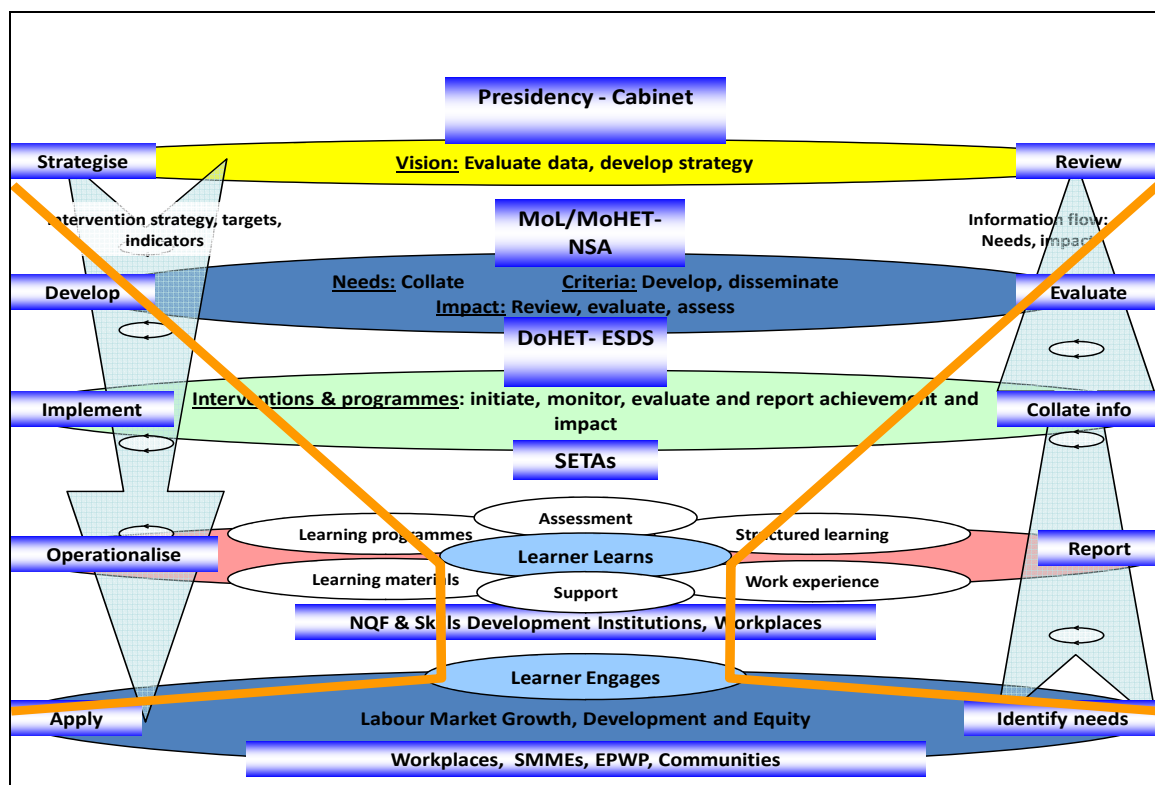


Figure 3.2. South African quality management system for skills development at macro level (Vorwerk, 2010c, p. 8)

DHET is responsible for implementing these strategies through appropriate interventions and programmes at SETA level. SETAs then operationalise these strategies by promoting the successful development and implementation of appropriate occupational learning programmes at workplace level. Such occupational learning programmes ultimately contribute to the supply of skills in the labour market. Quality management is

integrated at all these levels through mechanisms such as reporting, evaluation and review, as indicated in figure 3.3.

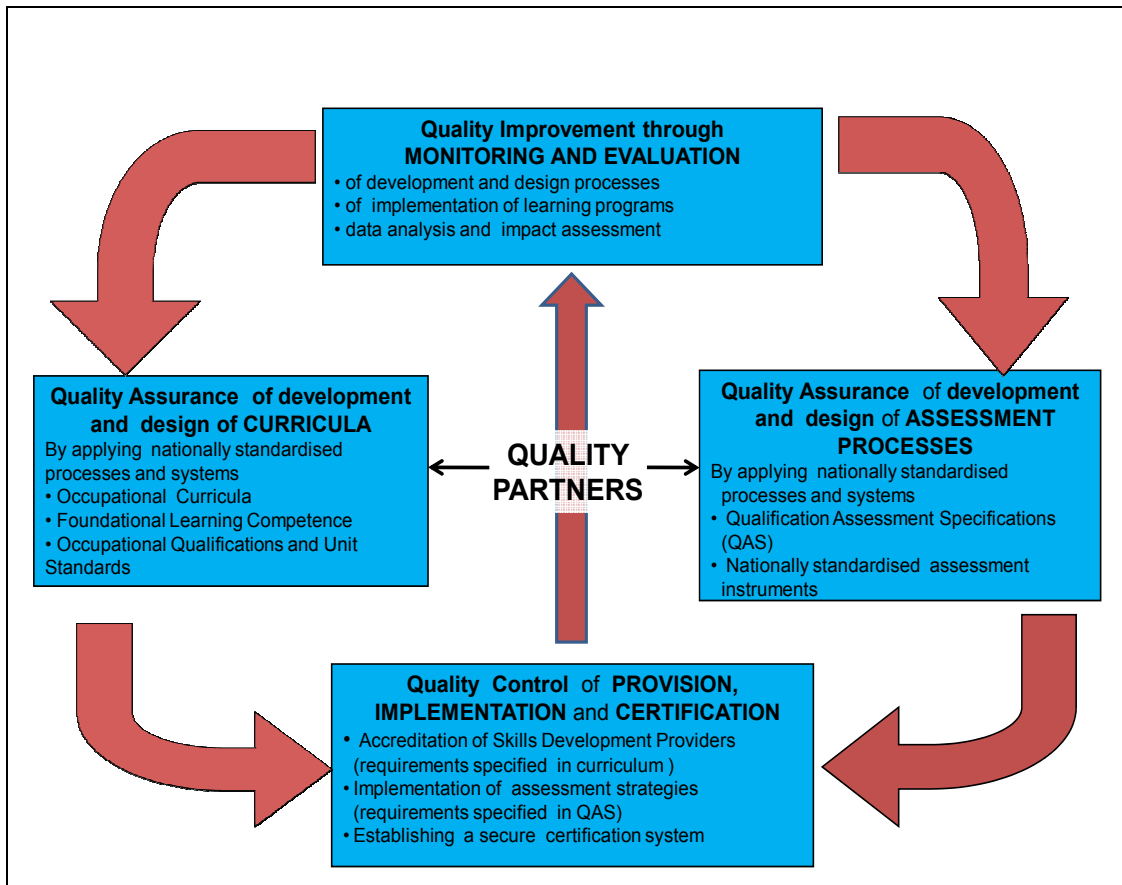


Figure 3.3. QCTO model for quality management (DHET, 2010c, p. 30)

Nevertheless, at micro level, a quality management system in the new OLS encompasses all aspects of quality (including ultimately impact assessment); quality assurance (the management, design and development of occupational curricula and qualification assessment specification and working with quality partners representing CEPs); quality control (accreditation of skills development providers, registration of assessment centres and registered constituent assessors, and monitoring of data); and quality improvement (responding to issues in the system at local level) (DHET, 2010c). The previous SETA/NQF model of quality assurance, which forms part of the NSDS I and NSDS II, was based on decentralised assessment whereby individual institutions were accredited to offer specific, registered qualifications. Each SETA had its own

requirements for the accreditation of providers in its sector, which had to design learning programmes aligned to the registered qualifications and ensure assessment and moderation to ensure quality assurance of the system.

Now, with the new OLS and the NSDS III, quality assurance for occupational learning revolves around the QCTO. The QCTO will set occupational standards, manage quality, monitor and evaluate the implementation of occupational learning programmes. According to Vorwerk (2010b), quality management is a strategic decision in an organisation. Quality is dependent on the utility of the learning, which includes managing the system (i.e. monitoring and evaluating the system delivery, programme evaluation and impact assessment) (DHET, 2010c). Figure 3.3 depicts the QCTO model for quality management in South Africa. It is clear from Figure 3.3 that quality is vital across all aspects of occupational learning programmes, namely curriculum development and design; monitoring and evaluation; design and development of assessment processes; and provision, implementation and certification.

3.3.1 Elements of the QCTO model for quality management

The QCTO remains small, but works through its partners. It has the responsibility to manage the consistency of the design and development process and certification of occupational qualifications; it controls the quality of provision and assessment through accreditation and registration; it monitors data and improve processes and quality control mechanisms; and, it improves development and design processes (DHET, 2010c). The elements of the QCTO model for quality management are briefly discussed below.

3.3.1.1 *Quality assurance of development and design of curricula*

The process of occupational qualification development is extremely rigorous and is initiated at industry level by constituents, SETAs or an association or professional body on the basis of existing needs. The needs may originate from the scarce skills list or demands from an industry or sector and be preceded by research. An application for qualification or curriculum development is then forwarded to the QCTO, which sets the process in motion. Key stakeholders including a curriculum/qualification development facilitator, a qualifications development partner and an assessment quality partner are identified and become involved in the process (DHET, 2010c).

The curriculum/qualification development facilitator guides and directs various working groups, which are responsible for the development of an occupational profile, the development of learning process design and the development of assessment specifications. These working groups collaborate with the CEPs. The result of this process is an occupational curriculum and qualification. The curriculum/qualification development facilitator, with inputs from the CEPs, compiles and submits the development process report, including occupational curricula, qualification assessment specifications and occupational qualifications, to the qualification development partner. Thereafter, the qualification development partner registers occupational curriculum and qualifications assessment specification on the NOPF, and finally, submits an occupational qualification to SAQA for registration. The QCTO oversees the whole process of occupational curriculum/qualification development to ensure that it meets the quality standards set.

3.3.1.2 Controlling the quality of provision, implementation and certification

The QCTO controls the quality of provision, assessment and certification by applying specified criteria in terms of the approval of regulated occupational learning programmes; accreditation of skills development providers; and the implementation of assessment strategies. It also approves all regulated occupational learning programmes developed by SETAs prior to the registration by the DHET to ensure validity and compliance with occupational qualification rules of combination (Vorwerk, 2010b). The accreditation of skills development providers is vital because they are required to deliver curriculum components and conduct internal assessment against related unit standards. Skills development providers will be accredited on the basis of their ability to provide the theory/knowledge and practical skills development components outlined in the curriculum. Workplace approval of learning sites is granted by the QCTO after it has been ascertained that the learning site has the ability to provide the work experience component (DHET, 2010c).

The approach whereby the QCTO accredits skills development providers is based on self-evaluation against general criteria and specific requirements specified in the relevant occupational curriculum components (subjects or modules), as well as recommendations from industry and/or an acceptable record of accomplishment. The

culture of self-regulation and strong links to relevant professional, occupational and industry bodies and associations is encouraged to maintain and raise standards. SETAs will have to focus on monitoring the implementation of occupational learning programmes in line with the DHET regulations. The regulatory and quality assurance functions of SETAs are coordinated through the QCTO in order to use the resources more effectively. In the end, quality monitoring and audits by the QCTO will be conducted constantly as required, on the strength of complaints and final assessment results.

3.3.1.3 Quality assurance of development and design of assessment processes

The QCTO has a responsibility to accredit assessment centres to conduct a final integrated assessment of occupational competence and to assist in the development of banks of assessment items as an alternative mechanism for standardising assessment practices nationally. On-going assessment for credit accumulation will continue and verification will be integrated into the monitoring and evaluation of occupational learning programme delivery (DoL, 2007b).

3.3.1.4 Quality improvement through monitoring and evaluation

The QCTO will conduct research to monitor the effectiveness of learning interventions in the context of the larger occupational learning system. The process of monitoring and evaluation revolves around the development and design processes, the implementation of occupational learning programmes and data analysis and impact assessment (qualitative and quantitative). Qualitative impact assessment focuses on the appropriateness and relevance of skills, the credibility of assessment, enhanced employability and increased productivity and the quality of work. Quantitative assessment focuses on whether the learning programme is delivering the right number of people as well as on the balance between demand and supply. The SETAs' role has changed from education and training quality assurance bodies to real quality assurance involving quality monitoring of programme implementation and programme evaluation research, including impact assessment. The QCTO will conduct the statistical analysis of learner data collected, including enrolment, completion and certification rate. These data will be analysed in terms of skills development providers and workplaces, assessment centres, learners, occupational learning programmes and qualifications (DoL, 2007b).

3.3.2 Quality control mechanisms in the new OLS

Overall, quality mechanisms in the new OLS include consultations with the CEPs, hence the notion of “quality partners”, one for the development of curricula, qualifications and assessment specifications, and the other, for the management of the assessment process using nationally standardised instruments. Figure 3.4 depicts the occupational curriculum development process as managed by the development quality partner.

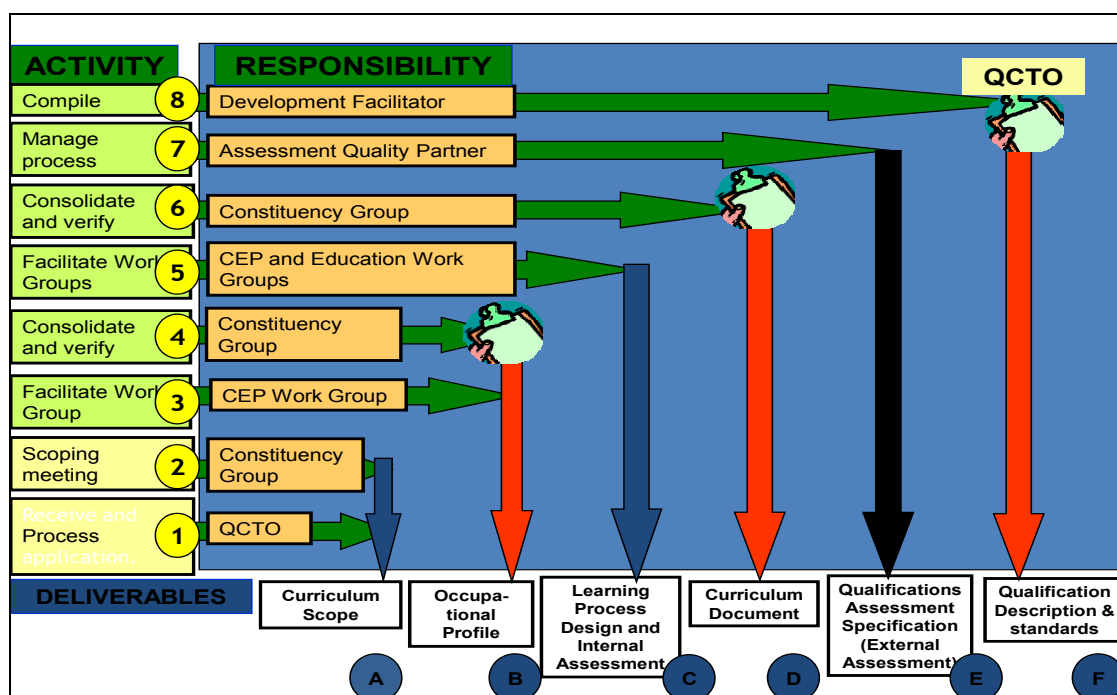


Figure 3.4. Occupational curriculum development process managed by development quality partner (DHET, 2010c, p. 12; Vorwerk, 2010a, p. 53)

According to Vorwerk (2010a), a focus on quality assurance is misleading if it is not embedded in a broader approach to quality management. Based on overall organisational strategy, quality assurance of occupational learning programmes ensures the predictability and repeatability of processes under the organisation’s control against the strategic criteria in the quality management system (Vorwerk, 2010a). Quality assurance of occupational learning programmes is largely an issue of quality control (DHET, 2010c).

The key principle in the quality assurance model is to create a framework for those with the most interest in occupational qualification to participate, (1) in its development, and (2) in its implementation, based on the external assessment - hence the concept of quality partners, as indicated in figure 3.5.

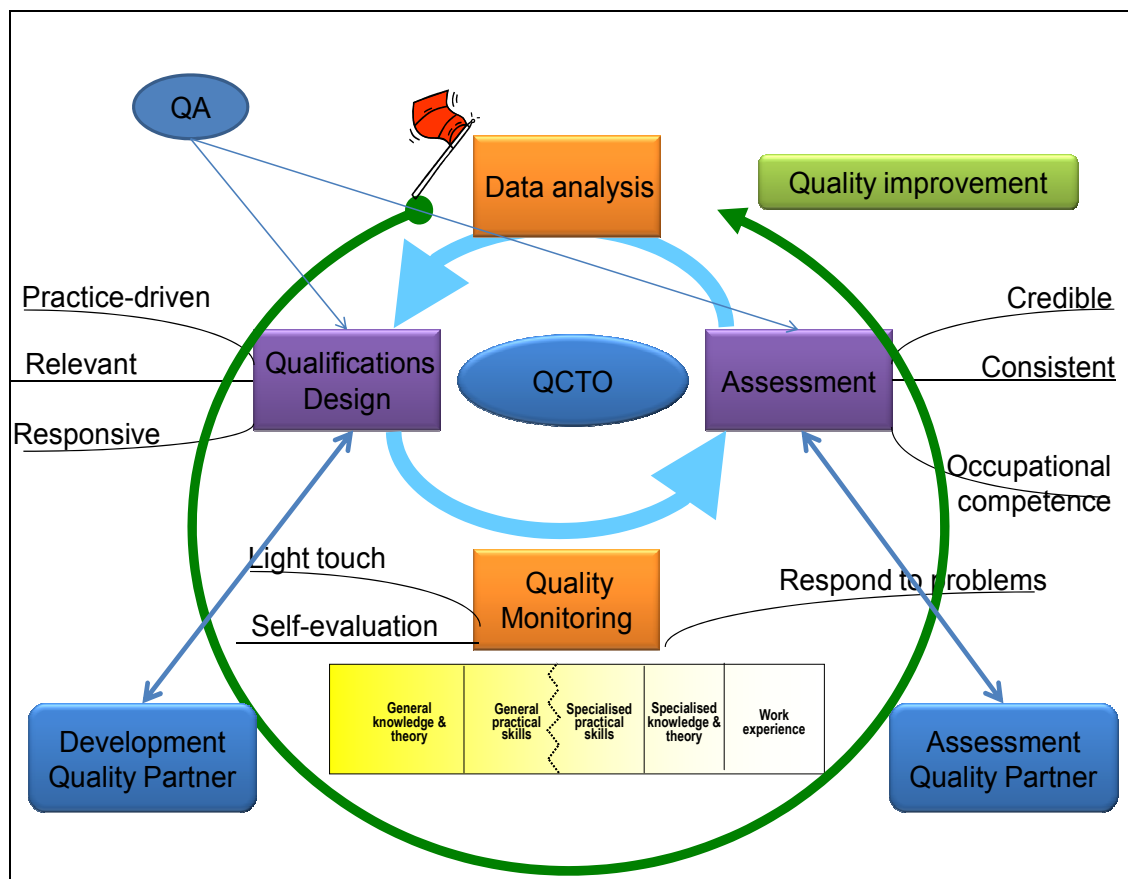


Figure 3.5. QCTO quality assurance process in the new OLS (DoL, 2008b, p. 6; Vorwerk, 2010a, p. 22; 2010b, p. 8)

A wide range of quality partners is involved in the promotion of quality in occupational learning and these include professional bodies, occupational associations, SAQA and SETAs, as illustrated in figure 3.6. These partners are involved from the initial stages of occupational qualification development, during implementation and during assessment.

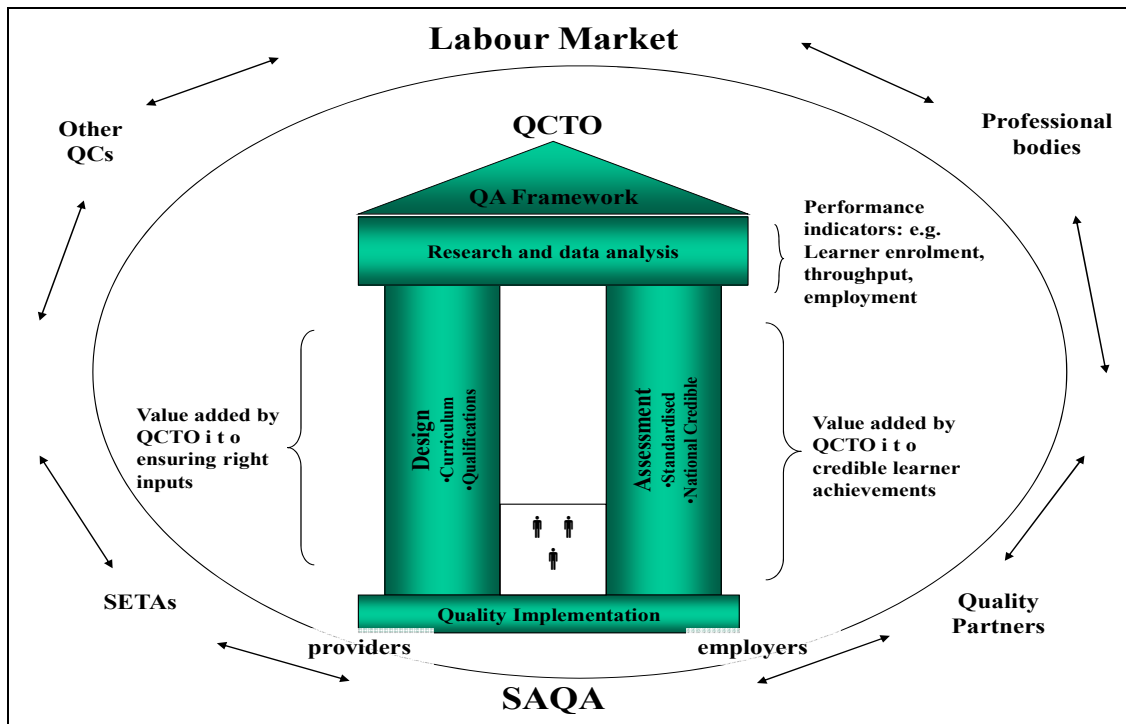


Figure 3.6. Quality assurance partners in the new OLS (DoL, 2008b, p. 14; DoL, 2009a, p. 8)

The section below discusses the global quality management models that provide a basis for understanding how occupational learning programmes can be effectively managed and evaluated.

3.4 GLOBAL QUALITY MANAGEMENT MODELS

Quality management with respect to training in general and occupational learning programmes in particular is inevitable in modern organisations. However, the research findings on the development of a general model of quality management do not agree (Franks, 2009). Various studies (Ahire, Damondar & Matthew, 1996; Anderson, Rungtusanatham & Schroeder, 1994; Saraph, Benson & Schroeder, 1989) have shed light on the building blocks or constructs underlying quality management. However, the findings of these studies have been diverse. There is thus a lack of consensus among researchers and practitioners in certain key areas.

Firstly, there is limited agreement about which constructs should be included in a general model of quality management.

Secondly, there is dearth of empirical research findings to support a theoretical model capable of explaining the pattern of relationships between the quality management constructs, that is, the manner in which the quality management practices interact to ultimately effect enhancement in organisational performance measures such as customer satisfaction and financial results.

A number of studies have attempted to identify those quality management practices that contribute optimally to organisational performance (Frank, 2009). While these studies have unquestionably contributed to the body of quality management knowledge, they have generally fallen short of offering a comprehensive explanation of how the quality management practices interact and influence one another to culminate in superior organisational performance. Previous research has not fully developed and validated a generalisable theory that adequately explains the quality management process (Tamimi, 1993).

Organisations are increasingly recognising the strategic significance of quality and quality management. Many organisations have arrived at the conclusion that effective quality management can enhance their competitive abilities and provide strategic advantages in the marketplace (Anderson *et al.*, 1994).

Nevertheless, quality award frameworks have a long history (Williams, 2008). Japan was the first country to introduce the concept of excellence in 1951, when the Union of Japanese Scientists and Engineers (JUSE) established the Deming Prize award. The prize was established in honour of W. Edwards Deming who was the driving force behind the development of quality products and services that greatly enhanced the Japanese economy in the post-World War II era. The Deming Prize was intended to recognise excellence in the implementation of company-wide quality control. In 1987, the Malcolm Baldrige National Quality Award (MBNQA) was launched in the USA. It is the best-known excellence award model and the world's most widely used excellence framework for self-assessment. In 1988, Australia followed with the introduction of the Australian Quality Award (AQA), while in 1992, the European Foundation for Quality

Management (EFQM) launched the European Model for Total Quality Management (Williams, 2008). Although the latter model was based mainly on the experiences of the Deming Prize and the Malcolm Baldrige Models, it offered a much greater business focus and its explicit reference to business results led to the development of the business excellence concept.

The sections below discuss the main features of some of these major international quality management models, but the emphasis is on elements/criteria that are relevant to this research. These models are part of the Global Excellence Models Network and are applied in various countries and in different organisations for different quality enhancement purposes. However, some of the elements/criteria of these models were used as a basis to develop a theoretical model for the effective management and evaluation of occupational learning programmes in this research.

3.4.1 The Malcolm Baldrige National Quality Award (MBNQA)

The USA made its first national commitments to excellence in terms of quality, speed and efficiency when President Reagan issued Executive Order No. 12552 in 1986 and Executive Order No. 12637 in 1988 (Pryor, Toombs, Anderson & White, 2010). The latter Executive Order defines an organisational performance standard as follows: “Organisational performance standard means a statement that quantifies and describes the desired level of quality, timeliness and efficiency of services to be provided by an organisation” (Executive Order No. 12637, 1988).

The US government created the Baldrige Award in 1987 in order to recognise quality excellence and to stimulate quality improvement in US industry (Garvin, 1991). It is awarded annually to manufacturers, service companies and small businesses, and being extended to include healthcare and educational organisations.

According to the MBNQA Criteria for Performance Excellence booklet (2010), the Baldrige Criteria strengthen the US competitive advantage in three ways:

- Helping improve organisational performance practices, capabilities and results.

- Facilitating communication and sharing of best practices information among US organisations of all types.
- Serving as a tool for understanding and managing performance and guiding organisational planning and opportunities for learning.

The Criteria for Performance Excellence (MBNQA, 2006) booklet further states that the criteria are designed to help organisations follow an integrated approach to organisational performance management that results in:

- The delivery of ever-improving value to customers, contributing to marketplace success.
- The improvement of overall organisational effectiveness and capabilities.
- Organisational and personal learning.

In other words, business leaders can use the MBNQA Criteria as a management model to systematically understand and manage all aspects of their business; as a tool to assess and improve their organisation and its operations; and as a tool for benchmarking other organisations and learning from them. It is mainly for this reason that this model is considered relevant to this research.

The seven categories of the MBNQA Criteria are leadership; strategic planning; measurement, analysis and knowledge management; workforce focus; process management; customer focus; and results (Award Criteria, MBNQA, 2010). The criteria are built on the following set of interrelated core values and concepts: visionary leadership; customer-driven excellence; organisational and personal learning; valuing workforce members and partners; agility; focusing on the future; managing for innovation; management by fact; societal responsibility; focusing on results and creating value; and systems perspective.

There are several advantages to using the Baldrige criteria (Award Criteria, MBNQA, 1994). First, the conceptual framework underlying the award addresses the principal domains of total quality. Second, the framework has repeatedly been updated by a team of experts to reflect current thinking on total quality. Third, the award framework is not

limited to a single quality perspective (e.g. that of Deming or Juran), but incorporates a diversity of viewpoints instead.

However, to properly use the MBNQA Criteria for assessment or to strategically manage a business, one must understand each individual category of the criteria and the core values and concepts upon which they are based as well as the necessity for alignment in the seven categories. Figure 3.7 provides the framework connecting and integrating the categories.

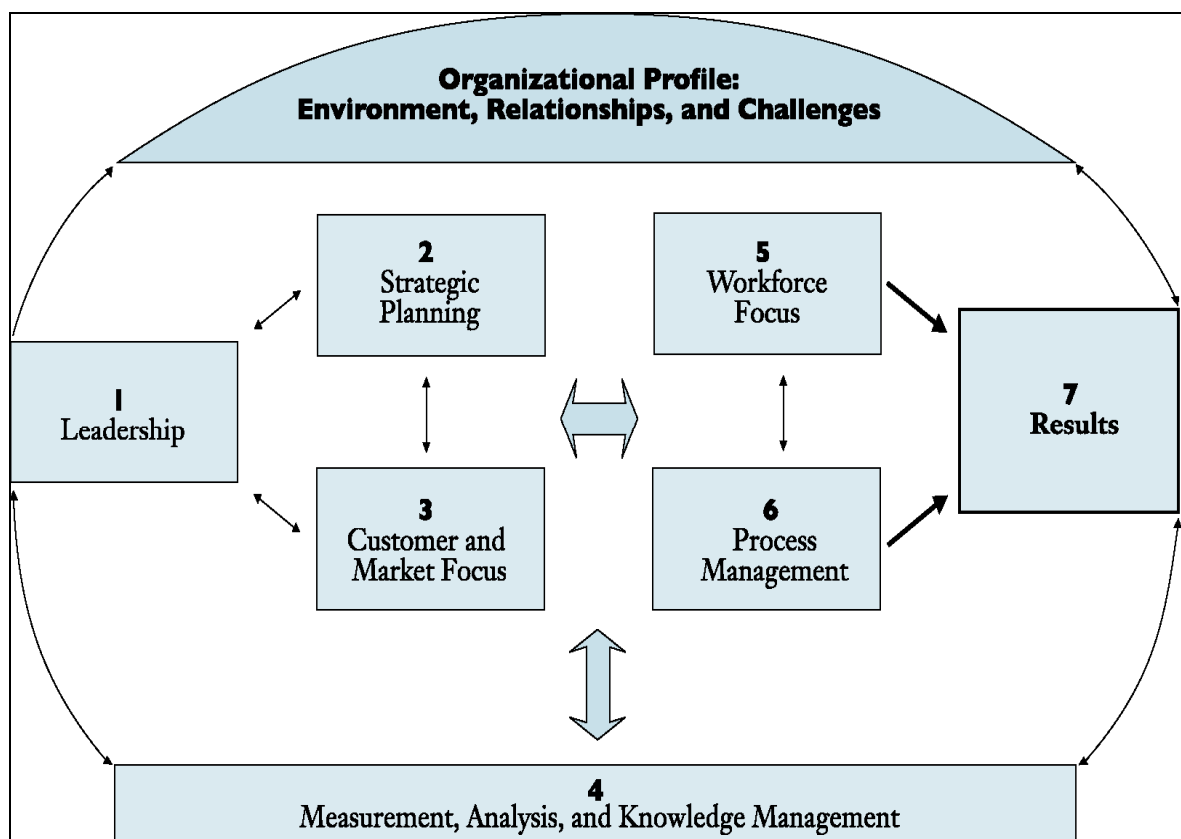


Figure 3.7. Baldrige Criteria Excellence Framework: a systems perspective (Award Criteria, MBNQA, 2010, p. iv)

3.4.1.1 Organisational profile

The organisational profile (top of figure 3.7) sets the context for the way an organisation operates. The environment, key working relationships and strategic challenges and advantages serve as an overarching guide for organisational performance management

system (Award Criteria, MBNQA, 2010). In the context of this research, an understanding of the environment in which occupational learning programmes are to be implemented is important, as is the relationship between the key stakeholders involved.

3.4.1.2 System operations

The system operations are composed of the six Baldrige categories in the centre of figure 3.7, which define the operations and the results that an organisation achieves. Leadership (category 1), strategic planning (category 2) and customer focus (category 3) represent the leadership triad. These categories are placed together to emphasise the importance of a leadership focus on strategy and customers. Senior leaders set an organisational direction and seek future opportunities for an organisation. Workforce focus (category 5), process management (category 6), and results (category 7) represent the results triad (Award Criteria, MBNQA, 2010).

An organisation's workforce and key processes accomplish the work of the organisation that yields overall performance results. All actions point towards results - a composite of product, customer, market and financial and internal operational performance results, including workforce, leadership, governance and societal responsibility results. The horizontal arrow in the centre of the framework links the leadership triad to the results triad, a linkage critical to organisational success. Furthermore, the arrow indicates the central relationship between leadership (category 1) and results (category 7). The two-headed arrows in figure 3.7 indicate the importance of feedback in an effective performance management system.

3.4.1.3 System foundation

Measurement, analysis and knowledge management (category 4) are critical to the effective management of an organisation and to a fact-based, knowledge-driven system for improving performance and competitiveness. Measurement, analysis and knowledge management serve as a foundation for the performance management system (Award Criteria, MBNQA, 2010). The sub-sections below discuss each of the categories in relation to total quality and management theory.

a) Leadership

The leadership category examines how an organisation's senior leaders' personal actions guide and sustain their organisation. Also examined are the organisation's governance system and how an organisation fulfils its legal, ethical and societal responsibilities and supports its key communities (Award Criteria, MBNQA, 2010). The focus of this category is the senior leader's central role in setting values and directions, communicating, creating and balancing value for all stakeholders, and creating an organisational bias for action. Success requires a strong orientation to the future and a commitment to improvement, innovation and organisational sustainability. Increasingly, this requires creating an environment for empowerment, agility and learning (Award Criteria, MBNQA, 2010). In highly respected organisations, senior leaders are committed to developing the organisation's future leaders and to recognising and rewarding contributions by members of the workforce. Senior leaders enhance their personal leadership skills. They participate in organisational learning, in the development of future leaders, in succession planning and in recognition opportunities and events that celebrate the workforce. Development of future leaders might include personal mentoring or participation in leadership development courses. Based on the above, it is therefore quite clear that the success of occupational learning programmes hinges on sound leadership.

b) Workforce focus

The workforce focus category examines how an organisation engages, manages and develops its workforce to utilise its full potential in alignment with an organisation's overall mission, strategy and action plans (Award Criteria, MBNQA, 2010). The category examines an organisation's ability to assess workforce capability and capacity needs and to build a workforce environment conducive to high performance. This category covers workforce engagement, development and management in an integrated way (i.e. aligned with an organisation's strategic objectives and action plans). Workforce focus includes an organisation's capability and capacity needs and its workforce support climate. To reinforce the basic alignment of workforce management with overall strategy, the Baldrige Award criteria also cover human resource or workforce planning as part of overall planning in the strategic planning category (category 2).

i) Human resource planning and management

In the Baldrige criteria, this total quality domain includes developing an overall HRM plan for selection, employee involvement, training, performance management and employee recognition that is aligned with an organisation's strategy. Strategic HRM has been well covered by management theory in recent years (Fombrun, Tichy, & Devanna, 1984; Wright & McMahan, 1992).

ii) Employee involvement

The approaches in total quality to involvement and empowerment are similar to early work on "System 4" organisations (Likert, 1967), which emphasised empowered workgroups and collaborative teams, and Theory Y (McGregor, 1960), which assumed employees were motivated and capable of doing good work on their own (Dean & Evans, 1994).

iii) Employee education and training

This domain is covered extensively in management theory. Indeed, total quality practitioners appear to implement techniques such as training evaluation and systematic needs analysis (Blackburn & Rosen, 1993), and comprehensive training in a broad range of skills (Snell & Dean, 1992), which have been long prescribed in the literature, but ignored in practice.

iv) Employee performance and recognition

This total quality domain is extensively covered in management theory. Traditional HRM research (and practice) in performance appraisal emphasises the impact of individual differences (i.e. the person) on performance and assumes that the assessment of individual differences in performance is meaningful.

v) Employee well-being and satisfaction

Total quality advocates appear to give more weight to the importance of employee satisfaction in organisational effectiveness than HRM researchers, who focus on performance per se (Cardy & Dobbins, 1993). The assumption of total quality advocates is that employee satisfaction is needed to support continuous improvement and customer satisfaction. They also appear to assume a strong correlation between job satisfaction and performance, but management researchers find only a modest relationship (Iaffaldano & Muchinsky, 1985).

In summary, the HRM domain in total quality has been covered extensively in the management literature, and similar prescriptions are found in the areas of employee involvement, training and career management. However, there also are significantly different prescriptions in the areas of selection, performance appraisal and compensation. These differences are embedded in the issue of person versus system determinants of work performance (Dobbins, Cardy & Carson, 1991; Waldman, 1994), which is an important area for future HRM research. Because performance is certain to be an interaction of the two, an issue for both research and practice is whether raters can separate person and system factors in performance appraisal and compensation (Dobbins *et al.*, 1991).

c) Strategic planning

The strategic planning category examines how an organisation develops strategic objectives and action plans. Also examined is the way in which the chosen strategic objectives and action plans are deployed and changed if circumstances require it, and how progress is measured (Award Criteria, MBNQA, 2010). This category emphasises that long-term organisational sustainability and an organisation's competitive environment are key strategic issues that need to be integral parts of an organisation's overall planning. Decisions about an organisation's core competencies are an integral part of organisational sustainability and are therefore key strategic decisions.

While many organisations are increasingly adept at strategic planning, plan execution is still a significant challenge. This is especially true given the need for market demands to

be agile and prepared for unexpected change, such as volatile economic conditions or disruptive technologies that can upset an otherwise fast-paced but more predictable marketplace. This category highlights the need to focus not only on developing organisational plans, but also on the organisation's capability to execute them. The Baldrige criteria (Award Criteria, MBMQA, 2010) emphasise the following three key aspects of organisational excellence, which are vital to strategic planning:

- Customer-driven excellence is a strategic view of excellence. The focus is on the drivers of customer engagement, new markets and market share - key factors in competitiveness, profitability and organisational sustainability.
- Operational performance improvement and innovation contribute to short- and longer-term productivity growth and cost/price competitiveness. Building operational capability, including speed, responsiveness and flexibility, represents an investment in strengthening organisational fitness.
- Organisational and personal learning is a necessary strategic consideration in today's fast-paced environment. The criteria emphasise that improvement and learning need to be embedded in work processes. The special role of strategic planning is to align work processes and learning initiatives with an organisation's strategic directions, thereby ensuring that improvement and learning prepare an organisation for and reinforce organisational priorities.

The strategic planning category examines how an organisation:

- Determines its key strengths, weaknesses, opportunities, and threats; its core competencies; and its ability to execute the strategy.
- Optimises the use of resources, ensures the availability of a skilled workforce, and bridges short- and longer-term requirements that may entail capital expenditures, technology development or acquisition, supplier development and new partnerships or collaborations.
- Ensures that deployment will be effective - that there are mechanisms to communicate requirements and achieve alignment at three levels: (1) the organisation and executive level, (2) the key work system and work process level, and (3) the work unit and individual job level (Award Criteria, MBNQA, 2010).

This category addresses business planning and deployment of plans, with special focus on customer and operational performance requirements. It stresses that customer-driven quality and operational performance excellence are key strategic business issues which need to be an integral part of overall business planning. The first item in this category is how the company develops and deploys customer-focused strategy, and the second, effective translation of plans to specific requirements for work units and suppliers (Award Criteria, MBNQA, 1994).

d) Measurement, analysis and knowledge management

The measurement, analysis and knowledge management category examines how an organisation selects, gathers, analyses, manages and improves its data, information and knowledge assets and manages its information technology. The category also examines how an organisation reviews and uses reviews to improve its performance. In the simplest terms, category 4 is the “brain centre” for the alignment of an organisation’s operations with its strategic objectives. Central to such use of data and information are their quality and availability (Award Criteria, MBQNA, 2010). Furthermore, since information, analysis and knowledge management might themselves be primary sources of competitive advantage and productivity growth, this category includes such strategic considerations.

This area is concerned with the scope, management and use of data and information to maintain a customer focus, to drive quality excellence, and to improve performance. (Award Criteria, MBNQA, 1994). Management theorists have worked extensively in the area of information and analysis. Management theory topics that overlap considerably with this category include decision making and information processing.

e) Process management

The process management category examines how an organisation designs its work systems and how it designs, manages and improves its key processes for implementing those work systems to deliver customer value and achieve organisational success and sustainability. Also examined is an organisation’s readiness for emergencies (Award Criteria, MBNQA, 2010). This category addresses the way in which the work of an

organisation is accomplished. It emphasises the importance of an organisation's core competencies and how it protects and capitalises on them for success and organisational sustainability. It focuses specific attention on the need to prepare for potential emergencies and ensure continuity of operations.

Efficient and effective work systems require effective design; a prevention orientation; and linkage to customers, suppliers, partners, and collaborators, as well as a focus on value creation for all key stakeholders; operational performance; cycle time; emergency readiness; and evaluation, continuous improvement, innovation and organisational learning. Agility, cost reduction and cycle time reduction are increasingly vital in all aspects of process management and organisational design. In the simplest terms, "agility" refers to an organisation's ability to adapt quickly, flexibly and effectively to changing requirements. Depending on the nature of an organisation's strategy and markets, agility could mean rapid change from one product to another, rapid response to changing demands or the ability to produce a wide range of customised services.

f) Customer focus

The customer focus category examines how an organisation engages its customers for long-term marketplace success. This engagement strategy includes how an organisation builds a customer-focused culture. Also examined is the way in which an organisation listens to the voice of its customers and uses this information to improve and identify opportunities for innovation (Award Criteria, MBNQA, 2010). This category stresses this engagement as a key outcome of an overall customer culture and listening, learning and performance excellence strategy. Customer satisfaction and dissatisfaction results provide vital information for understanding an organisation's customers and the marketplace. In many instances, the voice of the customer provides meaningful information not only on customers' views but also on their marketplace behaviours, and how these views and behaviours may contribute to the organisation's sustainability in the marketplace.

g) Results

The results category examines an organisation's performance and improvement in all key areas – product outcomes, customer-focused outcomes, financial and market outcomes, workforce-focused outcomes, process effectiveness outcomes and leadership outcomes. Performance levels are examined in relation to those of competitors and other organisations with similar product or service offerings (Award Criteria, MBNQA, 2010). The results category provides a results focus that encompasses an organisation's objective evaluation and customers' evaluation of the organisation's product/service offerings, its overall financial and market performance, its workforce results, its leadership system and societal responsibility results and the results of all key processes and process improvement activities.

Through this focus, the criteria's purposes are maintained, including the superior value of offerings as viewed by customers and the marketplace; superior organisational performance as reflected in the organisation's operational, workforce, legal, ethical, societal and financial indicators; and organisational and personal learning. Category 7 thus provides "real-time" information (measures of progress) for the evaluation and improvement of processes, products and services, in alignment with an overall organisational strategy (Award Criteria, MBNQA, 2010). An analysis and review of results, data and information are critical to determine an organisation's overall performance and to set priorities for improvement.

3.4.2 European Foundation of Quality Management (EFQM)

In 1989, 14 presidents of leading European organisations came together in a quest to improve the competitiveness of European industry (Gormley, 2004). The following organisations were represented: British Telecom, Robert Bosch, Bull, Ciba-Geigy AG, Dassault Aviation, AB Electrolux, Fiat Auto Spa, KLM Royal Dutch Airlines, Nestlé AG, Philips Electronics NV, Ing., C Olivetti & C.S.p.A., Renault, Gebr., Sulzer AG and Volkswagen AG. The outcome of this gathering was the establishment of the EFQM. It was originally founded to stimulate and, where necessary, to assist management in adopting and applying the principles of organisational excellence and to improve the competitiveness of European industry and to close the gap of competitiveness between

Europe, the USA and Japan. The EFQM Excellence model now forms the framework used to deliver a sustained competitive advantage for thousands of organisations in Europe.

The model is dedicated to stimulating and assisting management to apply the innovative principles of TQM suited to the European environment. Its aim is to improve the competitiveness of European private and public sector organisations. Over 10 000 firms in the private and public sector all over Europe now incorporate the EFQM excellence model in their overall corporate management process (Watson, 2002). In 1999, 60% of the top 25 companies in Europe (and 30% of the top 100) were members of the EFQM.

EFQM's mission is to:

- Stimulate and assist organisations throughout Europe to participate in improvement activities, ultimately leading to excellence in customer satisfaction, employee satisfaction, knowledge management, impact on society and business results.
- Support the managers of European organisations in accelerating the process of making TQM a decisive factor for achieving global competitive advantage (EFQM, 2000).

According to the EFQM, the main reason for companies to apply the EFQM excellence model is to pursue business excellence through TQM, thereby allowing them to compete successfully in European and global markets.

3.4.2.1 The need for a model

Regardless of sector, size, structure or maturity, in order to succeed, organisations need to establish an appropriate management system. The EFQM excellence model is a practical tool to help organisations do this by measuring where they are on the path to excellence; helping them understand the gaps; and then stimulating solutions (EFQM, 2000). The EFQM is committed to researching and updating the model with the inputs of tested good practices from thousands of organisations both in and outside Europe. The model thus remains dynamic and in line with current management thinking.

The EFQM excellence model consists of nine criteria and 32 sub-criteria (see figure 3.8). It is a non-prescriptive framework and each sub-criterion has specific areas to address. The sub-criteria are a series of statements about each criterion, which should be considered in the course of assessment. Grouped under each of the sub-criteria are areas to address, which provide guidance on the evidence that should be sought to assess each of the sub-criteria. The areas to address do not provide an exhaustive list, and gathering evidence for all those stipulated does not necessarily indicate excellence. The nine criteria can be used to assess an organisation's progress towards excellence. The basic premise is that excellent results in relation to performance, customers, people and society are achieved through a leadership driving policy and strategy that is delivered through people, partnerships and resources and processes. The arrows emphasise the dynamic nature of the model. They show that innovation and learning help to improve enablers, which in turn, leads to improved results.

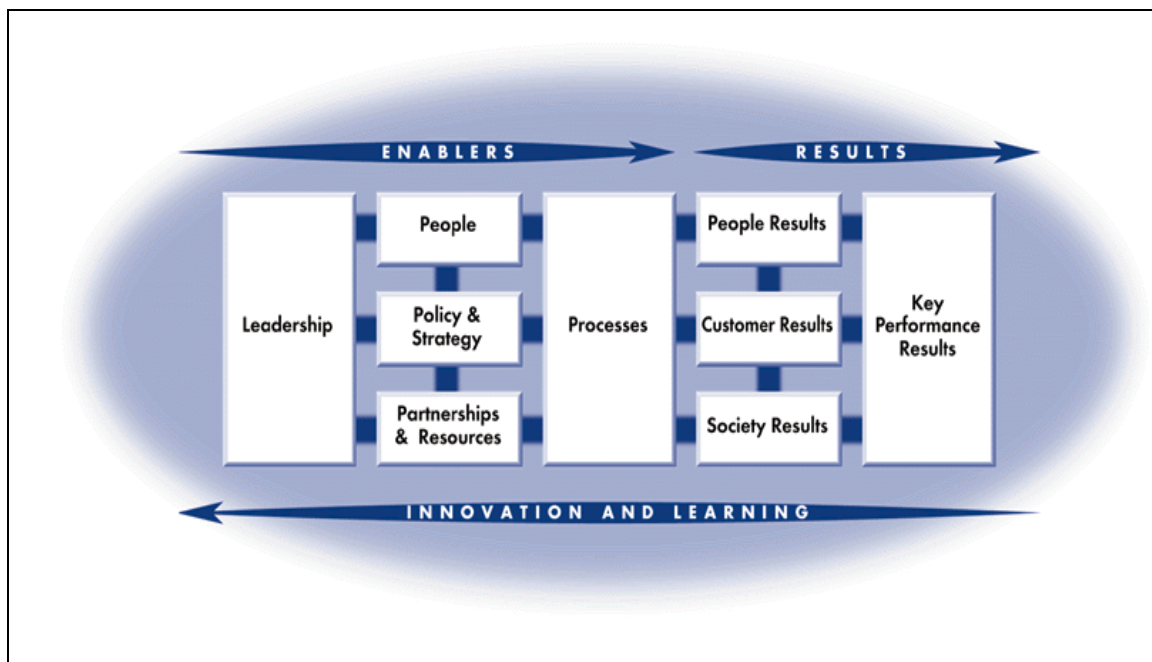


Figure 3.8. The EFQM excellence model (EFQM, 1999, p. 8; Watson, 2002, p. 7)

The five criteria on the left-hand side of figure 3.8 are called “enablers” and relate to the way in which the organisation performs various activities. According to Hillman (1994, p. 29): "The enablers are those processes and systems that need to be in place and managed to deliver total quality." The four criteria on the right-hand side of figure 3.8 are

concerned with the results the organisation is achieving with respect to different stakeholders. Hillman (1994) adds that the results provide the measure of actual improvement. According to Watson (2000), the EFQM model provides a truly service focused quality system with an inbuilt mechanism for the attainment of continued organisational improvement. Wiele van der, Dale and Williams (1997) maintain that the criteria of the model help managers to understand what TQM means in relation to managing a company.

The fundamental advantages of the new excellence model include increased cost effectiveness; results orientation; customer focus; partnership; knowledge management; performance; and learning (EFQM, 1999). The new model was designed to be simple (easy to understand and use); holistic (covering all aspects of an organisation's activities and results, yet not being unduly prescriptive); dynamic (in providing a live management tool that supports improvement and looks to the future); flexible (being readily applicable to different types of organisation and to units in those organisations); and innovative (EFQM, 1999).

Using this tool, an organisation can assess whether it is doing the right things and obtaining the right results. The ensuing assessment of an organisation's performance is measured both by results and by the quality of the processes and systems developed to achieve them. In its most sophisticated form, the model is used to assess an organisation for quality awards – including the European Quality Award. The assessment looks at the whole organisation (or the whole of a part of the organisation) using nine criteria. The model provides a balance and a relationship between approach (the way in which results are achieved) and results (what is achieved) – a balance between cause and effect. The criteria that deal with cause are referred to as enablers. Those dealing with effect are known as results. In scoring the organisation, both criteria have equal weighting.

In a study on self-assessment, Hillman (1994) elaborated further on the benefits of the EFQM model, stating the following:

- It is not a standard but allows interpretation of all the aspects of the business and all forms of organisation.

- Its widening use facilitates comparison between organisations. This provides the potential to learn from others in specific areas by using a common language.
- The inclusion of tangible results ensures that the focus remains on real improvement, instead of a preoccupation with the improvement process - that is, it focuses on achievement and not only activity.
- The comprehensive nature and results focus, broken down into discrete elements, helps develop a total improvement process specific for each organisation – it is a model for successful business.

3.4.2.2 *The nine criteria*

A full definition of each of the nine criteria depicted in figure 3.8 is provided below (EFQM, 1999).

a) Enablers

- (1) *Leadership*. This enabler relates to how leaders develop and facilitate the achievement of the mission and vision, develop values required for long-term success and implement these via appropriate actions and behaviours, and how the leaders are personally involved in ensuring that the organisation's management system is developed and implemented.
- (2) *Policy and strategy*. These entail how an organisation implements its mission and vision via a clear stakeholder-focused strategy, supported by relevant policies, plans and objectives.
- (3) *People*. This enabler is concerned with how an organisation manages, develops and releases the knowledge and full potential of its people at an individual, team-based and organisation-wide level, and plans these activities in order to support its policy and strategy and the effective operation of its processes.
- (4) *Partnership and resources*. This enabler relates to how an organisation plans and manages its external partnerships and internal resources in order to support its policy and strategy and the effective operation of its processes.

(5) *Processes*. This enabler entails how an organisation designs, manages and plans its processes in order to support its policy and strategy and fully satisfy and generate increasing value for its customers and other stakeholders.

b) *Results*

(6) *Customer results*. This enabler deals with what an organisation is achieving in relation to its external customers.

(7) *People results*. This enabler concerns what an organisation is achieving in relation to its people.

(8) *Society results*. This enabler has to do with what an organisation is achieving in relation to local, national and international society.

(9) *Key performance results*. This enabler relates to what an organisation is achieving in relation to its planned performance.

3.4.2.3 *The fundamental concepts of excellence*

The EFQM model is a non-prescriptive framework that recognises that there are many approaches to achieving sustainable excellence. Within this non-prescriptive approach, there are a number of fundamental concepts that underpin the EFQM model. These are explained below. No significance is attached to the order of the concepts. The list is not meant to be exhaustive and the concepts will change as excellent organisations develop and improve (EFQM, 1999).

a) *Results orientation*

Excellence is dependent upon balancing and satisfying the needs of all relevant stakeholders such as employees, customers, suppliers and society in general as well as those with financial interests in the organisation.

b) Customer focus

The customer is the final arbiter of product and service quality, and customer loyalty, retention and market share gain are best optimised through a clear focus on the needs of current and potential customers.

c) Leadership and constancy of purpose

The behaviour of an organisation's leaders creates clarity and unity of purpose in the organisation and an environment in which the organisation and its people can excel.

d) Management by processes and facts

Organisations perform more effectively when all interrelated activities are understood and systematically managed, and decisions concerning current operations and planned improvements are made using reliable information that includes stakeholder perceptions.

e) People development and involvement

The full potential of an organisation's people is best released through shared values and a culture of trust and empowerment, which encourages the involvement of everyone.

f) Continuous learning, innovation and improvement

Organisational performance is maximised when it is based on the management and sharing of knowledge in a culture of continuous learning, innovation and improvement.

g) Partnership development

An organisation works more effectively when it has mutually beneficial relationships, built on trust, sharing of knowledge and integration with its partners.

h) Public responsibility

The long-term interests of the organisation and its people are best served by adopting an ethical approach. This also includes exceeding the expectations and regulations of the community at large.

i) Policy and strategy

A successful organisation formulates policy and strategy in collaboration with its people and it is based on relevant, up-to-date and comprehensive information and research.

3.4.2.4 EFQM excellence model criteria

A new key concept for the EFQM excellence model is RADAR, which is the essential business logic underlying the model and determining the success of the search for performance improvements (EFQM, 1999). The fundamental elements of the concept are results, approach, deployment, assessment and review.

a) RADAR logic

The EFQM excellence model has the following basic logic:

- In the policy and corporate planning of an excellent organisation, the results the organisation requires are identified in terms of performance indicators.
- The approaches to be used to achieve the required results are identified in the organisation's plans and are an integrated part of the policy.
- These approaches are deployed throughout the entire organisation so that implementation of the plans and policy is systematic and consistent.
- The approaches are systematically assessed and reviewed in the light of results and feedback so that no approach will become ineffective or unnecessary once it has been implemented.

Hence the acronym RADAR.

Central to the RADAR logic then, is that an excellent organisation will have sound, fully deployed approaches that are consistent with policy and can be linked to the sustained achievement of appropriate targets. It will compare favourably with other organisations and will demonstrate continuous learning and improvement from external comparisons and internal review and assessment.

3.4.2.5 Approaches to apply the model

As indicated in figure 3.9, the level of investment in the model and the approach used by an organisation will depend on what the organisation wants from the model (EFQM, 1999).

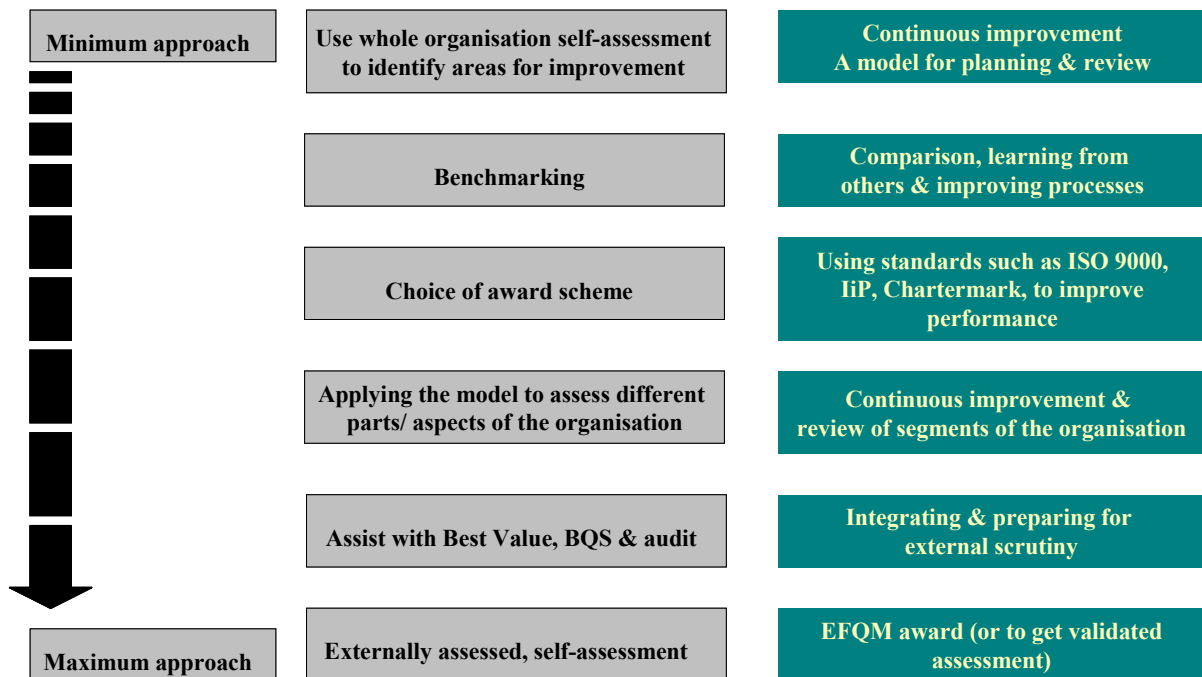


Figure 3.9. Ways in which the EFQM model can be used (Knivett Blake & Associates, 2002, p. 25)

A minimum approach would be an overview assessment in which managers share their perceptions of the organisation using the nine criteria. In contrast, a maximum amount of effort would be required to prepare the organisation for a campaign of continuous improvement aimed at securing an international award. The EFQM excellence model provides a valuable framework for addressing the key activities of modern organisations.

It is useful because it is possible to make a link between people, organisational objectives and improvement processes, all encompassed under the umbrella of continued improvement.

3.4.3 The Canadian Framework for Business Excellence (CFBE)

The Canada Awards for Excellence were introduced by the Ministry of Industry in 1984, and are administered by the National Quality Institute (NQI) (Porter & Tanner, 2004). They recognise outstanding achievement across major functions of an organisation. The award framework was revised in 1989 to reflect the Baldrige Model, and subsequent developments resulted in the Canadian Framework for Business Excellence. Many Canada-based private organisations use it as a framework for promoting organisational excellence, while the NQI uses it as the basis for adjudication of the Canada Awards for Excellence and many regional recognition programmes.

The NQI is an independent not-for-profit organisation whose vision is "to inspire organisational excellence" and whose mission is "to assist organisations in Canada achieve excellence through a strategic approach and application of quality principles, practices and certification as embodied in the NQI criteria, and to recognise outstanding achievement through the Canada Awards for Excellence" (NQI, 2007, p. 4). The CFBE (see figure 3.10) has many similarities to both the Baldrige and European models. The eight-section model includes principles for excellence, leadership, planning, customer focus, people focus, process management, partnership and business performance (NQI, 2007).

The sections are subdivided into subsections in a similar structure to the Baldrige and European models. The Canada Awards for Excellence are Canada's premier awards for recognising outstanding achievement (NQI, 2007). The Canadian Quality Award is presented to companies that meet or exceed the intent of the CFBE. Certificates of merit are awarded to organisations that are clearly on the road to excellence and are potential future award winners, but need more time to achieve the desired outcomes. The key features of the award framework and assessment process are highlighted below.

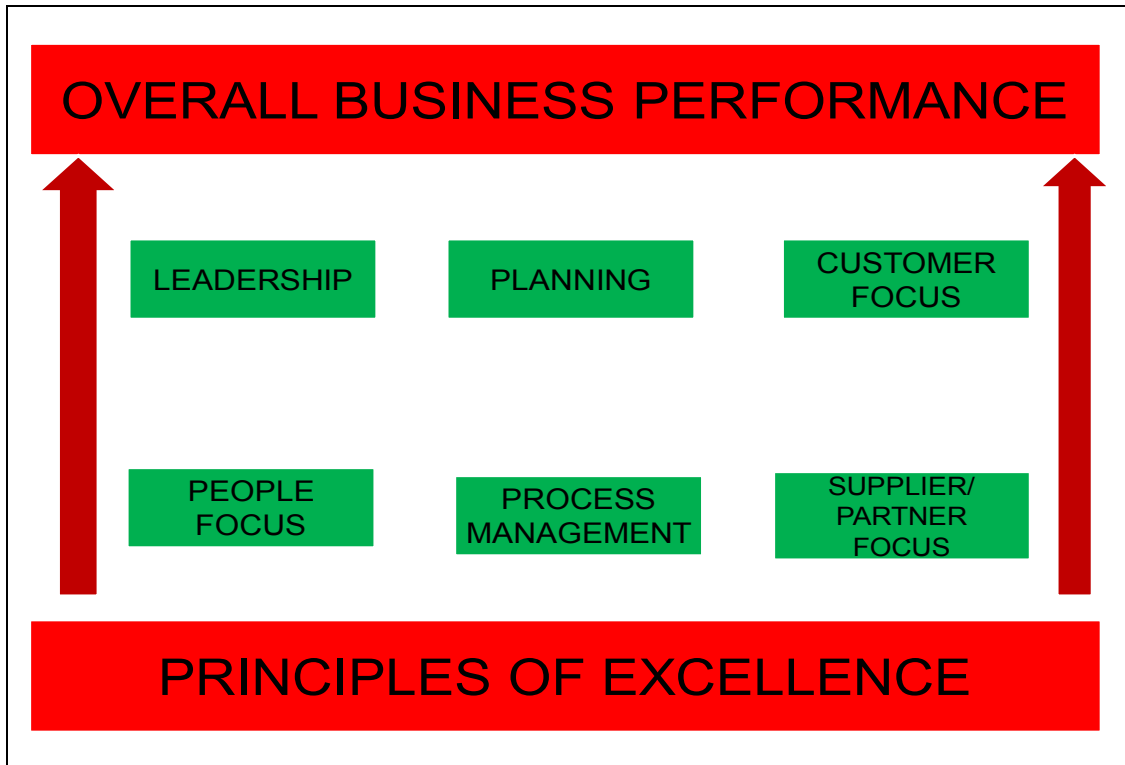


Figure 3.10. The Canadian Framework for Business Excellence (CFBE) (NQI, 2007, p. 3)

The CFBE (see figure 3.10) is used by numerous organisations as a management model for organisational excellence and as the basis for adjudication of the Canada Awards for Excellence and many regional recognition programmes. The Canadian Framework, based on the principles for excellence, is a comprehensive set of criteria for achieving positive business results.

3.4.3.1 Description of the elements of the criteria

The criteria of the CFBE (figure 3.10) are described below (NQI, 2007):

a) Section 1: leadership

This section focuses on creating the culture, values and overall direction for lasting success.

b) Section 2: planning

This section examines business planning (which incorporates improvement plans), the linkage of planning to strategic direction/intent and the implementation and measurement of performance to assess progress.

c) Section 3: customer focus

This section examines the organisation's focus on the customer and the marketplace and on the achievement of customer satisfaction and loyalty.

d) Section 4: people focus

This section examines how people are encouraged, enabled and involved to contribute to the achievement of the organisation's goals, while reaching their full potential.

e) Section 5: process management

This section examines how processes are managed to support the organisation's strategic direction, with a specific focus on prevention (as against correction), as well as continuous improvement. Process management applies to all activities in the organisation, in particular, those that are critical (key) for success. Process improvement priorities are derived from goals established in other sections, notably section 2 (planning) and section 3 (customer focus).

f) Section 6: supplier/partner focus

This section examines the organisation's external relationships with other organisations, institutions and/or alliances that are critical to it meeting its strategic objectives. Such working relationships may include suppliers, partnerships, distributors/dealers, joint ventures, insourcing/outsourcing, regulatory bodies and franchises. Suppliers may be external or internal (i.e. units of the parent organisation that provides goods/services).

g) Section 7: overall business performance

This section examines the outcomes from overall organisational achievements.

3.4.3.2 *Principles for business excellence*

These framework principles form the foundation for long-term improvement and excellence and permeate the CFBE (NQI, 2007).

a) Leadership through involvement

Developing an approach to excellence involves a transformation in management thinking and behaviour at all levels. This can only be achieved by the active involvement of senior management in establishing unity of purpose and direction and to facilitate, reinforce, communicate and support the changes necessary for improvement.

b) Primary focus on stakeholders/customers and the marketplace

In order to achieve its goals, the primary aim of everyone in the organisation must be to fully understand, meet and strive to exceed the needs of customers.

c) Cooperation and teamwork

Teamwork is nurtured and recognised within and between organisations as a cornerstone for the development of win-win relationships.

d) Prevention-based process management

An organisation is a network of interdependent value-adding processes, and improvement is achieved through understanding and changing these processes to improve the total system. To facilitate long-term improvements, a mindset of prevention as opposed to correction should be applied to eliminate the root causes of errors and waste.

e) Factual approach to decision making

Decisions are made on the basis of measured data, internal and external comparisons and an understanding of the cause and effect mechanisms at work, not simply on the basis of instinct, authority or anecdotal data.

f) Continuous learning and people involvement

At all levels of the organisation, all employees should be afforded the opportunity to develop their full potential and to use their creativity and make a positive contribution to the organisation's pursuit of excellence.

g) Focus on continuous improvement and breakthrough thinking

A focus on continuous improvement is the cornerstone for breakthrough thinking and innovation. No matter how much improvement has been accomplished, there are always practical and innovative ways of doing even better, and of providing improved service or products to the customer.

h) Fulfill obligations to all stakeholders and society

An organisation is seen as part of society, with key responsibilities to satisfy the expectations of its people, customers, partners, owners and other stakeholders, including exemplary concern for responsibility to society.

3.4.3.3 *The road map to excellence*

The CFBE is supported by a ten-step "road map to excellence", which outlines how the framework can be used to drive the quest for excellence. The road map has several key steps, as highlighted below.

- (1) *Support the principles.* The first step in the road map is to review the principles and discuss with everyone in the organisation how to apply and implement the principles in the workplace.

- (2) *Understand and review the Canadian Framework.* Step 2 starts with the organisation looking at the Canadian Framework itself. Using a small team, the organisation familiarises itself with the contents and scope of the framework.
- (3) *Take the NQI assessment.* The next stage in the road map is to reach consensus on how the practices in the organisation are currently working, by conducting a check-up using the NQI assessment. After completing the check-up, the team can identify any gaps highlighted by the self-assessment.
- (4) *Develop the improvement plan.* Building on the results of the NQI assessment, the next step is to talk to customers and partners about their needs and relationship with the organisation. There is also an internal need to discuss and gain consensus on the priority areas for improvement. Based on this data, the organisation needs to plan the actions that are required to facilitate the improvement. In addition, key here is the identification of the measurable targets to put the organisation on the road to excellence.
- (5) *Spread the message.* Everyone in the organisation should hear about the principles, the Canadian Framework and the commitment of the organisation to continuous improvement.
- (6) *Communicate the message.* Communicating the message will help everyone to become involved and set the scene for the next step in the road map.
- (7) *Put the improvement plan into action.* The plan created in step 4 is now put into action. Clarity on the organisation's improvement goals is paramount, as is training staff in the use of improvement tools to assist in the delivery of the plan.
- (8) *Monitor the improvement plan.* Now is the time to monitor and evaluate the progress made towards meeting the goals of the improvement plan by keeping a close watch on the targets set in step 4. The organisation should ensure that support is available for improvement teams who need help to achieve their goals. Celebration of the positive steps taken is encouraged.
- (9) *Maintain the gains.* Excellence should be a system not a programme. The best way to keep things on track is to apply a quality assurance method to everything done.
- (10) *Focus on continuous improvement.* Since the company has become an excellent organisation, it has to keep all eyes focused on continuous improvement to stay there. The Canadian Framework has become part of the company culture and the way it is managed (NQI, 2000).

3.4.4 South African excellence model

South Africa's level of engagement with the global economy has increased tremendously since 1994 (Williams, 2008). This is mainly because of the reduction of tariffs, the signing of new trade agreements, the establishment of trade relations with new trading partners and the inclusion of the country in multilateral trade organisations, which has ensured that the country's incentives are World Trade Organisation compliant. As a result, South Africa's levels of international trade grew from approximately R167 billion in 1994 to R467 billion in 2001 (SAQI, 2003).

South Africa has come a long way over the years in its approach to quality (Williams, 2008). One example is the success that Daimler Chrysler in East London had in winning the South African Excellence Prize for quality in the production of vehicles across the Daimler Chrysler group. The future of any economy, industry and business is intertwined with the global economy. Without focusing on quality, countries will not be able to successfully engage with the international market. Businesses wishing to succeed in today's business environment need to be quality aware and quality driven because business is one of the drivers of any economy.

3.4.4.1 South Africa's quality and business excellence history

In 1980, the South African Society for Quality Control was established as a unified national society for all practitioners in the quality profession (Williams, 2008). This was done by the amalgamation of the former South African Society for Quality Control with the Quality Assurance Specialist Division of the South African Institute for Production Engineers. The name was changed in 1989 to the South African Society for Quality (Williams, 2008, p. 38). The society's objectives are to:

- Provide a forum for sharing information, expertise and networking.
- Offer value-adding products and services.
- Assist in the development of a national quality culture through the initiation of and participation in quality projects.
- Support and recognise the efforts of their members through national and regional awards.

- Recognise individuals through national and regional awards for quality.
- Promote the value of SASQ membership in the broader business community and advocate and communicate professionalism in quality (SASQ, 2007).

In 1990, a group of concerned South African organisations met to discuss quality-related challenges in South Africa. This resulted in the establishment of the South African Quality Institute in 1993. SAQI acts as a global go-between to facilitate business connections, two-way trade and exchange of useful information for all South Africans and SAQI members and acts as a catalyst and a promoter in bringing quality events within reach of the South African public (SAQI, 2007). One of the objectives of SAQI was to implement a national quality award. The South African Excellence Model (SAEM) was launched in 1997 and is based on the experiences of the EFQM and the MBNQA. It is a non-prescriptive framework for management education, organisational self-assessment and continuous performance improvement (SAEF, 2001). It is non-prescriptive because there is no prescribed method for or approach to the achievement of sustainable organisational excellence. It is a powerful diagnostic self-assessment tool that can be used to identify organisational strengths and areas for improvement.

The SAEM framework was established to help organisations enhance their competitiveness through the delivery of ever-improving value to customers and the enhancement of overall company performance and capabilities. The model has the following four objectives:

- (1) It serves as a framework to help organisations develop their vision and goals for the future in a tangible measurable way.
- (2) It serves as a framework to help organisations identify and understand the systematic nature of their business, the key linkages and cause and effect relationships.
- (3) It forms the basis of the South African Excellence Award.
- (4) It is a diagnostic tool for assessing the current health of the organisation via the process of self-assessment (Williams, 2008, p. 39).

According to Williams (2008), the South African Excellence Foundation (SAEF) was appointed as the custodian of the SAEM. The founding members comprised ABSA,

Standard Bank, Daimler Chrysler SA, CSIR, Armscor, Groman Consulting Group, Ingersol Rand, Eskom, the Greater Metropolitan Council, Ideas Management, SAQI, SASQ and SABS. In the first four years after the launch, a further 150 ordinary members joined the SAEF. The SAEF's articles of association (AoA) were restructured in 2001, after which the membership of the 150 ordinary members was unilaterally cancelled. Thereafter, only ten organisations rejoined as new members under the revised AoA (Williams, 2008).

The SAEA was South Africa's most prestigious award for organisational excellence. However, the South African Excellence Foundation ceased to operate in 2003. Entering for the SAEA competition was an opportunity for organisations to celebrate and display their performance excellence. After the launch of SAEM and SAEA, 40 companies applied for the award between 1998 and 2002. Interest in the award, however, declined over the years. In 1998, 12 companies applied for the award, but only five applied in 2002. Only two companies have been awarded the SAEA: Honeywell SA received the award in 2000 and Daimler Chrysler's Parts Division won the SA Excellence Prize (business sector, level 2) in 2001 (Williams, 2008).

The SAEF was funded mainly by membership subscriptions, which were based on company turnover and interest received from a trust fund established by the founding members. No direct funding was received from the government (SQAM, 2001). The revision of the AoA also resulted in severe funding problems, which ultimately ended in the liquidation of the SAEF.

3.4.4.2 South Africa Business Excellence Model criteria

The SAEM was established to help South African organisations assess their levels of efficiency and effectiveness, identify business areas that needed improvement and institute significant performance improvements to achieve higher levels of competitiveness in the global marketplace (Williams, 2008). Its strengths lie in identifying sound management practices. The model drives continuous improvement and allows organisations to benchmark themselves against global businesses.

The model, as depicted in figure 3.11, consists of 11 criteria that apply to all organisations. It is an 11-box model that was developed to support management in accelerating the process of making quality a decisive influence for achieving global competitive advantage. The criteria are designed to help organisations enhance their competitiveness through the focus on results-oriented goals.

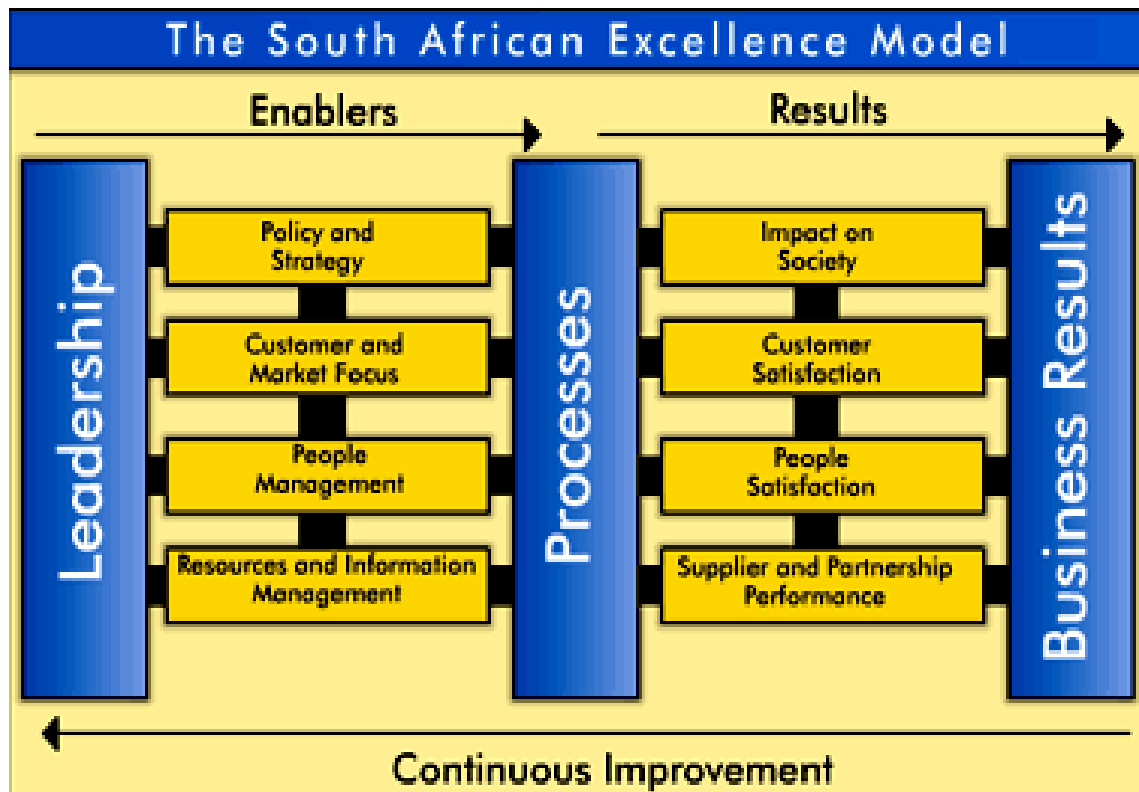


Figure 3.11. The South African Excellence Model (SAEF, 1997, p. 6)

The criteria are built upon a set of core values and concepts described in subsection 3.4.4.3. These values and concepts form the foundation for integrating key business requirements. The core values and concepts are as follows:

- customer focus/customer-driven quality.
- leadership creating strategies and setting direction.
- continuous improvement and learning.
- employee participation.
- process management.

- management by fact.
- role model leadership.
- partnership development (IRCA Global, 2004).

The underlying assumption of the model is that customer satisfaction, people (employee) satisfaction, the impact on society and supplier and partnership performance are achieved through leadership that drives policy and strategy, customer and market focus, people management, resource and information management and processes to achieve business results.

The core elements of the SAEM are divided into enablers and results, as depicted in Table 3.1.

Table 3.1

Description of the South Africa Business Excellence Model Criteria (SAEF, 1997)

Enablers	Results
<p><i>(a) Leadership</i></p> <p>How the behaviour and actions of the executive team and all other leaders inspire, support and promote a culture of performance excellence.</p>	<p><i>(g) Impact on society</i></p> <p>What the organisation is achieving in satisfying the needs and expectations of the local, national and international community at large.</p>
<p><i>(b) Policy and strategy</i></p> <p>How the organisation formulates, deploys, reviews and turns policy and strategy into plans and actions.</p>	<p><i>(h) Customer satisfaction</i></p> <p>What the organisation is achieving in relation to the satisfaction of its external customers.</p>
<p><i>(c) Customer and market focus</i></p> <p>How the organisation determines needs, requirements and expectations, enhances relationships and determines satisfaction of</p>	<p><i>(i) People satisfaction</i></p> <p>What the organisation is achieving in relation to the satisfaction of its people.</p>

customers and markets.	
<i>(d) People management</i> How the organisation releases the full potential of its people.	<i>(j) Supplier and partnership performance</i> What the organisation is achieving in relation to the management of supplier and partnering processes.
<i>(e) Resources and information management</i> How the organisation manages and uses resources and information effectively and efficiently.	<i>(k) Business results</i> What the organisation is achieving in relation to its planned business objectives in satisfying the needs and expectations of everyone with a financial interest or other stake in the organisation.
<i>(f) Processes</i> How the organisation identifies, manages, reviews and improves its processes.	

The leadership element addresses the way in which the behaviour of the executive team and all other leaders inspire, support and drive a culture of business excellence. The policy and strategy element examines the formulation, deployment and revision of organisational policy, objectives, vision, values and strategy into plans and actions. The people management element focuses on the organisation's development of its employees. It examines the development of skills, the recognition of improvement opportunities and the empowerment of people. Customer and market focus addresses the way organisations determine the needs, expectations and satisfaction of their customers and markets.

Resource and information management focuses on the effective and efficient management and usage of the organisation's resources and information. The processes criterion addresses the way the organisation manages, reviews and improves its operating processes. The second part of the model focuses on tracking the organisation's achievement of its objectives. It looks at what the organisation measures, the targets it sets and how it compares with others. It comprises the following five elements:

- *Customer satisfaction* refers to customers' perception of the organisation's products and services, customer relations and how this is achieved and managed.
- *Impact on society* includes the organisation's involvement in the local community and what the organisation is achieving in satisfying the needs and expectations of the local, national and international community.
- *People satisfaction* addresses the organisation's achievement and measurement of people satisfaction and the people's perception of the organisation.
- *Supplier and partnership performance* looks at the organisation's measurement of supplier and partnership processes and its perceptions of supplier and partner products, services and relationships.
- *Business results* address the organisation's achievement and measurement of its planned business and financial objectives and whether it is satisfying the needs and expectations of everyone with a financial interest in the organisation (Strydom, 2002).

Figure 3.11 also shows the relationship between the various criteria of the model. For example, people management will have an impact on employee satisfaction; policy and strategy will have an impact on society as well as on the business results; and customer and market focus will have an impact on customer satisfaction.

3.4.4.3 *Fundamental concepts of excellence*

There are many approaches to achieving sustainable organisational excellence. The SAEM is a non-prescriptive framework. The non-prescriptive approach has certain basic concepts that underpin the South African Excellence Model. These concepts are briefly explained below.

a) *Results orientation*

Excellence is dependent upon balancing and satisfying the needs of all relevant stakeholders, including employees, customers, suppliers and society at large, as well as those with a financial interest in the organisation.

b) Customer focus

The customer is the final judge of the product and service quality. Customer loyalty, retention and market share gain are best optimised through a clear focus on the needs of current and potential customers.

c) Leadership and consistency of purpose

The behaviour of an organisation's leaders creates a clarity and unity of purpose in the organisation and an environment in which the organisation and its people can excel.

d) Management by processes and facts

Organisations perform more effectively when all interrelated activities are understood and systematically managed, and decisions concerning current operations and planned improvements are made using reliable information that includes stakeholder perceptions.

e) People development and involvement

The full potential of an organisation's people (employees) is best released through values and a culture of trust and empowerment, which encourages the involvement of everyone.

f) Continuous learning, innovation and improvement

Organisational performance is maximised when it is based on the management and sharing of knowledge in a culture of continuous learning, innovation and improvement.

g) Partnership development

An organisation works more effectively when it has mutually beneficial relationships, built on trust, sharing of knowledge and integration with its partners.

h) Social responsibility

The long-term interests of the organisation and its people are best served by adopting an ethical approach and exceeding the expectations and regulations of the community at large in relation to its social responsibility.

3.4.4.4 Evaluation of the SAEM criteria

The evaluations of the enablers and of results criteria are different. Regarding the enablers, the organisation needs to demonstrate a sound, systematic and preventive approach, evaluate effectiveness and the use of maximum resource potential throughout the organisation (Williams, 2008). The assessment of the enabler criteria focuses on the excellence of the approach used and the degree of deployment of the approach. In assessing the results criteria, an organisation has to indicate to what extent its activities are covered by and the relevant importance of the parameters it has chosen to measure the results.

In order to measure results, organisations should answer the following questions:

- Are improvement targets in place and is the organisation meeting them?
- Are the results showing positive trends?
- Does the organisation understand why it is achieving these results?
- Can the organisation sustain further improvements on the results?
- How well do the results compare with those of other organisations?

Numerical data are the primary requirement for measuring results, which should be presented in graphic format, highlighting trends over a period of three years. Where appropriate, explanatory notes should be included.

3.4.4.5 Scoring the SAEM

Most business excellence models have a maximum score of 1 000 points or 100% (Williams, 2008). In order to qualify for the MBNQA, participants need to score between 650 and 700 points. In Europe, organisations need to score, on average, between 700

and 750 points to become winners of the EQA. In South Africa, applicants must score at least 500 points and do well in all parts of every criterion if they are to be considered for the SAEA.

As indicated earlier, between 1998 and 2002, only two organisations won the SAEA, namely Honeywell Southern Africa, which won the award in 2000, and Daimler Chrysler's Parts Division, which won the South African Excellence Prize (Business Sector, level 2) in 2001. Prior to 2000, most organisations that applied, scored between 200 and 400 points, which clearly illustrates that business excellence is not something that can be achieved overnight.

The SAEF has developed a performance improvement matrix for all the enabler and results criteria. Organisations can use this as an alternative scoring guideline when they make use of an organisation-specific achievement matrix in the SAEF model framework. The performance improvement matrix highlights the fundamental assumption that sustained business performance can only be achieved through a structured systematic approach. It is almost impossible for an organisation to jump to the top level of excellence without maturing through the lower stages of business excellence. The matrix scoring approach is appropriate if organisations have employed a variety of methodologies and then use the SAEF model to link all the initiatives holistically.

As with the other models discussed in this chapter, the idea of the SAEM is that organisations should conduct a self-assessment by comparing themselves against the criteria of the model. The logic behind the model is that results, which include financial and business results, customer satisfaction, people satisfaction, supplier and partnership performance and impact on society, are achieved through acting on enablers such as the leadership, policy and strategy, people management, resource and information management, processes and customer and market focus.

The SAEM, like the other international models discussed in this chapter, is based on the concepts of formulating quality policies, assigning responsibility for quality to top management, managing quality procedures and control, reviewing improvement processes delegating authority and empowering the workforce.

3.4.5 Summary of core values and concepts in the five quality management models

All five models discussed above were analysed on the basis of their core values and principles, some of which are referred to as fundamental concepts, fundamentals of excellence and other similar terms. The values and concepts are embedded attitudes, beliefs and behaviours found in high-performing organisations. In other words, they are the basis for establishing an excellence framework. They are embodied in the criteria categories (i.e. in each criterion and item). The core values and concepts are not specific to any criterion or item, but are usually present in a number of them.

As a rule, each statement of core values and principles covers more than one dimension. For example, the Baldrige core value, “valuing employees and partner”, involves two dimensions relative to organisational stakeholders (employees and partners). All core values and concepts for each quality management model were thus analysed in order to identify all the dimensions involved. This leads to 20 dimensions. Table 3.2 depicts a matrix that presents those dimensions and their presence in all four quality management models.

In order to further investigate the frequency of the core values and concepts in the awards, their presence was summed up both horizontally and vertically, as indicated in Table 3.2. When summing up horizontally, the most frequent core values and concepts can be identified.

As indicated in table 3.2, the top two tiers of core values and concepts, in terms of the frequency with which they appear in the models/awards, were as follows:

- (1) Customer focus, leadership, learning, management by fact and people.
- (2) Improvement (continuous), partnership, results and social/corporate responsibility.

The top five core values cited by all models (see Table 3.2) were customer focus, leadership, learning, management by fact and people. The second tier involves improvement (continuous), partnership, results and social/corporate responsibility.

Table 3.2

Dimensions of Core Values and Concepts in each Quality Management Model/Award

Models/awards & Core values & concept	Malcolm Baldrige (USA)	EFQM (Europe)	CFBE (Canada)	SAEM (South Africa)	QCTO Quality Management model	TOTAL
(1) Agility/fast response	X					1
(2) Breakthrough thinking			X			1
(3) Constancy of purpose		X		X	X	3
(4) Customer (orientation/focus/-driven)	X	X	X	X	X	5
(5) Delivery/creating value	X				X	2
(6) Focus/vision on the future	X				X	2
(7) Improvement (continuous)		X	X	X	X	4
(8) Innovation	X	X		X		3
(9) Leadership	X	X	X	X	X	5
(10) Learning (organisational/continual)	X	X	X	X	X	5
(11) Management/decision by fact/data	X	X	X	X	X	5
(12) Partnership	X	X		X	X	4
(13) People (valuing/development/involvement)	X	X	X	X	X	5
(14) Process management/orientation/perspective			X		X	2
(15) Quality (assurance/design/prevention)			X		X	2
(16) Results (orientation/focus on)	X	X		X	X	4
(17) Social/corporate responsibility	X	X	X	X		4
(18) Stakeholders (focus on)			X		X	2
(19) System (perspective/thinking)	X				X	2
(20) Teamwork			X		X	2
TOTAL	13	11	12	11	16	-

A customer is one of the main drivers for all types of organisations, while leadership is of paramount importance in guiding an organisation through its journey towards excellence. Learning is deemed to be a new trend and a vital core value because of its relationship with knowledge that impacts one of the main evolutionary resources in best class organisations (people), and it is fundamental to achieving excellence. Management by fact and people are also critical. Management involves rational decision making and resource allocation to achieve excellence, while the people dimension is also relevant because high-performance organisations view human resource management as a change agent and as a relevant source for building organisational knowledge. Continuous improvement of processes and systems is also critical for organisational success. Partnership focuses on relationships with key stakeholders, while results focus on the outcomes the organisation strives to achieve. The last value in the second tier is

social responsibility, which appears prominently because of increasing awareness of environmental concerns, ethical behaviour and support for the community and society.

The section below discusses a number of common training evaluation models relevant in contributing to the theoretical foundation in this research.

3.5 TRAINING EVALUATION THEORY

Because individuals rely on training to improve their current skills and to acquire new one (Mathieu, Tannenbaum & Salas, 1992), training is a key human resource practice and, as such, clearly deserves and requires systematic monitoring and evaluation (Giangreco, Sebastiano & Peccei, 2009). Early theories of training present evaluation as an essential and final phase of the training process that serves as the measure against which learning is examined and training effectiveness derived (Kirkpatrick, 1959). As a result, the need to evaluate training continues to rank high among training consultants and top management as a means of justifying training investment (Bober & Bartlett, 2004; Hashim, 2001; Noe, 2000; Swanson & Holton, 1999).

Training evaluation is extremely difficult (McLean, 2005), but continues to be essential in demonstrating the value of human resource development (Preskill, 1997). It is increasingly seen as crucial owing to the vast number of resources that contemporary organisations commonly invest in training programmes (Giangreco *et al.*, 2009). It is a key component in providing guidance to organisations on their human capital investment decisions because it is a means of ascertaining whether the training has been of value to the business (Galanou & Priporas, 2009).

Evaluation focuses on results beyond those of simply equipping people with the skills and knowledge necessary to perform their assigned tasks and duties. This means that training is redefined as an intervention, as a solution to some problem other than equipping people to do their jobs.

In instances where skill and knowledge deficiencies lead to mistakes, errors, defects, waste and so on, one might argue (and many do) that training that eliminates these deficiencies and in turn reduces mistakes, errors, defects and waste, would be a solution

to a performance problem. This argument is extended to assert that the reductions in mistakes, errors, defects and waste, as well as the financial value of any such reductions, constitute the results of training. The logic of this argument has a certain superficial appeal, but is far from impeccable and even further away from compelling. In short, it does not withstand serious scrutiny. It is frequently pointless to ask what business results were achieved as a result of training, because the goal of training is generally one of preventing mistakes, errors, defects and waste, not correcting them.

Thus, by a strange twist of circumstances, the only way to prove that such training is successful is to shut it down. As in many other practices, the true measure of the value of training lies in its absence, not presence. However, stopping training is hardly a practical way of testing this proposition. At this stage, it would be worthwhile to determine whether the evaluation of training programme can be cast in a more practical light. To accomplish this goal, this chapter also discusses the various models of training evaluation that can be applied in a practical organisational context.

It is clear that most training occurs in an organisational setting, typically in support of skill and knowledge requirements originating in the workplace. This relationship between training and the workplace is illustrated in figure 3.12.

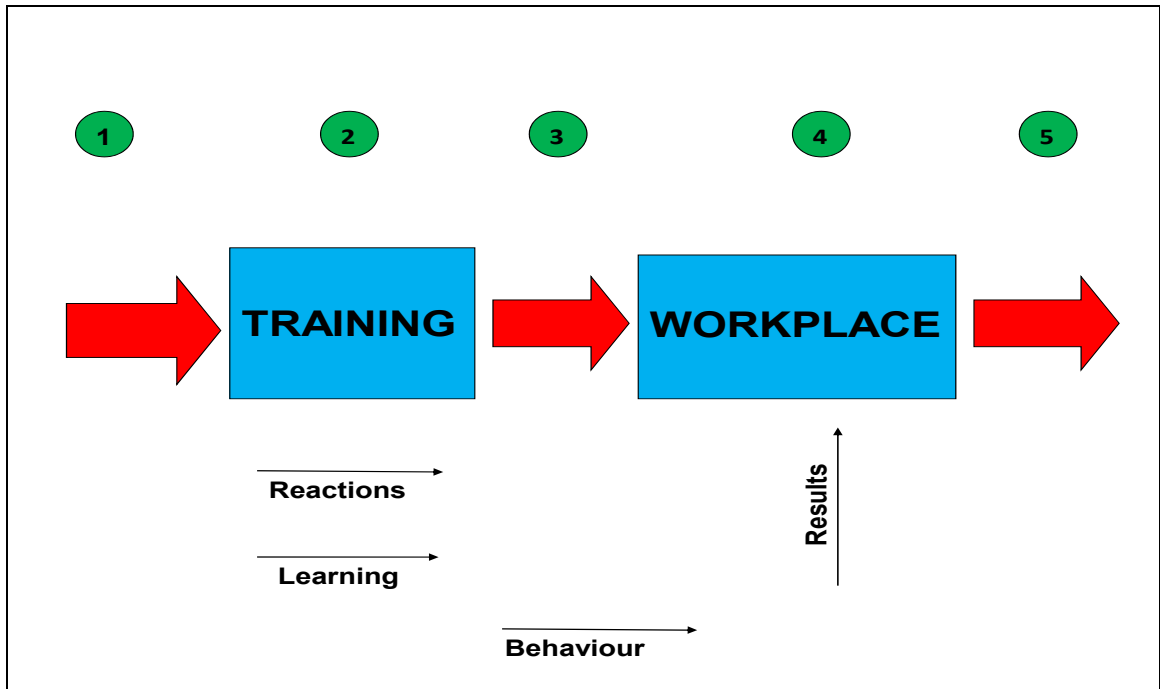


Figure 3.12. The structure of the training evaluation process (Nickols, 2003, p. 4)

Using figure 3.12 as a structural framework, the five basic points at which evaluation can be done are outlined. These five points are indicated in figure 3.12 by the numerals 1 to 5:

- (1) before training;
- (2) during training;
- (3) after training or before entry (re-entry);
- (4) in the workplace; and
- (5) upon exiting the workplace.

3.5.1 Conceptualising the construct of evaluation in the context of occupational learning programmes

At the simplest and broadest level, evaluation is defined as the process of determining and/or assessing something's merit or worth (Aspinwall, Simkins, Wilkinson & McAuley, 1992; Hopkins, 2002; Scriven, 2003). As early as 1949, Tyler (cited in Hopkins, 2002, p. 3) originally defined evaluation as "the process of determining to what extent the educational objectives have been realised". This educational definition of evaluation is

consistent with the definition of Campbell (1998, p. 324) in the context of training course and programme evaluation: “The results of an evaluation are intended to enable decision-making about whether a course or programme accomplished, what it was designed and developed to accomplish.” This defines an essential component of evaluation, which is concerned with goal achievement or “outcome measures” as stated by Goldstein (1986, p. 129).

Schalock (1995) provides a comprehensive discussion of outcome-based evaluation. However, the definitions of evaluation that focus solely on outcomes are criticised by Goldstein (1986) because he argues that in relying only on outcome measures, it is difficult to determine why certain criteria were achieved. In a more comprehensive definition he thus states that “evaluation is the systematic collection of descriptive and judgemental information necessary to make effective training decisions related to the selection, adoption, value, and modification of various instructional activities” (Goldstein, 1986, p. 141). This definition of evaluation focuses more on the processes (“process measures”) leading towards the outcome.

The importance of both outcome (impact) and process evaluation is further supported by Rossi, Lipsey and Freeman (2004) in the context of programme evaluation and by an early definition of Tracey (1968) formulated in the context of training and development systems. As Rossi *et al.* (2004) argue, any information about programme outcomes is incomplete and thus hypothetical, without having acquired sufficient knowledge of the programme activities that have produced the outcomes. Similarly, Tracey (1968) identifies evaluation as being critical to determining the value of training and development programmes, and further, for assessing the efficiency and effectiveness of the tasks performed for its achievement.

An examination of the above definitions indicates that a comprehensive definition of evaluation for the purposes of occupational learning must include the elements of both outcome and process. Patton (1986) provides the first definition that appears to be useful in the context of occupational learning. In his so-called “utilisation-focused evaluation”, he defines evaluation as follows (Patton, 2003, p. 14): “Programme evaluation is the systematic collection of information about the activities, characteristics, and outcomes of programmes for use by specific people to reduce uncertainties,

improve effectiveness, and make decisions with regard to what those programmes are doing and affecting.” The primary focus in utilisation-focused evaluation is on intended use by intended users. This central premise of utility was initially controversial when Patton introduced it in 1978, but since then has become a commonly accepted evaluation philosophy (Patton, 2003).

Patton’s (2003) focus on the utilisation of evaluation seems particularly significant in the light of the primary purpose of this research, namely to contribute to the development of a valid and reliable measure for the effective management and evaluation of occupational learning programmes. Stufflebeam (2003) provides the second comprehensive definition of evaluation, which underlies his CIPP model of evaluation. Corresponding to the letters in his acronym, CIPP, the model’s core concepts are context, input, process and product evaluation (the model will be discussed later in this section). The model applies to a wide range of contexts and can guide the evaluation of projects, personnel, products, institutions, and most importantly for this research, the evaluation of occupational learning programmes and systems (Stufflebeam, 2003). The formal definition of evaluation underlying this model is the following (Stufflebeam, 2003, p. 34):

Evaluation is the process of delineating, obtaining, providing and applying descriptive and judgemental information about the merit and worth of some object’s goals, design, implementation and outcomes to guide improvement decisions, provide accountability reports, inform institutionalisation/dissemination decisions, and improve understanding of the involved phenomena.

The primary focus of Stufflebeam’s (2003) model is not to prove, but to improve. Three following three key elements emerge from the above review of definitions for establishing a definition for occupational learning programme evaluation:

- (1) The systematic collection of descriptive and judgemental information on the system’s components (e.g. context, input, process [activities] and outcome).
- (2) Determining the system’s effectiveness regarding the desired outcome (goal achievement).

- (3) Making recommendations that can be utilised by the system users for further improvement.

Consequently, occupational learning programme evaluation is the systematic process of collecting descriptive and judgemental information on the programme's components (e.g. context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcome. The primary focus of occupational learning programme evaluation is on the utilisation of the evaluation outcomes by the relevant stakeholders in order to improve the programme's effectiveness.

3.5.2 Training evaluation models

Evaluation designs used in various contexts and for various purposes of evaluation have tended to be formulated as models. These models "reflect a particular or discrete evaluation method or an approach to a specific evaluation problem" (Hopkins, 1997, p. 18). Models attempt to specify or visualise, in a simplified way, phenomena that cannot be easily or directly observed (Scheerens, 1992). There are a considerable and ever-growing number of models for evaluation available in the existing literature. However, since the majority of these models primarily focus on the evaluation of training programmes in a closed organisational setting (instead of (in an open and complex multi-stakeholder context as found in the occupational learning system), the use of a single model seems inadequate.

Moreover, many of the models are theoretical instead of practical (Aspinwall *et al.*, 1992), and thus provide limited orientation for establishing a specific occupational learning programme evaluation measure. A more appropriate approach would be to establish a valid and reliable evaluation measure for the context of the current research, which takes cognisance of the various recognised models. Various researchers, such as Hopkins (1997), Rossi *et al.* (2004) and Goldstein (1986) in particular, who emphasises the necessity for developing evaluation models creatively, support this approach. In Goldstein's (1986) opinion, such models should allow for the extraction of the largest amount of information within the given constraints of the evaluation environment.

Phillips (1997a) further highlights the notion that there is no single best model and that in any evaluation effort, the main decision to be made is the selection of a model on which the evaluation will focus. Following this advice, a number of the most prominent and relevant models will be reviewed in the following section. These models will guide the development of a holistic and theoretical model, and a valid and reliable measure for the effective management and evaluation of occupational learning programmes. However, the two broad types of evaluation models are outlined in this research, that is, goal-based models (e.g., Kirkpatrick, 1994; Phillips, 1997a) and systems-based models, such as the CIPP Model (Worthen & Sanders, 1987); the Training Validation System (TVS) approach (Fitz-Enz, 1994); and the Input, Process, Output, Outcome (IPO) Model (Bushnell, 1990). The goal-based and systems-based approaches are predominantly used in the evaluation of training (Phillips, 1991). Various frameworks for the evaluation of training programmes have been proposed under the influence of these two approaches. The discussion below provides information on these evaluation models.

3.5.2.1 Goal-based evaluation models

Goal-based models (such as Kirkpatrick's four levels and Phillips's five levels) may help practitioners think about the purposes of evaluation ranging from purely technical to covertly political purpose (Eseryel, 2002). However, these models do not define the steps necessary to achieve purposes and do not address the ways to utilise results in order to improve training. The difficulty for practitioners using such models is in selecting and implementing appropriate evaluation methods (quantitative, qualitative or mixed). Because of their apparent simplicity, trainers jump feet first into using such models without taking the time to assess their needs and resources or actually determine how they will apply the model and the results (Bernthal, 1995).

Naturally, many organisations do not use the entire model, and training ends up being evaluated only at the reaction, or at best, the learning level. As the level of evaluation increases, the complexities involved increase. This may explain why only levels 1 and 2 of the Kirkpatrick model are used.

a) Kirkpatrick's four-level evaluation

The four elements of Kirkpatrick's (Kirkpatrick, 1994; Kirkpatrick & Kirkpatrick, 2006, pp. 31–114) framework, also depicted in figure 3.12, are defined below using his original definitions.

- (1) *Reactions*. "Reaction may best be defined as how well the learners liked a particular training programme." Reactions are typically measured at the end of training – at point 3 in figure 3.12. However, that is a summative or end-of-course assessment and reactions are measured during the training, even if only informally in terms of the facilitator's perceptions.
- (2) *Learning*. "What principles, facts and techniques were understood and absorbed by the learners?" What the learners know or can do may be measured during and at the end of training, but in order to say that this knowledge or skill resulted from the training, the learners' entering knowledge or skills levels must also be known or measured. Hence evaluating learning requires measurements at points 1, 2 and 3 – before, during and after training, as depicted in figure 3.12.
- (3) *Behaviour*. This refers to changes in on-the-job behaviour. Since Kirkpatrick (1994) did not originally offer a definition *per se* for this element in his framework, this definition is not in quotation marks. Nevertheless, the definition has been taken verbatim from Kirkpatrick's (1994) writings – the fourth and final article. Clearly, any evaluation of changes in on-the-job behaviour must occur in the workplace itself – at point 4 in figure 3.12. One should bear in mind, however, that behavioural changes occur in training and they are then transferred (or not transferred) to the workplace. It is therefore deemed useful to assess behaviour changes at the end of training and in the workplace. Indeed, the origins of human performance technology can be traced back to early investigations of disparities between behaviour changes realised during training and those realised on the job.
- (4) *Results*. Kirkpatrick (1994) did not offer a formal definition of this element of his framework either. Instead, he relied on a range of examples to make clear his meaning. Those examples are repeated here. "Reduction of costs; reduction of turnover and absenteeism; reduction of grievances; increase in quality and quantity or production; or improved morale which, it is hoped, will lead to some of the previously stated results". These factors are also measurable in the workplace

– at point 4 in figure 3.12. An expanded illustration of the training evaluation process is indicated in figure 3.13.

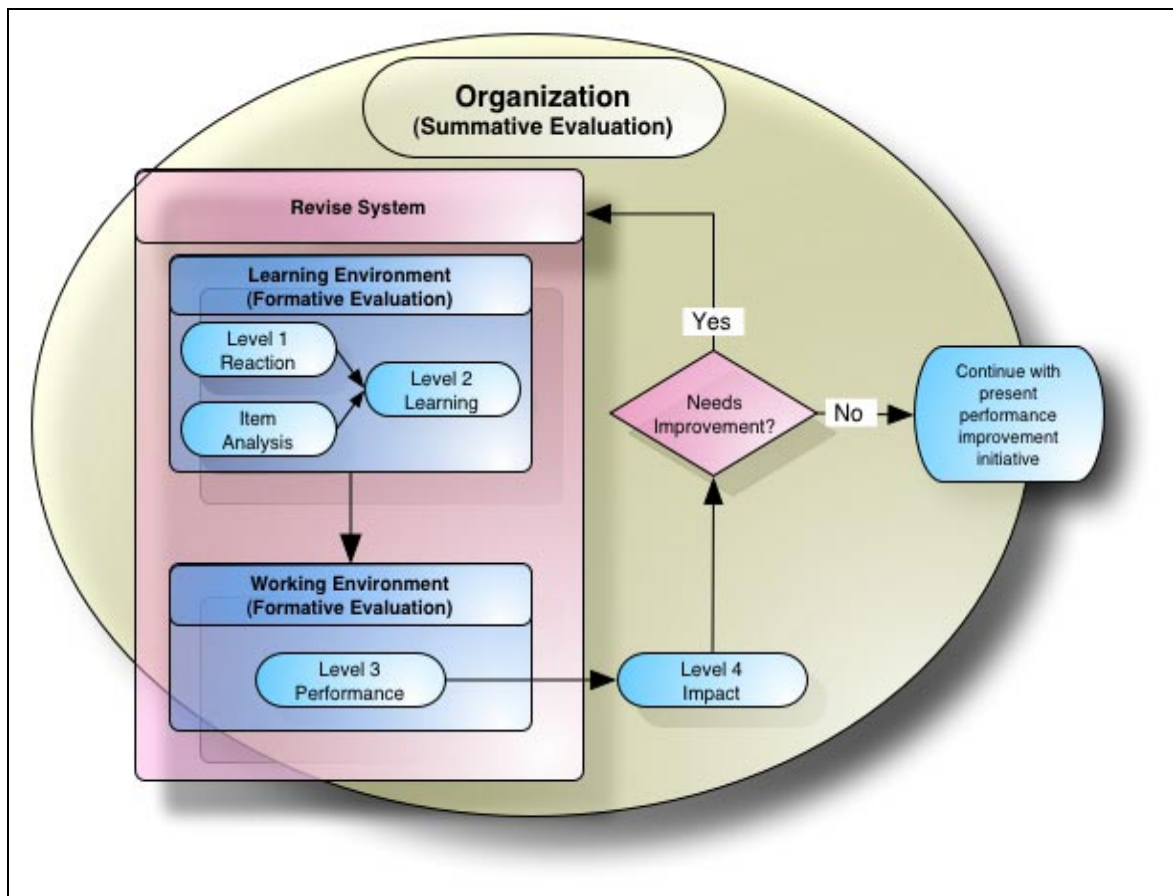


Figure 3.13. The training evaluation process (Nwlink, 2010, p. 2)

One should bear in mind that Kirkpatrick (1994) offered the best-known training evaluation methodology of reaction, learning, performance and impact. Figure 3.14 indicates how the evaluation process fits together using Kirkpatrick's framework. A comprehensive discussion of Kirkpatrick's model is provided in the next section.

i) Level 1: reaction

Kirkpatrick (1987) defines this first level of evaluation as determining how well trainees liked a particular training programme; measuring the feelings of trainees; and measuring

customer satisfaction. Consideration should be given to the learning environment and conditions (Kirkpatrick & Kirkpatrick, 2009) as illustrated in figure 3.14.

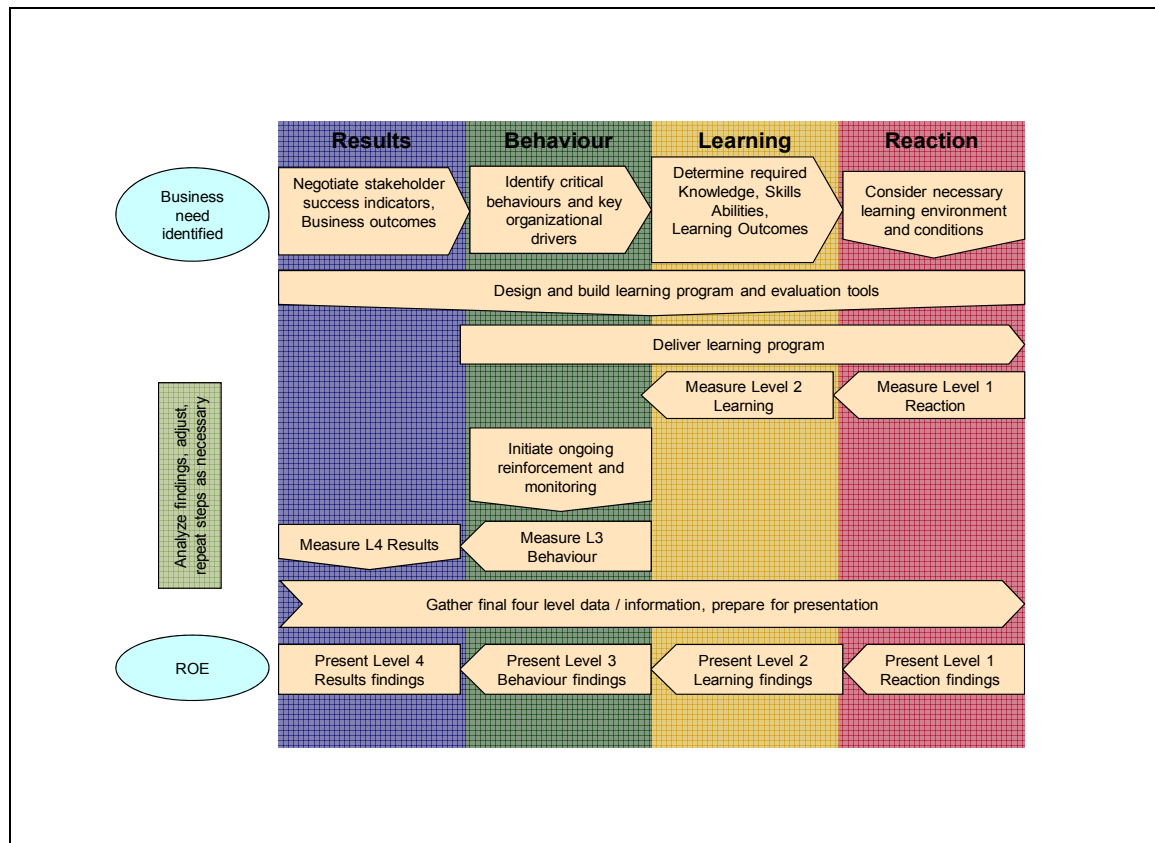


Figure 3.14. The Kirkpatrick model of training evaluation (Kirkpatrick & Kirkpatrick, 2009, p. 38)

Kirkpatrick (1987) outlined the following guidelines for evaluating reaction:

- (1) Determine what you want to find out.
- (2) Use a written comment sheet covering those items determined in item (1).
- (3) Design the form so that the reactions can be tabulated and quantified.
- (4) Obtain honest reactions by making the forms anonymous.
- (5) Encourage the trainees to write in additional comments not covered by the questions that were designed to be tabulated and quantified.

Together with evaluating the reactions of trainees, Kirkpatrick suggests that the programme coordinators, training managers and other qualified observers' reactions to the instructor's presentation(s) should also be evaluated. An analysis of the two would provide the best indication of the effectiveness of the programme at this first level of training evaluation. As the word implies, evaluation at this level measures how the learners react to the training. This level is often measured by means of attitude questionnaires that are handed out at the end of most training sessions. This level measures one thing: the learner's perception of (reaction to) the course. Learners are keenly aware of what they need to know to accomplish a task. If the training programme fails to satisfy their needs, a determination should be made about whether or not it is the fault of the programme design or delivery.

This level is not indicative of the training's performance potential because it does not measure what new skills the learners have acquired or what they have learnt that will transfer back to the working environment. This has led to some evaluators downplaying its value. However, the interest, attention and motivation of the participants are critical to the success of any training programme. People learn better when they react positively to the learning environment.

When a learning package is first presented, be it e-learning, classroom training, computer-based training, and so on, the learner has to decide whether he or she will pay attention to it. If the goal or task is judged as important and doable, then the learner is normally motivated to engage in it. However, if the task is presented as having a low relevance or there is a low probability of success, then a negative effect is generated and the reason for task engagement is low.

This differs somewhat from Kirkpatrick's (1996) view. He (Kirkpatrick, 1996, p. 55) writes as follows: "Reaction may best be considered as how well the trainees liked a particular training program." However, the less relevance the learning package has for a learner, the more effort that has to be put into the design and presentation of the learning package. In other words if it is not relevant to the learner, then the learning package has to entice the learner through slick design, humour, games and suchlike. This does not suggest that design, humour or games are not important. However, their use in a

learning package should be to promote the "learning process," not to promote the "learning package" itself.

In addition, if a learning package is soundly designed, it should be to help the learners to fix a performance gap. Hence they should be motivated to learn. If not, something went dreadfully wrong during the planning and building processes. If the learners have to be enticed through slick design, then one would probably need to re-evaluate the purpose of the learning programme.

ii) Level 2: learning

This is the extent to which participants change attitudes, improve knowledge and increase skill as a result of attending the programme (Kirkpatrick, 1994). It addresses the question: *Did the participants learn anything?* The learning evaluation requires post-testing to ascertain what skills were acquired during the training. In addition, post-testing is only valid when combined with pretesting, to enable the participants to differentiate between what they already knew prior to training and what they actually learnt during the training programme. Measuring the learning that takes place in a training programme is essential to validate the learning outcomes. Evaluating the learning that has taken place typically focuses on questions such as the following:

- What knowledge was acquired?
- What skills were developed or enhanced?
- What attitudes were changed?

Since Kirkpatrick (1987) defines learning, for the purpose of evaluation, as "attitudes that were changed, and knowledge and skills that were learned", he also outlines the following guidelines on evaluating learning:

- (1) The learning of each trainee should be measured so that quantitative results can be determined.
- (2) A before-and-after approach should be used so that any learning can be related to the programme.

- (3) Where practical, a control group not receiving the training should be compared with the group that received the training.
- (4) Where practical, the evaluation results should be analysed statistically so that learning can be proved in terms of correlation or level of confidence.

Besides using examinations (written, oral and performance tests), Kirkpatrick (1987) suggests that if a programme is carefully designed, learning can be fairly and objectively evaluated while the training session is being conducted. For example, the individual performance of a skill being taught and the discussions following a role-playing situation could be used as evaluation techniques.

Learner assessments may be created to allow a judgement to be made about the learner's capability for performance. There are two parts to this process: gathering information or evidence (testing the learner) and judging the information (what the data represent). This assessment should not be confused with *evaluation*. Assessment is about the progress and achievements of the individual learners, while evaluation is about the learning programme as a whole (Tovey, 1997).

Evaluation in this process comes through the learner assessment that is built into the design phase. Note that the assessment instrument normally has more benefits for the designer than for the learner. Why? For the designer, the building of the assessment helps to define what the learning must produce. For the learner, assessments are statistical instruments that normally correlate poorly with the realities of performance on the job and they rate learners low on the "assumed" correlatives of the job requirements (Gilbert, 1998). Hence the next level is the preferred method of assuring that the learning transfers to the job, but this is rarely performed.

iii) Level 3: performance (behaviour)

In Kirkpatrick's (1994) original four levels of evaluation, he names this level "behaviour". However, behaviour is the action that is performed, while the result of the behaviour is the actual performance. Identifying critical behaviours and key organisational drivers should be considered (Kirkpatrick & Kirkpatrick, 2009). According to Gilbert (1998), performance has two elements – behaviour is the means and its consequence is the

end. If trainers were only worried about the behavioural element, then evaluation could be done in the training environment. However, the consequence of the behaviour (performance) is what trainers are really after – can the learner now perform in the working environment? This evaluation involves testing the learner’s capabilities to perform learned skills while on the job, instead of in the classroom. Level 3 evaluation can be performed formally (testing) or informally (observation). It determines whether the correct performance is now occurring by answering the following question: Do people use their newly acquired learning on the job?

It is important to measure performance because the primary purpose of training is to improve results by having the students learn new skills and knowledge and then actually applying them to the job. Acquiring new skills and knowledge is useless to an organisation unless the participants actually use them in their work activities. Since level 3 measurements must take place after the learners have returned to their jobs, the actual level 3 measurements will typically involve someone closely involved with the learner such as his or her supervisor. Although it takes a greater effort to collect this data than it does to collect data during training, its value is important to the training department and organisation because the data provide insight into the transfer of learning from the classroom to the work environment and the barriers encountered when attempting to implement the new techniques learned in the programme. Realising that there may be a huge difference between knowing principles and techniques and using them on the job, Kirkpatrick (1987) suggests that the following five requirements should be met if behaviour is to change:

- (1) The desire to change.
- (2) Expertise of what to do and how to do it.
- (3) The right job climate.
- (4) Help in applying what was learned during training.
- (5) Rewards for changing behaviour.

Kirkpatrick (1987) outlines the following guidelines for evaluating training programmes in terms of behavioural changes on the job:

- (1) A systematic appraisal should be made of on-the-job performance on a before-and-after basis.
- (2) The appraisal of performance should be made by one or more of the following groups (the more the better):
 - the person receiving the training;
 - the person's supervisor or superiors;
 - the person's subordinates (if any); and
 - the person's peers or other people thoroughly familiar with his or her performance.
- (3) A statistical analysis should be conducted to compare performance before and after and to relate changes to the training programme.
- (4) The post-training appraisal should be done three months or more after the training so that the trainees have an opportunity to put into practice what they have learnt. Subsequent appraisals may add to the validity of the study.
- (5) A control group (not receiving the training) should be used.

Kirkpatrick (1994) notes that measuring changes in behaviour resulting from training programmes is a highly complicated procedure. Nevertheless, it is all worthwhile if the training programmes actually increase effectiveness and their benefits are made clear to top management. He also recognises the fact that few training managers have the background, skills and time to engage in extensive evaluations, and suggests they call on specialists, researchers and consultants for advice and help.

iv) Level 4: results

These results occur because of training participation. This level measures the training programme's effectiveness - in other words: What impact has the training achieved? These impacts may include such items as money, efficiency, morale, teamwork and so forth. While it is often difficult to isolate the results of a training programme, it is usually possible to link training contributions to organisational improvements. Collecting, organising and analysing level 4 information can be difficult, time consuming and more costly than the other three levels, but the results are often worthwhile when viewed in the full context of their value to the organisation.

Based on the premise that the objectives of most training programmes can be stated in terms of results such as reduced turnover, reduced costs, improved efficiency, reduction in grievances, increase in quality and quantity of production, or improved morale, Kirkpatrick (1987) concludes that it would be best to evaluate training programmes directly in terms of the results desired. He acknowledges the fact that there are so many complicating factors, that it is extremely difficult, if not impossible, to evaluate certain kinds of programmes in terms of results. He therefore recommends that training managers evaluate in terms of reaction, learning and behaviour first and then consider tangible business results. He also cautions that because of the difficulty in the separation of variables – that is, how much of the improvement is due to training compared with other factors – it is extremely difficult to measure results that can be attributed directly to a specific training programme.

From Kirkpatrick's (1987) experience with level 4 evaluations, he concludes that it is probably better to use the personal interview instead of a questionnaire to measure results. In addition, measures on a before-and-after basis can provide evidence (but not necessarily proof) that the business results are directly attributable to the training even though other factors might have been influential. As one moves from level 1 to level 4, the evaluation process becomes more difficult and time consuming. However, it provides information that is of increasingly significant value. Perhaps the most frequently type of measurement is level 1 because it is the easiest to measure. However, it provides the least valuable data. Measuring results that affect the organisation is considerably more difficult and is thus conducted less frequently even though it yields the most valuable information. Each evaluation level should be used to provide a cross-set of data for measuring the training programme. The first three levels of Kirkpatrick's evaluation, namely reaction, learning and performance are largely "soft" measurements. This does not mean that the first three are useless – indeed, they are useful for tracking problems in the learning package, as highlighted below.

- Reaction informs one how relevant the training is to the work the learners perform (it measures how well the training requirement analysis processes worked).
- Learning informs one of the degree of relevance of the training package in transferring knowledge, skills and abilities from the training material to the learners (it measures how well the design and development processes worked).

- The performance level informs one of the degree to which the learning can actually be applied to the learner's job (it measures how well the performance analysis process worked).
- Impact informs one of the "returns" the organisation receives from the training. Decision makers prefer this harder "result," although not necessarily in rands and cents. For example, a study of financial and information technology executives found that they considered both hard and soft "returns" when it comes to customer-centrist technologies, but gave more weight to nonfinancial metrics (soft) such as customer satisfaction and loyalty (Hayes, 2003).

Note the difference between information and returns. The first three levels provide information for improving the learning package, while the fourth level indicates impacts. A hard result is generally given in rands and cents, while soft results are more informational. However, instead of evaluating how well the training worked (the first three levels); the fourth level evaluates the impact of training on the organisation. There are exceptions however. For example, if the organisation's vision is to provide learning opportunities (possibly to increase retention), then a level 2 or level 3 evaluation could be used to provide a soft return. This final measurement of the training programme might be met with a more "balanced" approach or a "balanced scorecard" (Kaplan & Norton, 2001), which looks at the impact or return from the following four perspectives:

- (1) *Financial perspective*. This is a measurement such as ROI, which indicates a monetary return, or the impact itself, such as how the output is affected. Financial can mean either soft or hard results.
- (2) *Customer perspective*. This involves improving an area in which the organisation differentiates itself from its competitors in order to attract, retain and deepen relationships with its targeted customers.
- (3) *Internal perspective*. This relates to achieving excellence by improving processes such as supply chain management, the production process or the support process.
- (4) *Innovation and learning perspective*. This involves ensuring that the learning package supports a climate for organisational change, innovation and the growth of individuals.

Figure 3.15 depicts a feedback loop that could be followed to help eliminate snags during the evaluation process. The feedback loop will help to gradually improve the training process by instantly eliminating all challenges encountered. Trainers therefore do not have to wait for the final evaluation report in order to improve their delivery task.

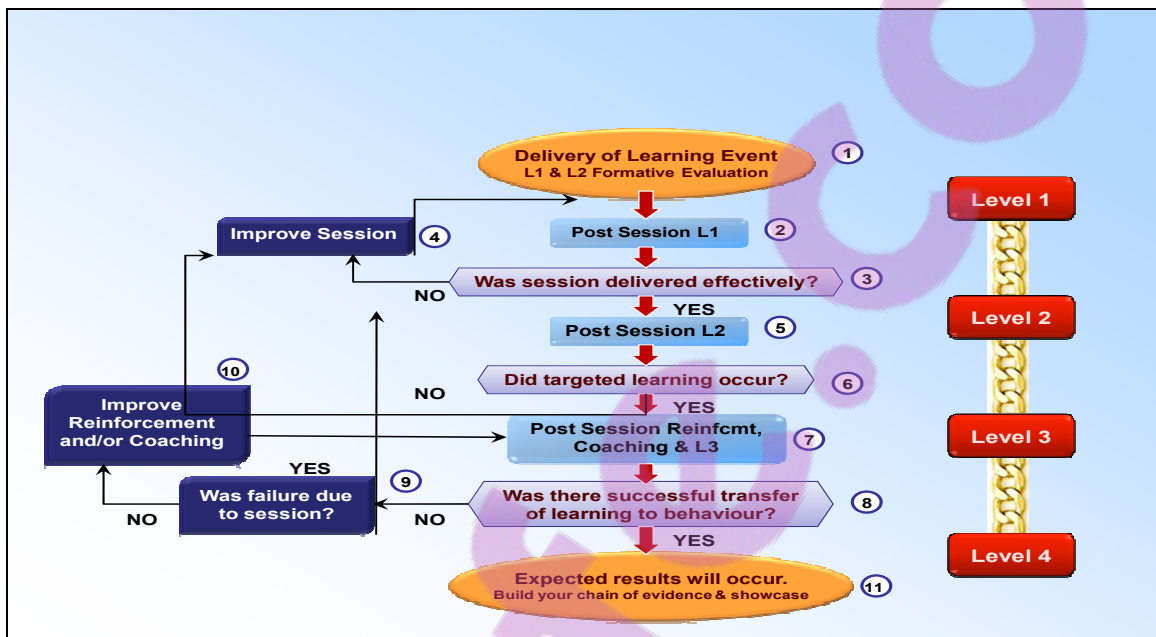


Figure 3.15. Kirkpatrick's four-level evaluation: feedback loop to eliminate snags (Kirkpatrick & Kirkpatrick, 2009, p. 50)

As indicated in figure 3.15, once the challenge has been identified, interventions can be made to immediately address it. For example, if learners' reactions show that the training session was not presented effectively during the first day because the facilitator was not interactive, then this should immediately be brought to the facilitator's attention and action taken to ensure that the next session is interactive. Table 3.3 illustrates the Kirkpatrick's (1996) structure in detail, particularly the modern-day interpretation of the Kirkpatrick learning evaluation model, usage, implications and examples of tools and methods.

Table 3.3

Modern Interpretation of Kirkpatrick's Learning Evaluation Model

Level	Evaluation description and characteristics	Examples of evaluation tools and methods	Relevance and practicability
1. Reaction	<p>Reaction evaluation relates to how the delegates felt, and their personal reactions to the training or learning experience. For example:</p> <ul style="list-style-type: none"> whether the trainees liked and enjoyed the training; whether they considered the training relevant; whether the training was worth their time; whether they liked the venue, style, timing; level of participation; ease and comfort of experience; the level of effort required to make the most of the learning; and perceived practicability and potential for applying the learning. 	<ul style="list-style-type: none"> Typically "happy sheets". Feedback forms based on subjective personal reaction to the training experience. Verbal reaction which can be noted and analysed. Post-training surveys or questionnaires. Online evaluation or grading by delegates. Subsequent verbal or written reports given by delegates to managers back at their jobs. 	<ul style="list-style-type: none"> This can be done at the end of the training. It is easy to obtain reaction feedback. Feedback is not expensive to gather or to analyse for groups. It is important to know that people were not upset or disappointed. It is important that people give a positive impression when relating their experience to others who might be deciding whether to experience same.
2. Learning	<p>Learning evaluation is the measurement of the increase in knowledge or intellectual capability from before to after the learning experience:</p> <ul style="list-style-type: none"> whether the trainees learnt what they were supposed to learn? whether the trainees experienced what they should have experienced? the extent of advancement or change in the trainees after the training, in the direction or area that was intended. 	<ul style="list-style-type: none"> Typically assessments or tests before and after the training. Interview or observation which can be used before and after, although this is time consuming and may be inconsistent. Methods of assessment that need to be closely related to the aims of the learning. Measurement and analysis that are possible and easy on a group scale. The establishment of reliable and clear scores and measurements in order to limit the risk of inconsistent assessment. The possibility of hard-copy, electronic, online or interview style assessments. 	<ul style="list-style-type: none"> It is relatively simple to set up, but more investment and thought required than reaction evaluation. It is highly relevant and clear-cut for certain training such as quantifiable or technical skills. It is not that easy for more complex learning such as attitudinal development, which is renowned for being difficult to assess. Cost escalates if systems are poorly designed, which increases the work required to measure and analyse.
3. Behaviour	<p>Behaviour evaluation is the extent to which the trainees applied the learning and changed their behaviour, which can be detected immediately or several months after the training, depending on the situation:</p> <ul style="list-style-type: none"> whether the trainees put their learning into effect when they were back on the job; whether the relevant skills and knowledge were used; 	<ul style="list-style-type: none"> Observation and interviews over time are required to assess the change and its relevance and sustainability. Arbitrary snapshot assessments are unreliable because people change in different ways at different times. Assessments need to be subtle and on-going, and then transferred to a suitable analysis 	<ul style="list-style-type: none"> Measurement of behaviour change is less easy to quantify and interpret than reaction and learning evaluation. Simple quick response systems are unlikely to be adequate. The cooperation and skill of observers, typically line managers, are key factors and difficult to control.

- whether there was a noticeable and measurable change in the activity and performance of the trainees when they were back in their roles;
 - whether the change in behaviour and the new level of knowledge were sustained;
 - whether the trainee was able to transfer his or her learning to another person; and
 - whether the trainee was aware of his or her change in behaviour, knowledge and skill level.
- tool.
 - Assessments need to be designed to reduce the subjective judgement of the observer or interviewer, which is a variable factor that can affect the reliability and consistency of measurements.
 - The opinion of the trainee, which is a relevant indicator, is also subjective and unreliable, and thus needs to be measured in a consistent defined way.
 - 360-degree feedback is a useful method and need not be used before training because respondents can make a judgement about change after training, and this can be analysed for groups of respondents and trainees.
 - Assessments can be designed around relevant performance scenarios, and specific key performance indicators or criteria.
 - Online and electronic assessments are more difficult to incorporate – assessments tend to be more successful when integrated with existing management and coaching protocols.
 - Self-assessment can be valuable when carefully designed criteria and measurements are used.
 - It is possible that many of these measures are already in place via normal management systems and reporting.
 - The challenge is to identify which measures and how they relate to the trainee's input and influence.
 - It is therefore necessary to identify and relate accountability and relevance to the trainees at the start of the training so that they understand what is to be measured.
 - This process underscores normal sound management practice – it simply needs to be linked to the training input.
 - Failure to link to training input type and timing will greatly reduce the ease with which results can be attributed to the training. Regarding senior employees in particular, annual appraisals and on-going agreement of key business objectives are integral to measuring the business results derived from training.
- The management and analysis of on-going subtle assessments are difficult, and virtually impossible without a system that is well designed from the outset.
 - The evaluation of implementation and application is vital - there is little value in a positive reaction and noticeable increase in capability if nothing changes in the job. Hence evaluation in this area is essential, albeit challenging.
 - Behaviour change evaluation is possible given effective support and involvement from line managers or trainees. It is thus helpful to involve them from the outset, and to identify benefits for them, which ties in with the level 4 evaluation below.
- Individually, results evaluation is not particularly difficult, but across an entire organisation it becomes more challenging, not least because of the reliance on line management and the frequency and scale of changing structures, responsibilities and roles, which complicate the process of attributing clear accountability.
 - Also, external factors greatly affect organisational and business performance, and this tends to cloud the true cause of good or poor results.

4. Results

b) *The Phillips five-level return on investment framework*

One well-known approach that has been developed from Kirkpatrick's framework is the Phillips five-level ROI framework. This approach adds a fifth level, that is, return on investment (ROI) to the previous four levels of evaluation. At level 5, the monetary value of the results and the costs of the programme are compared (Phillips, 1997a).

The term "return on investment" (ROI) may appear to be inappropriate in the training field (IAEA, 2003). The expression originates from the finance and accounting field and usually refers to the pre-tax contribution measured against controllable assets. It measures the anticipated profitability of an investment and is used as a standard measure of the performance of divisions or profit centres in a business.

The investment portion represents capital expenditures such as a training facility or equipment plus initial development or production costs (IAEA, 2003). The original investment figure can be used or the present book value can be expressed as the average investment over a certain period of time. If a training programme is a one-time offering, then the figure is all the original investment. However, if the initial costs are spread over a period of time, then the average book value is usually more appropriate. This value is essentially half the initial costs since, through depreciation, a certain fixed part of investment is written off each year over the life of the investments.

ROI is a measure of the monetary benefits obtained by an organisation over a specified time period in return for a given investment in a training programme (Kalemsi, 2005). Viewed in another way, ROI is the extent to which the outputs of training exceed the inputs. ROI can be used both to justify a planned investment and to evaluate the extent to which desired return was achieved.

However, it cannot measure all the aspects of training success - that is, whether or not the learners liked the training, the numbers of learners participating in the training and the extent to which the learners' personal objectives were accomplished (Shepherd, 1999). Table 3.4 depicts the Phillips five-level ROI framework.

Table 3.4

Five-Level ROI Framework (Phillips, 1997a, p. 43)

Level	Evaluation	Focus
1	Reaction and planned action	Measures participant's reaction to the programme and outlines specific plans for implementation
2	Learning	Measures skills, knowledge or attitude changes
3	Job applications	Measures change in behaviour on the job and specific application of the training material
4	Business results	Measures business impact of the programme
5	Return on investment	Measures the monetary value of the results and cost of the programme, usually expressed as a percentage

ROI adds the fifth level to the Kirkpatrick model as it appears in Table 3.4. There are certain advantages and disadvantages to calculating the ROI of a training programme. The costs of training are known and expressed in monetary terms, but the benefits are often soft, subjective and difficult to quantify and convert into monetary terms. Costs are known up front, before training, but benefits may accrue slowly over time. However, programme objectives and content will become more lean, relevant and behavioural with the focus on monetary results as opposed to the acquisition of information. Moreover, by calculating ROI on the training programmes where it is possible, it is more apt to be trusted on those that cannot be evaluated at the first four levels (Parry, 1996).

However, various other models, such as the resource requirements model, the life-cycle model, benefits models, productivity models and so on, are concerned with the cost effectiveness of training, and thus endeavour to find the most efficient training approach in terms of cost (Kearsley, 1982; Van Dyk, Nel, Loedolff, & Haasbroek, 2001). Typical cost-effectiveness analyses include whether a programme produces sufficient benefits in relation to its cost and whether other systems or approaches could produce the same benefits at a lower cost (Rossi *et al.*, 2004). Thus, what all these evaluation models require is firstly, an estimation of the programme related costs (and sometimes a monetary evaluation of the programme's benefits), and secondly, an alternative system for comparing costs and benefits.

Even though methods have been established to come to terms with the monetary estimation of costs and benefits, these issues are still regarded as highly difficult and debatable, given the multiple variables that affect training outcomes. Given the specialised financial expertise and data required for such evaluations, the application of cost-effectiveness models is considered most appropriate for “mature” and established programmes that have already undergone previous process and outcome evaluations (Levin & McEwan, 2001; Rossi *et al.*, 2004).

As Rossi *et al.* (2004, p. 61) put it: “A program must be well implemented and produce the desired outcomes before questions of efficiency become relevant.” Considering this statement and the aforementioned requirements (available data on costs or cost estimations as well as an alternative system for comparison), the approach does not seem appropriate for occupational learning programme evaluation in the current research context. However, since there is a high level of concern about programme costs and benefits relating to all public policies in general, this approach should ideally be considered as the focus of future research to investigate the cost and benefits of training interventions.

3.5.2.2 *Stufflebeam’s CIPP model*

Stufflebeam’s CIPP model is a thoroughly tested and commonly applied framework that would seem more useful in the context of occupational learning programmes evaluation. The model was originally developed for evaluating educational programmes but has developed and been refined to be applicable and adaptable to a wide range of settings and contexts (House, 2003; Stufflebeam, 2003; 2010; Stufflebeam & Shinkfield, 2007). Stufflebeam’s model is deemed to be one of the most practical models in evaluation theory. It is not only efficient, but effective, comprehensive and well balanced (Phillips, 1997b). The core concepts of the model are four fields of evaluation, namely context, input, process and product evaluation.

- *Context evaluation* primarily focuses on identifying the target group of the evaluated programme and assessing their needs. It therefore defines the relevant environment, identifies needs and assets and diagnoses specific problems.

- *Input evaluation* provides information to assess the system capabilities by looking into its resources and how they can best be applied to meet the programme's goal. The information from input evaluation helps to determine the general programme strategy for planning and procedural design, and also whether outside assistance is necessary.
- *Process evaluation* seeks to identify or predict defects in the work plan or its implementation and is thus concerned with assessing the actual programme activities. It provides feedback for managing the process, and for recording and judging the work effort.
- *Product evaluation* measures the actual outcomes of the programme (intended and unintended), which are then related to the goals (desired outcome) and the information obtained from the previous evaluations (context, input and process).

Since the model has been kept broad in order to be applicable to a variety of areas, it does not provide direct tools that can be utilised for occupational learning programme evaluation. However, it does give an indication of the four main areas to consider in an evaluation. Although the definition of product evaluation states that a sound evaluation, according to this model, should include information from all types of evaluation, Stufflebeam (2003) maintains that the different types can be conducted either on their own or in some combination of the different types, depending on the purpose of the research. The terms "outcome" and "output", which are sometimes differentiated (e.g. Bushnell, 1990) and sometimes not (Scheerens, 1992; Madaus, Airasian, & Kellaghan, 1980), will be used interchangeably in this context. Stufflebeam's model has been categorised as a systems-based model (Eseryel, 2002), which leads us to the next important framework to be considered, namely the systems approach or systems evaluation.

3.5.2.3 *A systems approach to evaluation*

Systems-based models (e.g. CIPP, IPO and TVS) seem to be more useful in terms of thinking about the overall context and situation but they may not provide sufficient granularity (Eseryel, 2002). Systems-based models may not represent the dynamic

interactions between the design and the evaluation of training. Few of these models provide detailed descriptions of the processes involved in each step. None provide tools for evaluation. Furthermore, these models do not address the collaborative process of evaluation – that is, the different roles and responsibilities that people may fulfil during an evaluation process.

However, the literature provides several accounts of the application of a systems approach to training, development and education, and hence the use of systems thinking for evaluation (Al-Khayyat & Elgamal, 1997; Babb & Meyer, 2005; Bushnell, 1990; Edney, 1972; Erasmus *et al.*, 2010; Eseryel, 2002; Goldstein, 1986; Madaus *et al.*, 1980; Patrick, 1992). The thinking underlying a systems approach is that, firstly, any functioning entity can be viewed as a system and defined in terms of what it is attempting to achieve (outcome). Secondly, every system can be broken down into subsystems and the interrelationships between them (Patrick, 1992; Erasmus & Van Dyk, 1996). The two main constituting components of a system are deemed to be inputs and outputs (Edney, 1972). In order to avoid “black box phenomena” (i.e. no attention is paid to what is happening between inputs and outputs; the actual processing remains a “black box”), the focus on the two former types needs to be extended to processes (Madaus *et al.*, 1980).

Consequently, a systems evaluation focuses on the whole system and the relationships between the interdependent components or subsystems (input, process and output) forming the system (Bramley, 1991). The simple systems model as described and visualised by Edney (1972) and Erasmus and Van Dyk (1996) underlying this kind of evaluation is that the inputs of the system are transformed through processes in the system into certain outputs or outcomes. The main value of the model is not its rigour but its simplicity and applicability. It brings a clear perspective and enables the evaluator to view the entire system in such a way that it reduces the complexity inherent to training/educational phenomena and limits the focus to three key elements (i.e. inputs, processes and outputs).

Furthermore, it enables one to reflect on and describe causal relationships between the components, which might not have emerged in a pure consideration of the individual components of the system (Edney, 1972; Madaus *et al.*, 1980, Patrick, 1992). There

appears to be no account in the literature that provides a final list of elements that should be included as inputs, process and outputs in a systems evaluation, and exactly how they are interlinked, given the different contexts to which they apply (Eseryel, 2002). Nevertheless, apart from the elements that can be drawn from Kirkpatrick's model and Stufflebeam's CIPP model, systems evaluation seems to be the most appropriate framework for occupational learning programme evaluation for the following four reasons:

- (1) It is consistent with the systems thinking about effectiveness and efficiency.
- (2) It enables the researcher to view the entire occupational learning programme and its components in a way that can serve the purposes of both proving (outcome) and improving (inputs and processes), and thus follows the definition of occupational learning programme evaluation in section 3.3.1.
- (3) It provides a simple and guiding framework for the evaluation (which reduces the inherent complexity of the system), at the same time offering enough room to adjust the evaluation to the specific needs of the users and the context of the evaluation.
- (4) Lastly, the framework complies with the quality dimensions identified for vocational education and training (VET) systems in general and more importantly with the critical elements identified by SAQA for the NQF and OLS quality assurance process in particular.

As suggested by Nielsen and Visser (1997, p. 14), in the context of vocational education, the achievement of quality objectives should be tested on the following four dimensions:

- (1) *Input*. An example would be the qualifications and motivation of those involved and the resources provided by the training institutions.
- (2) *Process*. This would entail the aim, structure and content of the course, the planning and execution of teaching and physical framework the teachers.
- (3) *Product*. An example would be course completion, passed examinations and school-leavers' competences.
- (4) *Effect*. An example would be employment, productivity and competitiveness.

Nielsen and Visser's (1997) product and effect dimensions coincide with the outcomes or outputs dimension given by Blom and Meyer's (2003, p. 41) framework of VET quality indicators. Here, outcomes or outputs include employment outcomes, stakeholder satisfaction, achieving vocational and generic skills and completion. The framework further establishes process indicators and stakeholder indicators that provide the input to the framework. Similarly, SAQA (2000b, p. 10) establishes the following three critical dimensions in the quality process of the NQF:

- (1) *the product or outcome*: awards; achievement of standards or qualifications; and accreditation
- (2) *the inputs*: learning provision; programmes; learning and learner resources; and life or experiential learning
- (3) *the process*: the quality of the learning and assessment interactions; and the quality of the monitoring and auditing interactions

A detailed discussion of the different quality dimensions can be found in Farrell (2006). While the various dimensions and quality elements identified in the cited literature do not directly match, they do coincide in the general dimensions considered – input, process and outcome. In light of above considerations and the given comparable quality dimensions, it is considered appropriate to ground and build the framework for occupational learning programme management and evaluation around the systems approach.

In addition, the framework will also include an adapted context dimension as drawn from the CIPP model and will address the elements, established from Kirkpatrick's model, namely occupational learning programme satisfaction and applied competence. Table 3.5 provides a comparison of several system-based models (CIPP, IPO and TVS) with a goal-based model (Kirkpatrick, 1959).

Table 3.5

Goal-Based and Systems-Based Approaches to Evaluation (Eseryel, 2002, pp. 3-4)

Kirkpatrick (1959)	CIPP model (Stufflebeam & Shinkfield, 2007)	IPO model (Bushnell, 1990)	TVS model (Fitz-Enz, 1994)
<p>1. Reaction: to gather data on participants' reactions at the end of a training programme.</p>	<p>1. Context: obtaining information on the situation to decide on educational needs and to establish programme objectives.</p>	<p>1. Input: evaluation of performance indicators such as trainee qualifications, availability of materials and appropriateness of training.</p>	<p>1. Situation: collecting pre-training data to ascertain current levels of performance in the organisation and defining a desirable level of future performance.</p>
<p>2. Learning: to assess whether the learning objectives for the programme are met.</p>	<p>2. Input: identifying educational strategies most likely to achieve the desired result.</p>	<p>2. Process: embraces design, development and delivery of training programmes.</p>	<p>2. Intervention: identifying the reason for the existence of the gap between the present and desirable performance to determine whether training is the solution to the problem.</p>
<p>3. Behaviour: to assess whether performance changes as a result of training.</p>	<p>3. Process: assessing the implementation of educational programme.</p>	<p>3. Output: gathering data from the training interventions</p>	<p>3. Impact: evaluating the difference between the pre- and post-training data.</p>
<p>4. Results: to assess costs versus benefits of training programmes' organisational impact in terms of reduced costs, improved quality and increased quantity of work.</p>	<p>4. Product: gathering information on the results of educational intervention to interpret its worth and merit.</p>	<p>4. Outcomes: longer-term results associated with improvement in the corporation's bottom line – profitability and competitiveness.</p>	<p>4. Value: measuring differences in quality, productivity, service or sales, all of which can be expressed in terms.</p>

3.6 INTEGRATION: A HOLISTIC AND INTEGRATED THEORETICAL MODEL FOR THE EFFECTIVE MANAGEMENT AND EVALUATION OF OCCUPATIONAL LEARNING PROGRAMMES

Table 3.6 provides a comprehensive matrix of dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes. It is evident from the matrix that environmental scanning, processes, assessment and progress reports and impact assessment are the top dimensions across all systems, models and frameworks.

However, from the quality management perspective, it is evident from the matrix that leadership, stakeholder focus, processes and self-evaluation are the core dimensions prevalent in all five quality management models discussed in this research. Impact assessment is also prevalent in four models, with the exception of the CFBE. The QCTO model of quality management integrates 14 of the 15 dimensions proposed in the holistic and integrated theoretical model for effective management and evaluation of occupational learning programmes.

Operationally, the project management framework for occupational learning programmes suggested by Bisschoff and Govender (2004) captures some of the 15 dimensions proposed for a holistic and integrated theoretical model in this research, for example, stakeholders, resources, quality leadership and results. Impact assessment is prevalent in all training evaluation models discussed in this research. However, environmental scanning and assessment and progress reports are also prevalent in all evaluation models, except the Phillips ROI framework. Overall, there is evidence in the literature that all 15 dimensions captured in the proposed holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes are contained in one or more of the models, frameworks and skills development systems reviewed in this research, as indicated in Table 3.6. The subsequent section describes the elements of the proposed holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes.

Table 3.6

Integration of the Dimensions of a Holistic and Integrated Theoretical Model

System/framework/model Element	Skills development system				Quality management models						Management framework and training evaluation models					
	Singapore system (Chee, 1992, pp. 2-4)	Australian system (NCVER, 2008, pp. 16-18)	Indian System (Palit, 2009, pp. 1-18)	Malcolm Baldrige (USA) (MBNQA, 2010, pp. 1-23)	EFQM (Europe) (Watson, 2002, p. 7)	CFBE (Canada) (NCL, 2007)	SAEM (South Africa) (SAEF, 2005)	QCTO Quality management model (DHET, 2010, p. 30)	Project management framework (Bisschoff & Goverder, 2004, pp. 77-78)	ROI Framework (Philip, Stone & Phillip, 2001, pp. 226)	Kirkpatrick & Kirkpatrick, 2006, pp. 31-114)	CIPP model (Stufflebeam & Shinkfield, 2007, pp. 325-347)	IPO model (Businelli, 1990, pp. 41-43)	TVS model (Fitz-Enz, 1994, pp. 54-58)	TOTAL	
1. Leadership				X	X	X	X									
2. Environmental scanning	X			X	X	X	X	X	X	X	X	X	X	X	5	
3. Stakeholder focus	X	X		X	X	X	X	X	X	X	X	X	X	X	9	
4. Processes	X	X		X	X	X	X	X	X	X	X	X	X	X	8	
5. Policy awareness			X		X										9	
6. Learning design	X	X					X	X		X	X	X	X	X	4	
7. Programme structure	X	X					X	X					X	X	6	
8. Quality assurance			X			X	X	X	X						3	
9. Monitoring	X					X	X	X	X						5	
10. Assessment and progress report	X				X	X	X	X	X	X	X	X	X	X	9	
11. Self-evaluation				X	X	X	X	X							5	
12. Completion rate and qualification			X				X	X							2	
13. Work readiness							X	X		X					2	
14. Occupational competence	X						X	X		X					4	
15. Impact assessment				X	X	X	X	X	X	X	X	X	X	X	9	
TOTAL	8	4	3	6	7	8	7	14	6	2	6	5	4	3		

3.6.1 Elements and dimensions of a holistic and integrated model for the effective management and evaluation of occupational learning programmes

Below is a clear description of the elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes.

3.6.1.1 Initiation

Initiation refers to the way an organisation scans its environment (external and internal) and uses the inputs obtained to plan and organise for the successful delivery of an occupational learning programme. The relevant inputs include legislative guidelines, needs analysis results and the resources (both human and financial) required to achieve the objectives of an occupational learning programme. The dimensions in this element are leadership, environmental scanning, stakeholder focus and processes.

a) Leadership

This dimension focuses on how organisational leaders (HRD management) drive HRD policy and strategy in order to facilitate the achievement of the objectives of an occupational learning programme. Also examined are the organisation's governance system and how an organisation fulfils its legal, ethical and societal responsibilities and supports its key communities. Senior leaders have a central role to play in setting values and directions, communicating, creating and balancing value for all stakeholders, and creating an organisational bias for action (Award Criteria, MBNQA, 2010).

This dimension also relates to the way leaders develop and facilitate the achievement of the mission and vision, develop values required for long-term success and implement these via appropriate actions and behaviours and how they are personally involved in ensuring that the organisation's management system is developed and implemented (EFQM, 1999). The NQI (2001) and the SAEF (2005) describe leadership as creating the culture, values and overall direction for lasting success in an organisation.

The behaviour of the executive team and all other leaders inspire, support and drive a culture of business excellence (SAEF, 2005). It is this behaviour that creates clarity and

unity of purpose in the organisation and an environment in which the organisation and its people can excel (EFQM, 1999; SAEF, 2005). Since the skills development provider takes operational custodianship of occupational learning programmes, it is significant that it should exercise sound leadership in order to manage these programmes successfully (Bisschoff & Govender, 2004).

b) Environmental scanning

This dimension entails an analysis of an organisation's external and internal environments in order to draw inputs necessary to plan and organise for the successful delivery of an occupational learning programme. This includes an analysis of the relevant legislation, facilities, relevant equipment and the availability of both the financial and human resources.

The MBNQA cites environment as one of the overarching guides for organisational performance management system (Award Criteria, MBNQA, 2010). This award stresses that long-term organisational sustainability and an organisation's competitive environment are key strategic issues that need to be integral parts of an organisation's overall planning. Organisational and personal learning are necessary strategic considerations in today's fast-paced environment. Knowledge of the way an organisation determines its key strengths, weaknesses, opportunities and threats, its core competencies and its ability to execute the strategy is essential for the organisation's survival.

In the South African context, the QCTO model of quality management emphasises that workplace approval as learning sites for occupational learning programmes will be granted after evidence is produced that such workplaces have the ability to provide work experience component (DHET, 2010c). According to Chee (1992), in Singapore, however, apprentices attend their off-the-job training at an ITE institute or the company's training centre. In the case of the latter, the company has to be a designated approved training centre (ATC) of the ITE and has to meet stipulated requirements on staff and equipment in order to present training. Hence environmental considerations are vital for the successful delivery of occupational learning programmes.

It is imperative for skills development providers, who are the custodians of occupational learning programmes in South Africa, to define the scope of an occupational learning programme. The process of scoping could be done successfully once the environment in which these programmes are to be implemented is carefully analysed. The scope will identify the inputs, range, criteria, stakeholders and outcomes of the programme. Once the scope has been defined, the programme should be scheduled according to relevant times, dates and stakeholders (Bisschoff & Govender, 2004).

Similarly, Kirkpatrick and Kirkpatrick (2006) indicate that adequate consideration should be given to the learning environment and conditions when evaluating training. Stuffelbeam and Shinkfield (2007) also focus on the importance of context when evaluating training programmes. They believe that the training context defines the relevant environment, identifies needs and assets and diagnoses specific problems that need to be addressed. Furthermore, Bushnell (1990) emphasises the importance of evaluating system performance indicators such as trainee qualifications, the availability of materials and the appropriateness of training. This view is also supported by Fitz-Enz (1994) who states that collecting pre-training data to ascertain current levels of performance in the organisation and defining a desirable level of future performance are key aspects of training evaluation. He also emphasises the need to identify the reason for the existence of the gap between the present and desirable performance in order to ascertain whether training is the solution to the problem.

c) Stakeholder focus

This dimension focuses on the way an organisation identifies and relates to its key stakeholders that are critical for the successful delivery of an occupational learning programme. These stakeholders include potential learners, skills development providers (including assessors and moderators), coaches and mentors (supervisors and managers). According to the EFQM (EFQM, 1999; SAEF, 2005), excellence in the organisation is dependent upon balancing and satisfying the needs of all relevant stakeholders (this includes the people employed, customers, suppliers and society in general as well as those with financial interests in the organisation).

An organisation is seen as part of society, with key responsibilities to satisfy the expectations of its people, customers, partners, owners and other stakeholders including exemplary concern for responsibility to society (NQI, 2007). However, from an occupational learning programme perspective, skills development providers must integrate their activities in any organisation by working with the skills development facilitators, assessors, other skills development providers, managers and learners. They must employ project management skills in order to manage diverse roles and responsibilities of all key stakeholders and to evade crisis management situations (Bisschoff & Govender, 2004).

For example, during the curriculum development phase of occupational learning programmes, key stakeholders such a curriculum/qualification development facilitator, a qualifications development partner and an assessment quality partner should be identified and involved in the process (DHET, 2010c). In terms of the new OLS landscape, the accreditation of skills development providers will be based on their ability to provide the theory/knowledge and practical skills development components outlined in the curriculum (DHET, 2010c).

Chee (1992) indicates that, as part of apprenticeships in Singapore, on-the-job training is conducted at the company's premises under the supervision of qualified trainers, and the list of tasks that the apprentice has to learn on the job are documented in a logbook. However, in Australia, the apprenticeship agreements set out the training and supervision an employer must provide for the employee, as well as the employee's obligations as a new apprentice.

Equally significant and from a training evaluation perspective, Kirkpatrick and Kirkpatrick (2006) suggest that along with the evaluation of learners, the programme coordinators, training managers and other qualified observers' reactions to the facilitator's presentation should also be evaluated. The success of learners during a training programme therefore also depends on the roles played by other stakeholders.

d) Processes

This dimension focuses on the critical activities required to support the successful delivery of an occupational learning programme. These include the recruitment, selection and placement of stakeholders. These processes also involve consultation with the successful candidates, clarification of roles and responsibilities, and finally, the conclusion of contractual arrangements. The EFQM states the importance of the way in which an organisation designs, manages and plans its processes in order to support its policy and strategy and fully satisfy and generate increasing value for its customers and other stakeholders (EFQM, 1999).

Organisations perform more effectively when all interrelated activities are understood and systematically managed, and decisions concerning current operations and planned improvements are made using reliable information that includes stakeholder perceptions (SAEF, 2005). This includes the way an organisation plans and manages its internal resources in order to support its policy and strategy and the effective operation of its processes.

An organisation's processes must be managed effectively to support its strategic direction, with a specific focus on prevention (as against correction), as well as continuous improvement. Process management applies to all activities in the organisation, in particular those that are critical for success (NQI, 2007). One should bear in mind that an organisation is a network of interdependent value-adding processes, and improvement is achieved through understanding and changing these processes in order to improve the total system. To facilitate long-term improvements, a mindset of prevention as opposed to correction should be applied to eliminate the root causes of errors and waste.

Hence an organisation's resources and information should be managed and utilised effectively and efficiently and its operating processes should be constantly reviewed and improved (SAEF, 2005). These work processes and learning initiatives should be aligned with an organisation's strategic directions, thereby ensuring that improvement and learning prepare an organisation for and reinforce organisational priorities. An organisation should design, manage and improve its key work systems and processes in

order to deliver customer value and achieve success and sustainability (Award Criteria, MBMQA, 2010).

In the South African context, however, the QCTO remains small, but works through its partners. It is responsible for managing the consistency of the design and development process, and certification of occupational qualifications; it controls quality of provision and assessment through accreditation and registration; it monitors data and improves processes and quality control mechanisms; and it improves development and design processes (DHET, 2010c).

Bisschoff and Govender (2004) suggest that adequate human resources should be allocated and managed to ensure the successful delivery of an occupational learning programme, and this should include workplace mentors, supervisors and assessors. They further state that effective skills development providers are those that value human resources as assets who need guidance, maintenance and support in order to prevent risks to the programme or people. The appointment of key staff, resources and contacts for the programme should thus be carefully considered prior to the commencement of an occupational learning programme (Bisschoff & Govender, 2004).

In the Singapore context, according to Chee (1992), the apprenticeship system is backed by a specific centre for the promotion, recruitment and placement of apprentices. Both the apprentice and the host company are subject to a legal obligation to each other as provided for under the apprenticeship contract. The requirements on the part of both the employer and apprentice are clearly specified, and both parties are required to honour them throughout the period of apprenticeship.

In Australia, however, new apprenticeships are covered by formal agreements known as either training agreements or contracts of trainings. The apprentice signs a contract of training with an employer in which the employer promises to respect responsibilities to provide appropriate training and work for the apprentice, while the apprentice promises to undertake the training and work as expected (NCVER, 2008). In South Africa, the skills development provider, employer and learner sign a learning programme agreement that is registered with the relevant SETA. The agreement spells out the duties and obligations of each stakeholder, and is legally enforceable.

However, from an evaluation perspective, Stuffelbeam and Shinkfield (2007) indicate that inputs should be evaluated in order to assess the system capabilities by looking into its resources and how they can best be applied to meet the programme's goal. Hence an effective and efficient management of organisational processes and resources is key to the successful implementation of occupational learning programmes.

3.6.1.2 *Execution*

This element focuses on the way an organisation plans, designs, implements and manages occupational learning programmes in accordance with the legislative guidelines and its policy and strategy in order to achieve the programme's objectives, and to fully satisfy and generate increasing value to its stakeholders. The dimensions in this element include policy awareness, learning design, programme structure and quality assurance.

a) *Policy awareness*

Policy awareness involves an organisation's analysis of relevant legislation that entrenches occupational learning programmes to inform and guide the design and implementation of occupational learning programmes. The relevant legislations include the Skills Development Act (as amended) and the National Qualifications Framework Act. Based on the provisions of these two pieces of legislation, an organisation can clearly formulate and effectively implement its HRD policies and strategies.

An organisation must implement its mission and vision via a clear stakeholder-focused strategy, supported by relevant policies, plans and objectives. A successful organisation formulates policy and strategy in collaboration with its people and this process should be based on relevant, up-to-date and comprehensive information and research (EFQM, 1999). The policy and strategy must be clearly formulated, deployed and revised and should be operationalised into plans and actions (SAEF, 2005). However, in the South African context, organisational policies for training need to be aligned with the skills development legislation. For example, training policies should make provision for cost benefit analysis since the skills development legislation demands that a cost benefit

analysis be completed to determine the benefits to annual training investments (Bisschoff & Govender, 2004).

In the Indian context, however, formal apprenticeships were introduced through the Apprenticeships Act of 1961, which requires employers in notified industries to engage apprentices in specified ratios in relation to the workforce. The Central Apprenticeship Council outlines the policies and different norms and standards of apprenticeship training in the country (Palit, 2009). Hence knowledge of legislative instruments that influence organisational training policies is vital to the success of occupational learning programmes.

b) Learning design

This dimension focuses on the way an organisation plans and designs its occupational learning programmes. It entails the use of relevant unit standards and logbooks, the format of presentation, the assessment scheme to be used and the outcome of the learning process. The new OLS landscape in South Africa demands that during the development phase of occupational curriculum/qualifications, a curriculum/qualification development facilitator should be appointed to guide and direct various working groups, which are responsible for the development of an occupational profile, the development of learning process design and the development of assessment specifications. The QCTO will have to ensure quality assurance of development and design task by applying nationally standardised processes and systems (DHET, 2010c). The design of a learning programme determines its outcomes.

Nevertheless, in the Singapore context, the design of apprenticeship training is such that the apprentice is given both theory and practical lessons during off-the-job training to complement his or her on-the-job component (Chee, 1992). In Australia, however, the new apprenticeship programme combines practical work with structured training to give young people a nationally recognised qualification and the experience they need to find the job they want. Training packages are designed by industry for industry and can be delivered on the job, off the job or a combination of both (NCVER, 2008).

As Kirkpatrick and Kirkpatrick (2006) indicate, if a learning package is of sound design, it should help the learners to bridge a performance gap. They suggest that if a programme is carefully designed, learning can be evaluated fairly and objectively while the training session is being conducted. Stuffelbeam and Shinkfield (2007), however, suggest that the evaluation of training programme inputs helps to determine the general programme strategy for planning and procedural design, and whether outside assistance is necessary. Bushnell (1990) suggests that evaluation should embrace the planning, design, development and delivery of training programmes. Occupational learning programmes should thus be carefully designed, taking into account the needs of all stakeholders and of the industry and the national interests.

c) Programme structure

This dimension focuses on the way an occupational learning programme is structured. Typically, an occupational learning programme contains three core aspects, namely knowledge and theory, practical skills and work experience. As highlighted earlier, in Singapore and Australia, apprenticeship training affords apprentices an opportunity to engage in practical work with structured training. However, in South Africa, the new OLS landscape demands that occupational learning programmes should be developed on the basis of theory, practical and work experience unit standards, and should have a minimum life cycle of 12 months (DHET, 2010c). Equally important, Chee (1992) states that depending on the trade area and the level of certification, the duration of apprenticeship in Singapore can take between one and three years, and all apprenticeship courses encompass the two key components of on-the-job and off-the-job training, which account for approximately 70 and 30% respectively of the total training duration.

The Australian experience is such that, traditionally, apprenticeships took three to four years to complete and traineeships lasted for one to two years. These apprenticeships are competency based. This means it may be possible for new apprentices to complete their training sooner if they have reached the skill level required (NCVER, 2008). In India, the apprenticeship training modules vary between six months and four years, at the end of which apprentices are tested by the National Council for Vocational Training (NCVT) (Palit, 2009).

d) Quality assurance

This dimension relates to the way an organisation promotes and assures quality in the design and implementation of occupational learning programmes. Occupational learning programmes must be practice driven, relevant and responsive to the needs of an occupation. The NQI (2007) emphasises that the best way to keep things on track in an organisation is to apply a quality assurance method to everything that is done (NQI, 2007). This view is supported by the SAEF which based the SAEM on the concepts of formulating quality policies, assigning responsibility for quality to top management, managing quality procedures and control, reviewing improvement processes, delegating authority and empowering the workforce (SAEF, 2005).

From an occupational learning programme perspective, however, Bisschoff and Govender, (2004) emphasise the importance of quality when stating that skills development providers, employers and learners must achieve quality standards of performance during these programmes. They contend that effective skills development providers should strive to promote excellence and quality in the occupational learning programme.

Nevertheless, in the new OLS landscape in South Africa, the QCTO controls the quality of provision, assessment and certification by applying specified criteria in terms of the approval of regulated occupational learning programmes (DHET, 2010c). The regulatory and quality assurance functions of SETAs are coordinated through the QCTO in order to use the resources more effectively. In the end, quality monitoring and audits by the QCTO will be conducted constantly as required on the basis of complaints and final assessment results.

The role of SETAs has changed from Education and Training Quality Assurance bodies to real quality assurance involving quality monitoring of programme implementation, and programme evaluation research, including impact assessment. Quality assurance of occupational learning programmes ensures the predictability and repeatability of processes under the organisation's control against the strategic criteria in the quality management system (Vorwerk, 2010a). It is largely an issue of quality control (DHET, 2010c). In the Indian context, however, the quality of apprenticeship training is only as

good as the skills of the master and his or her willingness and ability to pass on those skills (Palit, 2009). To this end, quality must permeate every aspect of an occupational learning programme, if such a programme is to succeed.

3.6.1.3 *Progress monitoring*

This element is concerned with the systematic post implementation monitoring of the occupational learning programmes. The dimensions of this element include observation and assessment and progress reporting.

a) Monitoring

This dimension entails regular observation visits (2–3 months) by SETA representatives or designated agents to sites of delivery (classroom, workshops, workplaces, etc.) in order to monitor learner's progress for the duration of the occupational learning programme. The NQI emphasises the importance of monitoring and evaluation of the progress made towards meeting the goals of the organisation (NQI, 2007). However, in South Africa, the QCTO will conduct research to monitor the effectiveness of learning interventions in the context of the larger occupational learning system. The process of monitoring and evaluation revolves around the development and design processes, the implementation of occupational learning programmes and data analysis and impact assessment (qualitative and quantitative) (DHET, 2010c). SETAs will have to focus on monitoring the implementation of occupational learning programmes in line with the DHET regulations.

In Singapore, according to Chee (1992), on-the-job training of apprentices is structured and backed by a comprehensive documentation and monitoring system. From the point of placement of an apprentice in a company, the ITE begins a programme of monitoring the particular apprentice's progress for the full duration of his or her training. ITE officers visit the company regularly, at intervals of about two to three months, to ensure that the training is in accordance with the training structure and on schedule; to monitor the apprentice's progress and performance through direct observation and dialogue with his or her supervisor; and to attend to any matters pertaining to the performance and welfare of the apprentice. Based on the observations made, the officers initiate the

necessary follow-up with the apprentice, company or ITE headquarter departments accordingly.

b) Assessment and progress reports

This dimension focuses on the assessment of progress made towards meeting the goals and objectives of an occupational learning programme. Assessment ensures that an organisation can measure whether it is doing the right things and obtaining the right results. It is about measuring the progress made towards meeting the goals of an organisation (NQI, 2007).

The ensuing assessment of an organisation's performance is measured both by the results and the quality of the processes and systems developed to achieve them. Approaches that are used to achieve the required results are systematically assessed and reviewed in the light of results and feedback so that no approach will become ineffective or unnecessary once implemented. Different parts or aspects of an organisation may be assessed through benchmarking or external assessment for continuous improvement (EFQM, 1999). In the South African context, the QCTO has a responsibility to accredit assessment centres, to conduct a final integrated assessment of occupational competence and to assist in the development of banks of assessment items as an alternative mechanism for standardising assessment practices nationally (DHET, 2010c). On-going assessment for credit accumulation will continue, and verification will be integrated into the monitoring and evaluation of occupational learning programme delivery (DoL, 2007b).

The QCTO ensures quality assurance of development and design of assessment processes by applying nationally standardised processes and systems such as qualification assessment specifications and nationally standardised assessment instruments. The accreditation of skills development providers is important because they are required to deliver curriculum components and conduct internal assessment against related unit standards (DHET, 2010c). Equally important, assessment ensures that occupational learning programme risks are identified, controlled, minimised and eliminated to ensure the success of the programme (Bisschoff & Govender, 2004).

From an evaluation perspective, Kirkpatrick and Kirkpatrick (2006) indicate that assessment ensures that what the learners know or can do is measured during and at the end of training. However, in order to say that this knowledge or skill resulted from the training, the learners' entering knowledge or skills levels must also be known or measured. Measuring the learning that occurs in a training programme is necessary to validate the learning outcomes. Learner assessments may be created to allow a judgement to be made about the learner's capability for performance.

A systematic appraisal should be made of on-the-job performance on a before-and-after basis. Stuffelbeam and Shinkfield (2007) also support the assessment of the actual training programme activities because this provides feedback on managing the process and recording and judging the work effort. Furthermore, Bushnell (1990) emphasises the significance of gathering data resulting from the training interventions. However, Fitz-Enz (1994) believes that evaluating the difference between the pre- and post-training data is vital to establish the actual value of a training intervention. The experience in Singapore, as reported by Chee (1992), is such that on-the-job training of apprentices is strictly supervised and the supervisor certifies the completion of each task in the logbook, thus closely monitoring the progress of the apprentice in following the tasks list.

3.6.1.4 Evaluation and review

This element involves a systematic analysis of the entire occupational learning programme from inception as well as tracking down the achievement of its objectives. The dimensions involved include self-evaluation, completion rate and qualification, work readiness, occupational competence and impact assessment.

a) Self-evaluation

This dimension focuses on the organisation broadly, and specifically on the roles of stakeholders involved in the occupational learning programme. Self-evaluation allows an organisation to examine itself by reviewing its processes and key systems, and uses reviews to improve its performance (Award Criteria, MBNQA, 2010). An organisation may use whole organisation self-evaluation to identify areas for improvement (EFQM, 1999). The NQI (2007) also supports the use of the self-evaluation mechanism. It is a

powerful diagnostic tool that can be used to identify organisational strengths and areas for improvement (SAEF, 2005). In the South African occupational learning context, however, the approach that the QCTO uses to accredit skills development providers is based on self-evaluation against general criteria and specific requirements specified in the relevant occupational curriculum components (subjects or modules), as well as recommendations from industry and/or a good track record (DHET, 2010c). One should bear in mind that skills development providers are the operational custodians of occupational learning programmes – hence the need for them to be accredited.

b) Completion rate and qualification

This dimension entails an evaluation of the quantitative data in terms of the learners who completed the programme and achieved a full SAQA accredited qualification. In the South African occupational learning context, the QCTO will conduct the statistical analysis of learner data collected including enrolment, completion and certification rate. The QCTO controls the quality of provision, assessment and certification by applying specified criteria in terms of the approval of regulated occupational learning programmes (DHET, 2010c). It ensures quality control of provision, implementation and certification by establishing a secure certification system (DHET, 2010c).

At the end, successful occupational learners in South Africa are awarded a National Occupational Award or a National Skills Certificate, which bears NQF credits. However, in India, successful apprentices are awarded National Apprenticeship Certificates that are recognised for employment opportunities in government and semi-government organisations (Palit, 2009).

c) Work readiness

This dimension involves an evaluation of the learner's ability to perform tasks or to apply the acquired skills practically in the work context. Learners may be observed or tested in practice. In the new OLS landscape in South Africa, occupational learning programmes are evaluated, *inter alia*, on the appropriateness and relevance of skills that learners acquired, learners' enhanced employability and enhanced productivity and quality of work (DHET, 2010c). Equally important, Kirkpatrick and Kirkpatrick (2006) indicate that it

is necessary to measure learners' performance because the primary purpose of training is to improve results by having the learners acquire new skills and knowledge and then actually apply them to the learners' jobs.

d) Occupational competence

This dimension entails an evaluation of learner's ability to function effectively and provide products or services relating to the relevant occupation. This may include working together with others in a team in order to achieve performance improvement in the relevant occupation in an organisation. An evaluation of the post-training occupational affiliation is necessary in this dimension. As highlighted earlier, occupational learning programmes in South Africa are evaluated on the basis of the learners' enhanced employability and enhanced productivity and quality of work (DHET, 2010c).

The acquisition of new skills and knowledge is of no value to an organisation unless the participants actually use them in their work activities (Kirkpatrick & Kirkpatrick, 2006). Phillips (1997a) also emphasises the importance of measuring change in behaviour on the job and specific application of the training material. However, according to Chee (1992), as part of the apprenticeship training in Singapore, the supervisor endorses completion of a task only upon the apprentice's achievement of the acceptable level of competence in the prescribed task. Successful occupational learning programmes should therefore impart the relevant skills to learners so that they can competently and effectively function in their respective occupations.

e) Impact assessment

This dimension entails a comprehensive assessment of the impact of the occupational learning programme on the stakeholders and society in general. This may include the delivery of much needed skills in various sectors and the resultant changes emanating from occupational learning programmes. In terms of the MBNQA, an analysis and review of results, data and information is critical to determine an organisation's overall performance and to set priorities for improvement (Award Criteria, MBNQA, 2010). The EFQM also emphasises that an organisation must assess what it is achieving in relation

to its external customers; what it is achieving in relation to its people; what is it achieving in relation to local, national and international society; and what it is achieving in relation to its planned performance (EFQM, 1999).

Similarly, the NQI reiterates the importance of examining organisational performance in terms of its overall achievements (NQI, 2007). This examination includes the organisation's involvement in the local community and what the organisation is achieving in satisfying the needs and expectations of the local, national and international community (SAEF, 2005).

From an occupational learning perspective, the QCTO ensures quality improvement through data analysis and impact assessment. Qualitative impact assessment focuses on the appropriateness and relevance of skills, the credibility of assessment, enhanced employability and enhanced productivity and quality of work. Quantitative assessment focuses on whether the learning programme is delivering the right number of people as well as the balance between the demand and supply (DHET, 2010c). Kirkpatrick and Kirkpatrick (2006) emphasise measurement of the impact of the training programme. They suggest that it would be best to evaluate training programmes directly in terms of the results desired. Similarly, Phillips (1997a) supports the need to measure the business impact of the training programme.

Stuffelbeam and Shinkfield (2007), however, emphasise product evaluation that measures the actual outcomes of the programme (intended and unintended), and Bushnell (1990) focuses on the evaluation of longer-term results associated with improvement in the corporation's bottom line – that is, its profitability and competitiveness. Furthermore, Fitz-Enz (1994) values measuring differences in quality, productivity, service or sales, all of which can be expressed in rand terms. To this end, the importance of assessing the impact of training interventions in an organisation and beyond cannot be underestimated, as indicated in the literature highlighted in this section.

Consequently, each of the four elements in figure 3.16 is of equal significance for the successful achievement of the objectives of an occupational learning programme. The

implications are such that if one element is not given adequate attention, the remaining three suffer.

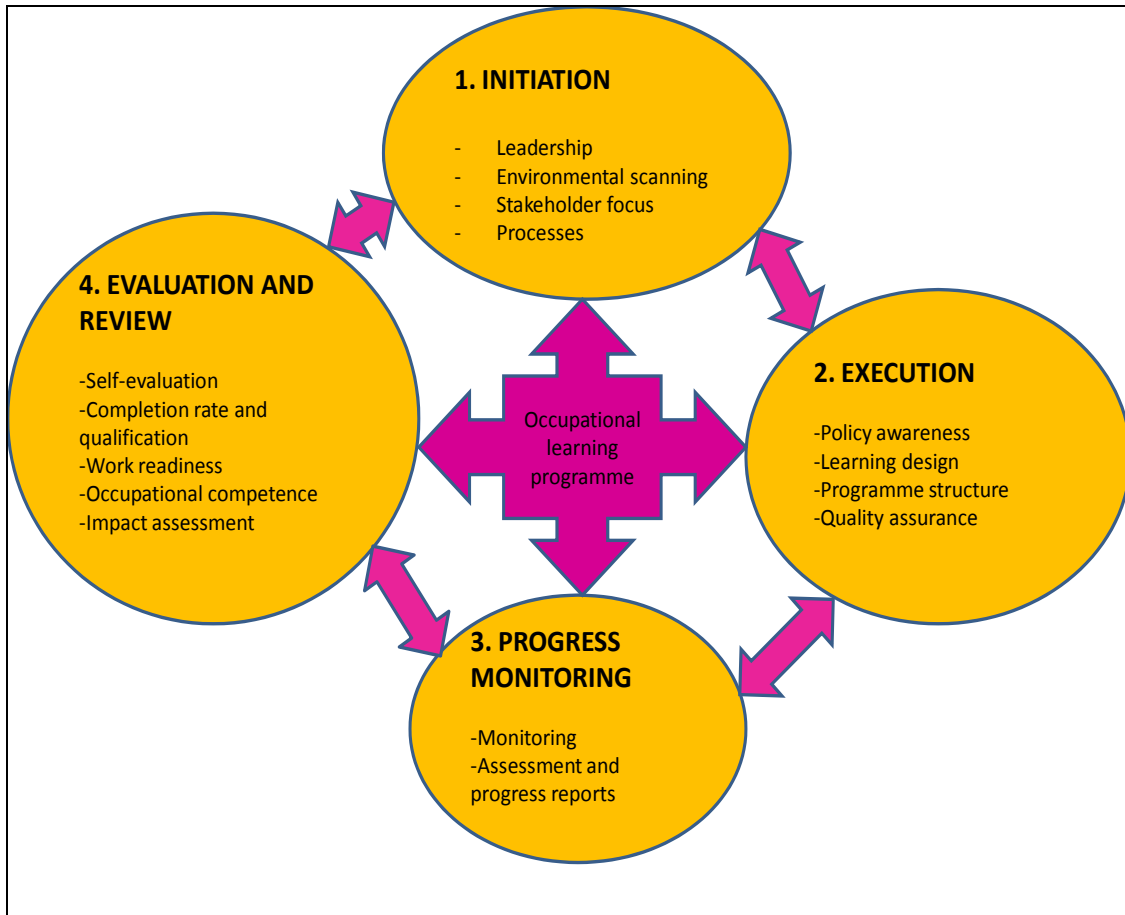


Figure 3.16. An integrated theoretical model for the effective management and evaluation of occupational learning programmes

3.6.2 Theoretical integration: skills development, training management and evaluation

This section presents the theoretical integration of Chapter 2 (Skills Development and the Occupational Learning System) and Chapter 3 (Training Management and Evaluation Models). As indicated in figure 3.17, the skills development policies and strategies are influenced by a myriad of external forces such as economic, political, technological and social forces. These forces shape the models and approaches to skills development that different countries around the world follow. The three key global

models discussed in this research are the Anglo Saxon, the Asian Tiger and the Germanic models, and they influence the skills development systems and processes of many countries, including South Africa. For example, the South African skills development system is a combination of the Germanic and Asian Tiger models because of the country's political history.

The South African skills development policies (legislation and strategies) are shaped by the political and economic ideology of the ruling party (the African National Congress (ANC)), which has a majority representation in Parliament. Such policies are also influenced by social conditions such as poverty and unemployment. If one takes a cursory look at the current National Skills Development Strategy (NSDS III), for example, one of the key challenges it seeks to address is poverty and unemployment, a major social concern in South Africa. However, the second Human Resource Development Strategy for South Africa (HRDSSA II) also emphasises this challenge. Commitment 4 of the HRDSSA II focuses on skills development programmes that are purposefully aimed at equipping recipients/citizens with the requisite skills to overcome the related scourges of poverty and unemployment.

Once the policies and strategies have been formulated, they are cascaded down to the operational level (organisations) for implementation. The Skills Development Amendment Act 37 of 2008, for example, gave birth to the new occupational learning system in South Africa. The aim of the new system is to integrate workplace and institutional learning in order to enhance skills development in the country. There are different types of occupational learning programmes that have to be implemented in the South African workplace, but this research focused on only two of them, namely apprenticeships and learnerships.

Both the apprenticeship and learnership must be implemented over a period of at least 12 months to ensure that participants achieve the requisite competence levels. These learning programmes must be effectively managed and evaluated to ensure that their intended objectives are achieved, and this is an interesting area subject to this investigation. Hence the central focus of this study is the effective management and evaluation of occupational learning programmes.

Various frameworks and models of management and evaluation were reviewed in this research in an effort to give credence to the holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes. These models and frameworks also shaped the development of a valid and reliable measure for effective management and evaluation of occupational learning programmes, which is a key methodological contribution of this research. The researcher's hope was that the effective management and evaluation of occupational learning programmes could lead to more skills becoming available in the South African labour market.

However, one should bear in mind that the skills development battlefield is a complex, ruthless and demanding environment driven by environmental forces, policies, international trends and obligations, lifelong learning principles, human capital investments and effective training provision benchmarks. Hence a sound knowledge of skills development models, management theory and training evaluation models is critical for the successful implementation of occupational learning programmes in South Africa. The literature highlighted deficiencies in management practices and a dearth of management capacity in South African organisations. These deficiencies, coupled with poor or inconsistent training evaluation practices (DHET, 2010a; Grawitzky, 2007; Kraak, 2005a; Nienaber, 2007), justify the need for a research study that focuses specifically on the management and evaluation of occupational learning programmes – hence this project.

However, since skills development providers are the operational custodians of skills development in South African workplaces, the task of managing the implementation of occupational learning programmes appears to rest primarily on their shoulders.

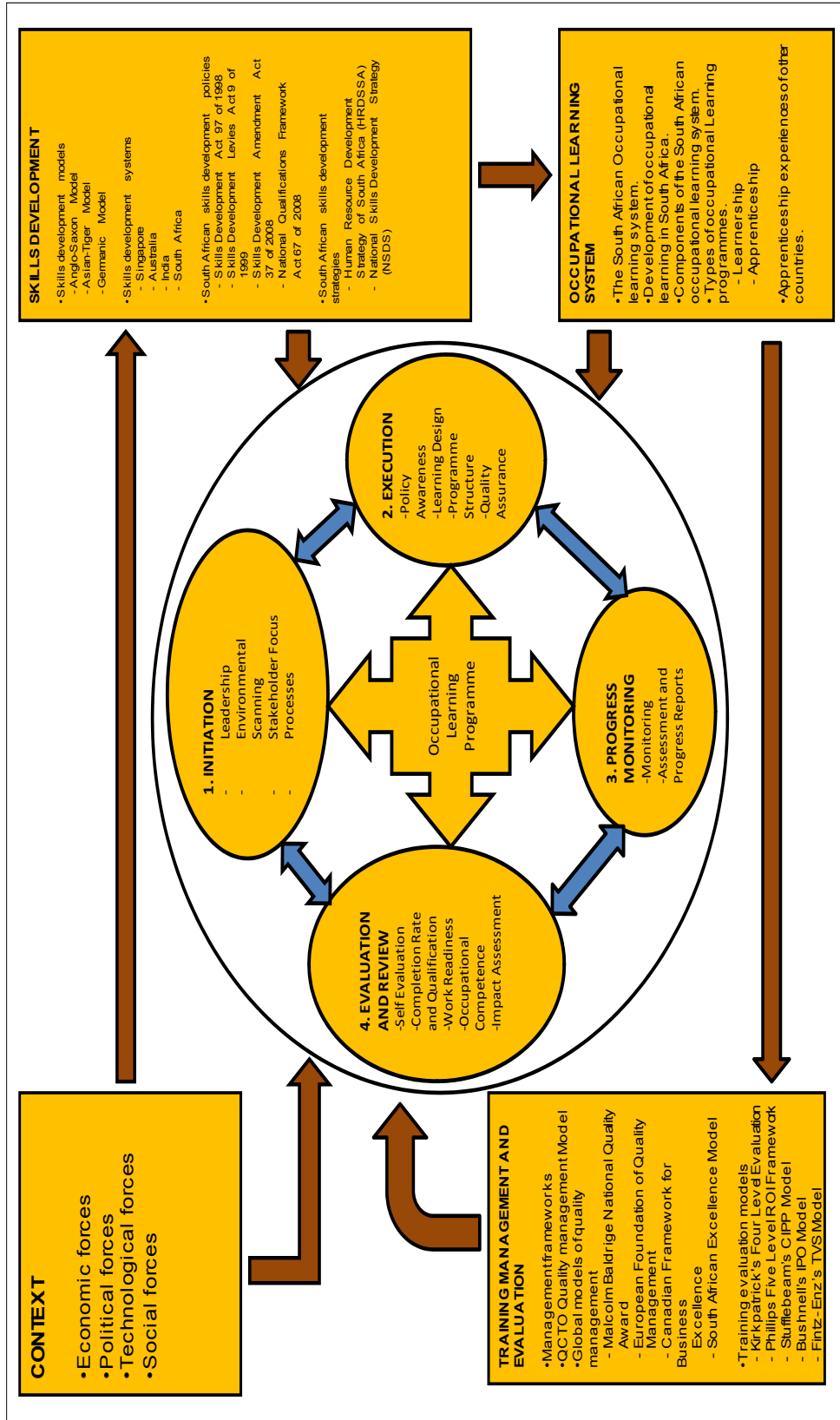


Figure 3.17. A holistic and integrated theoretical model for skills development, effective management and evaluation of occupational learning programmes

Skills development providers have to effectively manage the following responsibilities pertaining to occupational learning programmes: the alignment of occupational learning-related policies with the legislative prescripts and procedural criteria that underpin the management of workplace skills development; the implementation processes and training delivery tasks that must be monitored, managed and controlled; and the utilisation of an effective management framework needed to manage the overall system for executing the operational tasks successfully and in accordance with the applicable legislation. This responsibility is complex and requires the cooperation of other key stakeholders involved in the occupational learning programmes. Consequently, the management and evaluation of occupational learning programmes is critical if such interventions are to succeed. Of significance, however, is the fact that management and evaluation are two inseparable elements for any training intervention to achieve its intended objectives.

3.7 THEORETICAL EVALUATION

This section provides a comprehensive review of the problem statement of the theoretical chapters (i.e. Chapters 2 & 3) of this research. It provides a reflective analysis of the literature review and an assessment of whether the literature research aims were achieved. The literature aims set out below were formulated in Chapter 1 of the research and were subjected to a critical review to determine whether they were achieved in Chapter 2 (Skills Development and the Occupational Learning System) and in this Chapter (Training Management and Evaluation Models).

3.7.1 Literature research aim 1: to conceptualise the concept of the occupational learning programme

The literature presented in section 2.4 in Chapter 2 (Skills Development and the Occupational Learning System) provides a comprehensive discussion of the new occupational learning system in South Africa, including its historical origins, the reform processes that led to its introduction and its various components. The construct of the occupational learning programme was successfully conceptualised in section 2.5 of Chapter 2, followed by a discussion of the two types of occupational learning programmes (i.e. learnership and apprenticeship), which are the focus in this research. The legal definition of a learning programme, as per the Skills Development Amendment Act 37 of 2008, was deemed to be sufficiently comprehensive to describe the construct of an occupational

learning programme (the key focus in this research). Furthermore, the literature review provided insight into the conditions within which effective occupational learning can take place successfully (Holiday, 1994; Matthews, 1999). The concepts of learnership and apprenticeship were also clearly defined in the literature (Coetzee *et al.*, 2007; De Jager *et al.*, 2002; DoL, 1997; Hayward *et al.*, 2008; Marks *et al.*, 2004; Pattayanunt, 2009; Visser & Kruss, 2009). This literature research aim was thus achieved.

3.7.2 Literature research aim 2: to conceptualise the principles of effective management and evaluation in the context of occupational learning programmes

Section 3.1 in this chapter (training management and evaluation models) provided a brief introduction to management theory as it applies to occupational learning programmes. The construct of management was conceptualised in subsection 3.1.2 by analysing different definitions. The definitions of Koontz and O'Donnell (1964), Smit and Cronjé (1992), and Trewatha and Newport (1976) were carefully analysed in order to derive a comprehensive definition of management in the context of occupational learning programmes and this research. However, from an evaluation perspective, the construct of evaluation was conceptualised in subsection 3.5.1. Once again, different definitions were analysed with a view to formulating a comprehensive definition relating to the purpose of this research (Aspinwall *et al.*, 1992; Campbell, 1998; Goldstein, 1986; Hopkins, 2002; Patton, 1986; Scriven, 2003; Schalock, 1995; Stufflebeam, 2003; Tracey, 1968; Tyler, 1949). Based on this analysis, a comprehensive definition of the management and evaluation of occupational learning programmes was formulated to tie in with the purpose and aims of this research. This literature research aim was thus achieved.

3.7.3 Literature research aim 3: to investigate the current management and evaluation practices pertaining to occupational learning programmes in South Africa.

The literature review in both Chapter 2 and this chapter provided insight into the current management and evaluation practices pertaining to occupational learning programmes in South Africa. The empirical evidence that emerged from the literature review suggests that the management and evaluation of occupational learning programmes are ineffective and inconsistent, both at SETA and workplace level, and this has become an obstacle to adequate skills supply into the labour market (Babb, 2005; DHET, 2010a; Grawitzky, 2007;

Hattingh, 2004; Kunene, 2007; Kraak, 2005b; Kraak, 2008a; Marock *et al.*, 2008; Letsoalo, 2007a; Nienaber, 2007; Smith *et al.*, 2005; Visser & Kruss, 2009).

The literature review revealed the extent of management and evaluation practices pertaining to occupational learning programmes in South Africa, particularly the management and evaluation deficiencies in the system, and it is these deficiencies that this research aimed to address. This literature research aim was therefore achieved.

3.7.4 Literature research aim 4: to identify and conceptualise the elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the context of the new occupational learning system in South Africa

The literature review in both Chapter 2 and this chapter provided a solid base for the selection of the elements and dimensions used in the drafting of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes. An understanding of system deficiencies that emerged in the literature review facilitated the task of identifying elements and dimensions that could provide a possible solution to overcome such deficiencies.

After a careful analysis of the literature, only four elements were found to be theoretically important and crucial to the successful delivery of occupational learning programmes, namely initiation, execution, progress monitoring and evaluation and review. Each of these elements has a number of dimensions that are specific to the successful delivery of an occupational learning programme. These elements, which are part of the proposed holistic and integrated theoretical model, will be tested empirically later in this research in order to draw valid and reliable scientific conclusions about the suitability and relevance of such elements in both the measuring instrument and the model itself. This literature research aim was therefore achieved.

3.7.5 Literature research aim 5: to analyse the international best practices regarding the effective management and evaluation of occupational learning programmes and how these compare with the identified elements and dimensions of the theoretical model.

This chapter (training management and evaluation models) investigated the literature pertaining to the management and evaluation theory based on local and international

experiences. A number of training management frameworks used locally and internationally, as reported by Vollenhoven (2007), were briefly discussed in subsection 3.1.1. However, as yet, no clear and specific management framework has been developed for occupational learning programmes in South Africa (Bisschoff & Govender, 2004). Hence a learning programme management and evaluation framework is suggested with the elements of project management as the basic tools. This new framework could be used in the South African skills development context as a basis for understanding the management dynamics surrounding skills development in general and learning programmes management and evaluation in particular.

A number of quality management models were also analysed (the QCTO model in subsection 3.3.1 and the global models of quality management in subsection 3.4) and valuable inputs were detected which contribute to the selection of the elements of a proposed holistic and integrated theoretical model. Various global models of training evaluation (Bushnell, 1990; Fitz-Enz, 1994; Kirkpatrick & Kirkpatrick, 2006; Phillips, 1994; Stuffelbeam & Shinkfield, 2007) were also analysed and valuable inputs earmarked, which also contributed to the selection of the elements of a proposed model. These frameworks and models provided a clear perspective in terms of the international best practices pertaining to the effective management and evaluation of skills development interventions such as learning programmes in South Africa. This literature research aim was thus achieved.

3.7.6 Literature research aim 6: to conceptualise the elements and dimensions of a holistic and integrated model for the effective management and evaluation of occupational learning programmes on the basis of the literature review

An analysis of the literature review in both Chapter 2 and this chapter contributed to a comprehensive understanding of the constructs of this research. The experiences of other countries in the implementation of skills development interventions, particularly apprenticeships, indicated valuable lessons and contributions in selecting the elements that are relevant to and appropriate for the effective management and evaluation of occupational learning programmes.

Equally significant were the lessons drawn from the quality management and training evaluation models that were analysed in the literature review. These lessons contributed

much in decision making regarding which elements and dimensions should be considered for inclusion in the proposed model. Some of the model dimensions such as leadership, stakeholder focus and processes were adapted from the existing models (Award Criteria, MBNQA, 2010; EFQM, 1999; NQI, 2007) even though they were described in the context of occupational learning programmes in this research. This literature research aim was therefore achieved.

In conclusion, the review of literature shows that both the effective management and evaluation of occupational learning programmes are vital factors that merit adequate consideration in any organisation. However, the empirical evidence in the existing literature revealed deficiencies in the current management and evaluation practices pertaining to occupational learning programmes. This is significant justification for the researcher's decision to develop a valid and reliable measure and contribute to the development of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in South African workplaces. There is no valid and reliable measure and no effective management and evaluation framework for occupational learning programmes in South Africa – hence this research.

3.8 CHAPTER SUMMARY

This chapter discussed the training management and evaluation theory pertaining to this research. An overview was provided of various training management frameworks, followed by the conceptualisation of the construct of management. The systems approach to management was then discussed, and this was followed by an overview of the project management approach to occupational learning programmes and the various models of quality management. Training evaluation theory as well as evaluation models were outlined. Towards the end of the chapter, a theoretical integration was provided, which included a discussion of the elements of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes. Herewith the literature review research aims have been achieved.

Next is Chapter 4 which deals with the empirical phase of this research.

CHAPTER 4

EMPIRICAL STUDY

This chapter outlines the empirical investigation aimed at describing the sample for this research and the statistical strategies that were employed to achieve its empirical aims. The chapter contributes towards the achievement of the first empirical aim of this research: *to operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable Learning Programme Management and Evaluation (LPME) scale*. The chapter starts with the determination and description of the sample followed by the methods applied during the scale development process. Further, the chapter discusses the methods followed during the exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and inferential statistical analysis. The manner in which validity and reliability of this research was assured is also discussed. The chapter ends with a summary.

4.1 DETERMINATION AND DESCRIPTION OF THE SAMPLE

Polit and Hungler (1999, pp. 43, 232) define a population as the totality of all subjects that conform to a set of specifications, comprising the entire group of persons that is of interest to the researcher and for whom the research results are generated. LoBiondo-Wood and Haber (1998, p. 250), on the other hand, describe a sample as a portion of or a subset of the research population selected to participate in a study, representing the research population. The population for this research was comprised of skills development practitioners (learning managers, skills development providers, learning assessors/moderators) mentors/supervisors of apprentices/learners as well as apprentices/learners.

4.1.1 Sampling procedure

During the initial phase of the empirical study (research scale development), a non-probability, purposive sampling technique was utilised to gain access to respondents who participated in the Expert Review stage of the development of the new measuring instrument. According to Brink and Wood (1998, p. 320), “exploratory design calls for small samples that are chosen through a deliberative process to represent the desired population. Often these individuals are selected to participate in the research based on their first-hand experience of the phenomenon of interest”. The researcher purposefully selected

respondents based on their expertise regardless of their age and cultural background. The sample consisted of 27 respondents who were knowledgeable about the South African skills development system in general and the occupational learning system in particular. Their task was to review a draft measuring instrument in terms of item difficulty, item relevance, item importance and item clarity. The sample was drawn from academia and industry, and also included apprentices/learners as they constitute a key stakeholder in the South African occupational learning context.

During the main phase of the empirical study, a sample of about 900 respondents was drawn from 6 organisations (5 Sector Education and Training Authorities and the South African Board for People Practices) using a probabilistic simple random sampling technique. The 5 SETAs (Financial Services (FASSET); Media, Advertising, Information and Communications Technology (MICT SETA); Insurance Services (INSETA); Health and Welfare (H&WSETA); the Education, Training and Development (ETDP SETA); and the South African Board for People Practices (SABPP)) have a national presence with members across all 9 provinces of South Africa.

The sample was drawn from the databases of these organisations and the target respondents were learning managers/employers, mentors/supervisors, skills development officers/providers, learning assessors/facilitators/moderators as well as learners/apprentices. However, the conjecture was that all sampled participants have adequate knowledge of the South African skills development system including occupational learning programmes. In full view of this, the sample drawn was deemed representative of the study population. Below is a brief description of the sampling techniques employed in both the initial and main phases of this research.

4.1.1.1 Purposive sampling technique

The initial phase of the empirical study employed a purposive sampling technique. According to Fairfax (2003), purposive sampling is a non-probability procedure which requires the researcher to employ his or her own "expert" judgment about who to include in the sample frame. Prior knowledge and research skill are used in selecting the respondents or elements to be sampled. As with all non-probability sampling methods, the degree and direction of error introduced by the researcher cannot be measured and statistics that measure the

precision of the estimates cannot be calculated. The researcher obtains information relevant to and available from only certain groups (Forza, 2002).

4.1.1.2 *Simple random sampling technique*

During the main phase of the empirical study, the researcher employed a simple random sampling technique to select respondents. Simple random sampling is a probability sampling procedure that gives every element in the target population and each possible sample of a given size, an equal chance of being selected (Fairfax, 2003; Schwarz, 2011). As such, it is an equal probability selection method (EPSEM). Random selection from the sampling frame can be done by balloting, using a table of random numbers, or employing a computer (Lwanga, Tye & Ayeni, 1999, p. 73). This technique, like other probability sampling techniques, has some advantages and disadvantages, namely:

a) Advantages

- Because every unit in the population has an equal chance of being included in the sample, the sample is assured of representativity and subject only to sampling error.
- Estimates are easy to calculate.
- It has the advantage of reducing bias.
- It enables the researcher to estimate sampling errors and the precision of the estimates derived through statistical calculations (Fairfax, 2003).

b) Disadvantages

- If the sampling frame is large, this method may be impracticable because of the difficulty and expense of constructing or updating it in large-scale surveys.
- Minority subgroups of interest in the population may not be present in the sample in sufficient numbers for study (Fairfax, 2003).

The next sub-sections discuss the research methods and procedure followed in the current research.

4.1.2 Research methods

As discussed in Chapter 1 (Scientific Background and Contextualisation of the Research), a triangulation of data sources was used for data collection in this research. Krefting (1991) describes triangulation as the comparison of multiple perspectives by using different methods of data collection. An advantage of designing multi-method research lies in the potential for enhancement of the validity of the research findings. According to Polit and Hungler (1999), researchers can be much more confident about the validity of their research findings when such findings are supported by multiple and complementary types of data. In this research, multiple methods of data collection including documents analysis, expert review and questionnaire surveys were used. However, details of the process followed in the development of a questionnaire used in this research are presented in sub-section 4.2.3 in this chapter. Efforts were made to ensure that the new measure complies with the established universal conventions in terms of scientific rigor and psychometric properties, and the processes followed are reported later in this chapter. Next is a discussion of the research procedure applied in this research.

4.1.3 Research procedure

Permission to undertake this research was sought from all 21 SETAs and the South African Board for People Practices (SABPP). The researcher wrote official letters of request for permission to all Chief Executive Officers of the 21 SETAs. Unfortunately, only five of the twenty one SETAs gave permission for the research to be undertaken within their jurisdictions. Permission was also obtained from the SABPP. Once permission to undertake the research was granted, the researcher started the process of planning for sampling and data collection with the respective organisations. Five fieldworkers and a project administrator were appointed to render the data collection service and project management support. Project management support included assistance to the fieldworkers and the researcher, as well as management and capturing of data.

The fieldwork took place in three provinces, that is, Mpumalanga, North West and Gauteng, over a period of 3 months between July and September 2011. The questionnaire distributed to respondents had a cover letter which informed respondents of the purpose and significance of the research, and that their participation is voluntary and at their own consent. Also included in the letter was the time required to complete the questionnaire as well as the

assurance that respondents could discontinue their voluntary participation at any time. The cover letter also assured respondents of their anonymity and the confidentiality of their responses, which would only be used for the purpose of the current research.

In order to ensure a high degree of internal validity between the different fieldworkers, a number of criteria had to be met when appointing fieldworkers (Leedy & Ormrod, 2001, p. 103). Fieldworkers were selected according to the following criteria:

- Tertiary qualification: they were required to have at least a Bachelor's Degree in Human Resource Management (HRM) and knowledge of research methodology. A qualification in HRM provides a broader understanding of training/learning/human resource development issues and this knowledge was important to address questions that respondents might raise.
- The project administrator was required to have some experience with the research process, including logistics management, project management, data management and data capturing.
- A briefing session in which fieldworkers and an administrator were trained on various aspects pertaining to this research was also arranged. In addition, several demonstrations of the data collection procedure and data management were performed with the fieldworkers and the administrator respectively to ensure that they understood the process and complied with the ethical principles. Both the fieldworkers and an administrator demonstrated high level of knowledge and competence, as observed during interactions with the researcher before data collection began.

The reason for conducting physical fieldwork was to try and mitigate the low response rate commonly found in web surveys. The researcher decided to exclude the other 6 provinces from the survey as they were already represented in a web survey. Each of the 6 organisations that participated in the research had members in all 9 provinces of South Africa. A web-version of the research measure was developed thereafter for wider reach of the population. Web respondents were informed of the research and its purpose by their organisations using online newsletters, email and the website. An active web link to the questionnaire was sent to respondents by their organisations along with a covering letter on the organisations' letterheads. The cover letter also stipulated the time frame for the survey, and informed the respondents of their rights to participate and provided assurance of

anonymity and confidentiality. The next sub-section provides a description of the sample used in this research in terms of biographical characteristics.

4.1.4 Characteristics of the sample

As highlighted earlier, the main phase of the empirical study targeted 900 respondents. However, feedback was obtained from 652 respondents, yielding a response rate of about 72.4%. The sample was diverse in terms of age, gender, educational attainment, type of learning programme and occupational profile as reported below.

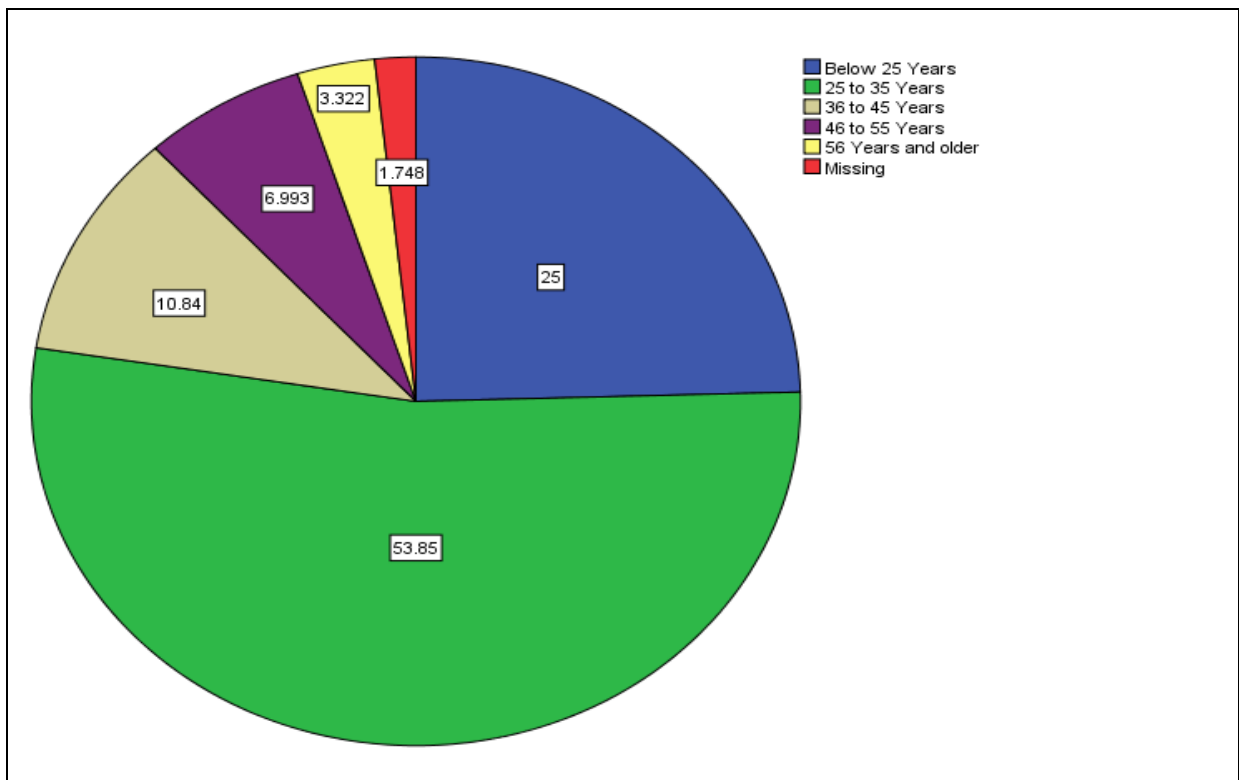


Figure 4.1. Age distribution of the sample

As can be seen in figure 4.1 about 78.8% of the respondents were aged below 35 years with only 3.3% older than 56 years. Thus the majority of respondents in this study were young people in their early career/life stage. These results make sense in view of the phenomenon under inquiry in this research. Learning programmes are targeted towards young people in order to provide them with the requisite work experience.

The gender composition of the sample slightly tilts towards females who constitute about 52.8% of the total sample as shown in figure 4.2. Given the marginal difference between males and females, the sample of this research is about equal in terms of gender.

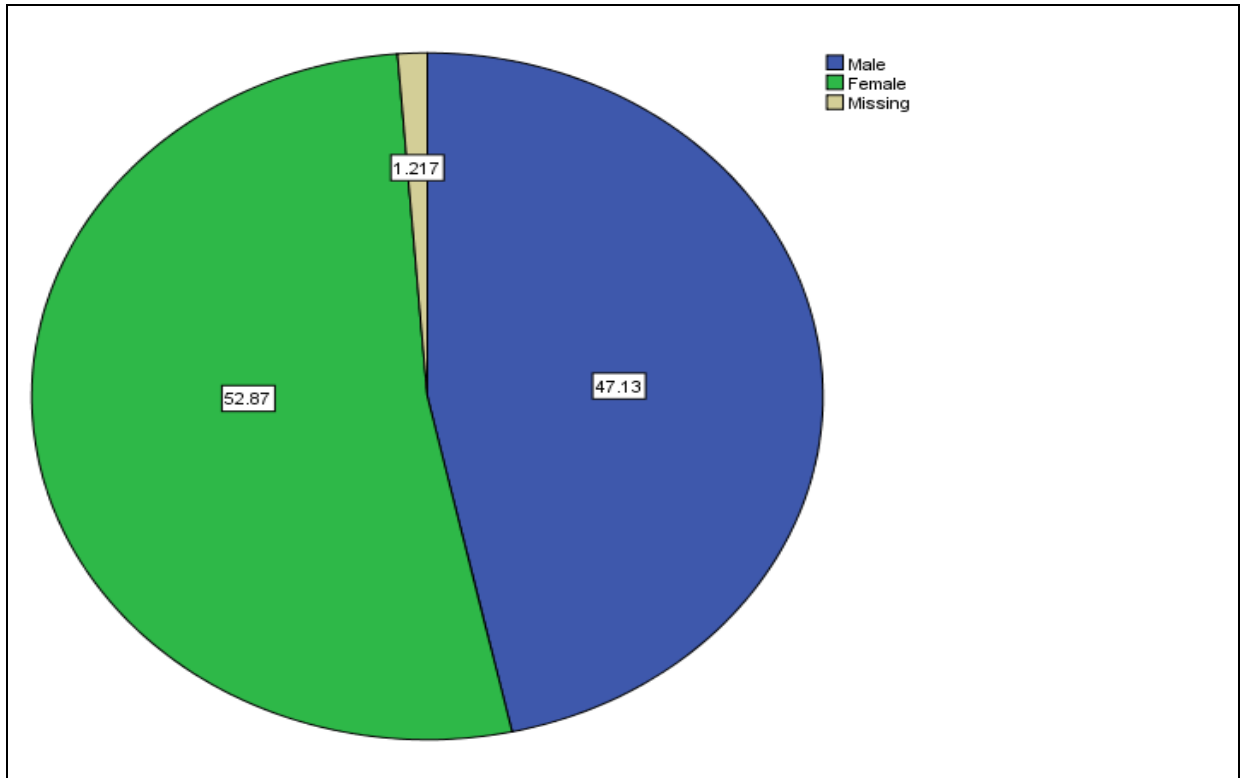


Figure 4.2. Gender composition of the sample

The sample was also analysed in terms of educational achievement and the results are depicted in figure 4.3. The results in figure 4.3 show that the majority of the respondents reportedly have a school leaving certificate (Matric/N3) as their highest qualification. Respondents with a minimum educational achievement of a four year professional/honours degree constitute about 13.9% of the total sample. Based on the total profile of the sample, it could be inferred that this percentage represents skills development officers/providers, assessors/facilitators, mentors/supervisors and employers/managers.

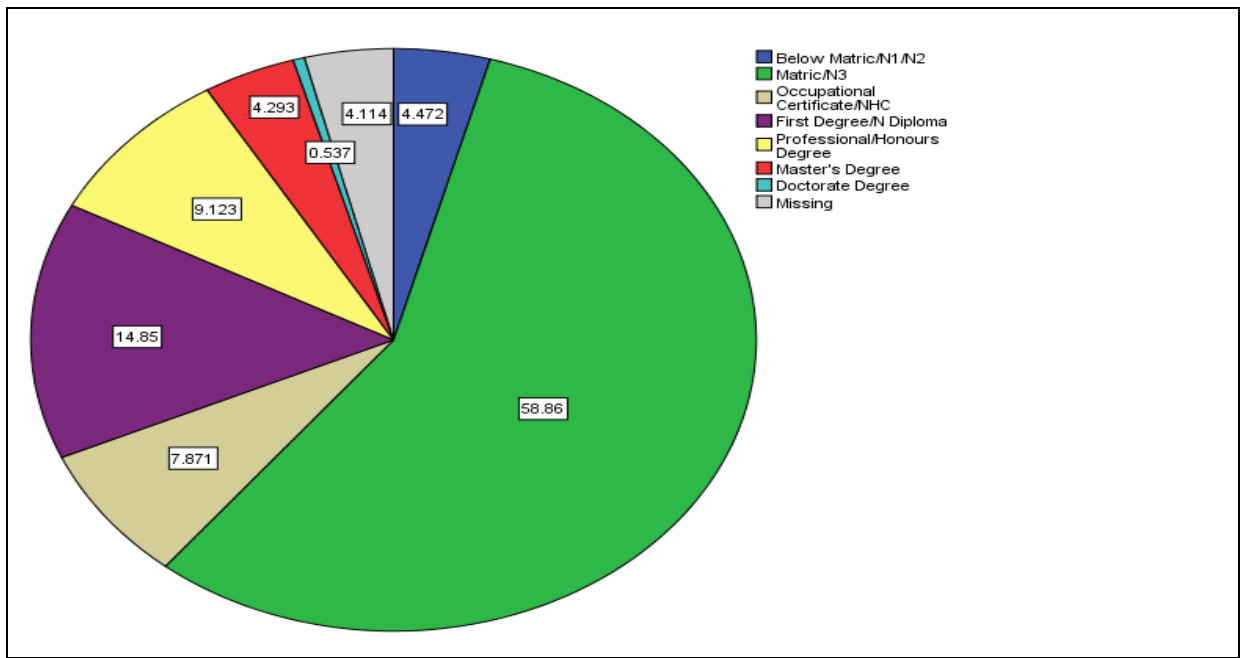


Figure 4.3. Educational achievement of the sample

An analysis was also conducted to determine the representation of respondents in terms of the type of learning programme in which they are/were involved, and the results are shown in figure 4.4.

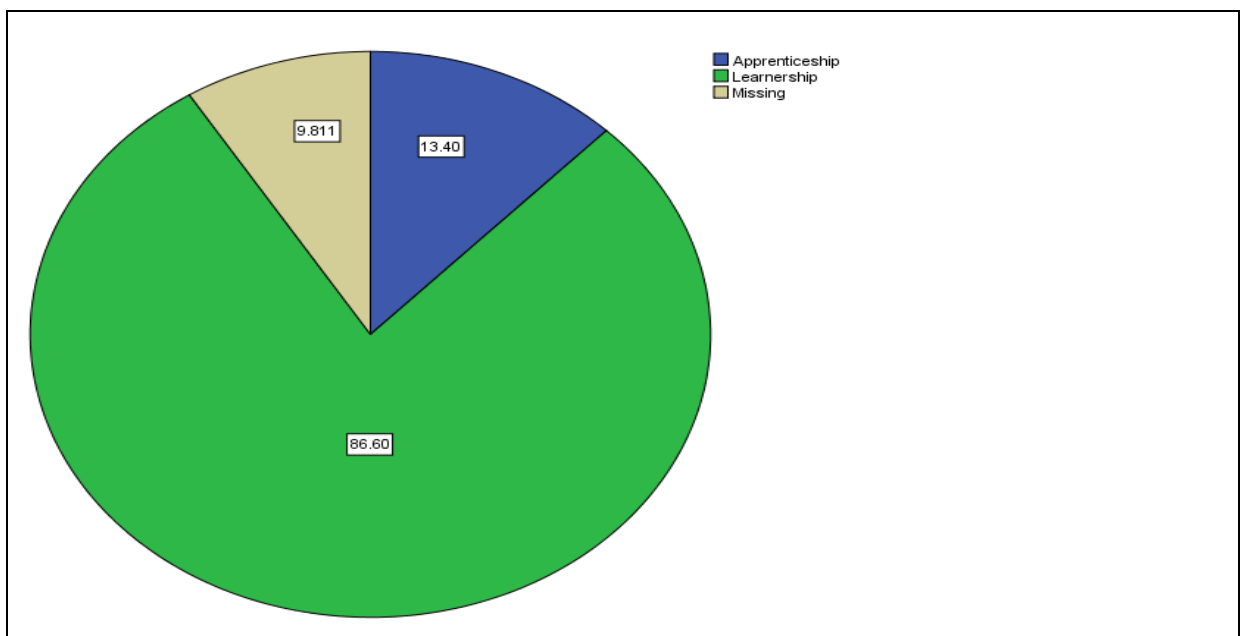


Figure 4.4. Type of learning programme in which respondents were/are involved

The results presented in figure 4.4 show that the majority of the respondents are/were involved in learnership and they constitute about 86.6% of the total sample. This is an interesting result particularly in view of the fact that out of the total population (headcount) of 52 872 representing learnership (43 556) and apprenticeship (9 316) enrolment in 2010, learnerships constituted about 82% (Janse van Rensburg, *et al.*, 2012). Taking this into account, the sample is well balanced and mirrors the target population of this research.

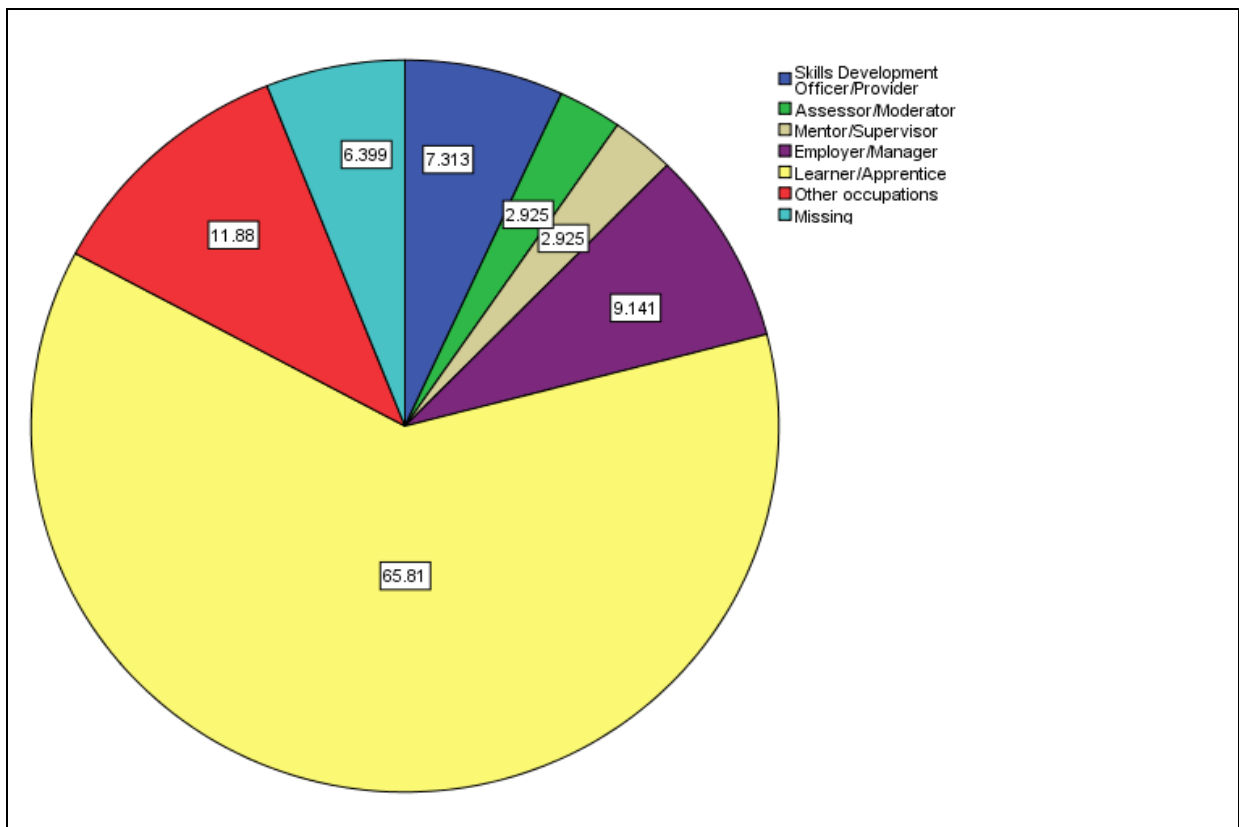


Figure 4.5. Occupational category of the sample

The sample was also analysed in terms of occupational position and the results are presented in figure 4.5. It is evident that the sample was dominated by learners and apprentices who constitute about 65.8% of the total. Only about 22.2% of the total sample is comprised of skills development officers/providers, assessors/moderators, mentors/supervisors, and employers/managers. These results are fairly aligned with the educational achievement of the sample. The next section presents a discussion of the methods and procedures followed during the scale development phase of the research.

4.2 RESEARCH METHOD: PHASE 1 (DEVELOPMENT OF SCALE)

The process that was followed during the scale development phase in this research adheres to the common scale development procedure discussed below.

4.2.1 Scale development procedure

The term “scale” is commonly used to refer to a measurement instrument developed with the purpose of measuring a theoretical phenomenon that cannot be readily observed or assessed directly (DeVellis, 2003). The scale development process is of critical importance and specific steps should be carried out in order for the researcher to construct a reliable and valid measure and to have any confidence in drawing conclusions about the construct(s) being measured. Depending on the exact author referenced, the specific steps in scale development vary in name and number, but the overall categorical functions remain constant (Benson & Clark, 1982; DeVellis, 2003; Gable & Wolf, 1993). Drawing upon the conceptual framework of Benson and Clark (1982), scale development can be broken down into four stages as shown in figure 4.6, namely, planning, construction, evaluation and validation.

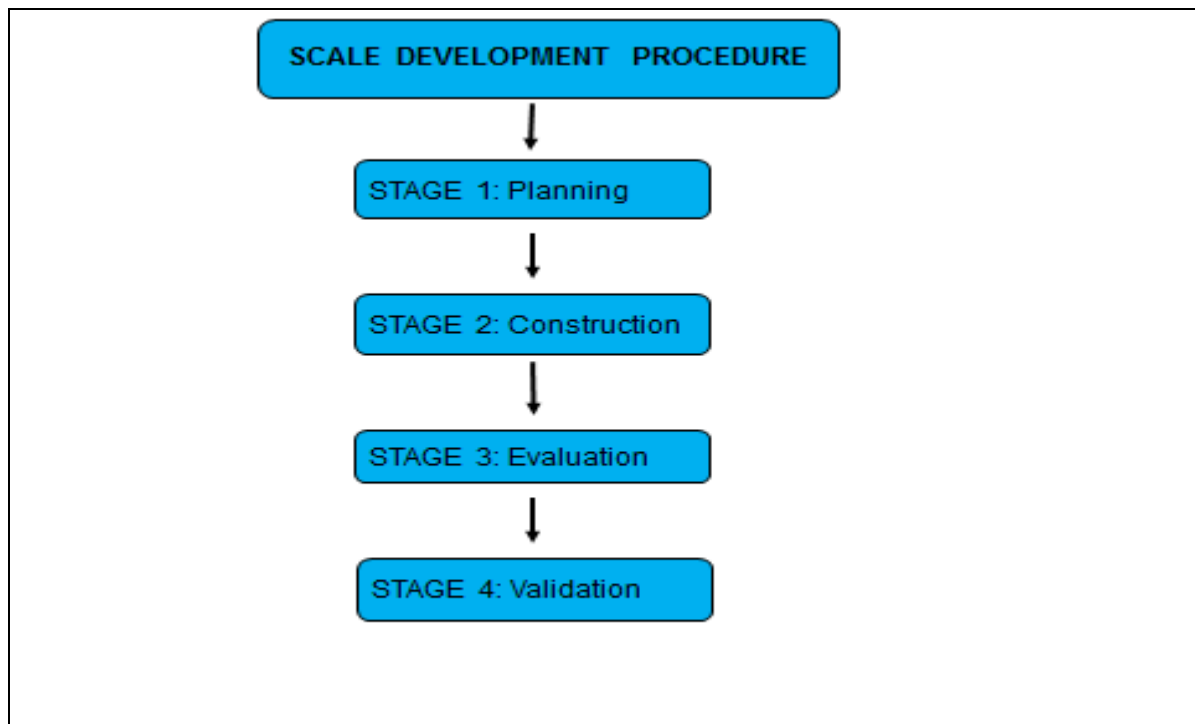


Figure 4.6. Scale development procedure

4.2.1.1 *Planning stage*

The critical steps of the planning stage include clearly identifying the construct to be measured, the determination of the target group for which the measurement is intended, and establishing operational definitions of the construct (Benson & Clark, 1982; DeVellis, 2003). A comprehensive review of literature is important during this stage as it aids in ensuring that an appropriate, reliable and valid instrument for the constructs under investigation does not already exist. The literature review also helps in operationalising the constructs of the research to ensure that the measurable components are clearly spelled out.

4.2.1.2 *Construction stage*

The construction of a new measure begins with listing the specific aims of the measure that pinpoint the purpose of the measure and indicate the content areas to be assessed. Specifying the content areas to be addressed by the aims is necessary but not sufficient for the formulation of aims. With the aims of the measure clearly stated, the writing of items may begin. The critical steps of the construction stage are selecting a response format, generating an item pool, and obtaining content validation (Benson & Clark, 1982; DeVellis, 2003; Gable & Wolf, 1993). The choice of which item response format best suits the intended participants in relation to their age and ability is important. The classical scales of Likert (Likert, 1932), Thurstone (Thurstone, 1928) and Guttman (Guttman, 1944) are generally selected for the development of affective instruments. Since the Likert format is the most commonly used in the development of attitude scales in the social sciences, this format was chosen for application in this research. The draft scale provided for a six-option response which ranged from 'Strongly agree' to 'Strongly disagree'. Thus, the higher the score, the more positive the participant's attitude was presumed to be.

4.2.1.3 *Evaluation and validation stages*

The critical steps of the evaluation and validation stages lead to the development and administration of pilot tests as a means of establishing reliability and validity and selecting items for the final instrument (Benson & Clark, 1982; DeVellis, 2003; Gable & Wolf, 1993). In this research, a pool of experts was used to review the instrument in order to examine the quality of items and to guide the selection of those items that remained in the final version of the instrument.

4.2.2 Conceptualisation of the constructs

Review of the literature aids in formulating an operational definition for the constructs to be measured. When a construct is operationalised, the components necessary to measure it are spelled out (Kerlinger, 1973). The review of the literature also helps to identify the types of items likely to assess the construct as accurately and meaningfully as possible. The main constructs in this research were operationalised as follows:

4.2.2.1 Occupational learning programme

An occupational learning programme in the context of this research is a legally regulated learning programme, which includes a structured work experience component (Van Rooyen, 2009). The programmes which were under investigation in this research are the apprenticeships and learnerships offered within the South African skills development system.

4.2.2.2 Management of occupational learning programmes

In the context of this research, management of occupational learning programmes referred to the process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human and physical) in order to achieve the objectives of an occupational learning programme (Trewatha & Newport, 1976).

4.2.2.3 Evaluation of occupational learning programmes

Occupational learning programme evaluation, as conceptualised in this research, referred to the systematic process of collecting descriptive and judgemental information on the programme's components (e.g. context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcomes (Stufflebeam, 2003). The primary focus of occupational learning programme evaluation is on the utilisation of the evaluation outcomes by the relevant stakeholders in order to improve the programme's effectiveness.

4.2.3 The development of a Learning Programme Management and Evaluation (LPME) scale

Developing valid and reliable measures is a process parallel to that aimed at building and testing a theory. As a result, measures go through a process of developing and testing. The aim is not only to build an instrument to allow theory testing but also to have an instrument that is reusable for other theories as well as for application purposes. The process followed in the development of a new LPME scale is outlined below. However, the empirical results which test the compliance of this new scale to the established psychometric principles (validity and reliability) are reported in Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

4.2.3.1 Item generation

In item generation, the primary concern is content validity, which may be viewed as the minimum psychometric requirement for measurement adequacy and is the first step in construct validation of a new measure (Schriesheim, Powers, Scandura, Gardiner & Lankau, 1993). Content validity must be built into the measure through the development of items. As such, any measure must adequately capture the specific domain of interest yet contain no extraneous content. There seems to be no generally accepted quantitative index of content validity of psychological measures, and judgement must be exercised in validating a measure (Stone, 1978). There are two basic approaches to item development that can be used during item generation. The first is deductive, sometimes called 'logical partitioning', or 'classification from above'. The second method is inductive, known also as 'grouping', or 'classification from below' (Hunt, 1991).

Deductive scale development utilises a classification schema or typology prior to data collection. This approach requires an understanding of the phenomenon to be investigated and a thorough review of the literature to develop the theoretical definition of the construct under examination. The definition is then used as a guide for the development of items (Schwab, 1980). This approach can be used in two primary ways. First, the researchers can derive items designed to tap a previously defined theoretical universe. Secondly, the researchers can develop conceptual definitions grounded in theory, but to then utilise a sample of respondents who are subject matter experts to provide critical incidents that are subsequently used to develop items (Hinkin, 1995, p. 969).

Conversely, the inductive approach is so labelled because there is often little theory involved at the outset as researchers attempt to identify constructs and generate measures from individual responses. Researchers usually develop scales inductively by asking a sample of respondents to provide descriptions of their feelings about their organisations or to describe some aspect of behaviour. Both deductive and inductively generated items may then be subjected to a sorting process that will serve as a pre-test, permitting the deletion of items that are deemed to be conceptually inconsistent. To summarise, the generation of items may be the most important part of developing sound measures (Hinkin, 1995).

In this research, a clear link was established between items and their theoretical domain. This was accomplished by beginning with a strong theoretical framework in Chapter 2 (Skills Development and the Occupational Learning System) and Chapter 3 (Training Management and Evaluation Models), and employing a rigorous sorting process that matched items to construct definitions. This process was succinct and is clearly reported in this chapter.

4.2.3.2 Item development

At this stage of the process the researcher identifies a potential set of items for the construct or constructs under consideration. The next step is the administration of these items to examine how well they confirm expectations about the structure of the measure (Hinkin, 1995). This process includes an assessment of the psychometric properties of the scale which will be followed by an examination of its relationship with other variables of interest.

There has been considerable discussion regarding several important issues in measurement that impact scale development (Hinkin, 1995). The first deals with the sample chosen, which should be representative of the population that the researcher will be studying in the future and to which results will be generalised.

The next issue of concern is the use of negatively worded (reverse-scored) items. Reverse-scored items may be employed primarily to attenuate response pattern bias (Idaszak & Drasgow, 1987). In recent years, however, their use has come under close scrutiny by a number of researchers. Reverse-scoring of items has been shown to reduce the validity of questionnaire responses (Schriesheim & Hill, 1981) and may introduce systematic error to a scale (Jackson, Wall, Martin & Davids, 1993). Researchers have shown that they may result

in an artifactual response factor consisting of all negatively-worded items (Harvey, Billings & Nilan, 1985; Schmitt & Stults, 1985).

The third issue in scale construction is the number of items in a measure. Both adequate domain sampling and parsimony are important to obtain content and construct validity (Cronbach & Meehl, 1955). Total scale information is a function of the number of items in a scale, and scale lengths could affect responses (Roznowski, 1989). Keeping a measure short is an effective means of minimising response biases (Schmitt & Stults, 1985; Schriesheim & Eisenbach, 1990) but scales with too few items may lack content and construct validity, internal consistency and test-retest reliability (Kenny, 1979; Nunnally, 1976). Scales with too many items can create problems with respondent fatigue or response biases (Anastasi, 1976). Additional items also demand more time in both the development and administration of a measure (Carmines & Zeller, 1979). Adequate internal consistency reliabilities can be obtained with as few as three items (Cook, Hepworth, Wall & Warr, 1981) and adding items indefinitely makes progressively less impact on scale reliability (Carmines & Zeller, 1979).

With respect to the fourth issue, scaling of items, it is important that the scale used generates sufficient variance among respondents for subsequent statistical analysis.

The fifth issue is that of the sample size needed to appropriately conduct tests of statistical significance. The results of many multivariate techniques can be sample-specific and increases in sample size may ameliorate this problem (Schwab, 1980). Simply put, if powerful statistical tests and confidence in results are desired, the larger the sample, the better, although obtaining large samples can be very costly (Stone, 1978). As sample size increases, the likelihood of attaining statistical significance increases, and it is important to note the difference between statistical and practical significance (Cohen, 1969). Both exploratory and confirmatory factor analysis have been shown to be particularly susceptible to sample size effects.

Factor analysis is the most commonly used analytic technique for data reduction and refining constructs (Ford, McCallum & Tait, 1986). To summarise, the primary purposes of either exploratory or confirmatory factor analysis in scale construction are to examine the stability of the factor structure and provide information that will facilitate the refinement of a new

measure. Because of the objective of the task of scale development, it is recommended that a confirmatory approach be utilised (Hinkin, 1995). Exploratory techniques allow the elimination of obviously poorly loading items, but the advantage of the confirmatory (LISREL, or similar approaches) analysis is that it allows the researcher more precision in evaluating the measurement model.

Writing items can be a long and tedious process. However, in this research, a large pool of items were written and carefully reviewed by the researcher with the assistance of the research supervisor. The review process was aimed to determine insofar as possible whether the items were clearly stated; whether the items conformed to the selected response format; whether the response options for each item were plausible; and, whether the wording was familiar to the target population. An initial pool of 182 items was generated during this stage based on review of the literature.

4.2.3.3 Item evaluation and refinement

At this stage, the review of the item pool begins. Steps included are content validation and a further qualitative evaluation in which the quality of the items is assessed in relation to the target population. In the content validation stage, a sample comprising 27 skills development experts and apprentices/learners reviewed the pool of 182 items with instructions to assess the face and content validity, to evaluate the relevance of the items to the dimensions they proposed to measure, to assess the importance of the items, to assess the item difficulty level (easy, medium, difficult), and to judge items for clarity. The goal was to obtain a reasonable number of items that would constitute the final draft measure.

Item quality and content relevance for the final draft of the measure were determined based on the strength of the literature and expert reviewers' comments. A decision to retain items for the final draft was made based on the results of expert review regarding item clarity, difficulty, relevance and importance. The results showed a clean ranking of each item in terms of clarity, difficulty, relevance, and importance. All items were consistently ranked and the results ranged from an average of 84.1 to 100 percent overall. However, in view of the fact that an average less than 100 percent demonstrates that not all reviewers agree on the clarity, difficulty, relevance, and importance of some items, the researcher decided that a cut-off point of 96 percent would be appropriate in order to eliminate some items that were not clear, relevant and important in the draft research measure.

Subsequent to this decision, the results of expert review on item clarity, difficulty, relevance, and importance showed that 33 items had an average of 100 percent agreement among experts; 24 items had an average percentage range of between 98.6 and 98.7; 43 items had an average percentage range of between 97.2 and 97.5; and only 9 items had an average percentage range of between 96.0 and 96.3. Consequently, all items below a 96 percent average were eliminated, except for only four best-averaged items below this cut-off point in two dimensions that were included to ensure that each dimension had at least 5 items. Each pair of these four retained items had the highest average percentage below the cut-off point (93.3 and 94.7 respectively) in their respective theoretical dimensions (*i.e.*, the 'Observation' and 'Self-evaluation' dimensions).

In the final analysis of the expert inputs, the revised draft instrument had 113 items in total which were administered to the sample chosen for this research on a 6-point Likert scale, ranging from (1) Strongly Agree to (6) Strongly Disagree. All items were classified into the appropriate dimension and each dimension had at least 5 items. As Benson and Clark (1982) state, an instrument is considered to be content valid when the items adequately reflect the process and content dimensions of the specified aims of the instrument as determined by expert opinion.

4.3 RESEARCH METHOD: PHASE 2 (ITEM EVALUATION WITH EXPLORATORY FACTOR ANALYSIS)

Below is a description of the research method followed during the exploratory phase of this research. Both the SPSS (Version 20) (IBM, 2011) and Winsteps (Version 3.70.0) (Linacre, 2010) software were used respectively to measure the adequacy of the sample, to determine the factor structure of the construct and to evaluate the psychometric properties of the new LPME scale, including the fitness of the data for the Rasch model.

4.3.1 Exploratory factor analysis (EFA)

Exploratory factor analysis (EFA) is a widely utilised and broadly applied statistical technique in the social sciences (Costello & Osborne, 2005). EFA is used to identify the underlying factors or latent variables for a set of variables (Harrington, 2009). The analysis accounts for the relationships (*i.e.*, correlations, covariation, and variation) among the items (*i.e.*, the observed variables or indicators). It is based on the *common factor model*, where each

observed variable is a linear function of one or more common factors (*i.e.*, the underlying latent variables) and one unique factor (*i.e.*, error or item-specific information). It partitions item variance into two components: common variance, which is accounted for by underlying latent factors; and *unique* variance, which is a combination of indicator-specific reliable variance and random error.

Exploratory factor analysis is often considered a data-driven approach to identifying a smaller number of underlying factors or latent variables (Harrington, 2009). It may also be used for generating basic explanatory theories and identifying the underlying latent variable structure; however, CFA testing or another approach to theory testing is needed to confirm the EFA findings (Haig, 2005). EFA may be used as an exploratory first step during the development of a measure, and then CFA can be used as a second step to examine whether the structure identified in the EFA works. In other words, CFA can be used to confirm the factor structure identified in the EFA.

4.3.1.1 *Diagnostics tests*

A Kaiser-Meyer-Olkin test and the Bartlett's Test of Sphericity were computed as part of the exploratory factor analysis. Kaiser-Meyer-Olkin (KMO) is a measure of how much the items have in common. A KMO value closer to 1 indicates that the variables have a lot in common. The suggested minimum value that is acceptable for further analysis is .60 (Tabachnick & Fidell, 2001). The Bartlett's Test of Sphericity was also conducted to test the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all the diagonal elements are 1 and off-diagonal elements are 0. The Bartlett's Test of Sphericity is significant at $p \leq .05$. The results of these tests are presented in Chapter 5 (Research Results: Exploratory Factor Analysis).

4.3.1.2 *Establishing the factor structure of the LPME scale*

The development of a new valid and reliable Learning Programme Management and Evaluation (LPME) scale conforms to multi-attribute utility theory and has demonstrated adequate structural independence between the dimensions included in the measure to avoid illogical corner states (*i.e.*, dimensions are orthogonal) as reported by Brazier, Ratcliffe, Tsuchiya and Solomon (2007) and Feeny (2002). One technique used in the current research to identify structurally independent dimensions was factor analysis (Chatfield &

Collins, 1980). The dimensions of the measure were identified using exploratory factor analysis and were individually analysed using SPSS (Version 20) (IBM, 2011) and Winsteps (Version 3.70.0) (Linacre, 2010) software.

Three basic decision points were considered during this analysis, namely: (a) the choice of an extraction method, (b) the choice of a rotation method, and (c) a decision regarding the number of factors. Thus, the researcher had to decide on the extraction method, the rotation method and the number of factors to retain for further analysis. A Principal Component Analysis (PCA) was conducted on all 113 items of the draft measure to establish its dimensional structure.

A PCA is a data reduction technique used to identify a smaller number of underlying components in a set of observed variables or items. It accounts for the variance in the items, rather than the correlations among them (Harrington, 2009). Costello and Osborne (2005) warn that both over-extraction and under-extraction of factors retained for rotation can have a deleterious effect on the results.

The next decision was rotation method. The goal of rotation is to simplify and clarify the data structure (Costello & Osborne, 2005). There are many different types of rotations that can be used. There are orthogonal rotation methods such as varimax, quartimax and equimax which impose the restriction that the factors cannot be correlated, and oblique methods such as direct oblimin, quartimin and promax which allow the factors to correlate (Costello & Osborne, 2005). However, in this research a varimax rotation was used as a method for data analysis. This method is by far the most common choice (Costello & Osborne, 2005).

The last decision was to decide on the number of factors to retain for further analysis. The size of eigenvalue units and the number of items that loaded adequately in each factor were considered for the retention of items. An eigenvalue cut-off of 1.45 units was used to establish the number of principal component factors following recommendations in the literature as to the minimum number of items required in each factor. All items with a factor load of at least 0.40 were considered for inclusion in each factor and each factor had to have a minimum of four items. About 19 strong factors with an eigenvalue unit greater than 1 were extracted. However, only 11 factors of the 19 extracted were considered for further analysis after meeting the criteria outlined above (See Chapter 5: Research Results: Exploratory

Factor Analysis). Table 4.1 depicts a summary of parameters followed during the EFA phase of this research.

Table 4.1

Summary of Parameters used during the Exploratory Factor Analysis (EFA)

Measure/procedure	Parameters	Source (s)
Sample size	50 is very poor; 100 is poor; 200 is fair; 300 is good; 500 is very good; and 1000 or more is excellent.	(Tabachnick & Fidell, 2001)
Kaiser-Meyer-Olkin	Minimum acceptable value for EFA ≥ 0.60	(Tabachnick & Fidell, 2001)
Bartlett's Test of Sphericity	Significance $p \leq .05$.	(Tabachnick & Fidell, 2001)
PCA Factor load	Minimum load of $\geq .3$	(Tabachnick & Fidell, 2001)
	Minimum of 3 items per factor	(Costello & Osborne, 2005)

4.3.2 RASCH modelling technique

After the EFA factor extraction process, Rasch modelling was conducted using Winsteps software (Version 3.70.0) (Linacre, 2010). Winsteps software first uses a normal approximation algorithm to obtain initial estimates of model parameters and uses these initial estimates for iterative Joint Maximum Likelihood Estimation (Linacre, 2005). The iterative process stops once convergence criteria are reached. A Rasch model is a probabilistic mathematical model which provides estimates of person's ability and item difficulty along a common measurement continuum, expressed in log-odd units (logits). It focuses on constructing the measurement instrument with accurateness rather than fitting the data to suit a measurement model (Hamzah, Khoiry, Osman, Hamid, Jaafar & Arshad, 2009). This model was used in this research to examine the psychometric properties of the newly developed Learning Programme Management and Evaluation (LPME) scale.

A logit is the natural log-odds of a participant being successful at a task versus being unsuccessful. The average item measure on the logit scale is arbitrarily set at zero. A negative item logit indicates that the item requires a lower level of ability than the average (*i.e.*, the item is relatively easier) (Pesudovs, Wright & Gothwal, 2010). The measures on the Rasch model are linear. For example, a person with the ability of 4 logits has three times

more ability than a person with the ability of 2 logits. The linearity of the measure is very important, because meaningful arithmetic operations can only be performed with linear measures, thus enabling comparisons and statistical studies (Planinic, Ivanek & Susac, 2010).

The Rasch model parallels physical measurement processes by being largely concerned with the construction of linear measures along specific unidimensional constructs (Planinic *et al.*, 2010). The item and person parameters are freed from the distributional properties of incidental parameters when the data fit the model expectations. If the data fit the model, the logit continuum is on an interval scale, making the estimates appropriate for parametric statistical analysis. Greater logit values for items indicate increasing item difficulty (Fendrich, Smith Jr, Pollack & Mackesy-Amiti, 2009). This model is intended for the development and examination of measurement instruments. By disclosing anomalies in the data that often have to be addressed qualitatively, the Rasch model bridges the gap between research methods representing partly different epistemological traditions.

A unique feature of the Rasch model is, however, that it provides measurement that is not dependent on the distribution of the persons, given that the data fit the model (Andrich, 1988). This also implies that no assumptions about the person distribution have to be made. The measurement requirements underpinning the Rasch model also connect to additive conjoint measurement, a concept with roots in mathematical psychology (Luce & Tukey, 1964; Perline, Wright & Wainer, 1979). The Rasch model was useful in this research for overall consideration of response category ordering, reliability and separation indices analysis, person-item targeting, goodness of fit, unidimensionality, and analysis for bias. At each step the data, response structure and targeting were checked for fit to the Rasch model. Applying the Rasch model started with calibration of items, and examined the overall estimates of the model parameters (Smith, 2001). Presented below is a brief description of the aspects that were examined for model fitness in this research using Rasch Modelling.

4.3.2.1 Response category ordering

The first step was to examine the performance of the response categories (Linacre, 1999). Response category ordering examines the extent to which an item with ordered response categories displays thresholds as the points at which responses to adjacent categories are

equally likely to occur. Items in which respondents have difficulty distinguishing between item levels are not desirable in new instrument development. If items are correctly ordered, then respondents should be able to distinguish between different levels of responses. Therefore, categories should follow the intended hierarchy; that is, they should demonstrate a stepwise change in ability level from category to category (e.g., strongly agree should represent a higher level of perception than agree). Should evidence of disordering emerge, then the response levels must be merged and the Rasch model refitted using the merged levels. The merging process must be repeated until all the items are ordered (Young, Yang, Brazier & Tsuchiya, 2011). The aim of this research was to develop a valid and reliable measure for the effective management and evaluation of occupational learning programmes. As a result, response categories were examined in the current research, and no evidence of under usage, infrequent usage or disorder was found in the data. Consequently, no response categories were collapsed and merged.

4.3.2.2 Person/item separation and reliability

Person and item separation and reliability of separation assess instrument spread across the trait continuum (Green & Frantom, 2002). Separation measures the spread of both items and persons in standard error units. It can be thought of as the number of levels into which the sample of items and persons can be separated. For a measure to be useful, separation should exceed 1.0, with higher values of separation representing greater spread of items and persons along a continuum. Larger person/item separation indicates higher precision, meaning more distinct levels of function can be distinguished (Mallinson, Stelmack & Velozo, 2004).

Lower values of separation indicate redundancy in the items and less variability of persons on the trait. If separation is 1.0 or below, then this may indicate that the items do not have sufficient breadth in position (Green & Frantom, 2002). In that case, it might be wise to reconsider what having less and more of the trait means in terms of items agreed or disagreed with, and on revision, add items that cover a broader range. An exception to this occurs if a measure is used to make dichotomous decisions. It is typical to find larger separation values for items than for persons, a function of the fact that researchers often work with a small number of items and a larger number of people, in case of the current research, 113 items and 652 respondents. Separation is affected by sample size, as are fit indices and error estimates. With larger sample sizes, separation tend to increase and error

decrease (Green & Frantom, 2002). Reliability of person separation was used in this research to demonstrate whether respondents were being adequately separated by items along the continuum representing the construct, as well as provide an indication of replicability for person placement across other items measuring the same construct. Equally important, the reliability of item separation was also examined to ensure that the measure adequately separates the people in terms of their ability. Rasch analysis provides internal consistency reliability estimates for both persons and items ranging from .0 to 1.00 (Fendrich *et al.*, 2009).

Conceptually, Rasch person reliability is analogous to Cronbach Alpha/KR 20 in the classical test theory in terms of interpretation and calculation (Smith, 2001). A cut-off point $\geq .70$ is considered acceptable (Kline, 2005; Polit & Beck, 2004). Rasch item reliability is an important aspect for construct validation as it indicates the spread of items along the continuum of interest. A spread of items is required to form a well-defined variable for interpretation (Smith, 2001).

4.3.2.3 *Person/Item targeting*

In addition to the two measurement properties described above, the Winsteps program enables item difficulty and person ability to be visualised along a linear scale (like a ruler), which is known as a person-item map (Gothwal, Wright, Lamoureux & Pesudovs, 2009). Such a map can be used in 3 ways; that is, to determine (i) the extent to which item positions match person positions (targeting) (if positions do not line up, items are likely inappropriate (e.g., too easy or too hard) for the persons); (ii) whether there are gaps in the measure, which if present indicate the need for more items; (iii) an item hierarchy, which provides information about the most and least difficult items and more and less able persons. Person-item mapping was conducted in this research and the results are presented in Chapter 5 (Research Results: Exploratory Factor Analysis). However, Mallison *et al.* (2004) suggest that for the successful construction of a valid and reliable measure, there must be adequate spread along its dimensions with negligible floor and ceiling effects.

4.3.2.4 *Goodness of fit and unidimensionality*

The next step was to check the overall goodness-of-fit statistics and unidimensionality of the measure, since testing for item fit forms one of the assessments of unidimensionality.

Unidimensionality refers to the capacity of the instrument to measure the specific attributes or underlying traits. The overall goodness-of-fit of the Rasch model is measured in terms of item-trait (in this case the LPME scale) interaction and the person and item fit residuals. The item-trait interaction measures whether data fit the Rasch model for discrete groups of respondents and are summarised using the test statistic. A well-fitting Rasch model should have no deviation between the observed and expected responses, and therefore the convention is that the p value for the overall model statistic should be greater than .01 ($p \geq .01$) for a well-fitting model (Kubinger, 1995).

Because the Rasch model is probabilistic and not deterministic, some failure of the model to predict the observed values is expected. In this regard, two statistics are used to represent these deviations: infit mean square (information-weighted fit statistic) and outfit mean square (outlier-sensitive fit statistic). The desired mean square value as expected by a Rasch model for both infit and outfit statistics is 1.0 (Bond & Fox, 2007; Linacre, 1994). Fit statistics, the infit and outfit, help detect discrepancies between the data and Rasch Model expectation. Only when a test fits the model expectation, can it be considered as having the property of fundamental measurement (Khairani & Nordin, 2011).

The infit statistic is more sensitive to unexpected responses to items near the respondents' ability level as predicted by their overall pattern of responses, while the outfit statistics is more sensitive to unexpected responses far away from the respondents' ability level. Because outfit score is less threatening to measurement and easy to manage (Linacre, 2002), infit scores are typically considered more informative (Bond & Fox, 2001). Consequently, the researcher used infit statistics to assess the fit of items to the Rasch model and the unidimensionality of the measure.

Fit statistics can be reported as mean-square standardised residuals (MNSQ) or standardised z scores ($Zstd$) for each item of the measure. In the current research, the researcher has used MNSQ over $Zstd$ because the latter is sample size dependent such that misfit is exaggerated in large sample sizes (Karabatsos, 2001; Linacre, 2003). Misfitting items were traced by infit MNSQ values outside the range of .6 and 1.4 (40% more or less variance than expected) (Linacre, 1994; Bond & Fox, 2007). Values below .6 indicate redundancy, while values beyond 1.40 show the presence of 'noise'. However, it is worth mentioning that fit statistics alone may be inadequate to determine dimensionality. A

principal component analysis (PCA) of the residuals (observed minus expected scores) must be performed as confirmation of dimensionality (Linacre, 2009; Smith, 2002).

In the PCA, the proportion of variance explained by the Rasch measure should be comparable for empirical calculation as well as that explained by the model (Bond & Fox, 2001). A high level of variance explained by the principal component indicates that there is a very low possibility of finding additional components. In addition, an eigenvalue less than 2.0 of the unexplained variance explained by the first contrast (Linacre, 2009) must be considered.

A contrast is considered to be evidence of multidimensionality if it had the strength of at least two items (as measured by eigenvalue units ≥ 2.0), as this is greater than the magnitude seen with random data. According to Reckase (1979), the variance explained by the first contrast should be greater than 20% to demonstrate unidimensionality of a measure.

4.3.2.5 *Test for bias*

It is prudent to examine a new measure in order to establish the presence of bias. This is because a number of factors may influence respondents to react to items of a measure in a particular way. The researcher has used Differential Item Functioning (DIF) to assess the presence of bias among respondents. Factors considered include age, gender, education level, type of occupational learning programme and type of occupation.

DIF concerns the expectation that respondents who are in different groups (e.g., male versus female) but have equal levels of ability would have the same probability of selecting a particular response (Holland & Wainer, 1993; Teresi, 2006). The definition of DIF was based on magnitude as follows: insignificant DIF, $<.50$ logits; mild (but probably inconsequential), between $.50$ and 1.00 logits; and notable, ≥ 1.00 logits (Wright & Douglas, 1975; 1976). Table 4.2 depicts a summary of the parameters of the statistical tests used in Rasch modelling.

Table 4.2

Summary of Parameters for Measures used in RASCH Modelling

Statistical procedure	Parameters	Source (s)
Person/item separation	Separation ≥ 1.0 (greater spread of items and persons along a continuum)	(Green & Frantom, 2002)
Reliability	Cut off point $\geq .70$	(Kline, 2005; Polit & Beck, 2004)
Goodness of fit	Values $\geq .6 \leq 1.4$ Values $\leq .6$ indicated redundancy, while values ≥ 1.40 show the presence of 'noise'.	(Linacre, 1994; Bond & Fox, 2007)
Unidimensionality	First contrast eigenvalue unit ≤ 2.0 Eigenvalue units ≥ 2.0 indicate multidimensionality.	(Linacre, 2009)
Differential Item Functioning (DIF)	Insignificant DIF, $\leq .50$ logits; Mild (but probably inconsequential), $\geq .50 \leq 1.00$ logits; and Notable, ≥ 1.00 logits	(Wright & Douglas, 1975; 1976)

The next section discusses the methods used during confirmatory factor and inferential analyses in the current research.

4.4. RESEARCH METHOD: PHASE 3 (CONFIRMATORY FACTOR ANALYSIS)

Confirmatory factor analysis (CFA) is a confirmatory technique that is theory-driven (Schreiber, Stage, King, Nora & Barlow, 2006). This technique is similar to structural equation modelling (SEM). In the current research, CFA was employed to test the factorial structure of the LPME scale extracted from EFA. A structural equation modelling and multi-group test for structural equivalence were computed as part of CFA. The planning of the CFA analysis was driven by theoretical relationships among the observed and unobserved variables. The CFA analysis is used for four major purposes:

- (1) Psychometric evaluation of measures;
- (2) Construct validation;
- (3) Testing method effects; and
- (4) Testing measurement invariance (e.g., across groups or populations) (Brown, 2006).

The CFA technique basically deals with the assessment of the relationship between a construct and its indicators (Maiyaki, 2012). It can be used to validate the scale being adapted or adopted, because it is important that the measurement of each variable is psychometrically sound (Byrne, 2010). Even with established scale, there is still a need to confirm the validity and unidimensionality in a particular context of study (Hair, Black, Babin & Anderson, 2010). Once these are confirmed, there would be much confidence in the findings derived from the structural model. Unlike EFA, CFA requires pre-specification of all aspects of the model to be tested and is more theory driven than data-driven. However, prior to the CFA, data were checked for missing values, outliers and multicollinearity as described below:

- (2) Missing data can decrease power and bias standard errors and loading coefficients (Allison, 2003). If extensive data are missing for certain variables, the data should be examined to determine if the data are missing at random or if there is a pattern to the missing data based on some other factor. Full information maximum likelihood estimation of missing values was used instead of listwise deletion. This method of replacing missing values produces the least bias, by maintaining the mean and variance of the original data (Holmes-Smith, Coote & Cunningham, 2004).
- (3) Univariate outliers are defined as cases with an 'extreme' value on a single variable (Kline, 2005). There is no absolute definition of 'extreme'; however, a common rule of thumb is that scores more than three standard deviations away from the mean are considered to be 'extreme' outliers (Kline, 2005). The subsequent analyses such as Structural Equation Modelling (SEM) are sensitive to the effects of extreme outliers as covariance matrices are negatively influenced (Bollen, 1989; Kline, 2005). However, in this research, no extreme cases were found on any of the individual items.
- (4) Multicollinearity is defined as bivariate correlations between variables that are extremely high, $r \geq .85$, (Bollen, 1989) or $r \geq .90$ (Maiyaki, 2012; Tabachnick & Fidell, 2007). This results in increased standard errors and unstable loading coefficients among the multicollinear variables (Bollen, 1989; Tabachnick & Fidell, 2001). Utilising indicators which are highly correlated, breaks an underlying assumption of SEM that indicators used for measurement are independent. Assessing for highly correlated indicators is critical in SEM given the use of latent variables formed through combining

multiple indicators to measure a single concept (Kline 2005; Garson, 2009). All correlation values in the current research were found to be within an acceptable range.

In the current research, CFA was undertaken using Statistical Package for Social Sciences (SPSS - Version 20) (IBM, 2011) and Analysis of Moment Structure (AMOS - Version 20) (Arbuckle, 2011). The overall purpose was to confirm the dimensional structure of the LPME scale and to test its reliability coefficients. The processes, procedures and parameters applied in this research to ensure the reliability of the LPME scale, to test for structural model fitness, to assess the validity of the overall research process and its findings are described below:

4.4.1 Reliability analysis

Scale reliability is defined as the proportion of variance in participants' scores on an instrument due to true differences in their scores (Polit & Beck, 2004). Reliability reflects the consistency of items over time, tests, and groups (Kline, 2005; Nunnally & Bernstein, 1994). The internal consistency method uses various algorithms to estimate the reliability of a measure from measure administration at one point in time (Forza, 2002). It assesses the equivalence, homogeneity and inter-correlation of the items used in a measure. This means that the items of a measure should hang together as a set and should be capable of independently measuring the same construct.

The most popular test within the internal consistency method is the Cronbach coefficient alpha (Cronbach, 1951). Nunnally (1978) states that newly developed measures can be accepted with $\geq .60$, otherwise $\geq .70$ should be the threshold (Kline, 2005; Polit & Beck, 2004). With a coefficient $\geq .80$ the measure is very reliable (Nunnally, 1978). In the current research, internal consistency coefficients (Cronbach's alpha) were calculated for the LPME scale, and its subscales and items, and the results are presented in both Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). However, the following aspects were carried out to ensure the reliability of this research and its findings:

- The researcher started this project with a definite aim 'to identify and conceptualise the elements and dimensions of a holistic and integrated theoretical model, and to develop

and refine a measurement scale for the effective management and evaluation of occupational learning programmes on the South African skills development context.

- The research has a good theoretical base and a sound methodological plan both of which are necessary for the collection of the right kind of information and for appropriate interpretation.
- Respondents were requested to give consent for their participation and were informed of the option to discontinue their participation at any time.
- Permission to conduct the research was sought from the target organisations.
- The draft LPME measure was subjected to a review process by experts in the field.
- Appropriate statistical techniques that are congruent with the aims of this research were used to analyse data.
- Exploratory factor analysis was conducted on the data to determine the factor structure and the sub-scale dimensions of the new measure and the results are presented in Chapter 5 (Research Results: Exploratory Factor Analysis).
- The new LPME scale was rigorously scrutinised for compliance with the psychometric requirements (*e.g.*, Rasch analysis, Cronbach Alpha test for consistency) and the results are presented in both Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).
- The methodology and design used in this research allow for application of the research findings in other relevant contexts.
- The research design applied in this project makes it possible to repeat the study exactly. If the results of the replication studies are the same again and again the conjectures will not be supported merely by chance.
- The findings of this research show precision and demonstrate how close the research is to 'reality' and to the probability that the researcher's assumptions are correct.
- The findings of this research are such that the data supports the researcher's conjectures or hypotheses developed after a careful study of the problem situation.
- The conclusions drawn through the interpretation of the findings are based on facts resulting from the actual data and not on the researcher's own subjective or emotional values.
- The researcher evaluated person fit statistics and the item difficulty hierarchies for the LPME scale and all its sub-scales developed and used in this research.

- Relevant support for possible extrapolation of findings was obtained from estimates of internal consistency reliability for the scale, subscale and items as reported in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

The next sub-section discusses the methods followed during structural equation modelling in the current research.

4.4.2 Structural equation modelling

Structural equation modelling (SEM) analysis technique was used within a framework of confirmatory factor analysis to analyse the strength of the relationships between each of the sub-scale dimensions of the LPME scale. SEM takes into account the modelling of interactions, nonlinearities, measurement error, correlated error terms, and multiple latent independents, each measured by multiple indicators, and one or more latent dependents also each with multiple indicators (Shah, 2012). AMOS software (Version 20) was used to test the hypothesised model (Arbuckle, 2011). To meet the several assumptions required by structural equation modelling, the data were checked for missing data, outliers, univariate and multivariate normal distributions, multicollinearity and reliability as reported earlier in this section.

4.4.2.1 Structural Equation Modelling Analysis

To analyse the strength of the relationships between each of the variables presented in the proposed theoretical model presented in Chapter 3 (Training Management and Evaluation Models), structural equation modelling (SEM) analysis techniques were used. SEM was selected as an appropriate technique in this research for the following reasons, namely:

- (1) SEM is a multivariate technique, used in the building and testing of theoretical models, that simultaneously estimates relationships between independent variables and dependent variables (Ullman, 1996).
- (2) Unlike other traditional multivariate techniques, SEM has the ability to model constructs as latent variables, allowing measurement error to be captured in the model and controlled for in the analysis (Baron & Kenny, 1986; Hoyle & Smith, 1994). SEM can accommodate the bias in the estimates due to the measurement error associated

with imperfect measures by using multiple indicators for all latent variables. As a result, SEM can provide more precise parameter estimates and increased statistical power.

- (3) SEM estimates indirect effects as well as direct effects among latent variables that allow for the estimation of the total effect. The path diagram in the SEM helps to clearly present the direction of each effect and the covariances among all variables in one complete picture (Hair, Anderson, Tatham & Black, 1998; Kline, 1998). The two-step approach to SEM was employed in this study, which involves first evaluating the measurement model and then evaluating the structural model (Anderson & Gerbing, 1998).

The structural equation model specifies the relationships among the latent variables, and describes the causal effects and amount of unexplained variance (Chavance, Escolano, Romon, Basdevant, de Lauzon-Guillain & Charles, 2010). The latent variables could be either endogenous or exogenous, and each has its own measurement equation. While exogenous latent variables act only as predictors or causes for other latent variables in the structural model, endogenous latent variables are the dependent or outcome variables in at least one causal relationship. The structural equation model uses the covariance and variances of the factors to estimate a causal system of relationships among them. All dimensions of the LPME scale were modelled as a manifest variable and measured by a single indicator (group of items).

4.4.2.2 Structural equation modelling procedure

The structural equation modelling procedure generally consists of four steps (Oort, Visser & Sprangers, 2004, pp. 600-601) as depicted in Figure 4.7 and discussed below.

a) Step 1: Model specification

The specification of the theoretical model is done either as a set of equations, or as a diagram (see figure 6.2 in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses)). Error terms are assigned to each endogenous variable. The line from the error term to the endogenous variable represents the combined effects of all the causes of that variable that are not being studied. In structural equation modelling with AMOS, it is necessary to initially assign an arbitrary value to a regression weight associated with the

error term. This allows the measurement scale to be set. By setting the paths from each error term to 1 initially allows for the model to be identified and the variance coefficients of the error terms to be determined (Arbuckle & Wothke, 1999; Garson, 2009).

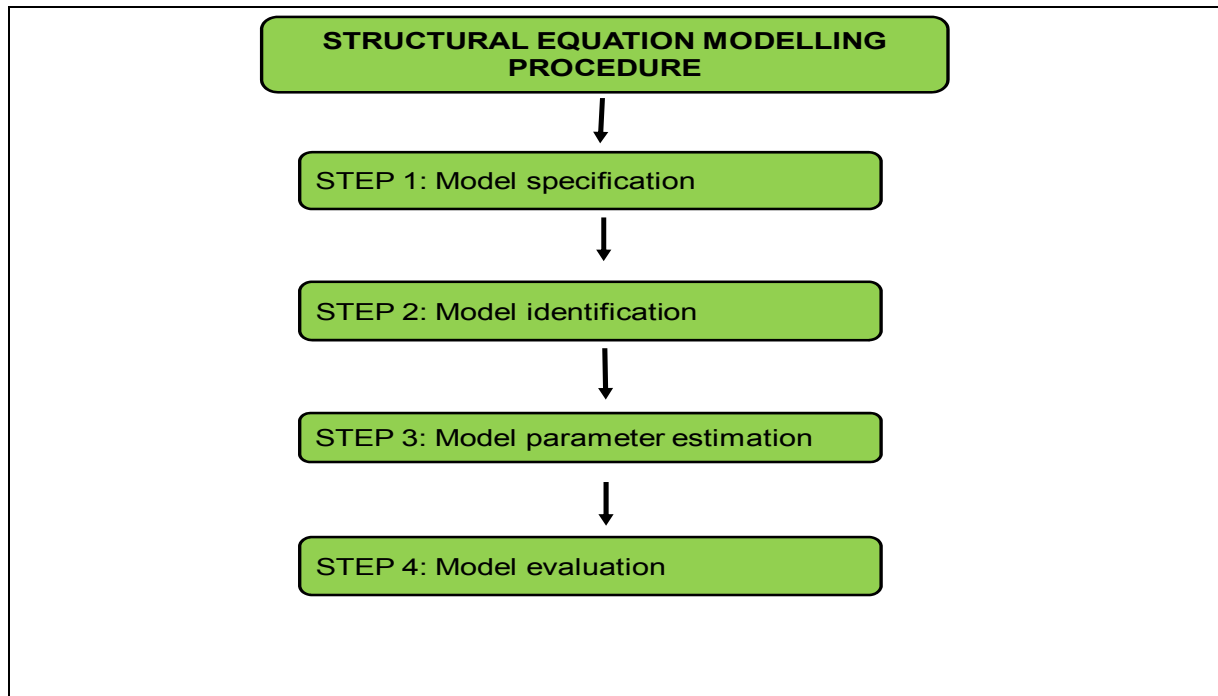


Figure 4.7. Structural equation modelling procedure

b) Step 2: Model identification

The identification of the model is done to ensure that the model can be estimated using the observed data. A model is said to be identified if it is theoretically possible to calculate a unique estimate of every one of its parameters (Kline, 1998). That there are at least as many observations as model parameters is a basic requirement for identification. An overidentified model is optimal with the number of 'knowns' (observed variable variances and covariances) being greater than the number of 'unknowns' (parameters to be estimated). For an overidentified model, the difference between observations and estimated parameters should result in degrees of freedom greater than zero (Kline, 2005; Pedhazur & Schmelkin, 1991). Thus, in AMOS software output, the listing for degrees of freedom (*df*) for model Chi-Square (χ^2) is a measure of the degree of overidentification of the model. Further information on this aspect is presented in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

c) Step 3: Model parameter estimation

The model parameters are estimated using AMOS. Estimation of the model fit yields values which indicate how well the model fits the data overall (fit statistics) as well as parameter estimates which indicate the strength of the hypothesised relationships between variables. Using the parameters of the estimated model, the correlations or covariances between measured variables are predicted, and compared to the observed correlations or covariances (Kenny, 1998).

d) Step 4: Model evaluation

This step involves the evaluation of overall model fit. AMOS generates goodness of fit measures for three versions of the structural model. The saturated model which is the fully explanatory model with as many parameter estimates as degrees of freedom. Most goodness of fit measures will be 1.0 for a saturated model, but since saturated models are the most unparsimonious models possible, parsimony-based goodness of fit measures will be 0. Some measures, like root mean square error of approximation (RMSEA), cannot be computed for the saturated model at all. The independence model is one which assumes all relationships among measured variables are 0, including correlations among the latent variables and all paths in the structural model. Where the saturated model will have a parsimony ratio of 0, the independence model has a parsimony ratio of 1.

Most fit indices will be 0, whether of the parsimony-adjusted variety or not, but some such as RMSEA will have non-zero values depending on the data. The default model is the theoretical or structural model which is always more parsimonious than the saturated model and almost always fits better than the independence model with which it is compared using goodness of fit measures. That is, the default model will have a goodness of fit between the perfect explanation of the trivial saturated model and terrible explanatory power of the independence model, which assumes no relationships (Kline, 1998). The goal is to find the most parsimonious model which is not significantly different from the saturated model and fully explains the data (Garson, 2009). Further information regarding the various model fit indices is presented in the next sub-sections. The next sub-section discusses the goodness of fit indices that were used to test the structural equation model fitness.

4.4.3 Goodness of fit indices

The following fit indices were computed in this research as part of structural equation modelling (SEM): absolute fit indices (the Chi-Square (χ^2) and Standardised Root Mean Square Residual (SRMR)), relative fit indices (Normed Fit Index (NFI), Tucker Lewis Index (TLI) and Incremental Fit Index (IFI)) and noncentrality-based indices (Comparative Fit Index (CFI) and Root Mean Square of Approximation (RMSEA)).

4.4.3.1 Absolute fit indices

Absolute fit indices do not use an alternative model as a base for comparison (Tanaka, 1993). They are simply derived from the fit of the obtained and implied covariance matrices and the maximum likelihood minimisation function. The following absolute fit indices were computed in this research:

a) Chi-Square (χ^2)

The Chi-Square value is the traditional measure for evaluating overall model fit and assesses the magnitude of discrepancy between the sample and fitted covariance matrices (Hu & Bentler, 1999). A good model fit would provide an insignificant χ^2 result at $p > .05$ threshold (Barret, 2007; Hooper, Coughlan & Mullen, 2008). A general rule for acceptable model fit is that the ratio of the χ^2 to df (CMIN/DF) should be ≤ 2 (Tabachnick & Fidell, 2007) or ≤ 3 (Kline, 2005). While the χ^2 test retains its popularity as a fit statistic, there exist a number of severe limitations to its use, namely:

- This test assumes multivariate normality and severe deviations from normality may result in model rejections even when the model is properly specified (McIntosh, 2006).
- Because the χ^2 statistic is in essence a statistical significance test it is sensitive to sample size. This means that the χ^2 statistics nearly always reject the model when large samples are used (Bentler & Bonnet, 1980; Jöreskog & Sörbom, 1993). On the other hand, where a small sample is used, the χ^2 statistic lacks power and because of this may not discriminate between well-fitting models and poorer fitting models (Kenny & McCoach, 2003).

- Model size also has an increasing effect on the χ^2 values. Models with more variables tend to have larger χ^2 (Tanaka, 1993).
- Chi-square is affected by the distribution of variables. Highly skewed and kurtotic variables increase χ^2 values, and this has to do with the multivariate normality assumption (Tanaka, 1993).
- There may be some lack of fit because of omitted variables which lead to a significant χ^2 . Omission of variables may make it difficult to reproduce the correlation (or covariance) matrix perfectly (Tanaka, 1993).

Another absolute fit index used in this research is the Standardised Root Mean Square Residual (SRMR) which is discussed next.

b) Standardised Root Mean Square Residual (SRMR)

A Standardised Root Mean Square Residual (SRMR) is the square root of the difference between the residuals of the sample covariance matrix and the hypothesised covariance model (Hooper *et al.*, 2008). Values of the SRMR range from zero to 1.0 with well-fitting models obtaining values less than .05 (Byrne, 1998; Diamanthopoulos & Siguaw, 2000). The smaller the SRMR, the better fit of the model. Values as high as .08 are deemed acceptable (Hu & Bentler, 1999; Schreiber *et al.*, 2006). An SRMR of 0 indicates perfect fit. It must be noted that the SRMR value will be lower when there is a high number of parameters in the model and in models based on large sample sizes (Hooper *et al.*, 2008). However, due to the restrictiveness of the model χ^2 , researchers have sought relative fit and noncentrality-based indices to assess model fit and these indices were also used in this research as discussed below:

4.4.3.2 *Relative fit indices*

Relative fit indices compare χ^2 for the model tested to one from a baseline model (null or independence model) (Tanaka, 1993). A baseline model is a model tested which specifies that all measured variables are uncorrelated (there are no latent variables). A baseline model should always have a very large χ^2 (poor fit).

The following relative fit indices were examined to determine model fitness in this research: Normed Fit Index (NFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI). Incremental fit indices, also known as comparative (Miles & Shevlin, 2007) or relative fit indices (McDonald & Ho, 2002) do not use the χ^2 in its raw form but compare the χ^2 value to a baseline model. For a baseline model, the null hypothesis is that all variables are uncorrelated (McDonald & Ho, 2002).

a) *The Normed Fit Index (NFI)*

The NFI assesses the model by comparing the χ^2 value of the model to the χ^2 of the null model (Hooper *et al.*, 2008). The null/independence model is the worst case scenario as it specifies that all measured variables are uncorrelated. Values of this statistic range between 0 and 1. Bentler and Bonnet (1980) recommend that values greater than .90 indicate a good fit. According to Schumacker and Lomax (2004), by convention, NFI values above .95 are good, between .90 and .95 are acceptable, and below .90 indicate a need to respecify the model.

A suggestion by Hu and Bentler (1999) is that the cut-off criterion should be $NFI \geq .95$. A major drawback as pointed out by Bentler (1990) and Mulaik, James, Van Alstine, Bennet, Lind and Stilwell (1989) is that the NFI is sensitive to sample size, underestimating fit for samples less than 200, and is thus not recommended to be solely relied on (Kline, 2005). This challenge was rectified by the Non-Normed Fit Index (NNFI), also known as the TLI which will be discussed later.

b) *Incremental Fit Index (IFI)*

This index is also known as the DELTA2: $IFI (\chi^2 \text{ for the null model} - \chi^2 \text{ for the default model})$. By convention, IFI should be equal to or greater than .90 to accept the model. However, a suggestion by Schreiber *et al.* (2006) is that the cut-off criterion should be $IFI \geq .95$.

c) *Tucker-Lewis Index (TLI)*

This index is similar to NFI, but penalises for model complexity. Marsh, Balla and McDonald (1988), and Marsh, Balla and Hau (1996) found TLI to be relatively independent of sample

size. TLI values range from 0 to 1, and values close to 1 indicate a good fit. Hu and Bentler (1999) have suggested $TLI \geq .95$ as the cutoff for a good model fit and this is widely accepted. TLI values below .90 indicate a need to respecify the model.

4.4.3.3 *Noncentrality-based indices*

The concept of the noncentrality parameter is a difficult one, and the rationale for this parameter is that the χ^2 is based on a test that the null hypothesis is true ($\chi^2 = 0$) (Tanaka 1993). This gives the distribution of the central χ^2 . Because the researcher is hoping not to reject the null hypotheses in structural equation modelling, it can be argued that focus should be testing to reject the alternative hypothesis (H_a). A test that rejects the alternative hypothesis, H_a , would make statistical decisions using the 'noncentral' χ^2 distribution created under the case when H_a is assumed to be true in the population (*i.e.*, an incorrect model in the population) (Tanaka, 1993). This approach to model fit uses a χ^2 equal to the degree of freedom (df) for the model as having a perfect fit (as opposed to $\chi^2 = 0$). Thus, the noncentrality parameter estimate is calculated by subtracting the df of the model from the χ^2 ($\chi^2 - df$). The following noncentrality-based indices were computed in this research:

a) Comparative Fit Index

The CFI is a revised form of NFI which takes into account the sample size (Byrne, 1998) and performs well even when the sample size is small (Tabachnick & Fidell, 2007). This index was first introduced by Bentler (1990). Like the NFI, this statistic assumes that all latent variables are uncorrelated (null/independence model) and compares the sample covariance matrix with this null model. As with the NFI, values for this statistic range between 0 and 1, with values closer to 1 indicating a good fit.

A cut-off criterion of $CFI \geq .90$ was initially advanced (Hooper *et al.*, 2008). However, studies have shown that a value greater than 0.90 is needed in order to ensure that misspecified models are not accepted (Hu & Bentler, 1999). Schreiber *et al.* (2006) have suggested $TLI \geq .95$ as the cutoff for a good model fit. The CFI is the most popular index in the recent period to be reported and included in structural equation modelling, because it is one of the measures least affected by sample size (Fan, Thompson & Wang, 1999).

b) Root Mean Square Error of Approximation (RMSEA)

This fit statistic was first developed by Steiger and Lind (1980). The RMSEA tells of how well the model, with unknown but optimally chosen parameter estimates would fit the population covariance matrix (Byrne, 1998). In recent times, this statistic has become one of the most informative fit indices (Diamantopoulos & Siguaw, 2000) due to its sensitivity to the number of estimated parameters in the model. Recommendations for RMSEA cut-off points have been reduced considerably. Up until the early nineties, an RMSEA in the range of .05 and .10 was considered an indication of fair fit and values above .10 indicated poor fit (MacCallum, Browne & Sugawara, 1996). It was then thought that a RMSEA value of between .08 and .10 provides a mediocre fit and below .08 shows a good fit (MacCallum *et al.*, 1996). However, in recent times, a cut-off value of .06 or less seems to be the general consensus amongst authorities in this area (Hooper *et al.*, 2008; Schreiber *et al.*, 2006).

4.4.4 Structural equivalence

A multi-group structural equivalence was conducted in the current research focusing on two sample sub-groups, namely, gender and type of learning programme. A critical assumption of multi-group analysis is that both the measuring instrument and the construct being measured are operating in the same way across the populations of interest (Byrne & van de Vijver, 2010). That is, there is presumed equality of (a) factorial structure (*i.e.*, same number of factors and pattern of item loadings onto these factors), (b) perceived item content, (c) factor loadings (*i.e.*, similar size of item estimates), and (d) item intercepts (*i.e.*, item means). Given their psychometric focus, these characteristics are commonly regarded as representing *measurement equivalence* (also termed *measurement invariance*). Likewise, there is presumed equality of the measured construct with respect to (e) its dimensionality (*i.e.*, unidimensional or multidimensional structure) and (f) in the case of multidimensional structure, relations among the construct dimensions (Byrne & van de Vijver, 2010). Given a focus on theoretical structure (Bentler, 1978), the latter characteristics are considered to represent *structural equivalence* (also termed *structural invariance*). These assumptions, as is the case for all statistical assumptions, need to be tested.

Indeed, Vandenberg and Lance (2000) have cautioned that failure to establish measurement and structural equivalence is as damaging to substantive interpretations as the inability to demonstrate reliability and validity. Fortunately, these equality assumptions are readily

testable using structural equation modelling (SEM) procedures within the framework of a confirmatory factor analytic (CFA) model. Development of a procedure capable of testing for multi-group equivalence derives from the seminal work of Jöreskog (1971). The classical approach to testing for factorial equivalence encompasses a series of hierarchical steps that begins with the determination of a well-fitting baseline multi-group model for which sets of parameters are put to the test of equality in a logically ordered and increasingly restrictive manner.

The first and least restrictive model to be tested is the baseline multi-group model noted above, which in SEM parlance is commonly termed the *configural* model (Horn & McArdle, 1992). With this initial model, only the extent to which the same number of factors and patterns (or configurations) of fixed and freely estimated parameters holds across groups is of interest and thus no equality constraints are imposed. In other words, for each group, the same model of hypothesised factorial structure is tested. The importance of the configural model is that it serves as the baseline against which all subsequent tests for equivalence are compared and thus, acceptable goodness-of-fit between this initial model and the multi-group data is imperative (Byrne & van de Vijver, 2010).

In contrast, all remaining tests for equivalence involve the specification of cross-group equality constraints for particular parameters. The first three constrained models test for measurement equivalence, while the remaining two test for structural equivalence. Measurement equivalence must be established prior to testing for structural equivalence (Byrne & van de Vijver, 2010). The difference in CFI value (ΔCFI) must be equal to or less than .01 to indicate a substantially 'practical' improvement in fit (Cheung & Rensvold, 2002). Given the known sample-size sensitivity of the chi-square statistic, together with substantial and increasing support for use of the ΔCFI value, the researcher considered the latter to provide the more logical and reasonable measure of model improvement than the traditional chi-square difference ($\Delta\chi^2$) value (Byrne & van de Vijver, 2010). Table 4.3 depicts a summary of the parameters of statistical techniques used in the CFA, inter-correlations, structural equation modelling, and structural equivalence.

Next is a section discussing the methods and procedures followed during the correlational and inferential statistical analyses stage of this research.

Table 4.3

Summary of Parameters for Statistical Techniques used in the CFA, Structural Equation Modelling, and Multi-group Structural Equation Equivalence.

Procedure/Index	Parameters	Interpretation and use of index	Source (s)
Cronbach Alpha	Cut off point $\geq .70$	Reliability reflects the consistency of items over time, tests, and groups. Cronbach's alphas $\geq .70$ are considered acceptable.	(Kline, 2005; Polit & Beck, 2004)
Chi-Square (χ^2)	Insignificant χ^2 result at $p > .05$ threshold. Acceptable model fit - ratio of χ^2 to df (CMIN/DF) should be ≤ 2 or ≤ 3 , useful for nested models/model trimming.	Tests the hypothesis that the specified model provides a perfect fit (within the limits of sampling error); the obtained χ^2 value should be smaller than 2; note that different discrepancy functions will yield different χ^2 values	(Barret, 2007; Hooper, Coughlan & Mullen, 2008; Tabachnick & Fidell, 2007; Kline, 2005)
Standardised Root Mean Square Residual (SRMR)	Range from zero to 1.0. Well-fitting models value is $\leq .05$. Values as high as .08 are deemed acceptable.	It is a measure of the average size of residuals between the fitted and sample covariance matrices; if a correlation matrix is analysed, RMR is "standardised" to fall within the [0, 1] interval (SRMR), otherwise it is only bounded from below; a cut off of .05 is often used for SRMR; Hu and Bentler (1999) recommend a cut-off value close to .08.	(Byrne, 1998; Diamanthopoulos & Siguaw, 2000) (Hu & Bentler, 1999; Schreiber et al., 2006)
Normed Fit Index (NFI)	Cut-off criterion should be $NFI \geq .95$.	It is a measure of the proportionate improvement in fit (defined in terms of f or χ^2) as one moves from the baseline to the target model; values greater than .9 are usually deemed desirable; problem that it is biased downward for small N; not recommended by Hu and Bentler (1999); a cut-off value of $\geq .95$ is recommended by Schreiber et al., (2006).	(Hu & Bentler, 1999; Schumacker & Lomax, 2004; ; Schreiber et al., 2006; Hooper et al., 2008)
Tucker Lewis Index (TLI)	Cut-off criterion should be $TLI \geq .95$.	It is a measure of the proportionate improvement in fit (defined in terms of noncentrality) as one moves from the baseline to the target model, per df; Hu and Bentler (1999) recommend a cut-off value of .95.	(Hu & Bentler, 1999; Schumacker & Lomax, 2004; Hooper et al., 2008)

Incremental Fit Index (IFI)	Cut-off criterion should be IFI \geq .95.	It is a modified version of NFI designed to lessen its dependence on sample size; however, it may be biased upward for small N when the model is misspecified, and the parsimony correction may be inappropriate; Hu and Bentler (1999) recommend a cut-off value of .95.	(Hu & Bentler, 1999; Schumacker & Lomax, 2004; Hooper et al., 2008)
Comparative Fit Index (CFI)	Cut-off criterion should be CFI \geq .95.	It is a measure of the proportionate improvement in fit (defined in terms of noncentrality) as one moves from the baseline to the target model; Hu and Bentler (1999) recommend a cut-off value of .95.	(Hu & Bentler, 1999; Schumacker & Lomax, 2004; Hooper et al., 2008)
Root Mean Square Error of Approximation (RMSEA)	A cut-off value of \leq .06.	It is an estimate of how well the fitted model approximates the population covariance matrix per <i>df</i> . A value of .05 indicates a close fit and that values up to .08 are reasonable; Hu and Bentler (1999) recommend a cut-off value of .06; a <i>p</i> -value for testing the hypothesis that the discrepancy is smaller than .05 may be calculated (test of close fit).	(Hu & Bentler, 1999; Schreiber et al., 2006; Hooper et al., 2008)
Δ CFI	Cut-off criterion of \geq .01 for significance.	It is a measure of the difference in comparative fit indices between structural models.	(Cheung & Rensvold, 2002)

4.5 CORRELATIONAL AND INFERENCE STATISTICAL ANALYSES

Correlational and inferential statistical analyses were conducted in the current research. These analyses include inter-correlations, multiple regression analysis, test for distribution normality and tests for significant mean differences. The next sub-section discusses the method followed when computing inter-correlations in the current research.

4.5.1 Inter-correlations of the subscales of the LPME scale

In order to analyse the relationships among sub-scales of the Learning Programme Management and Evaluation (LPME) scale, product-moment correlation coefficients (also known as a Pearson r) were computed. The product moment correlation, r , is a widely used index of effect that conveys information both on the magnitude of the relationship between variables and its direction (Gall, Gall & Borg, 2003; Rosenthal, 1991). The possible range of r is well known: from -1.00 through zero (absolutely no relationship) to +1.00 (Durlak, 2009). Product-moment correlation was selected because the variables being tested were considered to be continuous. In order to evaluate practical effect size, coefficient values ranging from .10 and below .30 were considered small, those ranging from .30 but below .50 were considered moderate, and those above .50 were considered large (Cohen, 1988; 1992; Osteen & Bright, 2010).

The purpose of correlation analysis is to measure and interpret the strength of a linear or non-linear (e.g., exponential, polynomial, and logistic) relationship between two continuous variables (Zou, Tuncali & Silverman, 2003). However, confirming a population's correlation coefficient as being merely unequal to zero does not entail much gain of content information, unless this correlation coefficient is sufficiently large enough; and this in turn means that the correlation explains a relevant amount of variance (Kubinger, Rasch & Šimečková, 2007). Quite often, the null hypothesis $H_0: \rho = 0$ is almost always tested against the alternative hypothesis $H_a: \rho > 0$. The convention has been established of calling a correlation coefficient "significant" if this null-hypothesis is rejected, or "not significant" if the null-hypothesis is not rejected (Kubinger, Rasch & Šimečková, 2007, p. 75). In this regard, the meaning of a significant correlation coefficient is that such a coefficient is (absolutely) larger than zero within the given population. The argument is that merely confirming a population's correlation coefficient as unequal to zero does not entail much gain of content information, unless this correlation coefficient explains a relevant amount of the variance of the variables.

In the present research, correlation coefficients were tested in terms of their practical effect size. This was done in view of the fact that the sample correlation coefficient, r , is a biased estimator of the population correlation coefficient, ρ , for normal populations. It is not widely recognised among researchers that this bias can be as much as .03 or .04 under some realistic conditions and that a simple correction formula is available and easy to use in practice (Zimmerman, Zumbo & Williams, 2003). This discrepancy may not be crucial if one is simply investigating whether or not a correlation exists. However, if one is concerned with an accurate estimate of the magnitude of a non-zero correlation in test and measurement procedures, then the discrepancy may be of concern.

In practice, researchers often select the alpha level to be suitably low, often a probability of $p \leq .05$, which means there would be only a 5% chance of falsely rejecting the null hypothesis and concluding that a difference exists when in fact there is no difference (Type I error). While a Type I error is evident when the researcher finds an effect in the sample which does not exist in the population, Type II error occurs when the researcher fails to find an effect or difference in the sample which exists in the population (Cohen, 1982).

Cohen (1982, pp. 248-252) offers some suggestions for minimising both Type I and Type II errors which the researcher tried to use in the present research.

4.5.1.1 *Minimising Type I error*

- This is done using theory to guide the statistical analysis. Statistical tests performed in the present research were guided by theory as discussed in the literature chapters (Chapter 2 and Chapter 3).
- It is also ensured by practicing good housekeeping of data sets. The full distribution of every variable and a number of bivariate plots and tables should be inspected prior to more complex analysis. In the present research, data were analysed in order to detect missing values, outliers and evidence of multicollinearity.
- By minimising the number of significance tests performed per study. Trying to use a single test for each substantive issue. Each substantive issue (empirical research aim) was tested using an appropriate statistical technique in the present research.
- Resisting the temptation to search for sub-groups in which some hypothesised relationship holds when it is not significant on the *a priori* most appropriate larger

group. Combining measures that should be related to the dependent variable by virtue of the same theoretical construct. The stated hypotheses were used as a guide to determine the statistical analysis.

- Not making conclusions about differences or effects which have not been tested for significance. The researcher only drew conclusions from the findings of the research.

4.5.1.2 *Minimising Type II error*

- Carrying out a power analysis before beginning the research. Statistical power depends on only three elements: the size of the population effect the researcher is looking for, the size of the random sample the researcher plans to examine, and the selected statistical significance criterion. The effect size may be expressed in a variety of metrics as appropriate to the particular test the researcher plans to apply. It could be a standardised difference between means, a proportion of variance, or a difference between proportions. This effect size can be estimated from the related literature, or it may be determined as the minimum effect which would be of substantive importance, or the researcher may use conventional values suitable to the substantive field. Next, the researcher selects a significance criterion (typically .05 or .01). In the present research, the significance level of the correlation coefficients was set at $p \leq .05$.
- Increasing the sample size. The bigger and more balanced the sample the better. It is the case that the power for detecting between group differences tends to be greatest when group sizes are equal if the overall number of subjects is fixed. The sample used in the current research was large enough to establish groups and sub-group differences.
- Removing extraneous sources of variability, especially in the dependent variable and primary independent variables. One way to accomplish this is by restricting the population studied in terms of these extraneous variables. In this research, possible extraneous variables were built into the study as biographical characteristics.
- Increasing the effect size. Although the effect size in the population may be conceived of as fixed, the sample effect size may be increased in several ways, including maximising the variance in the major independent variables. Just as restriction of range (variance) of an independent variable produces smaller effects on the dependent variable, so choosing a sample or treatment with a large range (variance) on the independent variable will produce larger effect sizes.

- Using the most powerful available data analytic procedures. It is hard to give general rules for which no exceptions can be found. However, it seems safe to say that when distributional assumptions are even approximately met, parametric procedures tend to be more powerful than non-parametric procedures. When distributional assumptions are grossly violated, non-parametric procedures may be more powerful than parametric procedures. The non-parametric tests were used in the present research after the normality distribution assumption was not satisfied.

The next sub-section describes the methods and parameters applied during the multiple regression analysis in the current research.

4.5.2 Multiple regression analysis

Multiple regression analysis was conducted in this research with biographical characteristics (age, gender, educational achievement, type of learning programme and occupation) used as independent variables to assess the percentage of variance explained in the dependent variables (sub-scales of the LPME scale). Multiple regression (R) is a statistical tool that allows for the examination of how multiple independent variables are related to a dependent variable (Higgins, 2005). Regression equations are used when the researcher wants to use one or more independent variables to predict a metric scaled dependent variable (Anglim, 2007). In multiple regression analysis, two or more variables are used to predict a single outcome. However, current reporting standards strongly suggest reporting effect sizes and confidence intervals to complement tests of statistical significance. Osteen and Bright (2010) have suggested the following cut-off criterion for multiple regression analysis: R^2 value $\geq .01 \leq .09$ (small practical effect size); R^2 value $\geq .09 \leq .25$ (moderate practical effect size); and R^2 value $\geq .25$ (large practical effect size). The significance level was set at $p \leq .05$.

The next sub-section discusses the methods followed to test the distribution normality in the current research.

4.5.3 Test for distribution normality

The data for this research were tested for distribution normality prior to the administration of the statistical tests for mean differences. A Kolmogorov-Smirnov test was employed to test for normality. Normality tests are important for at least two reasons, namely:

- (1) Nonlinear and interacting physical processes usually lead to non-Gaussian distributions, and the generating mechanism of the processes can therefore be better understood by examining the distribution of selected variables.
- (2) Many statistical procedures require or are optimal under the assumption of normality, and it is therefore of interest to know whether or not this assumption is fulfilled (Steinskog, Tjøstheim & Kvamstø, 2007).

Many data analysis methods depend on the assumption that data were sampled from a normal distribution or at least from a distribution which is sufficiently close to a normal distribution (Zvi, Turel & Zerom, 2008). Such an assumption is of great importance because, in many cases, it determines the method that ought to be used to estimate the unknown parameters in the model and also dictates the test procedures which the analyst may apply. However, if the normality assumptions were not satisfied, then the equivalent non-parametric test would be used (Chan, 2003). There are several tests available to determine if a sample comes from a normally distributed population, and Kolmogorov-Smirnov (KS) is one such test.

The Kolmogorov-Smirnov test is an “empirical distribution function (EDF)” test in which the theoretical cumulative distribution function of the test distribution is contrasted with the EDF of the data (Armitage & Colton, 1998, p. 3075). The KS test was first proposed by Kolmogorov and then developed by Smirnov. In its original form, the KS test is used to decide if a sample comes from a population with a completely specified continuous distribution (Drezner, Turel & Zerom, 2008). The test compares the cumulative distribution of the data with the expected cumulative normal distribution, and bases its p value ($p \leq .05$) on the largest discrepancy (Öztuna, Elhan & Tüccar, 2006).

When normality and homogeneity of variance assumptions are not satisfied, the equivalent non-parametric test must be applied to test mean differences. In the case of the current research, a Kruskal-Wallis and Mann-Whitney test were applied to test the sample mean differences as discussed in the next sub-section because the Kolmogorov-Smirnov test for normality showed that the sub-scales of the LPME scale failed to satisfy the normality assumption. In other words, the data were sampled from a non-normal distribution.

The next sub-section describes the methods and parameters applied during the tests for significant mean differences in this research.

4.5.4 Tests for significant mean differences

The test for mean difference was conducted using the two non-parametric tests, that is, Kruskal-Wallis and Mann-Whitney. Non-parametric statistical procedures rely on no or few assumptions about the shape or parameters of the population distribution from which the sample was drawn. The intention was to examine categorical mean differences among respondents on each of the sub-scales of the LPME scale. The difference could be established by comparing the mean scores of different categories of respondents. The results of these non-parametric tests are presented in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

4.5.4.1 The Kruskal-Wallis test

The Kruskal-Wallis test evaluates whether the population medians on a dependent variable are the same across all levels of a factor (Green & Salkind, 2008). The test uses a chi-square (χ^2) statistic to evaluate differences in mean ranks in order to assess the null hypothesis that the medians are equal across the groups. This test is appropriate for use under the following circumstances (Green & Salkind, 2008):

- (a) When there are three or more conditions that are comparable.
- (b) When each condition is performed by a *different* group of participants; *i.e.* when there are independent-measures designed with three or more conditions.
- (c) When the data do not meet the requirements for a parametric test (*i.e.* it is used if the data are not normally distributed; if the variances for the different conditions are markedly different; or if the data are measurements on an ordinal scale).

4.5.4.2 Mann-Whitney U test

The Mann-Whitney *U* test evaluates whether the medians on a test variable differ significantly between two groups. The Mann-Whitney *U* test then evaluates whether the mean ranks for the two groups differ significantly from each other. Because analyses for the Mann-Whitney *U* test are conducted on ranked scores, the distributions of the test variable

for the two populations do not have to be normally distributed (Green & Salkind, 2008). SPSS software does not report an effect size index for the Mann-Whitney *U* test, but simple indices can be computed to communicate the size of the effect. For example, Green and Salkind (2008) suggest that differences in mean ranks or medians between the two groups can serve as an effect size index.

The significance of non-parametric tests is usually evaluated through the approximation of the distributions of the test statistics to the *z* distribution when sample sizes are not too small, and statistical packages such as SPSS that run these tests report the appropriate *z* value in addition to the values for *U* or *T*. The *z* value can also be calculated by hand (Siegel & Castellan, 1988). Table 4.4 provides a summary of the parameters for statistical techniques used in multiple regression analysis, and the test for distribution normality.

Table 4.4

Summary of Parameters for Statistical Techniques used in Multiple Regression Analysis, Test for Distribution Normality and Test for Significant Mean Differences

Measure/procedure	Parameter	Source (s)
Inter-correlation	r value $\geq .10 \leq .30$ (small practical effect size).	(Cohen, 1988, 1992;
	r value $\geq .30 \leq .50$ (moderate practical effect size).	Osteen & Bright, 2010)
	r value $\geq .50$ (large practical effect size).	
	Significance level $p \leq .05$	
Multiple regression	R^2 value $\geq .01 \leq .09$ (small practical effect size)	(Osteen & Bright,
	R^2 value $\geq .09 \leq .25$ (moderate practical effect size)	2010)
	R^2 value $\geq .25$ (large practical effect size)	
	Significance level $p \leq .05$	
Test for distribution normality	Significance level $p \leq .05$	(Öztuna <i>et al.</i> , 2006)

The next section discusses the different types of validity that were applied in the current research to ensure a valid LPME scale and the valid research findings.

4.6 VALIDITY OF THE RESEARCH AND ITS FINDINGS

As Pallant (2007, p. 7) states, the validity of a study is defined as “the degree to which it measures what it is supposed to measure”. Below is a discussion of the different types of validity and how they were ensured in the current research.

4.6.1 Face validity

Healy and Perry (2000) define face validity as how well the research design appears to offer a process that will facilitate the data acquisition within the research agenda. The methodological paradigm in this research is congruent with the research paradigms and aligned to the research questions and aims. The hypotheses tested in this research were also aligned to the research aim. The research methodology, research design and methods are interwoven to provide answers to the research questions. Therefore, the research design followed in this research is succinct and synchronised with all other elements, thereby ensuring high face validity.

4.6.2 Content validity

As Babbie (2005) states, content validity refers to the degree to which a measure covers a range of meanings included within a concept. In the current research, content validity of the instrument was addressed by ensuring the relevance and representativeness of the content of the items and the technical quality of those items. In addition, the measure developed in this research was subjected to expert review in its draft stage and the experts' inputs were incorporated in the final draft. The instrument development process followed in the current research as outlined in this chapter gave support for the content aspect of validity by providing details on item generation, item development, item refinement and evaluation. The objective of the steps in the instrument development process as reported in this chapter, sub-section 4.2.3, was to create measures that demonstrate validity and reliability. However, further inferential statistical tests such as exploratory and confirmatory factor analysis were also performed on this measure to ensure that it satisfies the required psychometric scrutiny. The technical quality of the items of the measure was checked using point-measure correlation (analogous to the traditional item-total correlations in classical test theory) and standardised item mean-square fit indices (Wolfe & Smith, 2007a) to enhance content validity.

4.6.3 Criterion-related validity

As defined by Healy and Perry (2000, p. 125), criterion validity is a validity of “generative mechanisms and the contexts that make them”. “When an instrument is intended to perform a prediction function, validity depends entirely on how well the instrument correlates with what it is intended to predict (a criterion)” (Nunnally, 1978, p. 111). Criterion-related validity is established when the measure differentiates individuals on a criterion it is expected to predict. The item reliability separates respondents and items into different strata of ability and the fit statistics (including point-measure correlation) allow for the replication of the measure on a different sample with different ability levels. Moreover, the rigour and scientific precision followed in conducting the current research make it possible, with limitations, to apply the LPME scale and/or its sub-scales in a similar context.

4.6.4 Construct validity

A measure has construct validity if the set of items constituting a measure faithfully represents the set of aspects of the theoretical construct measured, and does not contain items which represent aspects not included in the theoretical construct. Indeed, in attempting to evaluate construct validity, researchers must consider both the theory of which the construct is part and the measurement instrument being used (Emory & Cooper, 1991).

Babbie (2005) defines construct validity as the degree to which a measure relates to other variables as expected within a system of theoretical relationships. The structural aspects of validity are concerned with the degree to which the scoring structure conforms to the dimensional structure of the construct. In the current research, the researcher investigated the Rasch model requirements of local independence and unidimensionality using principal component analyses of the standardised residuals, residual correlations and Rasch item fit statistics (Wolfe & Smith, 2007b).

To ensure construct validity, all LPME sub-scales and items were examined using Differential Item Functioning (DIF) in order to establish potential bias with respect to various demographic characteristics, and the Cronbach Alpha test for internal consistency. Rasch item reliability is an important aspect for construct validation as it indicates the spread of items along the continuum of interest. A spread of items is required to form a well-defined variable for interpretation (Smith, 2001). The results for these analyses are reported in

Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). As Cronbach and Meehl (1955) indicate, factor analysis, and internal consistency reliability provide evidence of construct validity. To summarise, construct validation is essential for the development of quality measures (Schmitt & Klimoski, 1991), hence this new LPME scale was subjected to rigorous scientific scrutiny.

4.7 CHAPTER SUMMARY

The population and sample used in this research were described and methods followed at different phases of this research project were discussed in detail in this chapter. During the first phase, the process followed in the development of a new measure was described in detail. The second phase outlined the methods followed during the exploratory factor analysis (EFA) phase of the research including the statistical techniques employed. Further, the methods and statistical procedures followed in the third phase of this research (Confirmatory Factor Analysis) were described. This includes the statistical procedures followed in inferential statistical analysis such as inter-correlations, structural equation modelling, structural equivalence, multiple regression, test for distribution normality and test for significant mean difference.

Next is Chapter 5, which presents the EFA and Rasch analysis results of this research.

CHAPTER 5

RESEARCH RESULTS: EXPLORATORY FACTOR ANALYSIS

This chapter presents the exploratory factor analysis and Rasch analysis results of the current research following an empirical investigation. The chapter provides evidence for the achievement of the empirical aims of the research as set out below.

Research aim 1: *To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable Learning Programme Management and Evaluation (LPME) scale.*

Sub-aim 1.1: *To analyse the psychometric properties of the newly developed LPME scale.*

Exploratory factor analysis results presented in this chapter include the KMO and Bartlett's test, and Principal Component Analysis (including Scree plot) which was conducted using a Varimax rotation technique. The chapter also presents the results of the Rasch analysis which was conducted to examine the psychometric properties of the new LPME scale. The chapter concludes with a summary.

5.1 EXPLORATORY FACTOR ANALYSIS RESULTS

The results of exploratory factor analysis are presented below. Exploratory factor analysis (EFA) was conducted on the whole sample ($n = 652$), using the principal component method of extraction and varimax rotation. Both the SPSS (Version 20) (IBM, 2011) and Winsteps (Version 3.70.0) (Linacre, 2010) software, respectively, were used to measure the adequacy of the sample, to determine the factor structure of the construct and to evaluate the psychometric properties of the new measure, including the fitness of the data according to the Rasch model.

5.1.1 Sample adequacy

Exploratory factor analysis is based on the correlation matrix of the variables involved, and correlations usually need a larger sample size before they stabilise. Tabachnick and Fidell (2001, p. 588) give the following advice regarding sample size for exploratory factor analysis:

50 is very poor, 100 is poor, 200 is fair, 300 is good, 500 is very good, and 1000 or more is excellent. In the current research, a sample size comprising 652 cases was considered appropriate for factor analysis. Two initial tests were performed to establish adequacy of the sample and the appropriateness of the correlation matrix for factoring, and the results are shown in Table 5.1. Specifically, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was performed. The values vary between 0 and 1, and values closer to 1 are better. The suggested minimum value that is acceptable for further analysis is .60 (Tabachnick & Fidell, 2001).

The Kaiser-Meyer-Olkin (KMO) index of .960 in this research indicates that the items in the draft LPME measure are very suitable for factor analysis (Kline, 1994), and therefore, the factorial structure to be obtained from the Principal Component Analysis (PCA) will be acceptable. KMO is a measure of how much the items have in common. A KMO value closer to 1 indicates that the variables have a lot in common.

The Bartlett's Test of Sphericity was also conducted to test the null hypothesis that 'the correlation matrix is an identity matrix'. An identity matrix is a matrix in which all the diagonal elements are 1 and off-diagonal elements are 0.

Table 5.1
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.960
Bartlett's Test of Sphericity	Approx. Chi-Square	49316.106
	Df	6328
	Sig.	.000

The Bartlett's Test of Sphericity was statistically significant (*Df.* 6328; $p \leq .000$) and thus the null hypothesis that 'the correlation matrix is an identity matrix' was rejected. The determinant of the correlation matrix between the factors was set to zero due to orthogonal rotation restriction which imposes the condition that the factors cannot be correlated. Taken together, the results of these tests meet a minimum standard which should be passed before a PCA is conducted.

5.2.2 Factor structure for further rotation

Nineteen strong factors with an eigenvalue greater than 1 are visible in Table 5.2 and in figure 5.1. While an eigenvalue of 1 represents the norm in the literature (and often the default in most statistical software packages), a cut-off point of 1.45 eigenvalue units was used to extract the factors in the current research. Furthermore, an additional criterion used to extract the factors was the number of items loading at .4 and higher. This criterion is slightly higher than the .3 rule of thumb for the minimum loading of an item as cited by Tabachnick and Fidell (2001). Thus, all factors with a total eigenvalue above 1.45 and a minimum of 4 items loading at .4 and higher were considered for further analysis. As Costello and Osborne (2005) suggest, a factor with fewer than three items is generally weak and unstable, hence the researcher's decision to consider factors with a minimum of four items loading at .4 and higher. Consequently, only the first 11 factors extracted were considered useful for further statistical analysis in this research. The determination on the number of factors for inclusion was guided by theory and informed by the research questions, and the need to extract only the factors that would yield the most interpretable results.

Alternate tests for factor retention include the use of a scree test. The scree test involves examining the graph of the eigenvalues and looking for the natural bend or break point in the data where the curve flattens out as shown in figure 5.1. Based on this scree plot's representation, the researcher's decision to retain factors was influenced by the magnitude of the first eleven eigenvalues (ranging between 42.92 and 1.46), percentage of variance accounted for (ranging between 37.99 and 1.29), numbers of large item loadings on each factor (all items load greater than .4 on their hypothesised factors as shown in Table 5.3) and the meaningfulness of the factors (see Table 5.3). The eleven factors retained for further analysis in this research account for 58.42% of the total variance.

Table 5.2

Factor Extraction using Principal Component Analysis (PCA)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	42.929	37.990	37.990	42.929	37.990	37.990	12.788	11.317	11.317
2	4.699	4.158	42.148	4.699	4.158	42.148	9.174	8.119	19.435
3	3.374	2.986	45.134	3.374	2.986	45.134	5.587	4.944	24.380
4	2.422	2.143	47.278	2.422	2.143	47.278	5.422	4.799	29.178
5	2.122	1.877	49.155	2.122	1.877	49.155	4.482	3.966	33.145
6	1.983	1.755	50.910	1.983	1.755	50.910	4.270	3.779	36.924
7	1.918	1.697	52.607	1.918	1.697	52.607	4.197	3.714	40.638
8	1.830	1.620	54.226	1.830	1.620	54.226	3.773	3.339	43.976
9	1.697	1.502	55.728	1.697	1.502	55.728	3.501	3.098	47.074
10	1.579	1.398	57.126	1.579	1.398	57.126	3.432	3.038	50.112
11	1.467	1.298	58.425	1.467	1.298	58.425	3.055	2.704	52.815
12	1.435	1.270	59.694	1.435	1.270	59.694	2.906	2.571	55.387
13	1.356	1.200	60.894	1.356	1.200	60.894	2.402	2.126	57.513
14	1.243	1.100	61.995	1.243	1.100	61.995	2.400	2.124	59.637
15	1.209	1.070	63.065	1.209	1.070	63.065	1.853	1.640	61.276
16	1.188	1.052	64.116	1.188	1.052	64.116	1.723	1.524	62.801
17	1.108	.981	65.097	1.108	.981	65.097	1.684	1.490	64.291
18	1.034	.915	66.012	1.034	.915	66.012	1.653	1.462	65.753
19	1.019	.901	66.914	1.019	.901	66.914	1.311	1.160	66.914

Extraction Method: Principal Component Analysis

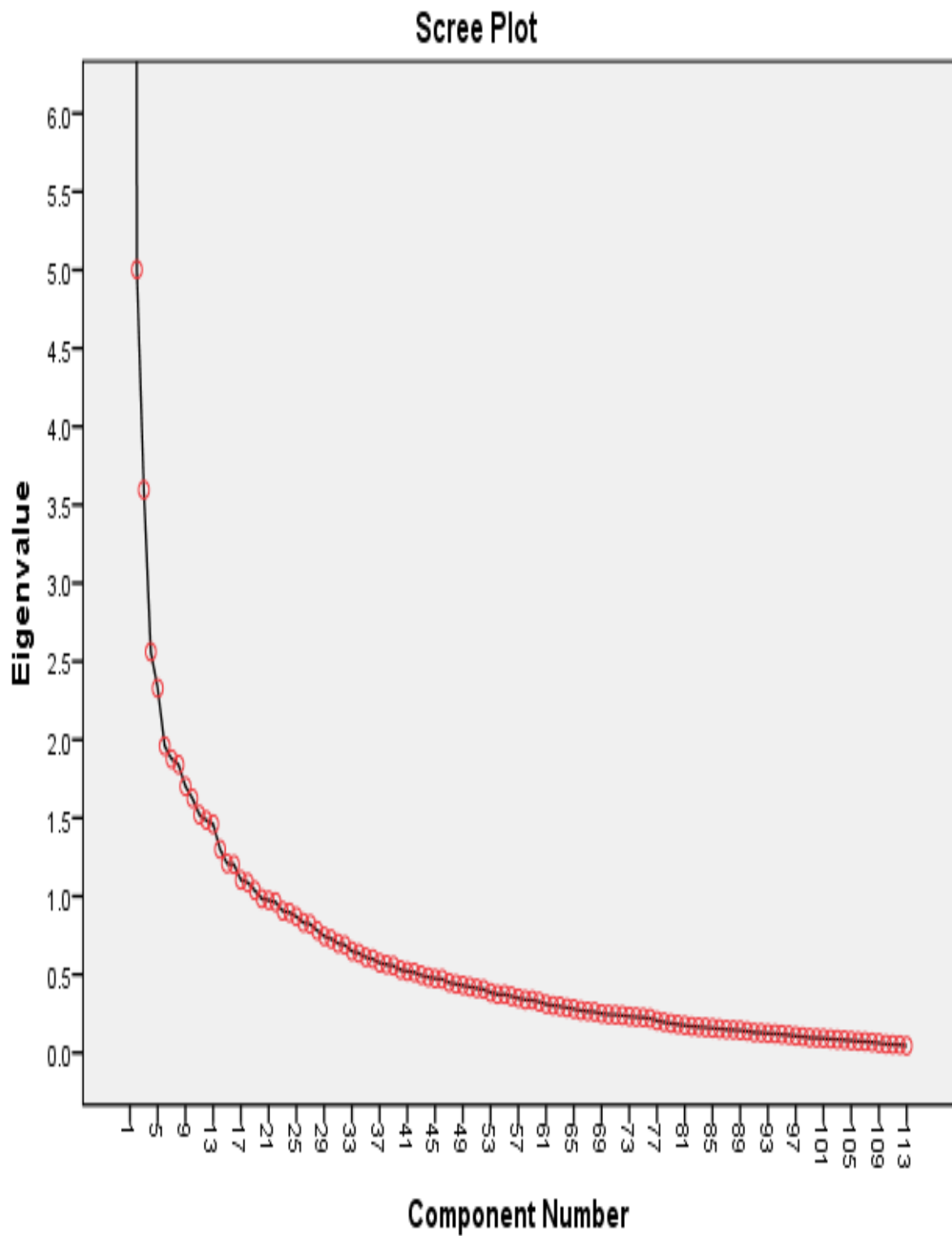


Figure 5.1. Scree plot for factor retention

Table 5.3
Item Loading per Factor

	Rotated Component Matrix ^a																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
B13.9	.692																		
B13.11	.691																		
B13.10	.689																		
B13.7	.679																		
B13.6	.678																		
B13.12	.673																		
B13.13	.655																		
B13.8	.637																		
B13.4	.633																		
B13.14	.631																		
B13.15	.621																		
B13.3	.548															.484			.455
B13.5	.517																		
B10.5	.486																		
B13.2	.479														.303				
B13.1	.472																		
B11.5	.466																		
B10.6	.444												.413						
B12.3	.432																		
B10.4	.426														.399				.312
B11.1	.425																		
B10.3	.403																		
B12.4	.393																		
B3.18		.638																	
B3.12		.614																	
B3.14		.613																	
B3.13		.606																	
B3.11		.603																	
B3.9		.602																	
B3.21		.576																	
B3.15		.574																	
B3.19		.557																	
B3.17		.555																	
B3.20		.529																	
B3.22		.525																	
B3.10		.508																	
B3.16		.504																	
B4.1		.489																	
B3.24	.320																		.321
B6.8																			.597

Rotated Component Matrix (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
B6.7	.331		.563																
B7.3			.554																
B6.6	.381		.536																
B8.8			.522																
B7.2			.506																
B8.9			.504																
B7.1			.503																
B7.5	.301		.458																
B7.6	.346		.433	.419															
B6.5			.418	.395				.319											
B8.7			.395					.321											
B7.4	.318		.366																
B8.5			.337																
B5.7				.703															
B5.8				.680															
B5.6				.675															
B5.9				.639															
B5.4				.550															
B5.3				.432															
B5.5				.415															
B6.2					.732														
B6.3					.720														
B6.4				.322															
B6.1				.559															
B8.4				.324															
B9.4						.621													
B9.2						.602													
B9.3						.593													
B10.1						.526													
B9.1						.502													
B9.5	.388					.462													
B10.2						.410													
B1.2							.782												
B1.1							.761												
B1.3							.754												
B1.4							.652												
B1.5							.565												
B14.3	.360							.618											
B14.4	.419							.606											
B14.5	.377							.590											
B14.2	.357							.529											
B14.6	.334							.524											

Rotated Component Matrix (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
B8.1									.703										
B8.2								.698											
B8.3								.610											
B8.6			.313					.305	.403										
B2.2									.641										
B2.4									.639										
B2.3									.532										
B2.5									.507										
B2.1									.472										
B3.3		.321							.465					.378					
B4.4									.671										
B4.5									.627										
B4.3									.614										
B4.2									.583										
B3.8									.630										
B3.7									.604										
B14.1	.339								.494										
B3.6									.471										
B3.23									.365										
B11.4	.426	.353							.508										.365
B11.2	.335								.501										
B11.3	.408								.429										
B3.2									.658										
B3.4		.302							.531										
B3.1									.427										
B3.5		.351							.422										
B12.5	.417								.309						.551				
B5.1															.346				.315
B5.2															.475				.584
B12.2	.433																		
B12.1	.394																		.573

Extraction Method: Principal Component Analysis
 Rotation Method: Varimax with Kaiser Normalisation
 a. Rotation converged in 30 iterations

5.3 RASCH ANALYSIS RESULTS

Subsequent to the Principal Component Analysis (PCA) factor extraction process reported above, 11 factors which were retained constitute the sub-scales of the Learning Programme Management and Evaluation (LPME) scale as shown in Table 5.4. A Rasch analysis was conducted on the 11 sub-scales in order to test the validity and reliability of the sub-scales and items. This section, therefore, presents the results of Rasch analysis for all 11 sub-scales of the LPME scale as computed using the Winsteps (Version 3.70.0) (Linacre, 2010) software. The results include a summary of person/item separation indices and reliability coefficients, person-item mapping, measure order, principal component analysis and differential item functioning (DIF).

The person/item separation indices examine the extent to which the new measure distinguishes the different levels of responses and respondents abilities. The reliability coefficient assesses the internal consistency of the measure. Person-item mapping assesses the manner in which the new measure targets respondents (whether or not there is balance between respondents' ability and item difficulty). Measure order assesses the goodness of item fit to the Rasch model as well as unidimensionality.

Table 5.4
Summary of the Sub-Scales and Items of the LPME Scale

Sub-scale	Sub-scale label	No. of Items	Item code
Administrative Processes	AP	5	B4.1; B4.2; B4.3; B4.4 and B4.5
Environmental Scanning	ES	6	B2.1; B2.2; B2.3; B2.4; B2.5 and B3.3
Observation and Problem Solving	OPS	6	B9.2; B9.3; B9.4; B9.5; B10.1 and B10.2
Policy Awareness	PA	8	B5.2; B5.3; B5.4; B5.5; B5.6; B5.7; B5.8 and B5.9
Quality Assurance	QA	4	B8.1; B8.2; B8.3 and B8.6
Stakeholder Inputs	SI	16	B3.9; B3.10; B3.11; B3.12; B3.13; B3.14; B3.15; B3.16; B3.17; B3.18; B3.19; B3.20; B3.21; B3.22; B3.23; and B3.24
Strategic Leadership	SL	4	B1.1; B1.2; B1.3 and B1.4
Learning Programme Design and Development	LPDD	13	B6.5; B6.6; B6.7; B6.8; B7.1; B7.2; B7.3; B7.4; B7.5; B7.6; B8.7; B8.8 and B8.9
Learning Programme Specifications	LPS	3	B6.2; B6.3 and B6.4
Monitoring and Evaluation	ME	5	B3.6; B3.7; B3.8; B9.1; B14.1
Occupational Competence	OC	11	B11.1; B11.5; B12.3; B13.1; B13.2; B13.6; B13.7; B13.9; B13.11; B13.13 and B13.14

The principal component analysis assesses the spread of variance in order to detect the existence of additional dimensions (unidimensionality). Differential item functioning assesses

the presence of bias in a measure due to other extraneous factors such as age, gender, education, *etcetera*. All these aspects were analysed and the results are presented in this section of the research as evidence to demonstrate that this new measure adheres to the established psychometric principles. Next are the sub-sections presenting the Rasch analysis results of each subscale of the LPME scale.

5.3.1 Administrative processes sub-scale

An overall explanation of how well the Administrative Processes (AP) sub-scale was constructed and whether respondents' ability levels exist or otherwise, is presented in the summary statistics as depicted in Table 5.5. About 99.0% of the responses to the AP sub-scale were valid. The sub-scale yielded a Cronbach alpha coefficient of $\alpha = .83$ which is acceptable for a new measure. The Cronbach Alpha (KR-20) person raw score reliability is the conventional 'test' reliability index (Bond & Fox, 2007). It reports approximate test reliability based on the raw scores of the sample and it is only reported for complete data.

The results in Table 5.5 show the separation statistics, which is the index of spread of the person or item positions. These results show a wider person spread of 7.5 logits. The mean score of -2.74 for the measure shows that respondents had some difficulty in answering the items of the measure and therefore the results fall below the expected performance. The standard deviation (1.52 logits) for person estimates indicates a greater spread in person variation than was observed in item difficulty measures, which are even more restricted at 32 logits. The person separation index ($G = 1.28$) could reliably separate respondents into at least two statistically distinct strata of persons (high ability and low ability persons) with a marginal person reliability coefficient of .62.

A person strata index indicates the number of distinct ability levels which can be identified by a test (Stone & Wright, 1988; Wright & Stone, 1988). The person reliability coefficient can be improved if more test items are added or if sample-item targeting is improved. However, reliability for the items is very good ($\alpha = .93$). That is, the chances that the difficulty ordering of the items will be repeated if the measure were given to another group of respondents is extremely high.

Table 5.5

Summary Statistics for Administrative Processes Sub-Scale

```

INPUT: 652 PERSONS 5 ITEMS MEASURED: 604 PERSONS 5 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 448 MEASURED (NON-EXTREME) PERSONS
+-----+
|          RAW          MODEL          INFIT          OUTFIT          |
|          SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD        |
+-----+-----+-----+-----+-----+-----+-----+-----+
| MEAN          9.4          5.0          -2.74          .82          .97          -.2          .99          -.2          |
| S.D.           2.8          .3          1.52          .16          1.02         1.3          1.06         1.3          |
| MAX.           26.0         5.0          2.28          1.87         9.90         5.2          9.90         5.2          |
| MIN.           2.0          1.0          -5.29         .42          .00         -2.9         .00         -2.8          |
+-----+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE     .94 ADJ.SD    1.20 SEPARATION  1.28 PERSON RELIABILITY .62 |
| MODEL RMSE    .84 ADJ.SD    1.27 SEPARATION  1.52 PERSON RELIABILITY .70 |
| S.E. OF PERSON MEAN = .07 |
+-----+-----+-----+-----+-----+-----+-----+
| MINIMUM EXTREME SCORE:    156 PERSONS |
| LACKING RESPONSES:       48 PERSONS    |
| VALID RESPONSES:         99.0%        |
+-----+-----+-----+-----+-----+-----+
SUMMARY OF 604 MEASURED (EXTREME AND NON-EXTREME) PERSONS
+-----+-----+-----+-----+-----+-----+-----+
|          RAW          MODEL          INFIT          OUTFIT          |
|          SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD        |
+-----+-----+-----+-----+-----+-----+-----+-----+
| MEAN          8.3          5.0          -3.75         1.10         .97         -.1          .99         -.2          |
| S.D.           3.1          .3          2.16          .48          1.02         1.3          1.06         1.3          |
| MAX.           26.0         5.0          2.28          1.88         9.90         5.2          9.90         5.2          |
| MIN.           2.0          1.0          -6.65         .42          .00         -2.9         .00         -2.8          |
+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE     1.25 ADJ.SD    1.76 SEPARATION  1.41 PERSON RELIABILITY .66 |
| MODEL RMSE    1.20 ADJ.SD    1.79 SEPARATION  1.50 PERSON RELIABILITY .69 |
| S.E. OF PERSON MEAN = .09 |
+-----+-----+-----+-----+-----+-----+-----+
PERSON RAW SCORE-TO-MEASURE CORRELATION = .94 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .83 (approximate due to missing data)
SUMMARY OF 5 MEASURED (NON-EXTREME) ITEMS
+-----+-----+-----+-----+-----+-----+-----+
|          RAW          MODEL          INFIT          OUTFIT          |
|          SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD        |
+-----+-----+-----+-----+-----+-----+-----+-----+
| MEAN          845.6        443.6         .00          .08          1.00         -.1          1.00         -.2          |
| S.D.           42.3          1.6          .32          .00          .22          2.8          .22          3.0          |
| MAX.           887.0        446.0         .61          .09          1.35         4.1          1.35         4.3          |
| MIN.           764.0        441.0        -.31          .08          .67         -4.5         .67         -5.1          |
+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE     .09 ADJ.SD    .31 SEPARATION  3.59 ITEM RELIABILITY .93 |
| MODEL RMSE    .08 ADJ.SD    .31 SEPARATION  3.77 ITEM RELIABILITY .93 |
| S.E. OF ITEM MEAN = .16 |
+-----+-----+-----+-----+-----+-----+-----+
| UMEAN=.000 USCALE=1.000 |
| ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00 (approximate due to missing data) |
| 2218 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 3592.18 |
+-----+-----+-----+-----+-----+-----+-----+

```

It is expected for items to be better-behaved than the persons (Wright & Linacre, 1994), hence the results show a good item separation ($G = 3.59$) which is broader than that of a person as depicted in Table 5.5. This index translates to about five levels of item difficulty, for example, very easy, easy, moderate, difficult and very difficult. An item reliability of .93

indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

Once the item and person calibrations are obtained, they are placed on a vertical ruler as shown in figure 5.2. This vertical ruler measures person ability and item difficulty on the same logit scale. On the right-hand side of the ruler are the AP sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot. On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items, with the most successful persons on the top. The results shown on the plot in figure 5.2 depict that the items were difficult for the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other.

The mean item difficulty is 2.5 logits above the mean person ability. The large difference between the mean person location and the mean item location reflects the relative mismatch between the person and item location. Ideally, the measure should be centred on the target population (Planinic *et al.*, 2010).

5.3.1.1 *Person-measure targeting*

Figure 5.2 shows the ordering of items according to their difficulty. Items with negative calibrations are easier, and those with positive calibrations are more difficult than the item average whose difficulty is set at zero. The spacing between the items is also very important. Items should not be too close in difficulty, because otherwise one item is not distinctly separate from the next. However, the separation between two items should also not be too large to avoid large gaps between the items (Planinic *et al.*, 2010). A close inspection of figure 5.2 reveals that the width of the sub-scale items is only about 1 logit, whereas the width of the person distribution is just above 8 logits. All the items in the sub-scale are located between -1 logit and +1 logit, but only a small fraction of persons are found in this range. Only two items (B4.2 and B4.3) are similar in difficulty. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.6. The differences between the probabilities are known as residuals, which are used to evaluate the fit of data to the model (Bond & Fox, 2001).

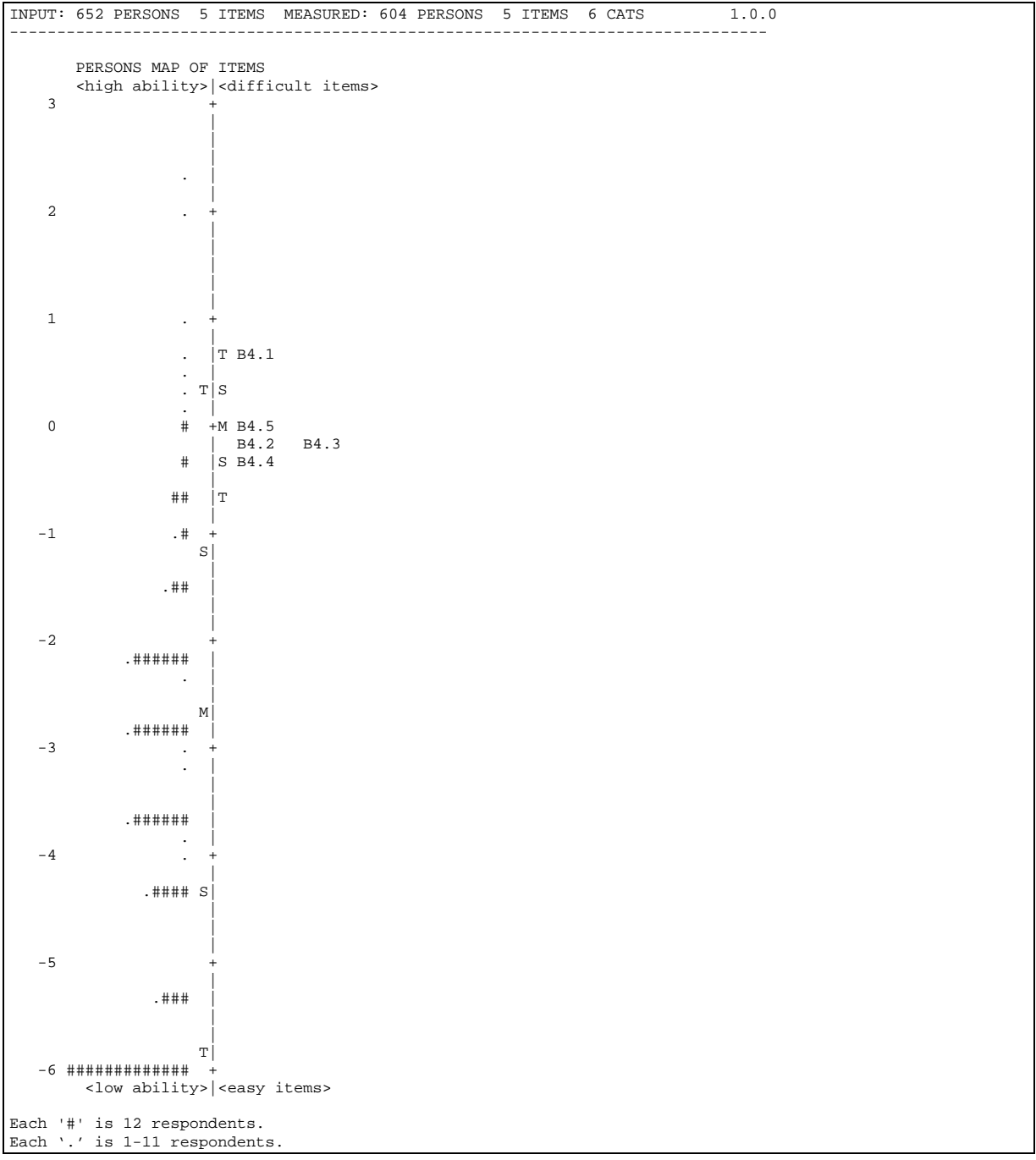


Figure 5.2. Items-Persons Map for Administrative Processes Sub-Scale

5.3.1.2 Item fit statistics

Table 5.6 shows the results of the fit statistics for the AP sub-scale which is presented as two Chi-square (χ^2) ratios: infit and outfit mean square statistics. Outfit is based on the conventional averaged sum of squared standardised residuals, whereas infit is an information-weighted sum which gives more value to on-target observation (Planinic *et al.*, 2010). A large infit value on a particular item indicates that some respondents who had the

ability to respond to difficult items did not respond in a way consistent with the model. A large outfit value of an item indicates that persons who did not have the ability to respond to difficult items, responded in an unexpected way. For example, large outfit of an easy item means that some able persons have unexpectedly failed on that item. Larger outfit of a difficult item means that some persons of low ability have unexpectedly succeeded on this item. Large infit values are generally considered more problematic than larger outfit values.

Table 5.6
Item Fit Statistics for Administrative Processes Sub-Scale

INPUT: 652 PERSONS 5 ITEMS MEASURED: 604 PERSONS 5 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.28 REL.: .62 ... ITEM: REAL SEP.: 3.59 REL.: .93												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
1	920	602	.61	.09	1.35	4.1	1.35	4.3	.64	59.9	65.8	B4.1
5	1009	599	-.06	.08	.98	-.2	.96	-.6	.75	63.9	63.2	B4.5
3	1017	600	-.11	.08	.67	-4.5	.67	-5.1	.80	73.2	63.2	B4.3
2	1019	600	-.13	.08	1.05	.7	1.04	.6	.74	64.4	63.1	B4.2
4	1043	597	-.31	.08	.93	-.8	.96	-.5	.79	68.7	62.1	B4.4
MEAN	845.6	443.6	.00	.08	1.00	-.1	1.00	-.2		66.0	63.5	
S.D.	42.3	1.6	.32	.00	.22	2.8	.22	3.0		4.6	1.2	

In the current research, the focus was more on the evaluation of infit values since they are weighted to take less notice of extreme responses (Vianya-Estopa, Elliot & Barrett, 2010). It is evident in Table 5.6 that the spread of logit scale of item measure yielded a maximum value of .61 logit and a minimum value of -.31 logit. Reference is made to the common logit scale in this research, since this is the same scale that is used in measuring both the person and the item difficulty; comparing both variables on the same interval scale. The difference between logit_{\max} where item B4.1 is and the logit_{\min} where item B4.4 is, is $\delta = .92$. This indicates that the item difficulty spread over .92 logit units.

The expected mean value of both infit and outfit is 1 (Wright & Linacre, 1994; Planinic *et al.*, 2010). Values < 1 suggest a lack of stochasticity in the data, potentially due to a violation of local independence. Local independence means that, after controlling for the latent trait, responses to items should be independent of each other (Fendrich *et al.*, 2009). Values > 1 are indicative of excessive variability, which may signify a departure from unidimensionality. The results in Table 5.6 show the average means value of 1.00 for both the infit and outfit

and this matches the value expected by the model. This means that the data for the items show goodness of fit, satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the AP sub-scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The concept of unidimensionality is very important for the Rasch model. All items are expected to work together and define a single underlying construct. The content of the items of the measure is considered an empirical definition of the construct. The point-measure correlation (PTMEA CORR) examines the presence of the construct in the measure. It is the correlation between the Rasch person ability measures and the person's response to the item (Linacre, 1994). Winsteps software has the capability to compute these correlations as Pearson product-moment correlation (r) coefficients. The size of correlations can indicate which items contribute more to the construct and which ones contribute less.

As depicted in Table 5.6, the point measure correlation ranged from .64 to .80, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the AP sub-scale and met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures, and *vice versa*. For this to be true, the correlations must be positive, as shown in Table 5.6. The lowest correlation is .64 for item B4.1 and its value is positive. There are no misfitting items.

5.3.1.3 *Principal Component Analysis (PCA)*

A further examination of unidimensionality which complements the use of fit statistics was conducted using Principal Component Analysis (PCA) of standardised residuals as shown in Table 5.7. The PCA of standardised residuals has an advantage over fit statistics in detecting departures from unidimensionality when (1) the level of common variance between components in multidimensional data increases and (2) there are approximately an equal number of items contributing to each component (Smith, 2004). To judge whether a residual component adequately constitutes a separate dimension, the researcher looked at the size

of the first eigenvalue (<2) of unexplained variance that is attributable to this residual contrast.

Table 5.7

Principal Component Analysis of Standardised Residuals for Administrative Processes Sub-Scale

```

INPUT: 652 PERSONS  5 ITEMS  MEASURED: 604 PERSONS  5 ITEMS  6 CATS  1.0.0
-----
                STANDARDISED RESIDUAL VARIANCE SCREE PLOT
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)
                Empirical      Modelled
Total variance in observations      =      9.1 100.0%      100.0%
Variance explained by measures      =      4.1 45.2%      45.9%
Unexplained variance (total)        =      5.0 54.8% 100.0%  54.1%
Unexplained variance in 1st contrast =      1.9 20.5%  37.5%
Unexplained variance in 2nd contrast =      1.3 13.7%  25.0%
Unexplained variance in 3rd contrast =      1.0 11.0%  20.1%
Unexplained variance in 4th contrast =      .9  9.5%  17.3%
Unexplained variance in 5th contrast =      .0  .0%   .1%

+-----+-----+
|CON-   |          |          INFIT OUTFIT | ENTRY |          |          INFIT OUTFIT | ENTRY |
| TRAST | LOADING | MEASURE  MNSQ MNSQ | NUMBER | ITEM | MEASURE  MNSQ MNSQ | NUMBER | ITEM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1     | .73    | -.31 .93 .96 | 4     | 4 B4.4 | -.64 | -.13 1.05 1.04 | 2     | 2 B4.2 |
| 1     | .73    | -.06 .98 .96 | 5     | 5 B4.5 | -.56 | -.11 .67 .67   | 3     | 3 B4.3 |
|      |        |          |      |      | -.31 | .61 1.35 1.35 | 1     | 1 B4.1 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+
|CON-   |          |          INFIT OUTFIT | ENTRY |          |          INFIT OUTFIT | ENTRY |
| TRAST | LOADING | MEASURE  MNSQ MNSQ | NUMBER | ITEM | MEASURE  MNSQ MNSQ | NUMBER | ITEM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1     | .73    | -.31 .93 .96 | 4     | 4 B4.4 |      |      |      |      |      |      |
| 1     | .73    | -.06 .98 .96 | 5     | 5 B4.5 |      |      |      |      |      |      |
|      |        |          |      |      |      |      |      |      |      |      |
| 1     | -.64   | -.13 1.05 1.04 | 2     | 2 B4.2 |      |      |      |      |      |      |
| 1     | -.56   | -.11 .67 .67   | 3     | 3 B4.3 |      |      |      |      |      |      |
| 1     | -.31   | .61 1.35 1.35 | 1     | 1 B4.1 |      |      |      |      |      |      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

```

The results in Table 5.7 show that only 45.2% of the variance was explained by the sub-scale, which indicates the presence of the first dominant factor. According to Reckase (1979), the variance explained by the first factor should be greater than 20% to indicate dimensionality. The unexplained variance explained by the first contrast had an eigenvalue of 1.9, which is slightly lower than the chance value of 2.0 (Smith, 2002). The sub-scale shows a two-strata separation ($G = 1.28$) with a marginal person reliability coefficient of .62. Individual items are not calibrated too far apart and they all contribute to the underlying construct (AP). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items are working together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well-separated with

sufficient width. However, the only noticeable problem is poor targeting of the measure in the sample. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.1.4 *Differential Item Functioning*

Differences among respondents regarding their perceptions of each item of the AP sub-scale were assessed using Differential Item Functioning (DIF) (Bond & Fox, 2007). DIF allows each item calibration to be compared between two or more groups in order to assess whether group membership affects responses to the items (Gothwall *et al.*, 2009). A negative DIF index shows that the item is easily agreed upon by a certain group while a positive DIF index means that an item is more difficult to be agreed upon by a group which has similar abilities but with different levels of probability in answering the item correctly. The criteria used for the DIF analysis in this research were DIF contrast $\geq .5 < 1$ ($p \leq .01$) and DIF contrast ≥ 1 ($p \leq .001$).

The age contrast DIF results are presented in figure 5.3. With the exception of respondents aged between 36 and 45 years, all other age groups reported difficulty with item B4.1. Extreme level of difficult was experienced by those respondents aged 56 years and older with regard to this item. No significant DIF were reported across all age groups for items B4.2 and B4.3. Regarding item B4.4, respondents older than 45 years found it easy to endorse. Those respondents older than 56 years found item B4.5 easier to endorse relative to other age groups.

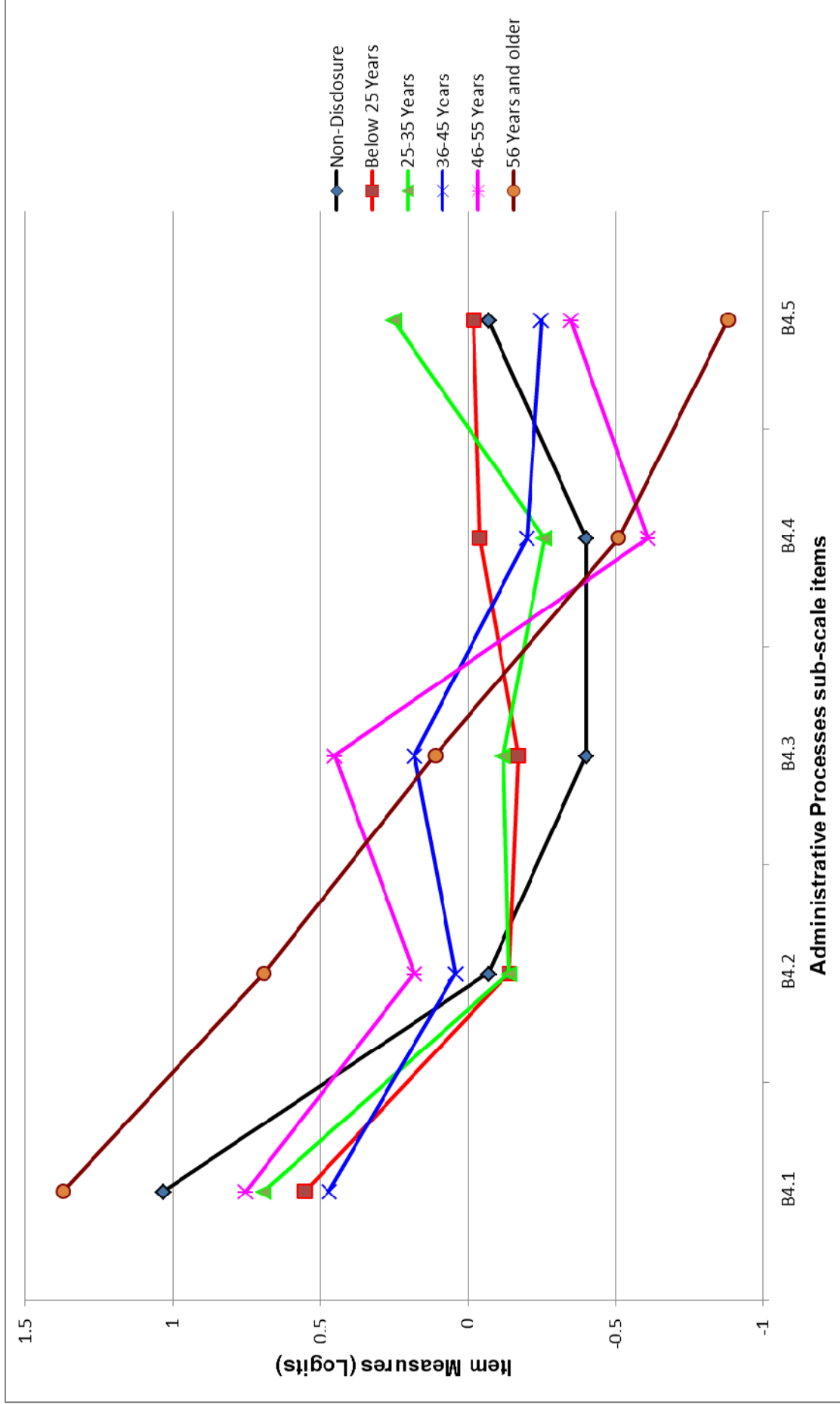
The gender contrast DIF results are presented in figure 5.4. Except for item B4.1 which was difficult for both males and females respectively, all other items of the Administrative Processes sub-scale were neither difficult nor easy.

The educational achievement contrast DIF results are presented in figure 5.5. With the exception of those respondents whose educational achievement is below matric/N1/N2 and those who hold Occupational Certificate/NHC, all other groups of respondents reported extreme difficulty in endorsing item B4.1. Furthermore, it was significantly very easy for respondents with educational achievement below matric/N1/N2 to endorse item B4.2. For item B4.3, respondents with Occupational Certificate/NHC found the item to be extremely difficult while those with a Doctorate Degree found the item to be extremely easy to endorse.

Respondents with a Professional/Honours Degree found items B4.4 and B4.5 to be extremely easy to endorse relative to other groups of respondents.

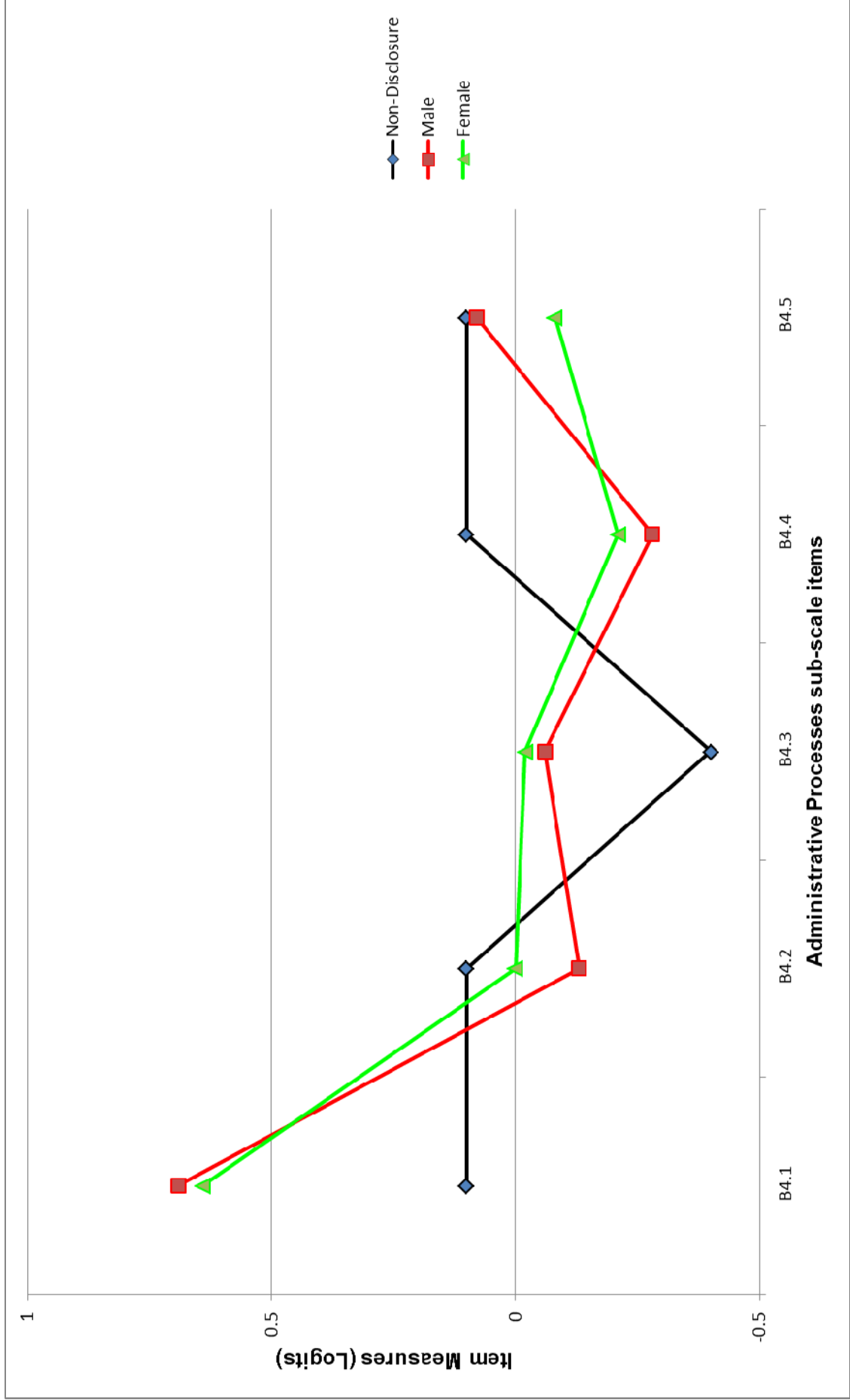
Figure 5.6 shows the results of the DIF contrast by the type of learning programme in which respondents were involved. The results show a statistically significant difference between respondents who are involved in apprenticeships relative to those involved in learnerships. Respondents involved in apprenticeships found it a little more difficult to endorse item B4.1 of the AP sub-scale. No significant DIF was reported for all other items of the scale between the two groups.

The occupation contrast DIF results are presented in figure 5.7. It is evident that item B4.1 was found to be difficult by Skills Development Officers/Providers, Employers/Managers and Learners/Apprentices. No significant DIF were reported across all occupations regarding items B4.2, 4.3 and B4.5. Regarding item B4.4, only Assessors/Facilitators reported difficulty with the item relative to other occupational groups.



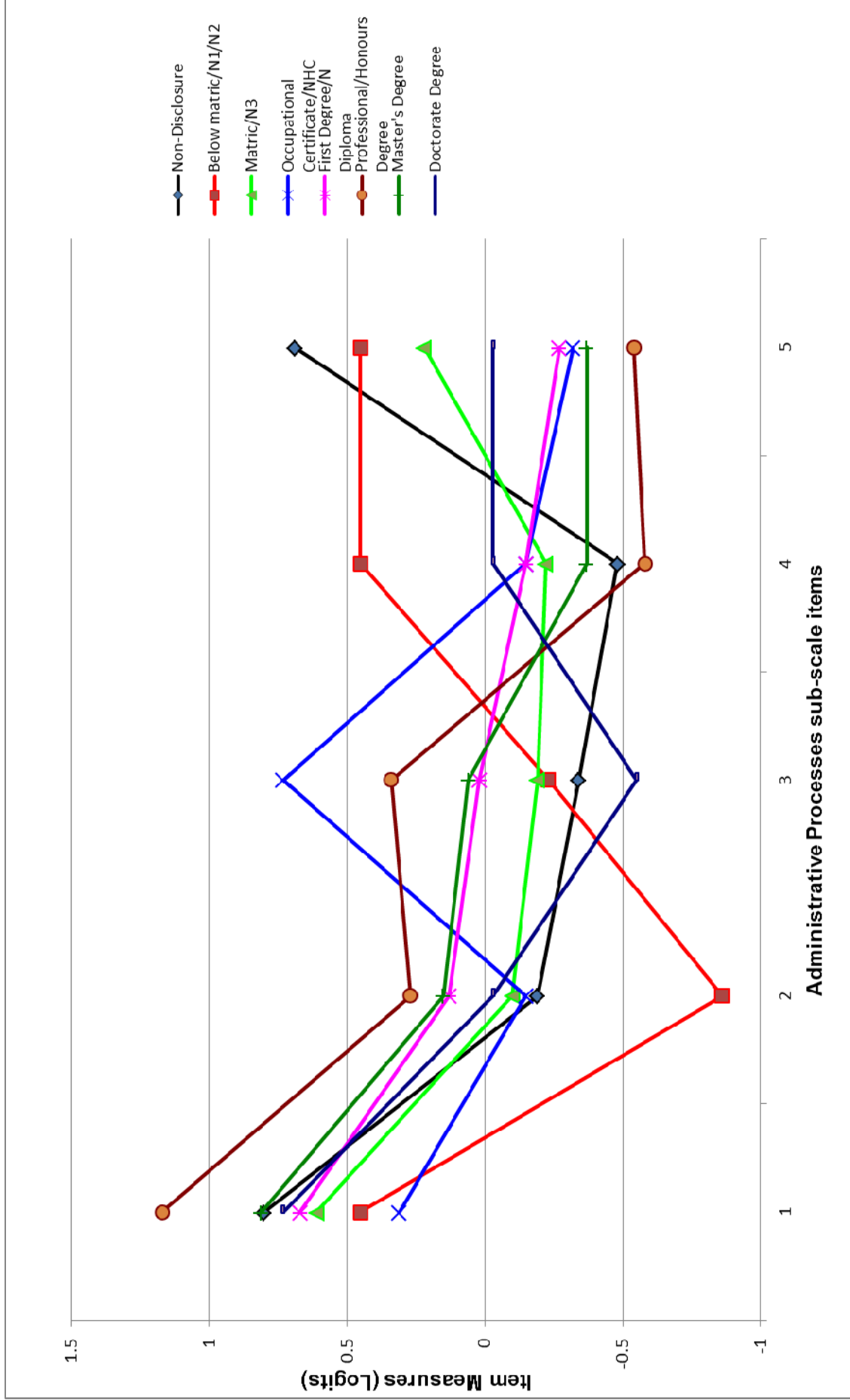
DIF parameters: ≤ -0.50 Logits = Insignificant; \geq 1.00</math> Logits = Notable and significant.

Figure 5.3. Age contrast plot for Administrative Processes Sub-Scale items



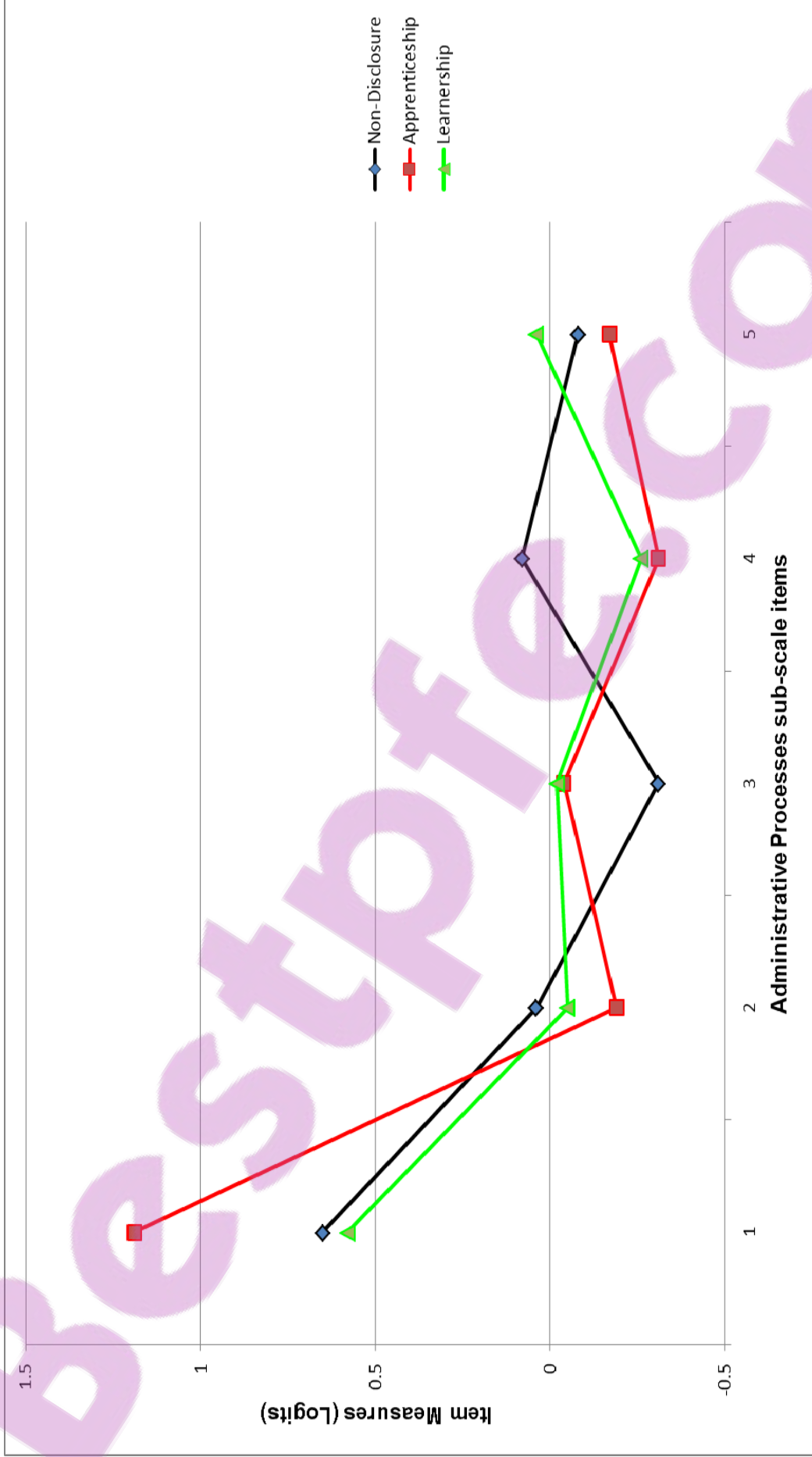
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.4. Gender contrast plot for Administrative Processes Sub-Scale items



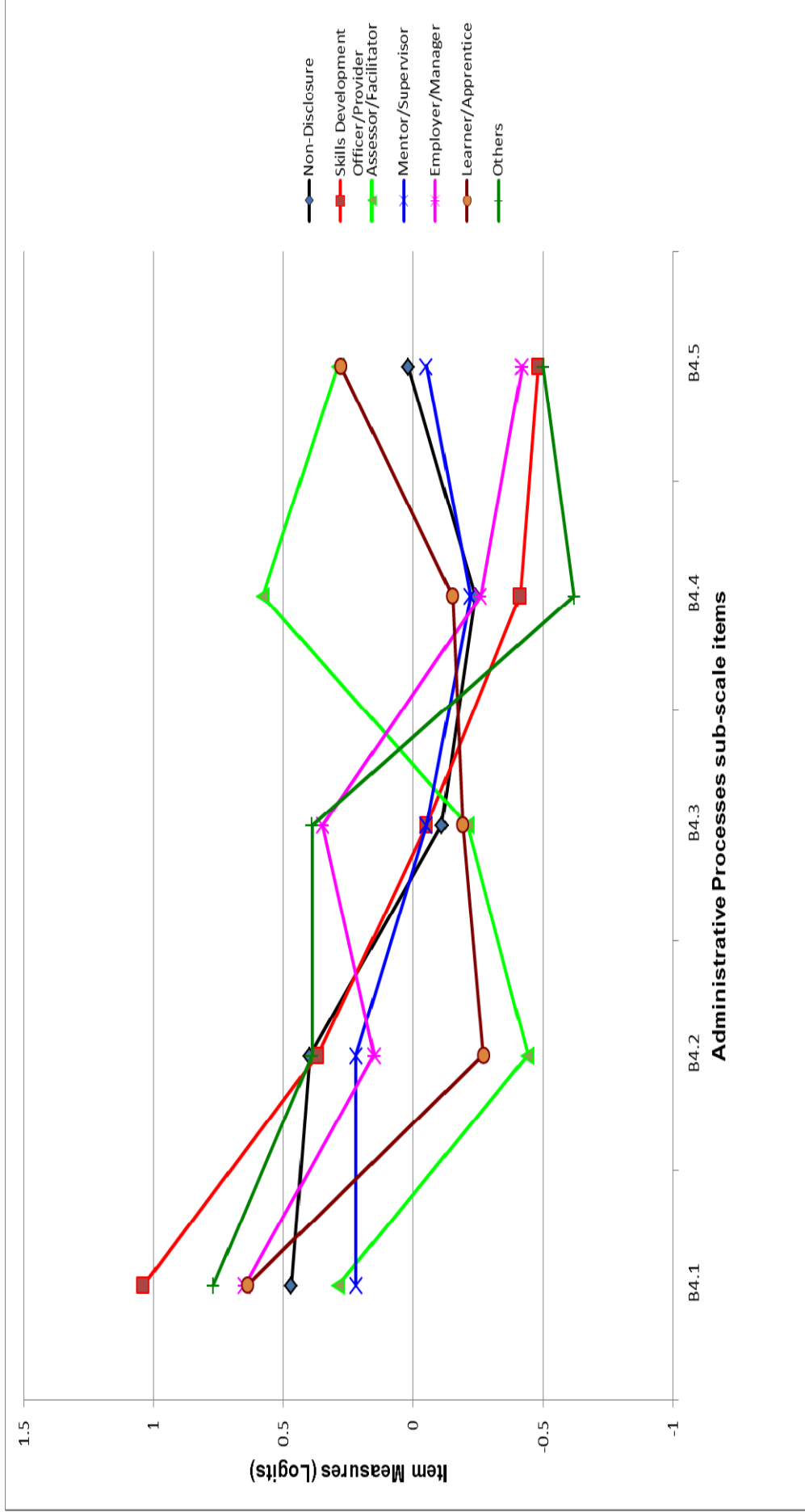
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.5. Educational achievement contrast plot for Administrative Processes Sub-scale items



DIF parameters: <math><0.50</math> Logits = Insignificant;

Figure 5.6. Learning Programme contrast plot for Administrative Processes Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.7. Occupation contrast plot for Administrative Processes Sub-Scale items

5.3.2 Environmental scanning sub-scale

As shown in Table 5.8, the Environmental Scanning (ES) sub-scale yielded a Cronbach alpha coefficient of .84 which is acceptable. About 98.7% of the responses to this sub-scale were valid. The results in Table 5.8 show a wider person spread of 6.39 logits.

Table 5.8
Summary Statistics for Environmental Scanning Sub-Scale

```

INPUT: 652 PERSONS 6 ITEMS MEASURED: 612 PERSONS 6 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 362 MEASURED (NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          | |
|---|---|---|---|---|---|---|---|---|
| MEAN      | 9.8    | 5.9    | -2.54   | .77    | .99    | .0    | .98    | -.1    |
| S.D.     | 3.5    | .3     | 1.24    | .20    | .87    | 1.1   | .86    | 1.1    |
| MAX.     | 30.0   | 6.0    | 2.29    | 1.12   | 8.40   | 4.6   | 8.35   | 4.6    |
| MIN.     | 5.0    | 4.0    | -4.10   | .32    | .01    | -4.1  | .01    | -4.0   |
|-----|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE | .85    | ADJ.SD | .90     | SEPARATION | 1.06   | PERSON RELIABILITY | .53   |
| MODEL RMSE | .80    | ADJ.SD | .95     | SEPARATION | 1.19   | PERSON RELIABILITY | .59   |
| S.E. OF PERSON MEAN = .07
+-----+-----+-----+-----+-----+-----+-----+-----+
MINIMUM EXTREME SCORE: 250 PERSONS
LACKING RESPONSES: 40 PERSONS
VALID RESPONSES: 98.7%
-----
SUMMARY OF 612 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          | |
|---|---|---|---|---|---|---|---|---|
| MEAN      | 8.2    | 5.9    | -3.71   | 1.22   |        |        |        |        |
| S.D.     | 3.3    | .3     | 1.70    | .56    |        |        |        |        |
| MAX.     | 30.0   | 6.0    | 2.29    | 1.90   |        |        |        |        |
| MIN.     | 3.0    | 3.0    | -5.41   | .32    |        |        |        |        |
|-----|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE | 1.36   | ADJ.SD | 1.02    | SEPARATION | .75    | PERSON RELIABILITY | .36   |
| MODEL RMSE | 1.34   | ADJ.SD | 1.04    | SEPARATION | .78    | PERSON RELIABILITY | .38   |
| S.E. OF PERSON MEAN = .07
+-----+-----+-----+-----+-----+-----+-----+-----+
PERSON RAW SCORE-TO-MEASURE CORRELATION = .89 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .84 (approximate due to missing data)
-----
SUMMARY OF 6 MEASURED (NON-EXTREME) ITEMS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          | |
|---|---|---|---|---|---|---|---|---|
| MEAN     | 589.0  | 357.2  | .00     | .09    | .99    | -.1   | .99    | -.2   |
| S.D.    | 27.9   | 2.2    | .20     | .00    | .15    | 1.4   | .16    | 1.8   |
| MAX.    | 633.0  | 359.0  | .33     | .09    | 1.24   | 2.2   | 1.24   | 2.7   |
| MIN.    | 547.0  | 353.0  | -.29    | .08    | .81    | -1.9  | .74    | -3.0  |
|-----|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE | .09    | ADJ.SD | .18     | SEPARATION | 2.02   | ITEM RELIABILITY | .80   |
| MODEL RMSE | .09    | ADJ.SD | .18     | SEPARATION | 2.09   | ITEM RELIABILITY | .81   |
| S.E. OF ITEM MEAN = .09
+-----+-----+-----+-----+-----+-----+-----+-----+
UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.96 (approximate due to missing data)
2143 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 3400.95

```



The mean score of -2.54 for the ES sub-scale shows that respondents had some difficulty in answering the items of the measure and therefore fall below expected performance. The person separation index ($G = 1.06$) could only separate respondents into one statistically distinct stratum of persons with a low person reliability coefficient of .53. The reliability coefficient can be improved by adding more items to the measure, by improving sample-item targeting or by stretching the sample ability variance.

However, reliability for the items is very good ($\alpha = .80$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show a good item separation ($G = 2.02$) which is broader than that of a person. This index translates to about three levels of item difficulties, these being, easy, moderate and difficult. An item reliability of .80 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.2.1 *Person-Measure targeting*

Figure 5.8 depicts the Person-Item Map for the ES sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot.

On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.8 depict that the items were difficult for the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 2.5 logits above the mean person ability.

A close inspection of figure 5.8 reveals that the width of the sub-scale items is less than 1 logit, whereas the width of the person distribution is just over 6 logits. All the items of the sub-scale are located between -.5 logit and +.5 logit, but only a small fraction of persons can be found in this range. Only two items (B2.5 and B3.3) are similar in difficulty. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.9. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

5.3.2.2 Item fit statistics

It is evident in Table 5.9 that the spread of logit scale of item measure yielded a maximum value of .33 logit and a minimum value of -.29 logit. The difference between logit_{\max} where item B2.2 is and the logit_{\min} where item B2.4 is, was $\delta = .62$. This indicates that the item difficulty spread over .62 logit units.

Table 5.9
Item Fit Statistics for Environmental Scanning Sub-Scale

INPUT: 652 PERSONS 6 ITEMS MEASURED: 612 PERSONS 6 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.06 REL.: .53 ... ITEM: REAL SEP.: 2.02 REL.: .80												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
2	796	605	.33	.09	.81	-1.9	.74	-3.0	.69	71.9	66.6	B2.2
3	820	607	.16	.09	.93	-.7	.94	-.7	.69	68.5	65.1	B2.3
6	821	599	.00	.09	1.10	1.0	1.14	1.5	.64	61.8	64.0	B3.3
5	846	607	-.04	.09	.99	-.1	.95	-.5	.70	65.7	62.3	B2.5
1	857	605	-.16	.08	1.24	2.2	1.24	2.7	.65	60.2	61.8	B2.1
4	882	608	-.29	.08	.86	-1.4	.91	-1.0	.74	66.6	60.2	B2.4
MEAN	589.0	357.2	.00	.09	.99	-.1	.99	-.2		65.8	63.3	
S.D.	27.9	2.2	.20	.00	.15	1.4	.16	1.8		3.9	2.1	

Furthermore, Table 5.9 shows the average mean value of .99 for both the infit and outfit and this is slightly lower than the value expected by the model. This indicates that there is 1% deficiency in the Rasch model predicted randomness in the data. However, the data for the items show goodness of fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive, must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the ES sub-scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The results depicted in Table 5.9 also show that the point measure correlation (PTMEA CORR) ranged from .64 to .74, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the Environmental Scanning construct and have met all the criteria of a quality question, and

thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and *vice versa*. For this to be true, the correlations must be positive as shown in Table 5.9. The lowest correlation is .64 for item B3.3 and its value is positive. There are no misfitting items shown in Table 5.9.

5.3.2.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.10.

Table 5.10

Principal Component Analysis of Standardised Residuals for Environmental Scanning Sub-Scale

INPUT: 652 PERSONS 6 ITEMS MEASURED: 612 PERSONS 6 ITEMS 6 CATS 1.0.0												

STANDARDISED RESIDUAL VARIANCE SCREE PLOT												
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)												
						Empirical			Modelled			
Total variance in observations =						11.1	100.0%				100.0%	
Variance explained by measures =						5.1	45.8%				45.2%	
Unexplained variance (total) =						6.0	54.2%	100.0%				54.8%
Unexplained variance in 1st contrast =						1.4	12.7%	23.5%				
Unexplained variance in 2nd contrast =						1.3	11.7%	21.6%				
Unexplained variance in 3rd contrast =						1.2	10.6%	19.5%				
Unexplained variance in 4th contrast =						1.1	10.2%	18.8%				
Unexplained variance in 5th contrast =						1.0	9.0%	16.5%				

+-----+-----+																				
CON-		INFIT OUTFIT					ENTRY		INFIT OUTFIT					ENTRY						
TRAST	LOADING	MEASURE	MNSQ	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	
+-----+-----+																				
1	.62	.16	.93	.94		3	3 B2.3	-	.00	1.10	1.14	6	6 B3.3	-	.00	1.10	1.14	6	6 B3.3	
1	.53	.33	.81	.74		2	2 B2.2	-	-.50	-.04	.99	.95	5	5 B2.5	-	-.04	.99	.95	5	5 B2.5
1	.32	-.29	.86	.91		4	4 B2.4	-	-.17	-.16	1.24	1.24	1	1 B2.1	-	-.16	1.24	1.24	1	1 B2.1
+-----+-----+																				
CON-		INFIT OUTFIT					ENTRY		INFIT OUTFIT					ENTRY						
TRAST	LOADING	MEASURE	MNSQ	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	
+-----+-----+																				

1	.62	.16	.93	.94		3	3 B2.3												
1	.53	.33	.81	.74		2	2 B2.2												
1	.32	-.29	.86	.91		4	4 B2.4												
+-----+-----+																			
1	-.60	.00	1.10	1.14		6	6 B3.3												
1	-.50	-.04	.99	.95		5	5 B2.5												
1	-.17	-.16	1.24	1.24		1	1 B2.1												
+-----+-----+																			

The PCA results in Table 5.10 show that only 45.8% of the variance was explained by the measure as compared to the 45.2% modelled. The unexplained variance explained by the first contrast had an eigenvalue of 1.4, which is lower than the chance value of 2.0 (Smith, 2002). The unexplained variance explained in the second, third fourth and fifth contrast is 11.7%, 10.6%, 10.2% and 9.0% respectively. Taken together, the fact that the items of the ES sub-scale fit the model and the higher variance is explained by the measure (1.4 eigenvalues in the first contrast), these results support the unidimensionality of the ES sub-scale.

As a result, the ES sub-scale fits the Rasch model and is unidimensional. Individual items are not calibrated too far apart and they all contribute to the underlying construct (ES). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well separated with sufficient width. However, several problems are noticeable: poor targeting of the measure on the sample; poor person separation index (only one stratum identified: $G = 1.06$); and a low person reliability coefficient at .53. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.2.4 *Differential Item Functioning*

Figure 5.9 shows the DIF results contrasting different age groups of respondents with regards to items of the ES sub-scale. It is clear that respondents aged 46 years and older found it extremely difficult to endorse item B2.2. Furthermore, respondents aged between 46 and 55 years expressed some difficulty in endorsing item B2.3. There were no significant DIF variations across all age groups for all other items of the ES sub-scale.

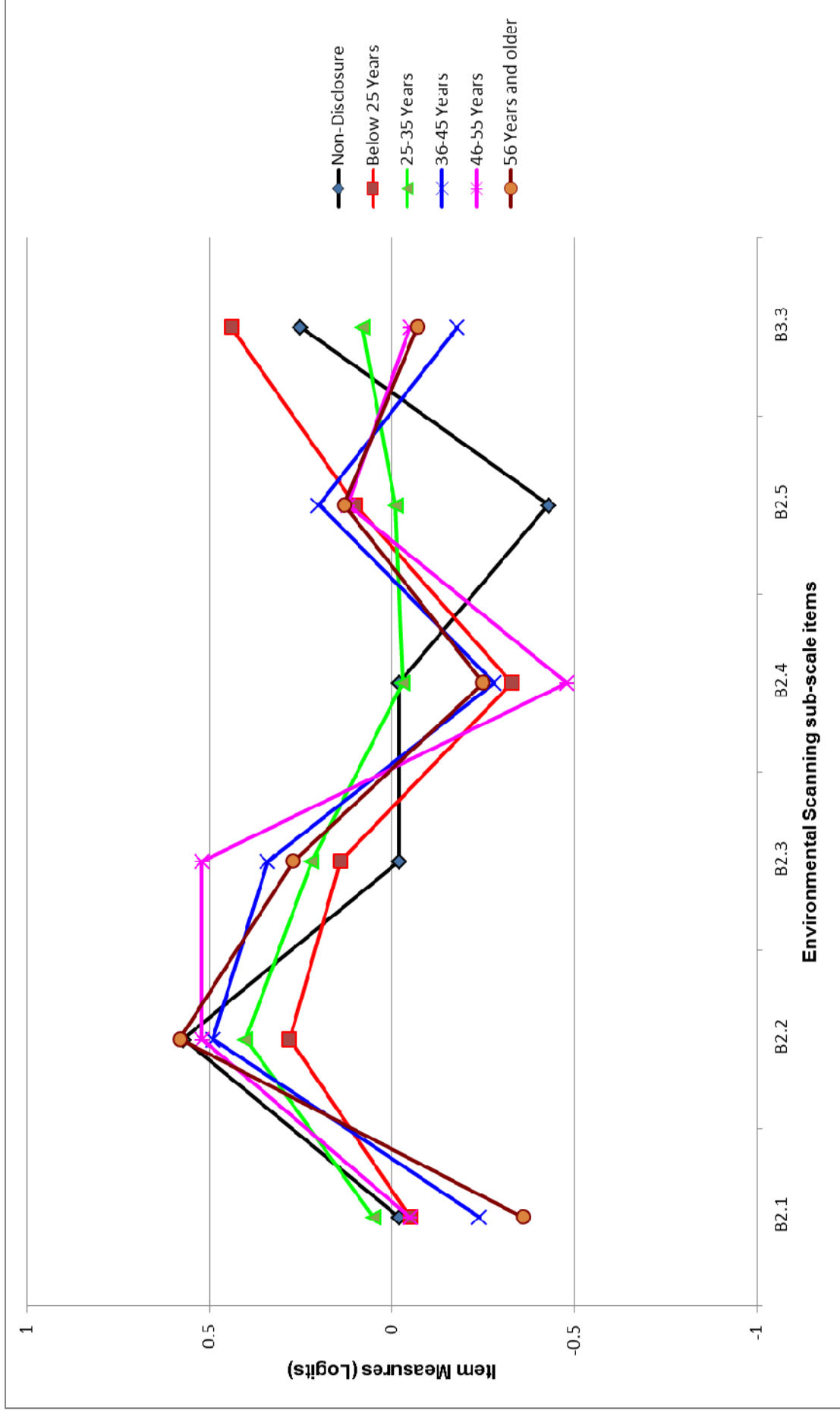
Figure 5.10 shows the DIF results contrasting male and female respondents. Male respondents reported extreme difficulties in endorsing item B2.2 relative to their female counterparts. There were no significant DIF variations between male and female respondents across all other items of the ES sub-scale.

Figure 5.11 shows the DIF results of the educational achievement contrast for the items of the ES sub-scale. The results show that respondents with a Doctorate Degree found it extremely easy to endorse item B2.1 when compared to those with First Degree/N Diploma.

Furthermore, respondents with a Doctorate Degree found it extremely easy to endorse item B2.4 when compared to those with Occupational Certificate/NHC. All respondents found it difficult to endorse item B2.2, with the most extreme difficulties reported by those with an educational achievement below matric/N1/N2, those with Occupational Certificate/NHC and those with a professional/Honours Degree. No significant DIF variations were reported for item B2.3. For item B2.4, respondents with an educational achievement below matric/N1/N2, those with Occupational Certificate/NHC and those with a professional/Honours Degree found it very easy to endorse the item. However, respondents with educational level below matric/N1/N2 found it difficult to endorse item B3.3.

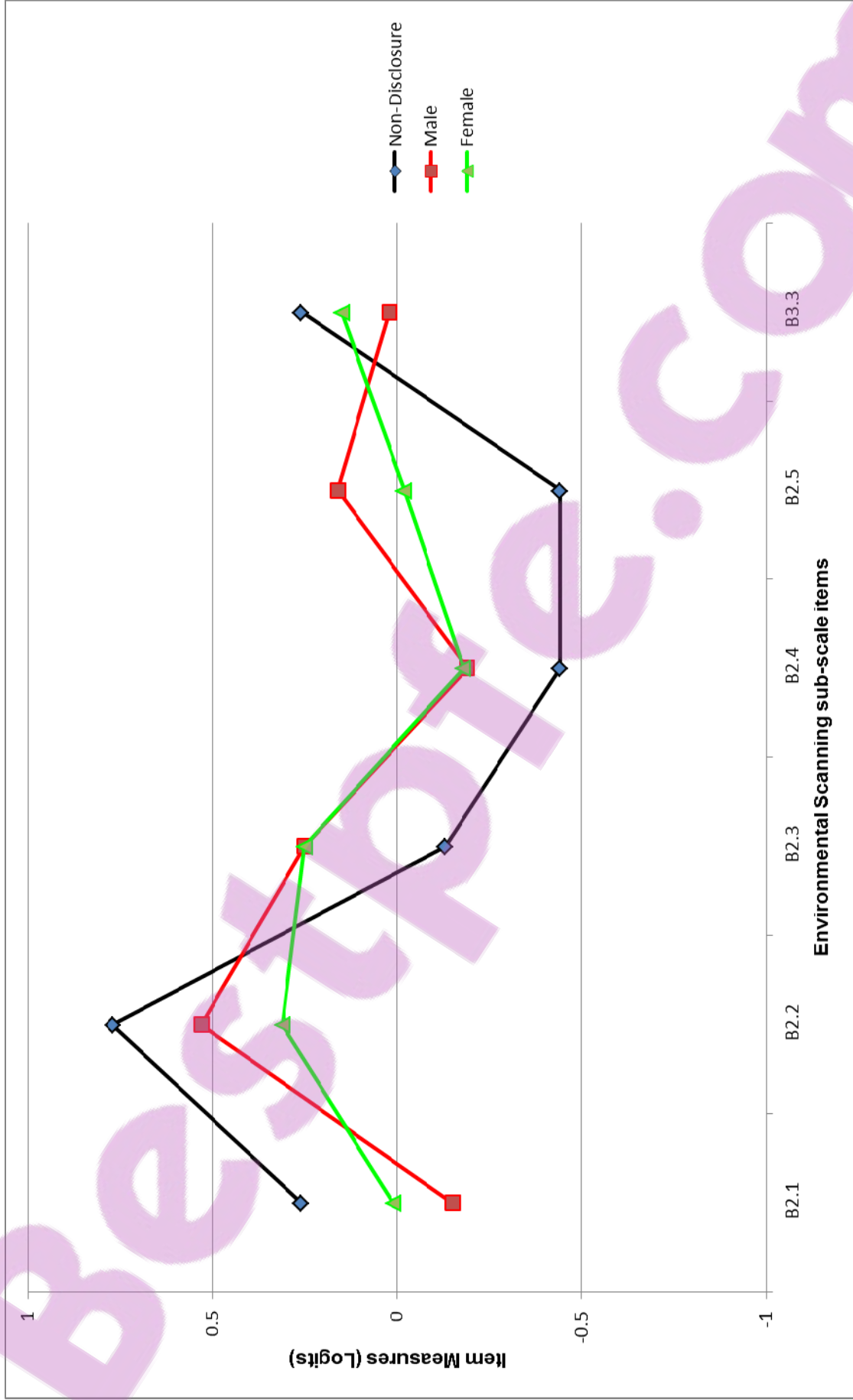
Figure 5.12 shows the DIF results of the contrast for the type of learning programme in which respondents are involved. A statistically significant DIF is reported for respondents involved in apprenticeships. This group found it extremely difficult to endorse item B2.1 when compared to the learnership group which found it easy to endorse the same item. No significant DIF was reported between the two groups for all other items of the ES sub-scale.

Figure 5.13 shows the DIF results for the occupation contrast with respect to the items of the ES sub-scale. Skills Development Officers/Providers and Employers/Managers reported extreme difficulty with regard to endorsing item B2.2. Furthermore, a significant DIF variation is reported for item B2.3. Assessors/Facilitators found it extremely difficult to endorse item B2.3 although the rest of the groups reported some degree of difficulty too. Contrary to that, Assessors/Moderators found item B3.3 very easy to endorse relative to other groups. There was no significant DIF reported for all other items of the ES sub-scale with regard to occupation.



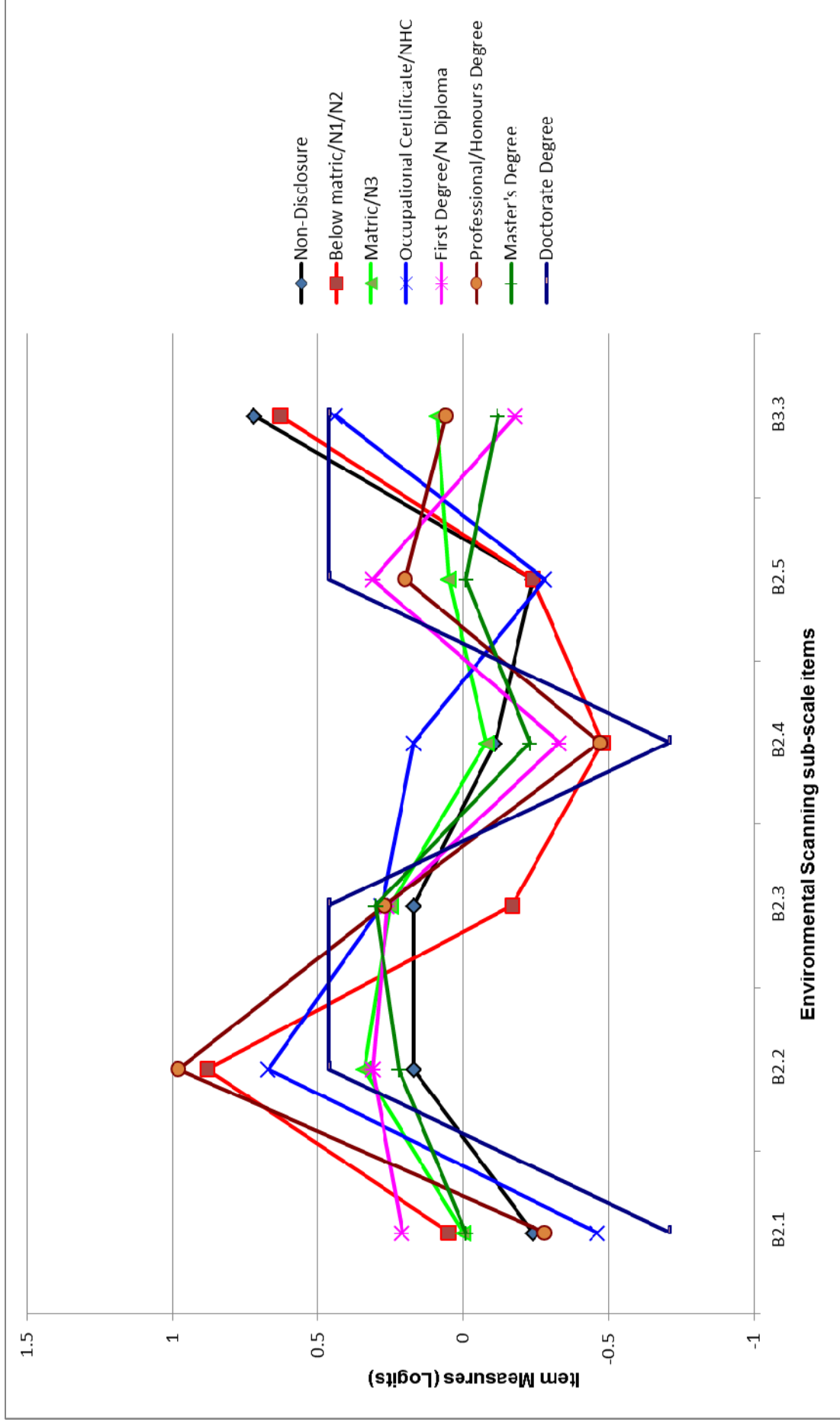
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.9. Age contrast plot for Environmental Scanning Sub-Scale items



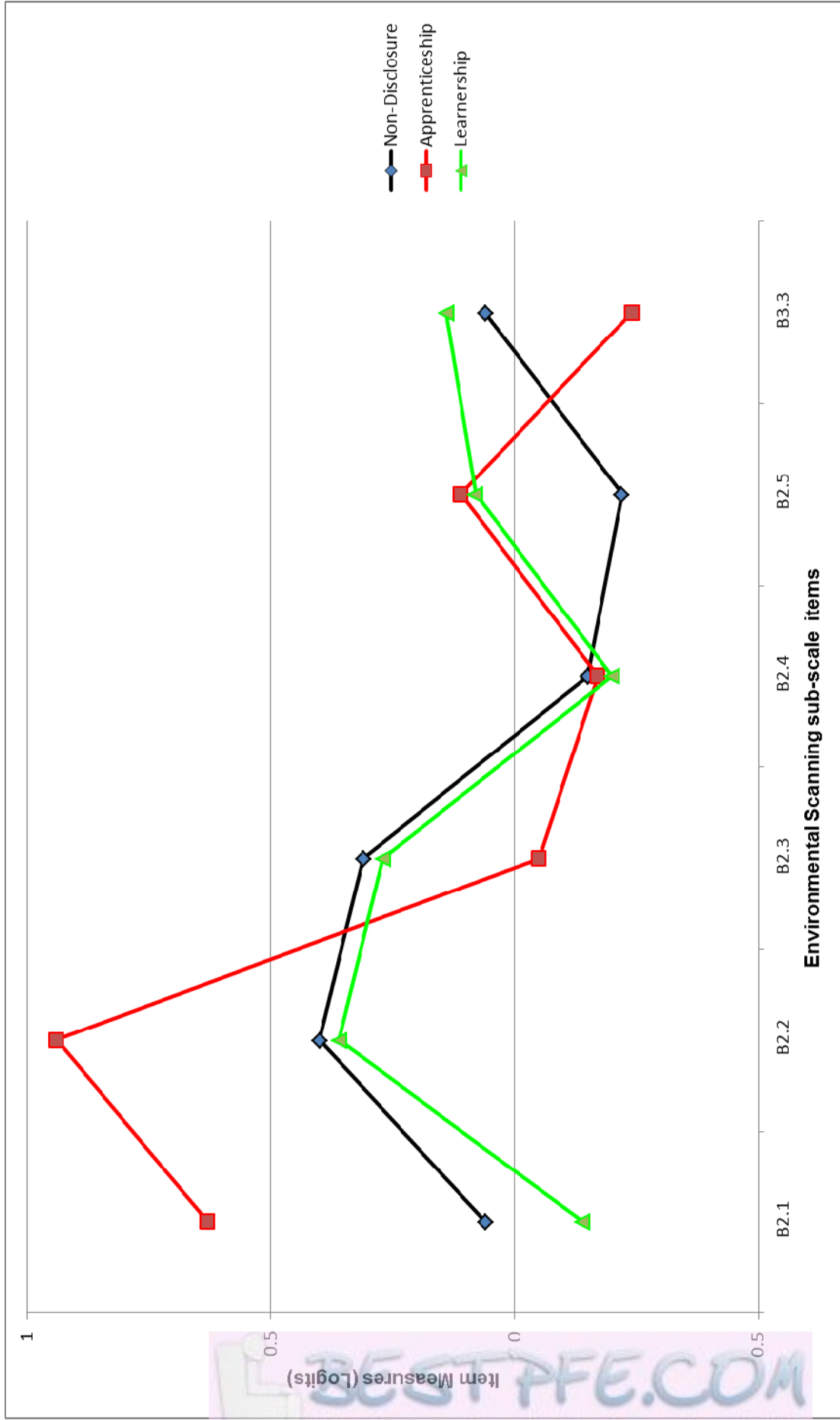
DIF parameters: <math>< -0.50</math> Logits = Insignificant;

Figure 5.10. Gender contrast plot for Environmental Scanning Sub-Scale items



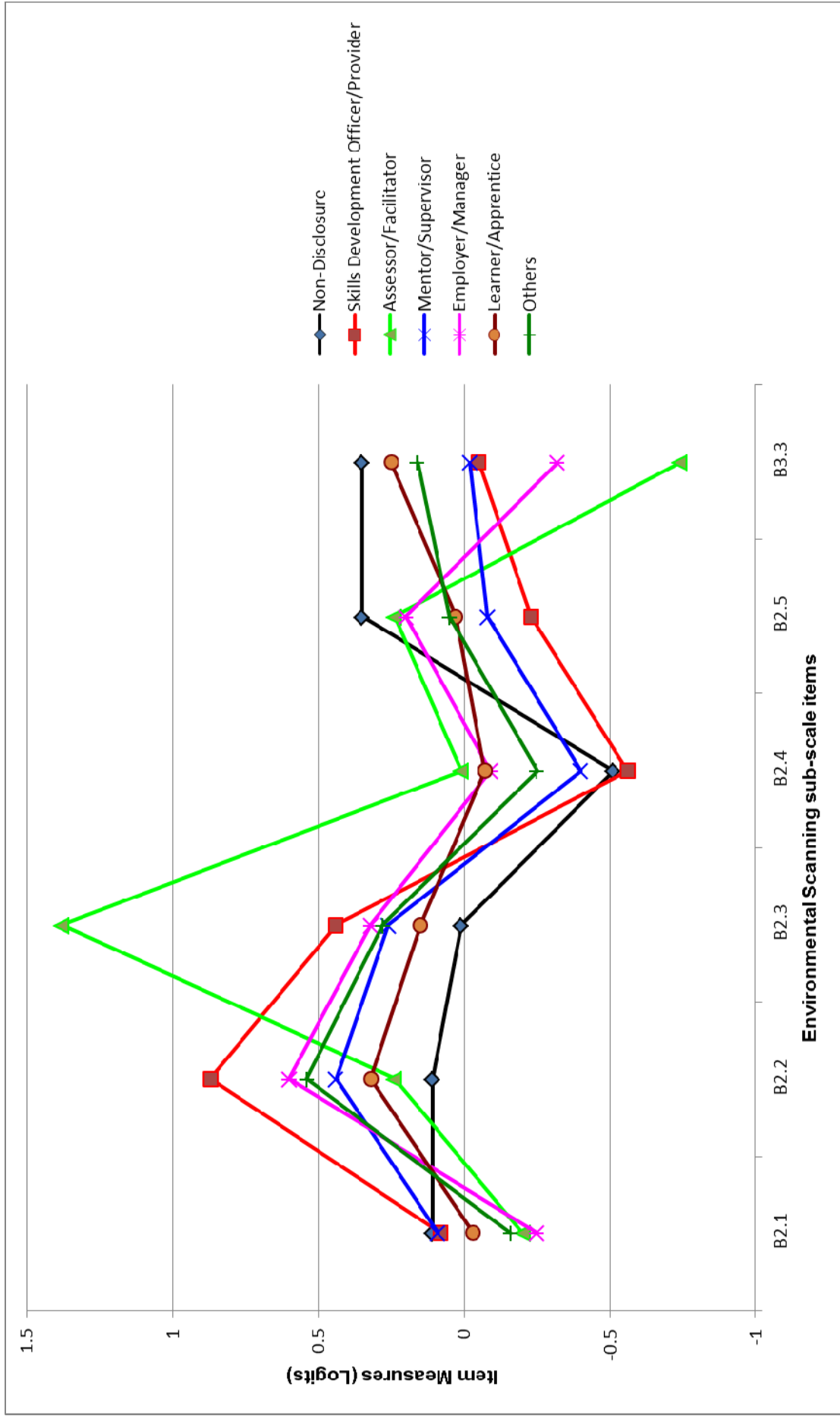
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.11. Educational achievement contrast plot for Environmental Scanning Sub-Scale items



DIF parameters: <math><0.50</math> Logits = Insignificant;

Figure 5.12. Learning Programme contrast plot for Environmental Scanning Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.13. Occupation contrast plot for Environmental Scanning Sub-Scale items

5.3.3 Monitoring and evaluation sub-scale

As shown in Table 5.11, the Monitoring and Evaluation (ME) sub-scale yielded a Cronbach alpha coefficient of .79 which is acceptable. About 97.5% of the responses to this sub-scale were valid. The results in Table 5.11 show a wider person spread of 5.83 logits.

Table 5.11

Summary Statistics for Monitoring and Evaluation Sub-Scale

```

INPUT: 652 PERSONS 5 ITEMS MEASURED: 607 PERSONS 5 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 456 MEASURED (NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          | MEASURE | MODEL  | INFIT   | OUTFIT  |          |          |
|          COUNT       |          |         | ERROR  | MNSQ   | ZSTD    | MNSQ   | ZSTD    |
+-----+-----+-----+-----+-----+-----+-----+-----+
| MEAN      | 8.8     | 4.9     | -2.02  | .77     | .98     | -.1    | .97     |
| S.D.     | 3.0     | .5      | 1.22   | .20     | .87     | 1.1    | .85     |
| MAX.     | 28.0    | 5.0     | 1.99   | 1.27    | 6.47    | 3.7    | 6.33    |
| MIN.     | 3.0     | 1.0     | -3.84  | .33     | .00     | -4.0   | .00     |
+-----+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE | .87    | ADJ.SD | .86    | SEPARATION | .99    | PERSON RELIABILITY | .49    |
| MODEL RMSE | .80    | ADJ.SD | .93    | SEPARATION | 1.16   | PERSON RELIABILITY | .58    |
| S.E. OF PERSON MEAN = .06
+-----+-----+-----+-----+-----+-----+-----+-----+
| MINIMUM EXTREME SCORE: 151 PERSONS
| LACKING RESPONSES: 45 PERSONS
| VALID RESPONSES: 97.5%
+-----+-----+-----+-----+-----+-----+-----+-----+
SUMMARY OF 607 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          | MEASURE | MODEL  | INFIT   | OUTFIT  |          |          |
|          COUNT       |          |         | ERROR  | MNSQ   | ZSTD    | MNSQ   | ZSTD    |
+-----+-----+-----+-----+-----+-----+-----+-----+
| MEAN      | 7.8     | 4.9     | -2.79  | 1.05    |         |         |         |
| S.D.     | 3.2     | .5      | 1.71   | .51     |         |         |         |
| MAX.     | 28.0    | 5.0     | 1.99   | 1.95    |         |         |         |
| MIN.     | 2.0     | 1.0     | -5.18  | .33     |         |         |         |
+-----+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE | 1.20   | ADJ.SD | 1.22   | SEPARATION | 1.01   | PERSON RELIABILITY | .51    |
| MODEL RMSE | 1.16   | ADJ.SD | 1.25   | SEPARATION | 1.08   | PERSON RELIABILITY | .54    |
| S.E. OF PERSON MEAN = .07
+-----+-----+-----+-----+-----+-----+-----+-----+
| PERSON RAW SCORE-TO-MEASURE CORRELATION = .87 (approximate due to missing data)
| CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .79 (approximate due to missing data)
+-----+-----+-----+-----+-----+-----+-----+-----+
SUMMARY OF 5 MEASURED (NON-EXTREME) ITEMS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          | MEASURE | MODEL  | INFIT   | OUTFIT  |          |          |
|          COUNT       |          |         | ERROR  | MNSQ   | ZSTD    | MNSQ   | ZSTD    |
+-----+-----+-----+-----+-----+-----+-----+-----+
| MEAN      | 804.6   | 444.8   | .00    | .07     | .99     | -.1    | .97     |
| S.D.     | 38.8   | 4.3     | .23    | .00     | .13     | 1.4    | .14     |
| MAX.     | 849.0  | 451.0   | .35    | .08     | 1.17    | 1.7    | 1.16    |
| MIN.     | 746.0  | 439.0   | -.23   | .07     | .84     | -1.8   | .80     |
+-----+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE | .07    | ADJ.SD | .22    | SEPARATION | 3.01   | ITEM RELIABILITY | .90    |
| MODEL RMSE | .07    | ADJ.SD | .22    | SEPARATION | 3.10   | ITEM RELIABILITY | .91    |
| S.E. OF ITEM MEAN = .12
+-----+-----+-----+-----+-----+-----+-----+-----+
| UMEAN=.000 USCALE=1.000
| ITEM RAW SCORE-TO-MEASURE CORRELATION = -.92 (approximate due to missing data)
| 2224 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 3904.58

```

The mean score of -2.02 for the ME sub-scale shows that respondents had some difficulty in answering the items of the measure and therefore fall below expected performance. The person separation index ($G = .99$) could only separate respondents into one statistically distinct stratum of persons with a low person reliability coefficient of .49. The reliability coefficient can be improved by adding more items to the measure, by improving sample-item targeting or by stretching the sample ability variance.

However, the reliability for the items is extremely good ($\alpha = .90$). The results show a good item separation ($G = 3.01$) which is broader than that of a person. This index translates to about four levels of item difficulty. An item reliability of .90 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.3.1 *Person-Measure targeting*

Figure 5.14 depicts the Person-Item Map for the ME sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot. On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.14 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 2 logit units above the mean person ability.

A close inspection of figure 5.14 reveals that the width of the sub-scale is less than 1 logit, whereas the width of the person distribution is 6 logits. All the items of the sub-scale are located between -.5 logit and +.5 logit, but only a small fraction of persons can be found in this range. Only two items (B3.7 and B9.1) are similar in difficulty. Items B3.6 and B3.8 are positioned positively slightly above the item mean, whereas the remaining items are slightly below the item mean. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.12. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

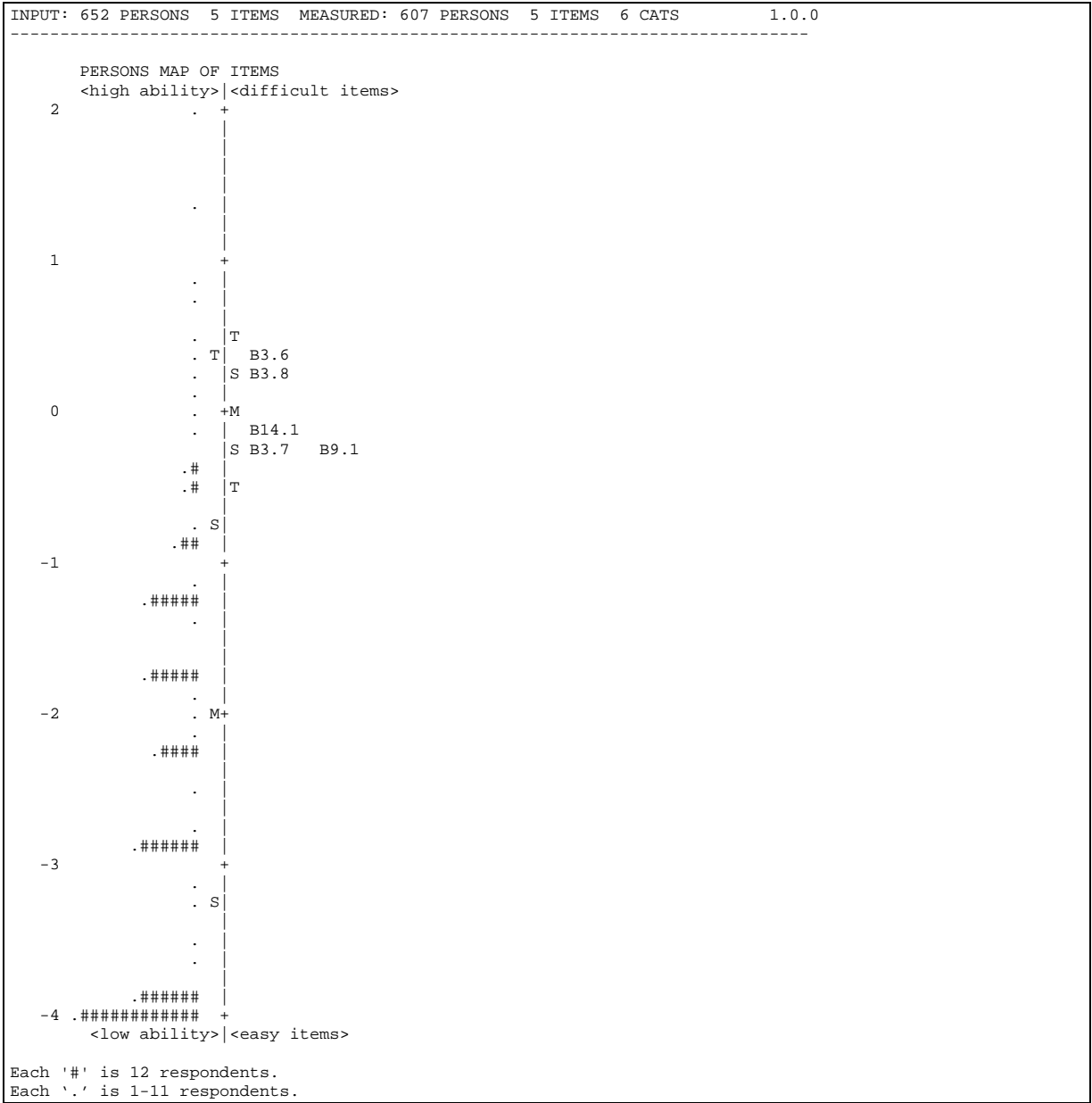


Figure 5.14. Items-Persons Map for Monitoring and Evaluation Sub-Scale

5.3.3.2 Item fit statistics

It is evident in Table 5.12 that the spread of logit scale of item measure yielded a maximum value of .35 logit units and a minimum value of -.23 logit units. The difference between $logit_{max}$ where item B3.6 is and the $logit_{min}$ where item B9.1 is, is $\delta = .58$. This indicates that the item difficulty is spread over .58 logit units.

Table 5.12

Item Fit Statistics for Monitoring and Evaluation Sub-Scale

INPUT: 652 PERSONS 5 ITEMS MEASURED: 607 PERSONS 5 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: .99 REL.: .49 ... ITEM: REAL SEP.: 3.01 REL.: .90												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
1	896	597	.35	.08	.92	-.9	.80	-2.6	.67	68.9	63.5	B3.6
3	927	601	.21	.07	.89	-1.2	.96	-.5	.67	62.3	61.6	B3.8
5	947	576	-.13	.07	1.17	1.7	1.11	1.4	.65	60.1	59.8	B14.1
2	999	596	-.20	.07	.84	-1.8	.84	-2.1	.72	65.5	58.0	B3.7
4	978	578	-.23	.07	1.13	1.4	1.16	1.9	.63	54.4	57.7	B9.1
MEAN	804.6	444.8	.00	.07	.99	-.1	.97	-.4		62.2	60.1	
S.D.	38.8	4.3	.23	.00	.13	1.4	.14	1.8		4.9	2.2	

As depicted in Table 5.12, the point measure correlation (PTMEA CORR) ranged from .63 to .72, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the ME sub-scale and met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, the item is acceptable. The average means for the infit and outfit MNSQ of .99 (1% deficiency in predicted randomness) and .97 (3% deficiency in predicted randomness) respectively are slightly lower than the value expected by the model (1.00), meaning that the data for the items showed goodness of fit satisfying the condition that the values should not exceed 1.40. This data suggests that the amount of distortion of the sub-scale is minimal. The standard deviations of both the infit and outfit MNSQ (.13 and .14 respectively) are slightly higher than the expected value of .00, even though the data showed little variation from the Rasch Model expectation. The lowest correlation is .63 for item B9.1 and its value is positive. There are no misfitting items shown in the table.

5.3.3.3 *Principal Component Analysis (PCA)*

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.13. The PCA results in Table 5.13 show that only 46.4% of the variance was explained by the ME sub-scale. The unexplained variance explained by the first contrast had an eigenvalue of 1.7, which is slightly lower than the chance value of 2.0 (Smith, 2002). Taken together, the fact that all items of the ME sub-scale fit the model and that the raw variance explained by the measure (46.4%) is more than two times the

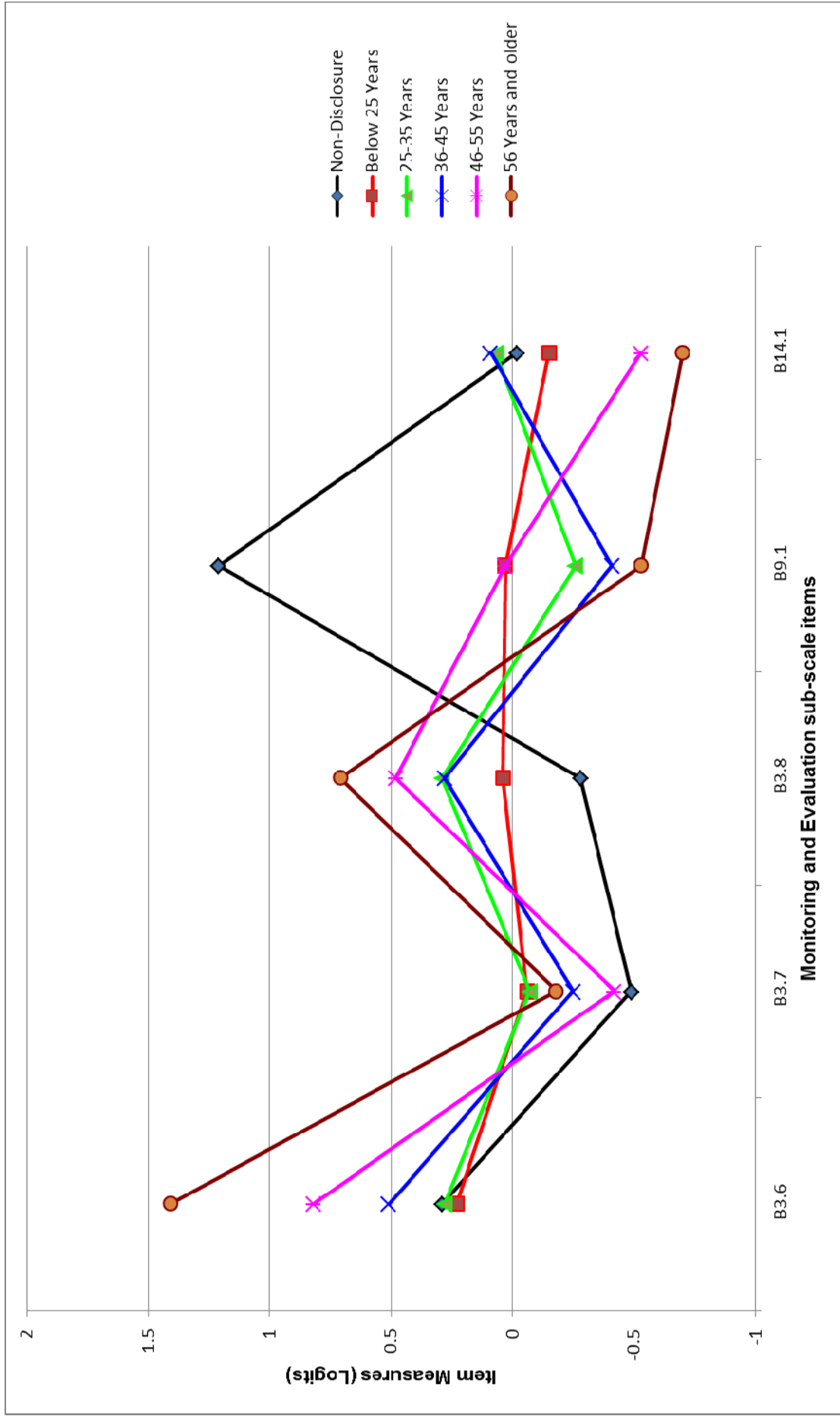
variance explained by the first contrast (18.4%) supports the unidimensionality of the ME sub-scale. There is no noticeable evidence of a secondary dimension emerging in the items.

Table 5.13

Principal Component Analysis of Standardised Residuals for Monitoring and Evaluation Sub-Scale

INPUT: 652 PERSONS 5 ITEMS MEASURED: 607 PERSONS 5 ITEMS 6 CATS 1.0.0																																																																																																																																																																																																							
STANDARDISED RESIDUAL VARIANCE SCREE PLOT																																																																																																																																																																																																							
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)																																																																																																																																																																																																							
				Empirical				Modelled																																																																																																																																																																																															
Total variance in observations =				9.3 100.0%				100.0%																																																																																																																																																																																															
Variance explained by measures =				4.3 46.4%				45.3%																																																																																																																																																																																															
Unexplained variance (total) =				5.0 53.6%				100.0% 54.7%																																																																																																																																																																																															
Unexplained variance in 1st contrast =				1.7 18.4%				34.2%																																																																																																																																																																																															
Unexplained variance in 2nd contrast =				1.2 13.1%				24.5%																																																																																																																																																																																															
Unexplained variance in 3rd contrast =				1.1 12.3%				22.9%																																																																																																																																																																																															
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As a result, the ME sub-scale fits the Rasch model and is unidimensional. Individual items are not calibrated too far apart and they all contribute to the underlying ME construct. It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well separated with sufficient width. However, several problems are noticeable: poor targeting of the measure on the sample; poor person separation index (only one strata identified; G = .99); and a poor person reliability coefficient at .49. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the ME sub-scale.



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

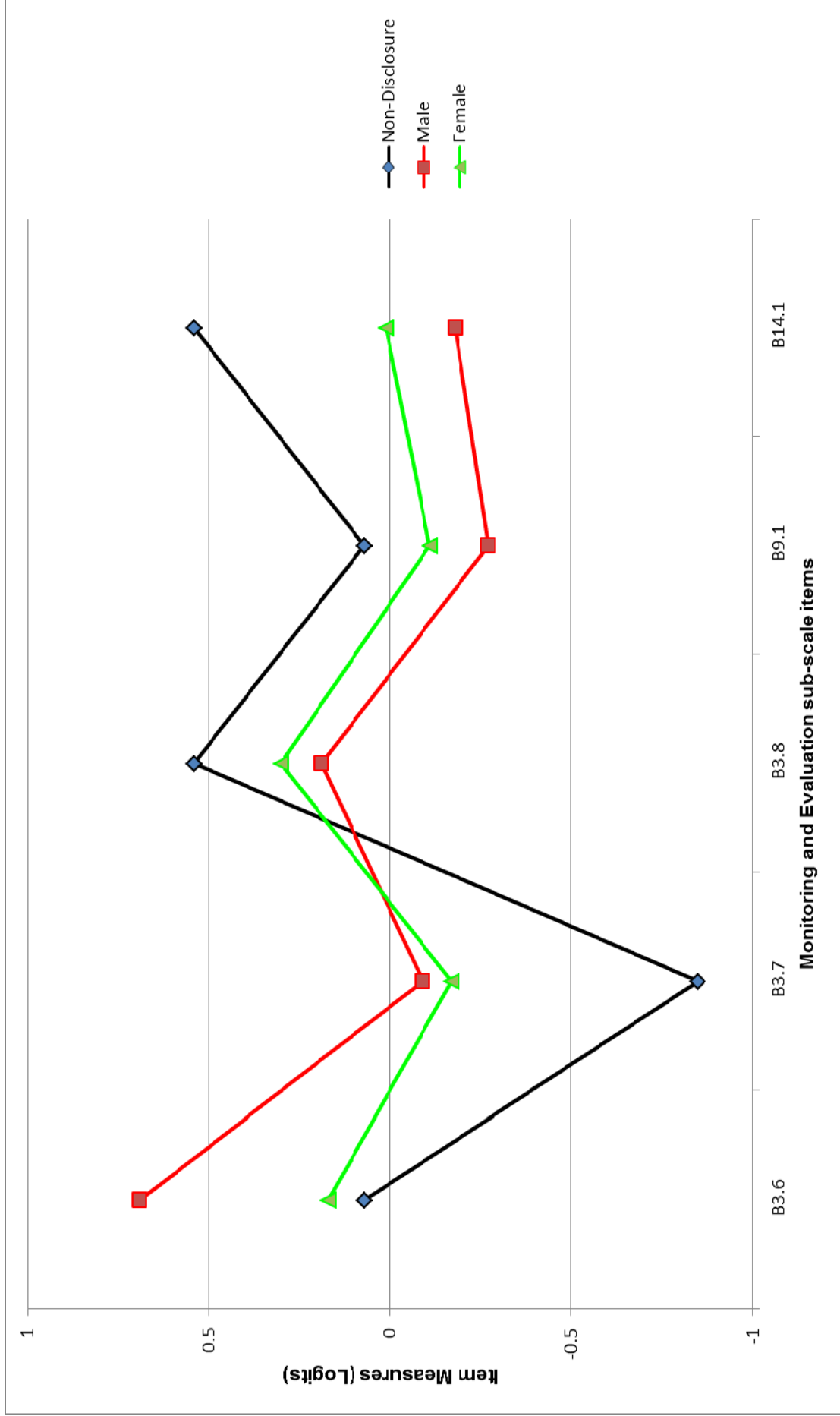
Figure 5.15. Age contrast plot for Monitoring and Evaluation Sub-Scale items

5.3.3.4 Differential Item Functioning

Figure 5.15 depicts the DIF results contrasting different age groups with respect to the various items of the ME sub-scale. Relative to the other age groups which also reported some degree of difficulty, respondents aged 46 years and older found it extremely difficult to endorse item B3.6. Of more interest is the result that all age groups found items B3.7 and B9.1 easy, and item B3.8 difficult to endorse. Those aged 56 years and older found item B3.8 extremely difficult to endorse. With the exception of those aged between 25 and 45 years who found item B14.1 slightly difficult, all other age groups found this item easy to endorse, with extreme difficulty reported by those who are 46 years and older.

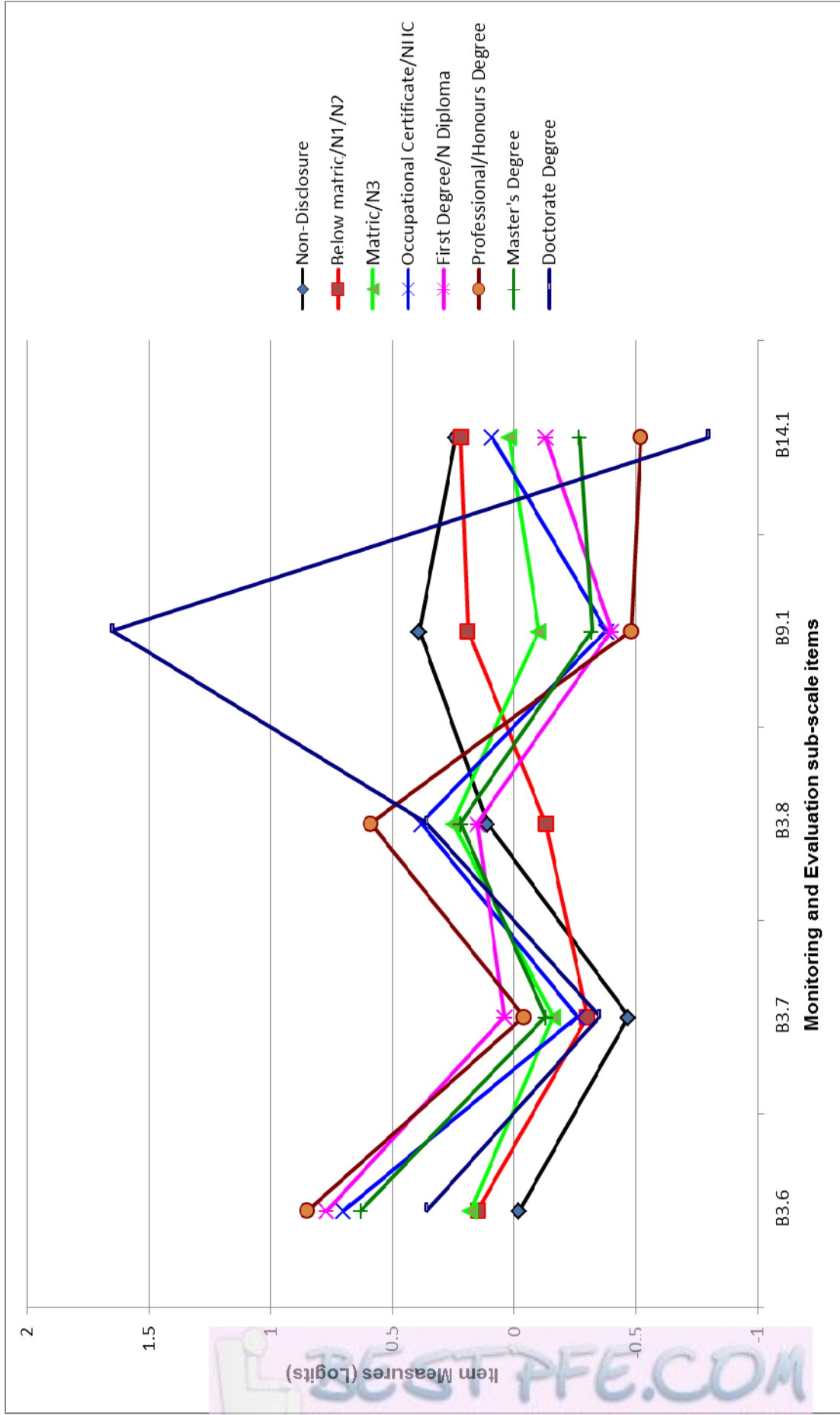
In terms of gender contrast, the results shown in figure 5.16 indicate that male respondents found item B3.6 extremely difficult to endorse relative to female respondents who also experienced slight difficulty with the item. With the exception of item B3.8 which is reportedly difficult, all other items appear to be easy to endorse for both male and female respondents.

The DIF contrast for educational achievement with respect to the ME sub-scale items was also examined and the results are reported in figure 5.17. The results show that item B3.6 was perceived to be difficult and item B3.7 appeared easy across the board, except for those respondents with First Degree/N Diploma who experienced slight difficulty. The rest of the groups perceived item B3.8 as being difficult except for those whose educational achievement is below matric/N1/N2 who perceived the item to be easy. Respondents with a Doctorate Degree found item B9.1 extremely difficult to endorse relative to those below Matric/N1/N2 who experienced some difficulty with the item. The rest of the other groups found item B9.1 easy to endorse. Item B9.1 appears as unusually difficult while item B14.1 appears as easy for respondents with a Doctorate degree.



DIF parameters: < .50 Logits = Insignificant; .5 – 1.00 Logits = Mild (but probably inconsequential); ≥ 1.00 Logits = Notable and significant.

Figure 5.16. Gender contrast plot for Monitoring and Evaluation Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.17. Educational achievement contrast plot for Monitoring and Evaluation Sub-Scale items

In terms of the type of learning programme contrast DIF as reported in figure 5.18, respondents involved in apprenticeships reported extreme difficulties in endorsing item B3.6. However, item B3.8 was found to be difficult to endorse, while items B3.7, B9.1 and B14.1 were found to be easy by both the respondents involved in apprenticeships and learnerships respectively.

The occupation contrast DIF results for the ME sub-scale are shown in figure 5.19. Item B3.6 was found to be extremely difficult to endorse by Skills Development Officers/Providers and Employers/Managers. No statistically significant DIF variations were reported for item B3.7. Item B3.8 was found to be extremely difficult to endorse by Skills Development Officers/Providers relative to other groups. On the other hand, Skills Development Officers/Providers found item B9.1 to be very easy to endorse. There were no statistically significant DIF variations that were reported for item B14.1.

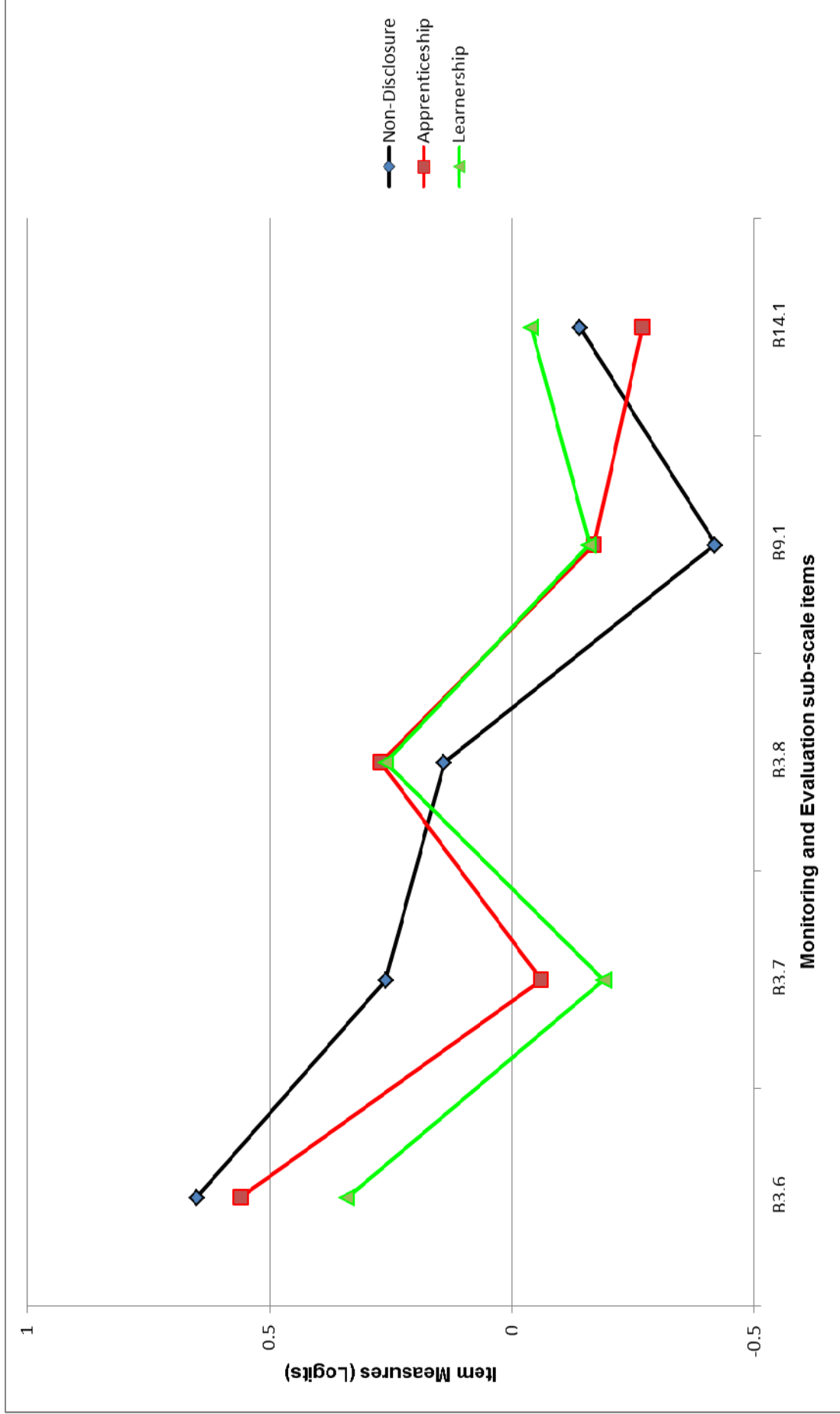


Figure 5.18. Learning Programme contrast plot for Monitoring and Evaluation Sub-Scale items

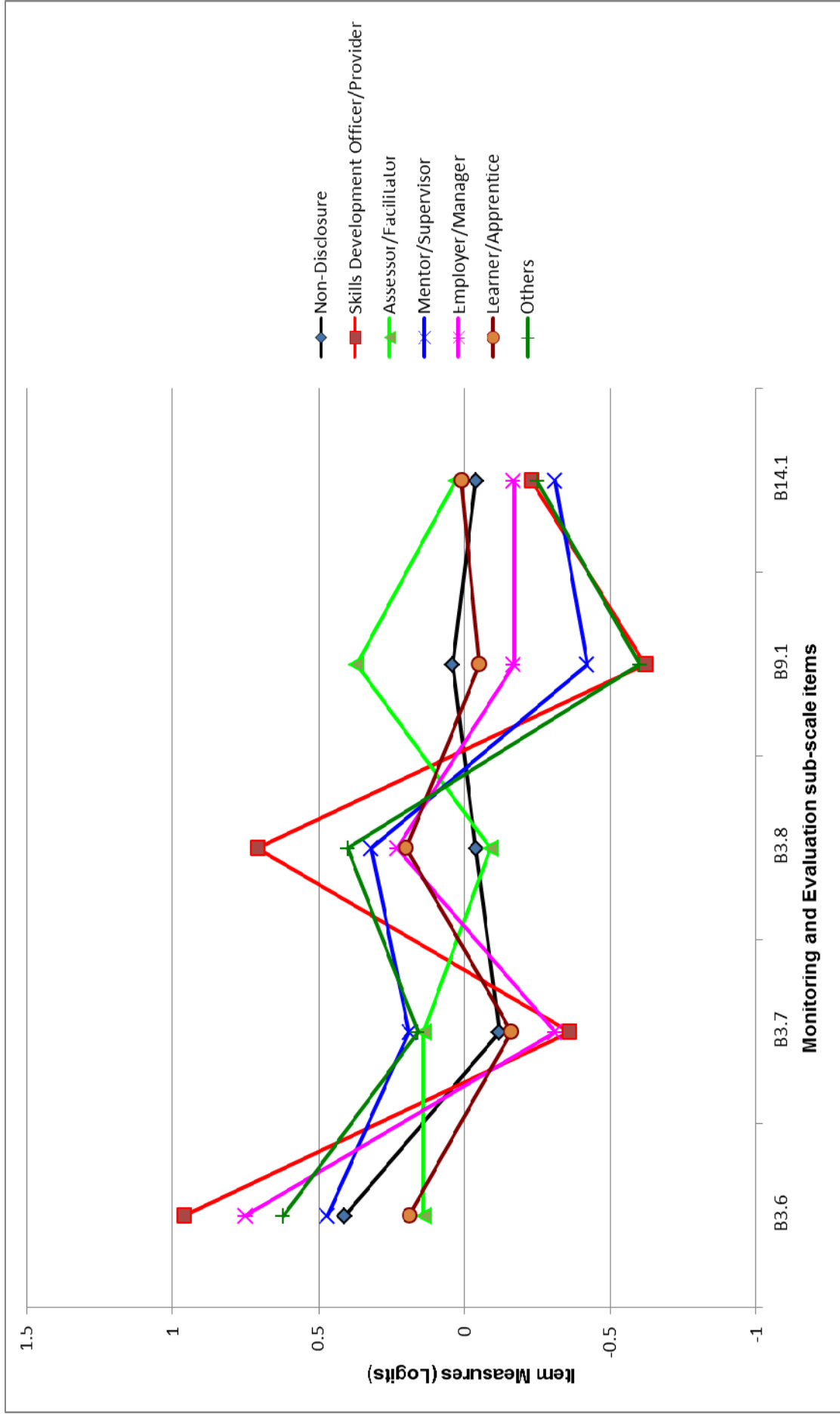


Figure 5.19. Occupation contrast plot for Monitoring and Evaluation Sub-Scale items

5.3.4 Observation and problem solving sub-scale

As shown in Table 5.14, the Observation and Problem Solving (OPS) sub-scale yielded a Cronbach alpha coefficient of .88 which is acceptable. About 99.3% of the responses to this sub-scale were valid. The results in Table 5.14 show a wider person spread of 7.02 logits.

Table 5.14

Summary Statistics for Observation and Problem Solving Sub-Scale

```

INPUT: 652 PERSONS 6 ITEMS MEASURED: 583 PERSONS 6 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 402 MEASURED (NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          |
+-----+-----+-----+-----+-----+-----+-----+
| MEAN    | 11.2   | 6.0    | -2.72  | .78    | .99    | -.3    | 1.00   | -.3    |
| S.D.    | 3.3    | .2     | 1.63   | .15    | 1.15   | 1.5    | 1.16   | 1.6    |
| MAX.    | 28.0   | 6.0    | 1.53   | 1.14   | 9.90   | 6.7    | 9.90   | 6.6    |
| MIN.    | 5.0    | 4.0    | -5.49  | .35    | .01    | -3.4   | .01    | -3.3   |
+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE | .90   | ADJ.SD | 1.36   | SEPARATION | 1.50   | PERSON RELIABILITY | .69   |
| MODEL RMSE | .80   | ADJ.SD | 1.42   | SEPARATION | 1.79   | PERSON RELIABILITY | .76   |
| S.E. OF PERSON MEAN = .08
+-----+-----+-----+-----+-----+-----+-----+
MINIMUM EXTREME SCORE: 181 PERSONS
LACKING RESPONSES: 69 PERSONS
VALID RESPONSES: 99.3%
-----
SUMMARY OF 583 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          |
+-----+-----+-----+-----+-----+-----+-----+
| MEAN    | 9.6    | 6.0    | -3.99  | 1.12   |
| S.D.    | 3.6    | .2     | 2.33   | .52    |
| MAX.    | 28.0   | 6.0    | 1.53   | 1.88   |
| MIN.    | 5.0    | 4.0    | -6.83  | .35    |
+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE | 1.28  | ADJ.SD | 1.95   | SEPARATION | 1.52   | PERSON RELIABILITY | .70   |
| MODEL RMSE | 1.23  | ADJ.SD | 1.98   | SEPARATION | 1.61   | PERSON RELIABILITY | .72   |
| S.E. OF PERSON MEAN = .10
+-----+-----+-----+-----+-----+-----+-----+
PERSON RAW SCORE-TO-MEASURE CORRELATION = .95 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .88 (approximate due to missing data)
-----
SUMMARY OF 6 MEASURED (NON-EXTREME) ITEMS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          |
+-----+-----+-----+-----+-----+-----+-----+
| MEAN    | 751.8  | 399.2  | .00    | .09    | .99    | -.1    | 1.01   | .0    |
| S.D.    | 30.8   | 1.2    | .25    | .00    | .09    | 1.0    | .15    | 1.9    |
| MAX.    | 804.0  | 401.0  | .34    | .09    | 1.10   | 1.1    | 1.20   | 2.4    |
| MIN.    | 709.0  | 398.0  | -.42   | .08    | .85    | -1.7   | .74    | -3.5   |
+-----+-----+-----+-----+-----+-----+-----+
| REAL RMSE | .09   | ADJ.SD | .23   | SEPARATION | 2.59   | ITEM RELIABILITY | .87   |
| MODEL RMSE | .09   | ADJ.SD | .23   | SEPARATION | 2.64   | ITEM RELIABILITY | .87   |
| S.E. OF ITEM MEAN = .11
+-----+-----+-----+-----+-----+-----+-----+
UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00 (approximate due to missing data)
2395 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 3701.52

```

The mean score of -2.72 with a standard deviation of 1.63 for the OPS sub-scale shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 1.50$) could clearly separate respondents into two statistically distinct strata of persons (high-ability and low-ability persons) with a marginal person reliability coefficient of .69. The reliability coefficient can be improved by adding more items to the measure, by improving sample-item targeting or by stretching the sample ability variance.

However, the reliability for the items is very good ($\alpha = .87$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show a good item separation ($G = 2.59$) which is broader than that of a person. This index translates to about three levels of item difficulty, examples being easy, moderate and difficult. An item reliability of .87 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.4.1 *Person-Measure targeting*

Figure 5.20 depicts the Person-Item Map for the OPS sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot.

On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items, with the most successful persons on the top. The results shown on the plot in Figure 5.20 depict that the items were difficult for the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 2.5 logits above the mean person ability.

A close inspection of figure 5.20 reveals that the width of the measure is less than 1 logit, whereas the width of the person distribution is 7.5 logits. All the items of the OPS sub-scale are located between -.5 logit and +.5 logit, but only a small fraction of persons can be found in this range. Items B9.4 and B10.1 are similar in difficulty, and so are items B9.3 and 9.5. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.15. The differences between

the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

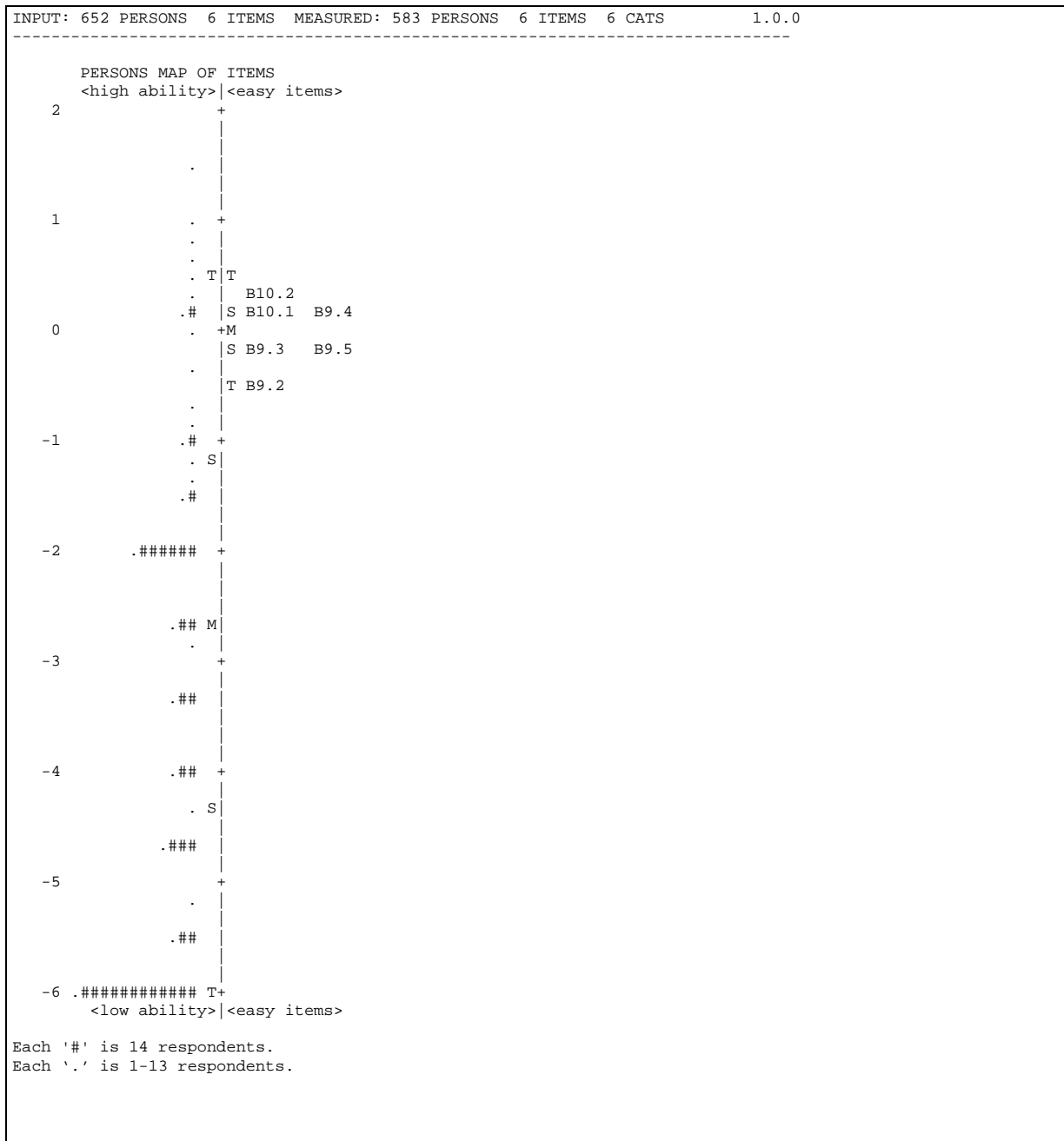


Figure 5.20. Items-Persons Map for Observation and Problem Solving Sub-Scale

5.3.4.2 Item fit statistics

It is evident in Table 5.15 that the spread of logit scale of item measure yielded a maximum value of .34 logit units and a minimum value of -.42 logit units. The difference between logit_{\max} where item B10.2 is and the logit_{\min} where item B9.2 is, is $\delta = .76$. This indicates that item difficulty spreads over .76 logit units.

Table 5.15

Item Fit Statistics for Observation and Problem Solving Sub-Scale

INPUT: 652 PERSONS 6 ITEMS MEASURED: 583 PERSONS 6 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.50 REL.: .69 ... ITEM: REAL SEP.: 2.59 REL.: .87												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
6	890	579	.34	.09	1.06	.7	1.13	1.5	.72	70.9	67.9	B10.2
5	913	582	.18	.09	.99	.0	.98	-.3	.75	67.1	67.1	B10.1
3	915	581	.14	.09	.85	-1.7	.74	-3.5	.78	75.0	67.0	B9.4
2	943	579	-.10	.09	1.03	.4	1.05	.7	.76	68.8	65.3	B9.3
4	950	580	-.13	.09	.92	-.9	.94	-.7	.79	69.5	65.2	B9.5
1	985	579	-.42	.08	1.10	1.1	1.20	2.4	.75	63.8	63.4	B9.2
MEAN	751.8	399.2	.00	.09	.99	-.1	1.01	.0		69.2	66.0	
S.D.	30.8	1.2	.25	.00	.09	1.0	.15	1.9		3.4	1.5	

Table 5.15 shows an average infit mean value of .99 (1% deficiency in predicted randomness) and an outfit mean value of 1.01 (1% noise in the data than that modelled), which are respectively slightly below and above the value expected by the model. However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the OPS sub-scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The results depicted in Table 5.15 show that the point measure correlation (PTMEA CORR) ranged from .72 to .79, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the OPS sub-scale and met all the criteria of a quality question, and thus review is not required. If the Point

Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and vice versa. For this to be true, the correlations must be positive as shown in Table 5.15. The lowest correlation is .72 for item B10.2 and its value is positive. There are no misfitting items shown in the table.

5.3.4.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.16.

Table 5.16

Principal Component Analysis of Standardised Residuals for Observation and Problem Solving Sub-Scale

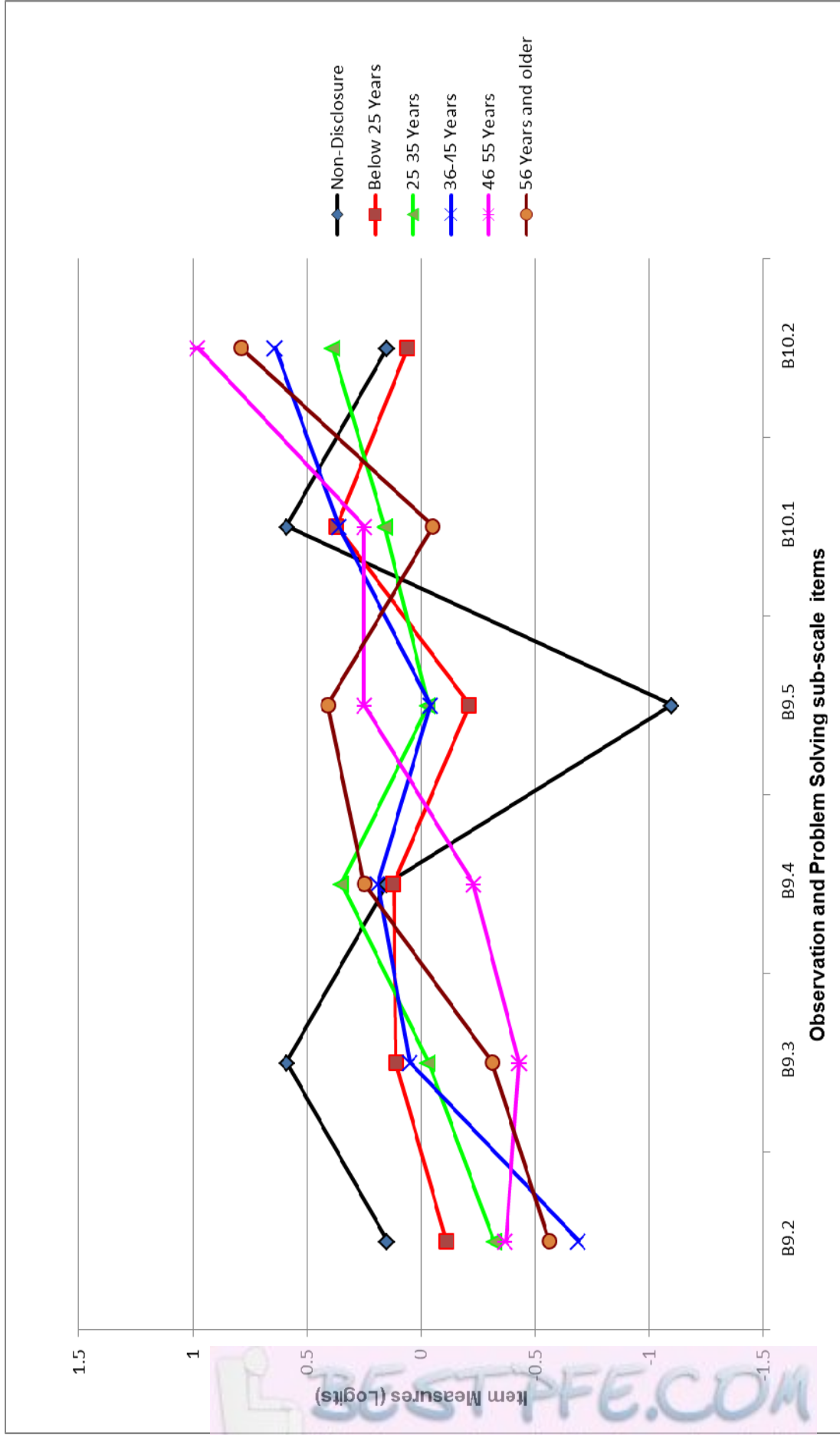
INPUT: 652 PERSONS 6 ITEMS MEASURED: 583 PERSONS 6 ITEMS 6 CATS 1.0.0												
STANDARDISED RESIDUAL VARIANCE SCREE PLOT												
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)												
				Empirical			Modelled					
Total variance in observations		=		11.0			100.0%					
Variance explained by measures		=		5.0			45.5%					
Unexplained variance (total)		=		6.0			54.5%					
Unexplained variance in 1st contrast		=		1.7			15.8%					
Unexplained variance in 2nd contrast		=		1.3			11.6%					
Unexplained variance in 3rd contrast		=		1.1			9.7%					
Unexplained variance in 4th contrast		=		1.0			8.9%					
Unexplained variance in 5th contrast		=		.9			8.5%					

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+												
CON-		INFIT OUTFIT			ENTRY			INFIT OUTFIT			ENTRY	
TRAST	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM
1	.66	-.42	1.10	1.20	1	1 B9.2	-.58	.18	.99	.98	5	5 B10.1
1	.56	-.10	1.03	1.05	2	2 B9.3	-.57	.34	1.06	1.13	6	6 B10.2
1	.30	.14	.85	.74	3	3 B9.4	-.48	-.13	.92	.94	4	4 B9.5
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+												
CON-		INFIT OUTFIT			ENTRY			INFIT OUTFIT			ENTRY	
TRAST	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM
1	.66	-.42	1.10	1.20	1	1 B9.2						
1	.56	-.10	1.03	1.05	2	2 B9.3						
1	.30	.14	.85	.74	3	3 B9.4						
1	-.58	.18	.99	.98	5	5 B10.1						
1	-.57	.34	1.06	1.13	6	6 B10.2						
1	-.48	-.13	.92	.94	4	4 B9.5						
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+												

The PCA results in Table 5.16 show that only 45.5% of the variance was explained by the OPS sub-scale. The unexplained variance explained by the first contrast had an eigenvalue of 1.7, which is slightly lower than the chance value of 2.0 (Smith, 2002). The fact that all items of the OPS sub-scale fit the model and that the raw variance explained by the

measure (46.4%) is more than two times the variance explained by the first contrast (15.8%) support the unidimensionality of the sub-scale. There is no noticeable evidence of a secondary dimension emerging in the items.

As a result, the OPS sub-scale fits the Rasch model, is unidimensional and has two person separation strata identified ($G = 1.50$) with a marginal person reliability coefficient of .69. Individual items are not calibrated too far apart and they all contribute to the OPS sub-scale. It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of this sub-scale are neither difficult nor easy as shown in the Person-Item Map, and they are well-separated with sufficient width. However, the results show a noticeable problem of poor targeting of the sub-scale on the sample. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.



DIF parameters: <math>< -0.50</math> Logits = Insignificant;

Figure 5.21. Age contrast plot for Observation and Problem Solving Sub-Scale items

5.3.4.4 *Differential Item Functioning*

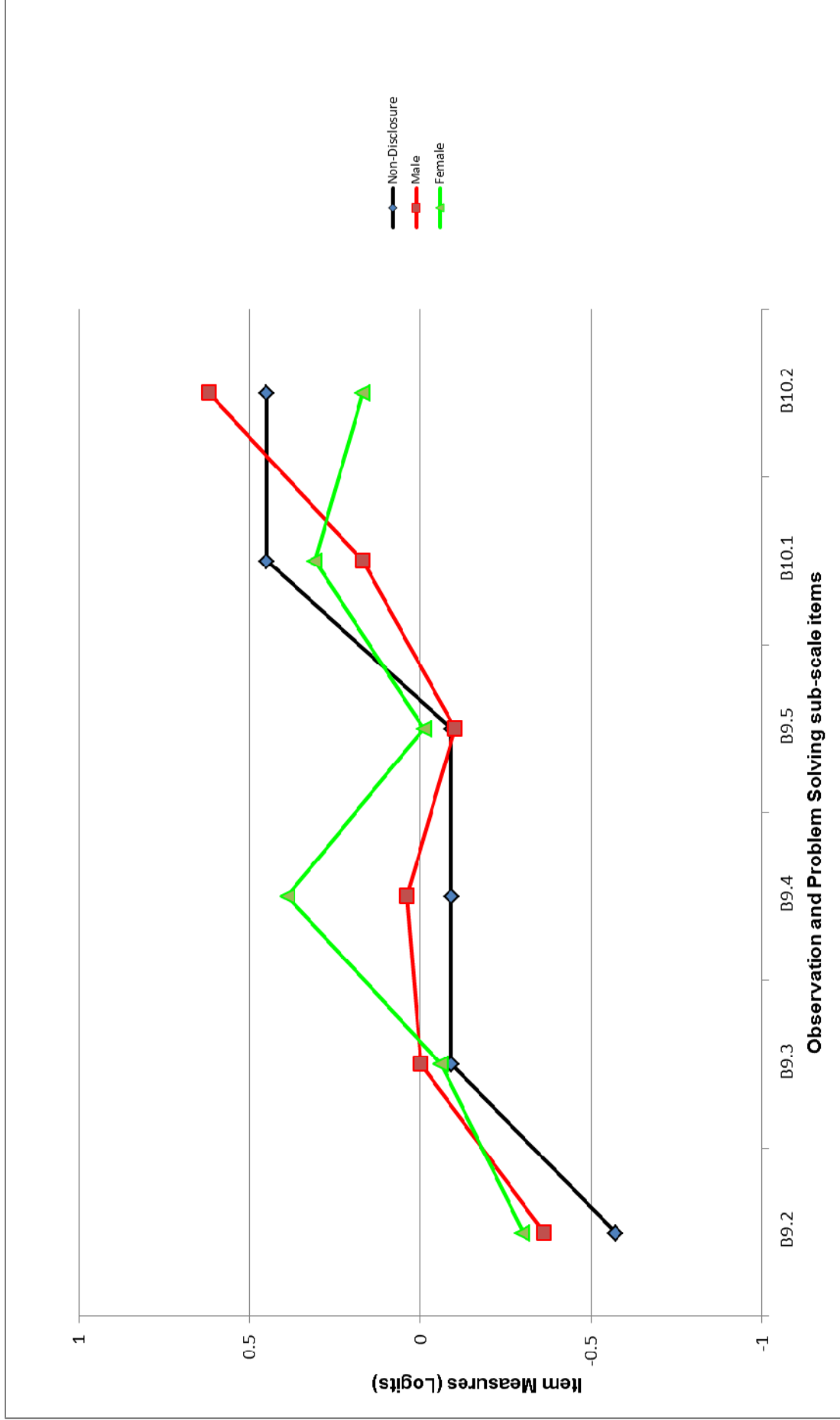
The results of the age contrast for OPS sub-scale items are shown in figure 5.21. The results reveal that for item B10.2, respondents aged between 36 and 55 reported extreme difficulties in endorsing this item. All age groups found item B9.2 to be easy to endorse with those aged between 36 and 45 years reporting extreme ease with the item. There were slight but insignificant variations across different age groups in terms of endorsement of items B9.3, B9.4, B9.5 and B10.1 as to their simplicity or difficulty.

The gender contrast as shown in figure 5.22 points to a significant DIF for item B10.2. Male respondents found item B10.2 extremely difficult relative to females who also experienced a slight difficulty with the item. Item B9.2 was found to be easy to endorse by both male and female respondents, while items B9.3 and B9.5 were found to be moderate. On the contrary, both items B10.1 and B10.2 were found to be difficult to endorse by both male and female respondents.

The results for the education DIF contrast are depicted in figure 5.23. There were slight but insignificant DIF variations reported for items B9.2, B9.4, B9.5 and B10.2 across different levels of educational attainment. Respondents with an educational achievement below matric/N1/N2 found item B9.3 to be extremely difficult to endorse relative to other educational categories. Equally interesting is the extreme level of difficulty experienced by respondents with Doctorate Degrees for item B10.1.

In terms of the type of learning programme that respondents are involved in, no statistically significant DIF was reported in figure 5.24 except for item B9.4. Respondents involved in apprenticeships found item B9.4 to be very difficult to endorse relative to the slight difficulty reported for those involved in learnerships. Both groups found items B9.2, B9.3 and B9.5 to be easy to endorse. On the other hand, items B10.1 and B10.2 were found to be difficult to endorse by both groups.

The DIF contrast results for occupation are reported in figure 5.25. It is evident that there were no statistically significant DIF for items B9.2, B9.3, B9.5 and B10.1. The results show a slight but insignificant variation across different occupations for these items. However, for items B9.4 and B10.2, Assessors/Facilitators reported extreme levels of difficulty relative to other occupational groups.



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.22. Gender contrast plot for Observation and Problem Solving Sub-Scale items

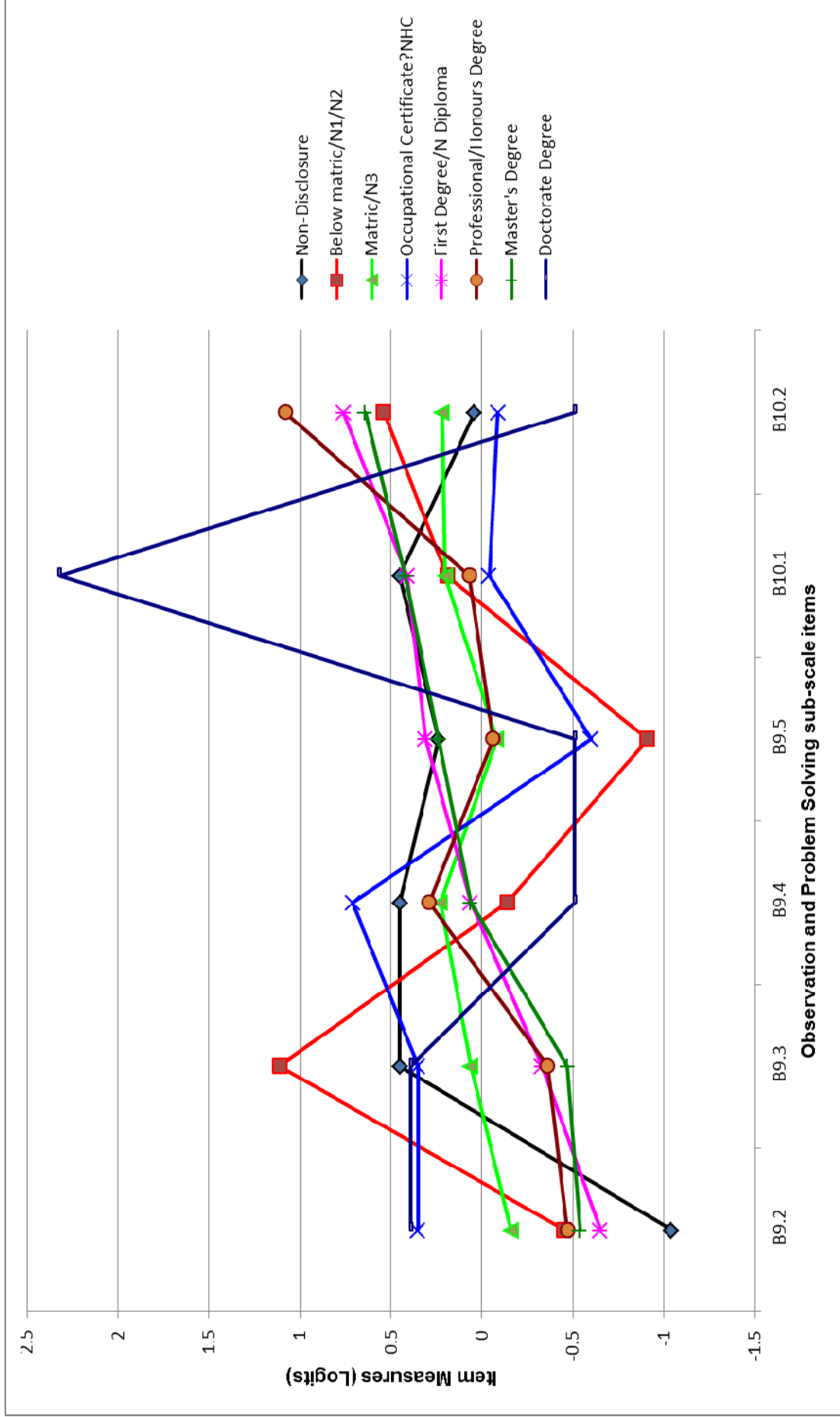


Figure 5.23. Educational achievement contrast plot for Observation and Problem Solving Sub-Scale items

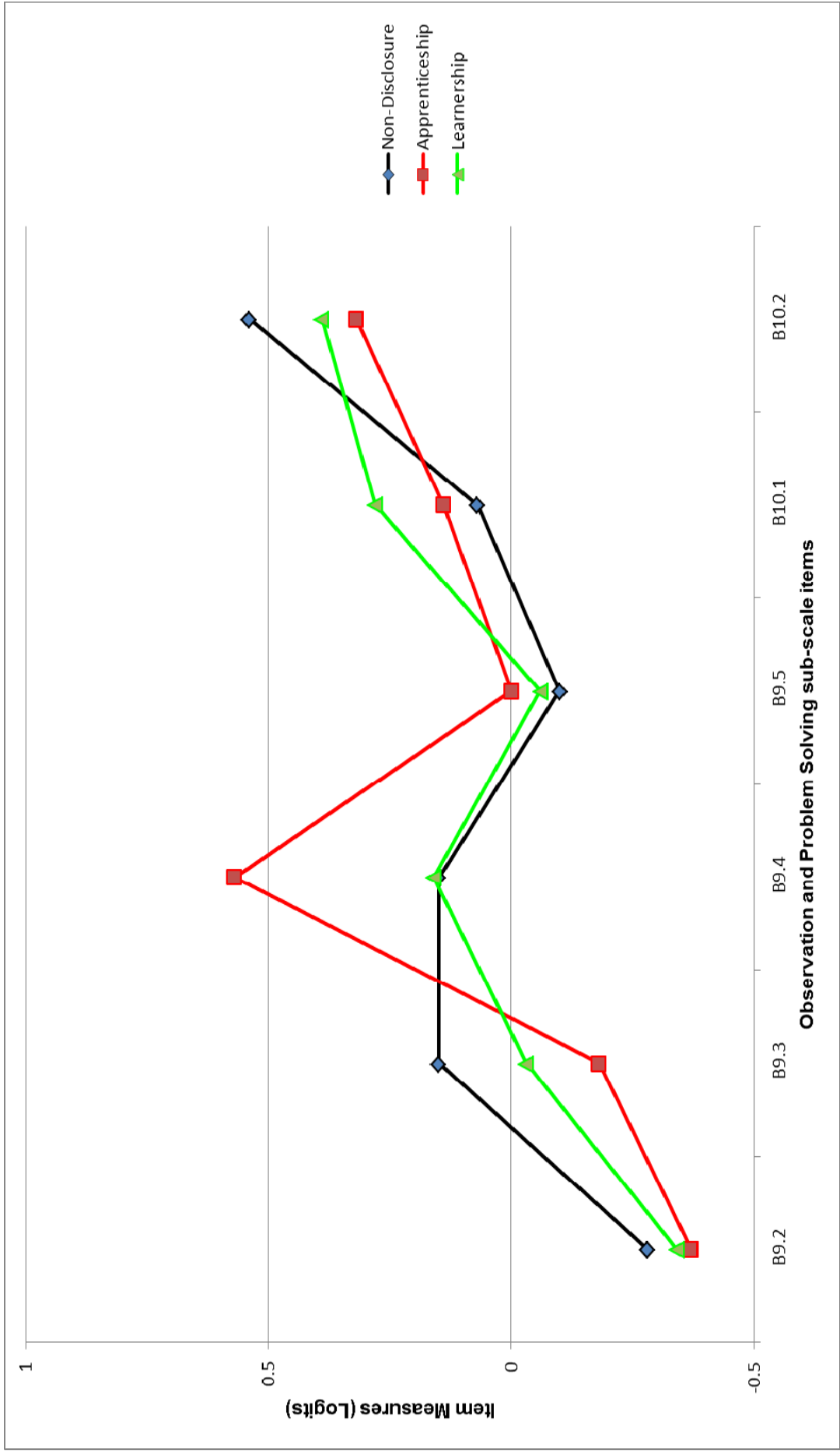
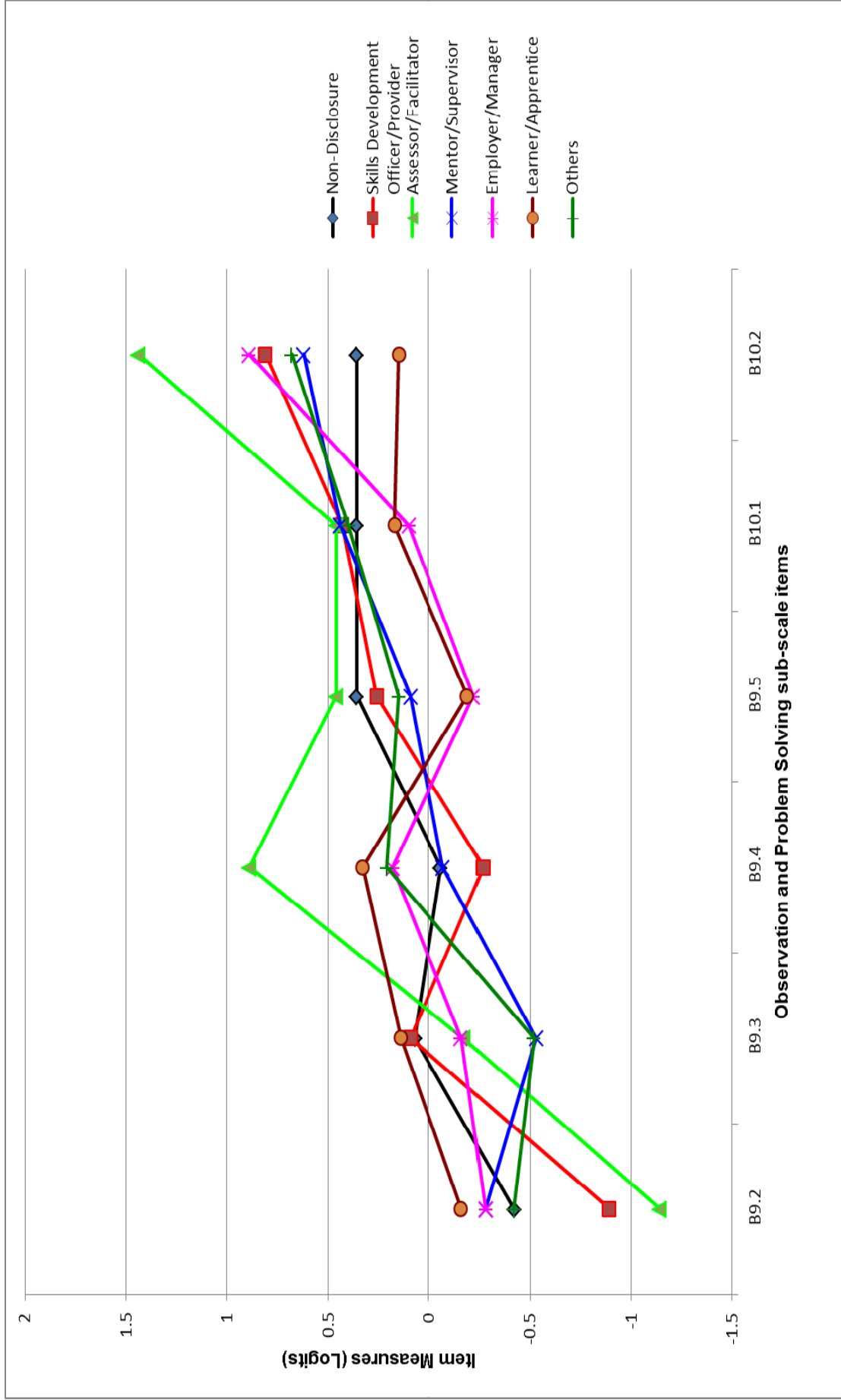


Figure 5.24. Learning Programme contrast plot for Observation and Problem Solving Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.25. Occupation contrast plot for Observation and Problem Solving Sub-Scale items

5.3.5 Policy awareness sub-scale

As shown in Table 5.17, the Policy Awareness sub-scale yielded a Cronbach alpha coefficient of .89 which is acceptable. About 99.2% of the responses to this sub-scale were valid. The results in Table 5.17 show a wider person spread of 7.03 logits.

Table 5.17

Summary Statistics for Policy Awareness Sub-Scale

```

INPUT: 652 PERSONS 8 ITEMS MEASURED: 598 PERSONS 8 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 422 MEASURED (NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          | |
|---|---|---|---|---|---|---|---|---|
| MEAN      | 14.2   | 7.9   | -2.86  | .67    | .98    | -.3    | .99    | -.3    |
| S.D.     | 4.3    | .4    | 1.51   | .17    | .86    | 1.7    | .88    | 1.7    |
| MAX.     | 39.0   | 8.0   | 1.61   | 1.13   | 6.52   | 6.6    | 6.46   | 6.6    |
| MIN.     | 5.0    | 3.0   | -5.42  | .31    | .01    | -5.4   | .01    | -5.3   |
|-----|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE | .75    | ADJ.SD | 1.31   | SEPARATION | 1.74   | PERSON RELIABILITY | .75    |
| MODEL RMSE | .69    | ADJ.SD | 1.34   | SEPARATION | 1.95   | PERSON RELIABILITY | .79    |
| S.E. OF PERSON MEAN = .07
+-----+-----+-----+-----+-----+-----+-----+-----+
MINIMUM EXTREME SCORE: 176 PERSONS
LACKING RESPONSES: 54 PERSONS
VALID RESPONSES: 99.2%
-----
SUMMARY OF 598 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          |
|-----|-----|-----|-----|-----|-----|-----|-----|
| MEAN      | 12.4   | 8.0   | -3.99  | 1.02   |
| S.D.     | 4.6    | .3    | 2.17   | .56    |
| MAX.     | 39.0   | 8.0   | 1.61   | 1.85   |
| MIN.     | 5.0    | 3.0   | -6.71  | .31    |
|-----|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE | 1.19   | ADJ.SD | 1.81   | SEPARATION | 1.53   | PERSON RELIABILITY | .70    |
| MODEL RMSE | 1.16   | ADJ.SD | 1.83   | SEPARATION | 1.58   | PERSON RELIABILITY | .71    |
| S.E. OF PERSON MEAN = .09
+-----+-----+-----+-----+-----+-----+-----+-----+
PERSON RAW SCORE-TO-MEASURE CORRELATION = .94 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .89 (approximate due to missing data)
-----
SUMMARY OF 8 MEASURED (NON-EXTREME) ITEMS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|          SCORE        |          |          |          |          |          |          |          |
|          COUNT        |          |          |          |          |          |          |          | |
|---|---|---|---|---|---|---|---|---|
| MEAN      | 748.9  | 418.6 | .00    | .08    | 1.00   | -.1    | .99    | -.3    |
| S.D.     | 21.4   | 2.1   | .16    | .00    | .18    | 2.0   | .15    | 1.9    |
| MAX.     | 778.0  | 421.0 | .34    | .09    | 1.37   | 3.9   | 1.21   | 2.4    |
| MIN.     | 707.0  | 415.0 | -.25   | .08    | .80    | -2.5  | .79    | -2.8   |
|-----|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE | .09    | ADJ.SD | .14    | SEPARATION | 1.58   | ITEM RELIABILITY | .71    |
| MODEL RMSE | .08    | ADJ.SD | .14    | SEPARATION | 1.67   | ITEM RELIABILITY | .74    |
| S.E. OF ITEM MEAN = .06
+-----+-----+-----+-----+-----+-----+-----+-----+
UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.99 (approximate due to missing data)
3349 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 5325.36

```

The mean score of -2.86 for the PA sub-scale shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 1.74$) could clearly separate respondents into three statistically distinct strata of persons (high ability, medium ability and low ability persons) with a good person reliability coefficient of .75.

In addition, the reliability for the items is also good ($\alpha = .71$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show a good item separation ($G = 1.58$) which is larger than that of persons. This index translates to about three levels of item difficulty, these being, easy, moderate and difficult. An item reliability of .71 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.5.1 *Person-Measure targeting*

Figure 5.26 depicts the Person-Item Map for the PA sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot.

On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.26 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is just under 3 logits above the mean person ability.

A close inspection of figure 5.26 reveals that the width of the measure is slightly over .5 logit, whereas the width of the person distribution is slightly over 7.5 logits. All the items of the PA sub-scale are located between -.5 logit and +.5 logit, but only a small fraction of persons can be found in this range. Five items (B5.2, B5.3, B5.7, B5.8 and B5.9) are similar in terms of the level of difficulty. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.19. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

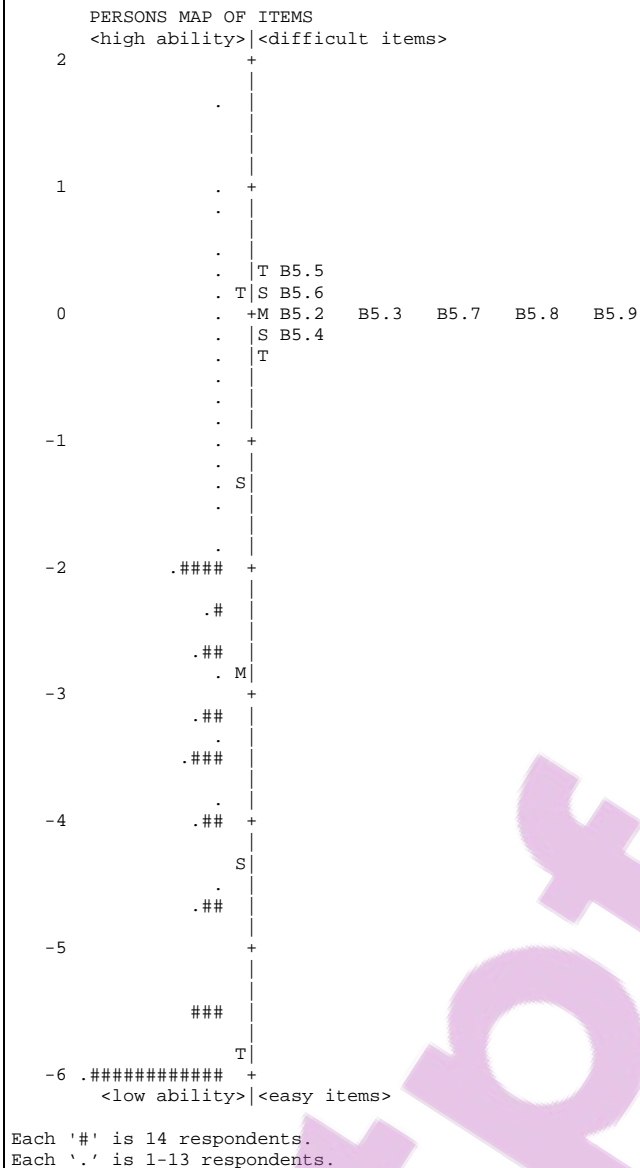


Figure 5.26. Items-Persons Map for Policy Awareness Sub-Scale

5.3.5.2 Item fit statistics

It is evident in Table 5.18 that the spread of logit scale of item measure yielded a maximum value of .34 logits and a minimum value of -.25 logits. The difference between logit_{\max} where item B2.2 is and the logit_{\min} where item B2.4 is, is $\delta = .59$. This indicates that the item difficulty was spread over .59 logit units.

Table 5.18

Item Fit Statistics for Policy Awareness Sub-Scale

```

INPUT: 652 PERSONS 8 ITEMS MEASURED: 598 PERSONS 8 ITEMS 6 CATS 1.0.0
-----
PERSON: REAL SEP.: 1.74 REL.: .75 ... ITEM: REAL SEP.: 1.58 REL.: .71

ITEM STATISTICS: MEASURE ORDER
-----
| ENTRY  TOTAL  MODEL  INFIT  OUTFIT  PTMEA  EXACT  MATCH  |
| NUMBER SCORE  COUNT  MEASURE  S.E.  MNSQ  ZSTD  MNSQ  ZSTD  CORR.  OBS%  EXP%  ITEM  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4      883   597    .34     .09  1.37  3.9  1.21  2.4  .65  66.3  65.4  B5.5  |
| 5      900   592    .13     .09  1.17  1.9  1.17  2.1  .69  70.7  64.6  B5.6  |
| 6      923   597    .03     .08  .88  -1.4  .84  -2.1  .74  69.4  64.1  B5.7  |
| 8      931   594   -.05     .08  .80  -2.5  .79  -2.8  .76  69.1  63.0  B5.9  |
| 2      933   594   -.06     .08  1.06  .8  1.08  1.0  .71  62.0  62.9  B5.3  |
| 1      937   596   -.07     .08  1.01  .2  1.06  .8  .72  62.9  62.9  B5.2  |
| 7      938   596   -.08     .08  .85  -1.8  .84  -2.1  .76  68.3  62.9  B5.8  |
| 3      954   591   -.25     .08  .87  -1.5  .90  -1.3  .75  68.4  62.6  B5.4  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| MEAN   748.9  418.6  .00     .08  1.00  -.1  .99  -.3  | 67.1  63.5 |
| S.D.   21.4   2.1   .16     .00  .18  2.0  .15  1.9  | 3.0  1.0 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

```

Table 5.18 shows the average infit mean value of 1.00 which is expected by the model, and an outfit mean value of .99 which is slightly below the expected model value. However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the PA scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The results depicted in Table 5.18 show that the point measure correlation (PTMEA CORR) ranged from .65 to .76, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the PA construct and met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and *vice versa*. For this to be true, the correlations must be positive as shown in Table 5.18. The lowest correlation is .64 for item B5.5 and its value is positive. There are no misfitting items shown in the table.

be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well-separated with sufficient width. However, the only noticeable problem is poor targeting of the measure on the sample. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.5.4 *Differential Item Functioning*

Figure 5.27 depicts the results of the age contrast for PA sub-scale items. There are no significant variations in terms of age DIF for items B5.2, B5.3, B5.4, B5.6, B5.8 and B5.9. However, items B5.5 and B5.7 show some significant DIF. It is clear in figure 5.27 that respondents aged between 46 and 55 years found item B5.5 extremely difficult to endorse relative to other age categories. Furthermore, respondents aged 56 and older found item B5.7 to be very difficult to endorse. The DIF for gender contrast is depicted in figure 5.28. It is evident that there is no significant gender DIF for all items of the PA sub-scale. Items B5.2, B5.3, B5.4, B5.8 and B5.9 were rated as moderate and easy by both male and female respondents. However, items B5.5, B5.6 and B5.7 were rated as slightly difficult by both male and female respondents.

Figure 5.29 depicts the educational achievement DIF for PA sub-scale items. The results show that respondents with a Doctorate Degree found item B5.2 extremely difficult to endorse, while those with educational achievement below matric/N1/N2 found this item to be slightly easier to endorse. For item B5.3, respondents with educational achievement below matric/N1/N2 found this item to be very difficult to endorse, while those with a Doctorate Degree found the item to be extremely easy. Furthermore, respondents with a Doctorate Degree found item B5.4 to be extremely difficult to endorse while all other groups found the item to be easy, save those with occupational certificate/NHC. For item B5.5, respondents with a First Degree/N Diploma found it extremely difficult to endorse this item relative to all other groups who also perceived the item as slightly difficult, except those with a Doctorate Degree who found the item to be slightly easy.

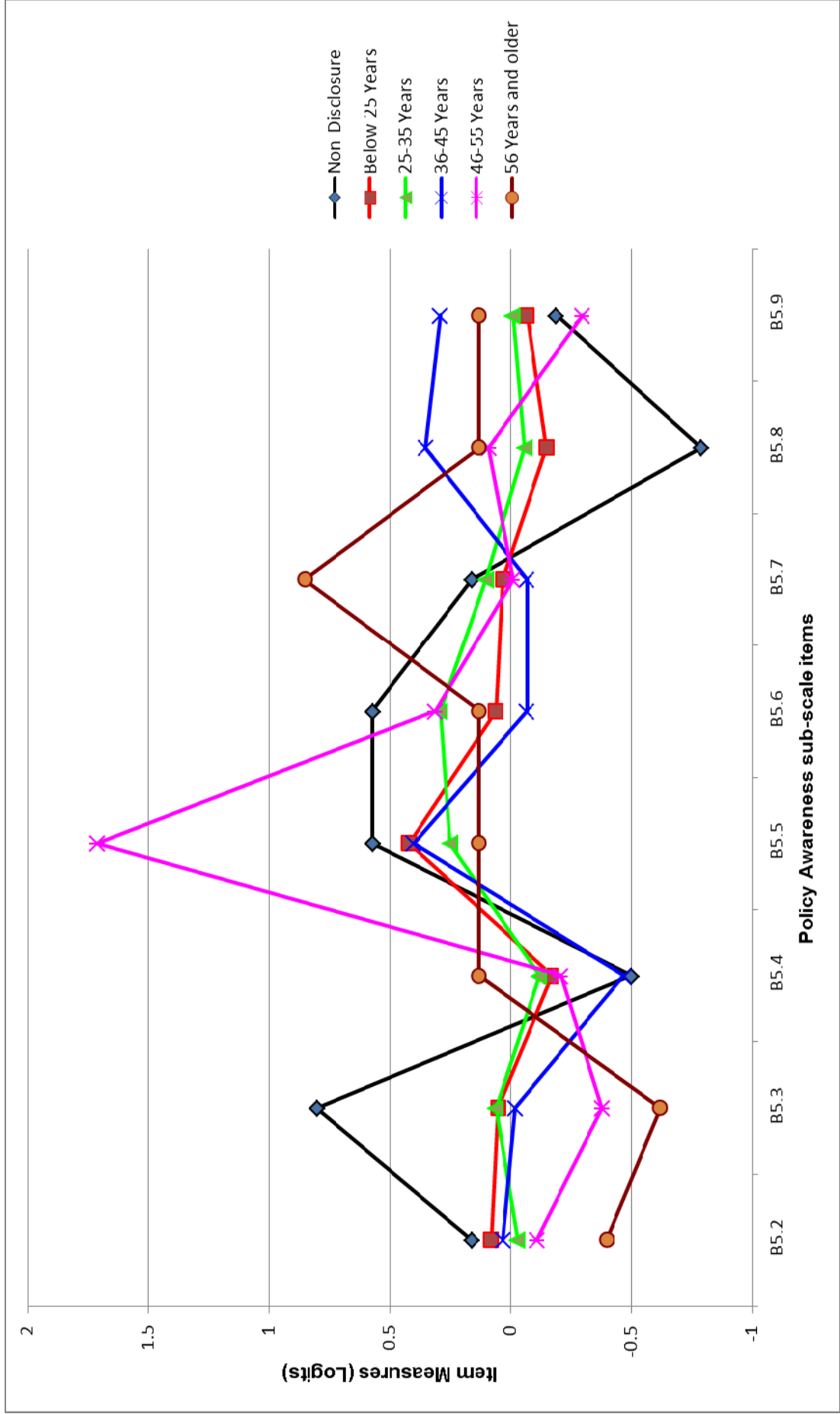
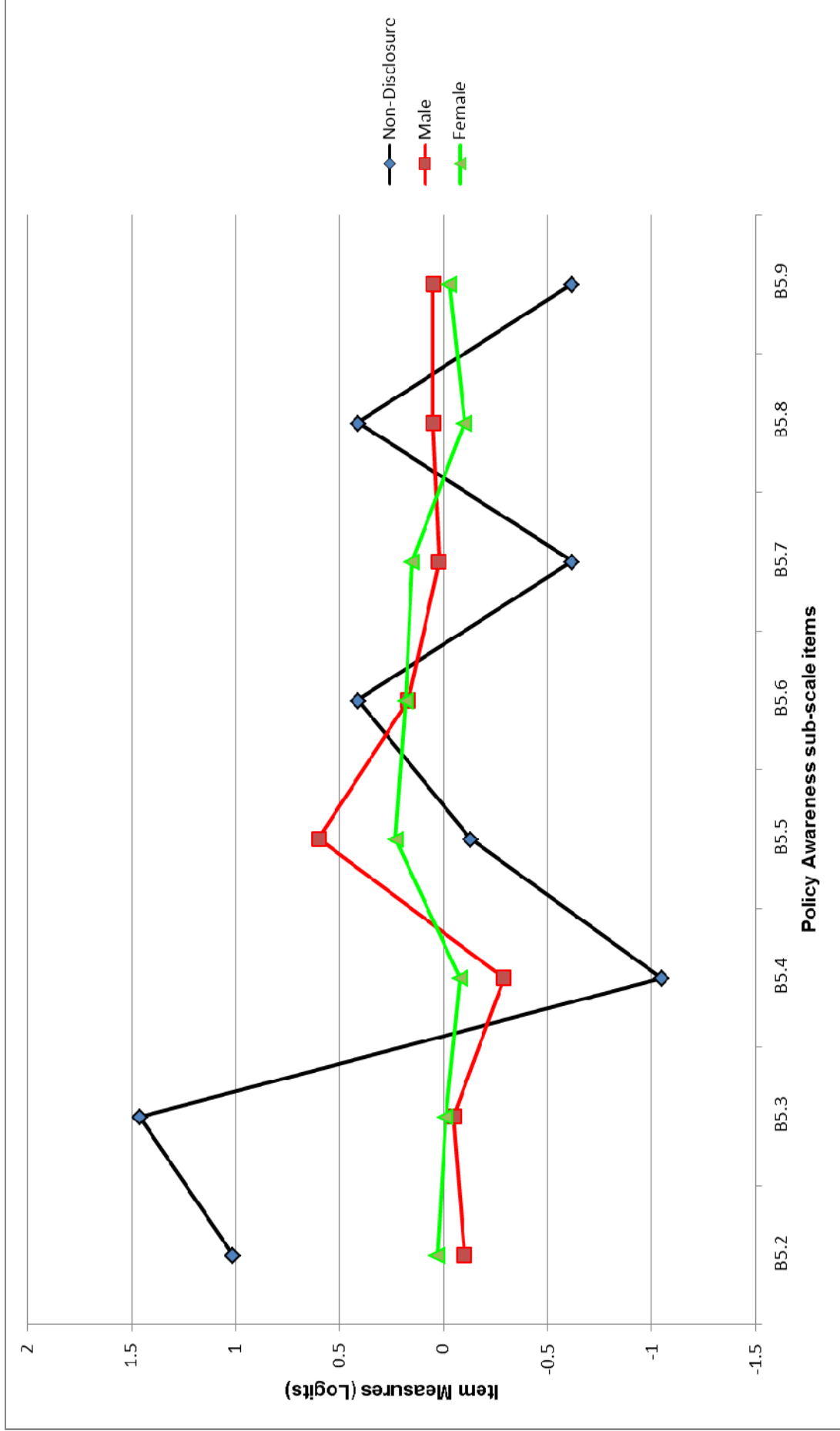


Figure 5.27. Age contrast plot for Policy Awareness Sub-Scale items

Item B5.6 was found to be very difficult by respondents with an occupational certificate/NHC relative to all other groups which also experienced slight difficulty, except those with Professional/Honours Degree who found the item slightly easy. For item B5.7, respondents with a Doctorate Degree found it very difficult to endorse, while those with Master's Degree also experienced slight difficulties with the item. Respondents with educational achievement below matric/N1/N2 found item B5.8 to be very easy to endorse. Finally, for item B5.9, there were slight but insignificant DIF variations across all groups with some endorsing the item as difficult while others found it easy.

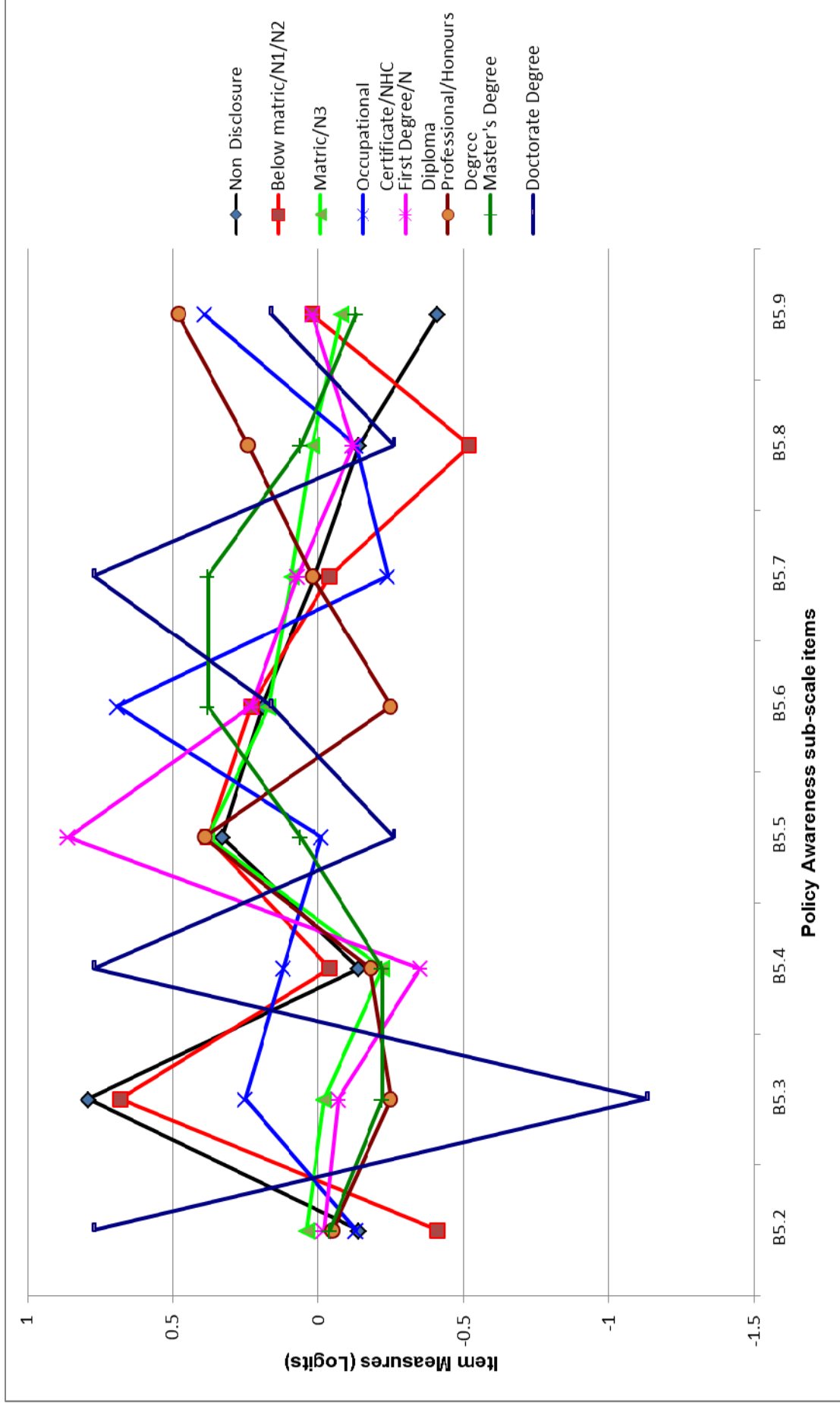
The results of the DIF contrast for the type of learning programme in which respondents are involved is shown in figure 5.30. There are no significant DIF variations for items B5.2, B5.4, B5.5, B5.7, B5.8 and B5.9. Both groups of respondents (involved in apprenticeships and learnerships) found item B5.4 to be relatively easy to endorse while they found item B5.5 to be difficult. Respondents involved in apprenticeships found item B5.2 slightly difficult while those involved in learnerships found it slightly easy. For item B5.3, respondents involved in apprenticeship found it difficult to endorse the item relative to those involved in learnerships. While respondents involved in apprenticeship found items B5.6 and B5.7 to be slightly easy, those involved in learnerships found the items to be slightly difficult to endorse.

The results of the DIF contrast for occupation are shown in figure 5.31. There were slight but insignificant DIF variations across all occupational groups for items B5.5, B5.6, B5.7 and B5.9. All occupational groups perceived items B5.5 and B5.6 as slightly difficult to endorse, while only Assessors/Facilitators perceived item B5.6 as slightly easy to endorse. For item B5.2, Assessors/Facilitators found the item to be very easy to endorse while Employers/Managers experienced slight difficulty with the item. To the contrary, employers/managers found item B5.3 to be easy to endorse while Assessors/Moderators found this item to be difficult. Furthermore, Assessors/Moderators found item B5.4 to be extremely difficult to endorse while the rest of the occupational groups found this item to be easy. Finally, Mentors/Supervisors found item B5.8 to be very easy to endorse relative to other groups.



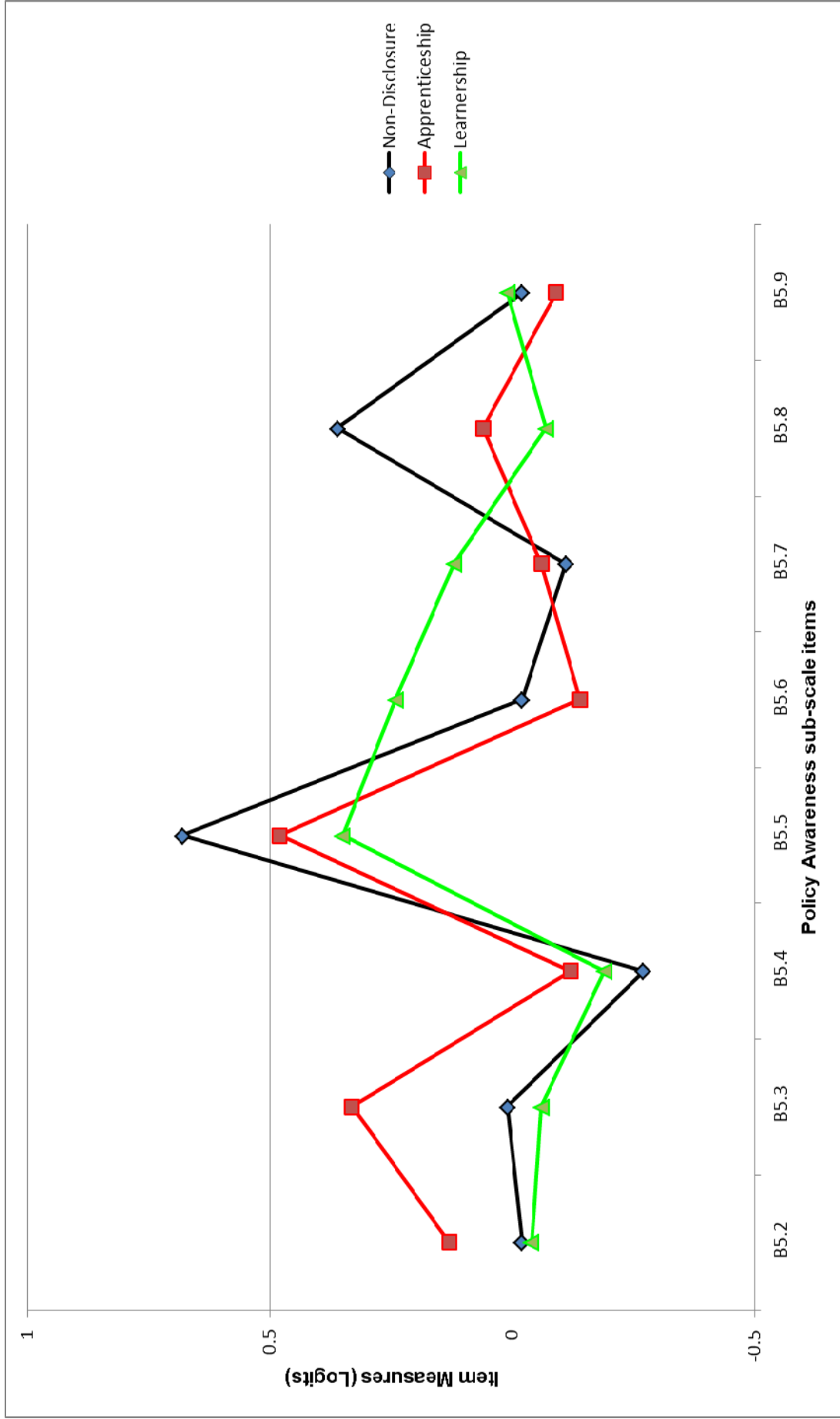
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.28. Gender contrast plot for Policy Awareness Sub-Scale items



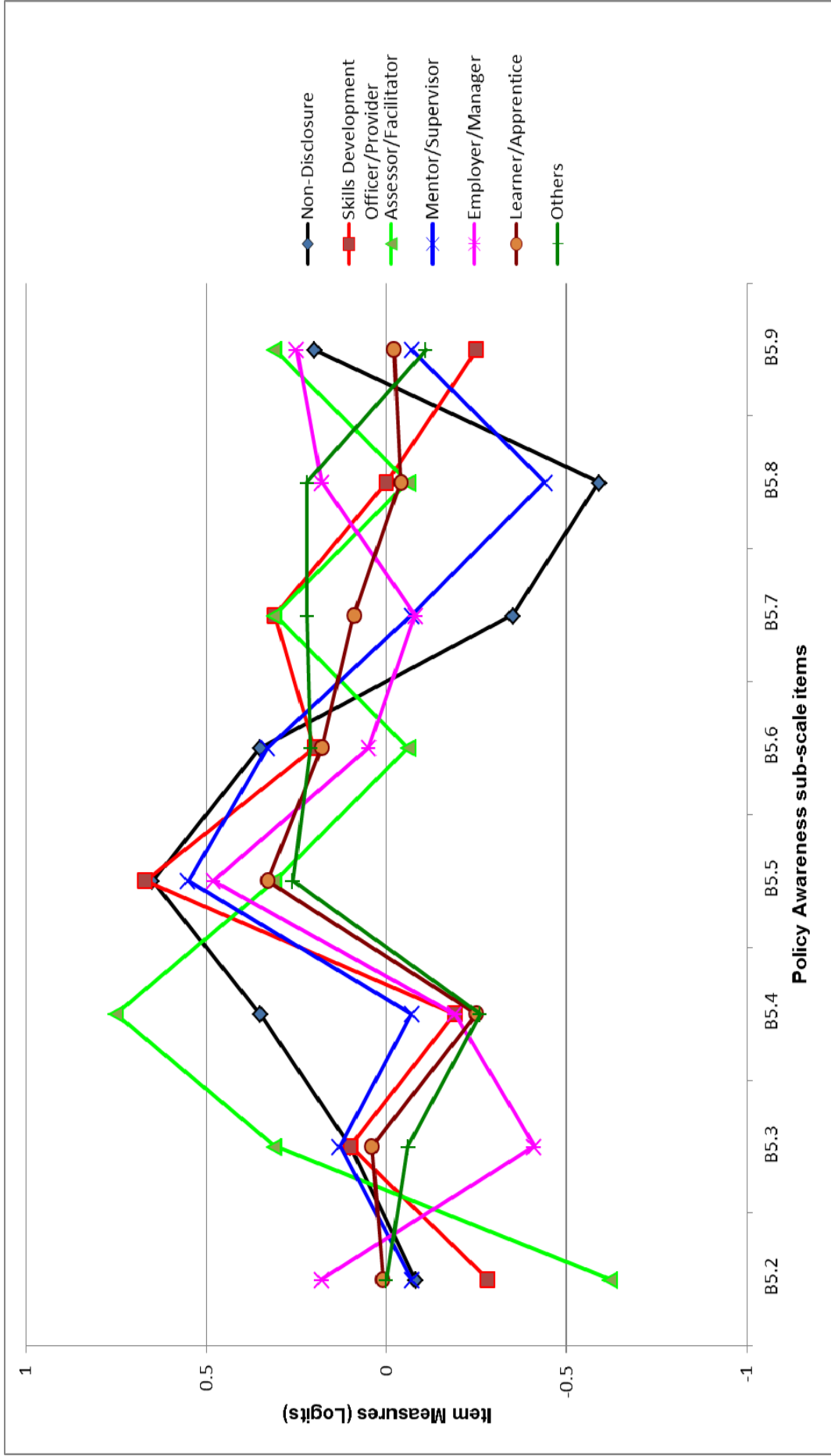
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.29. Educational achievement contrast plot for Policy Awareness Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.30. Learning Programme contrast plot for Policy Awareness Sub-Scale items



DIF parameters: <math>< -0.50</math> Logits = Insignificant; \geq 1.00</math> Logits = Notable and significant.

Figure 5.31. Occupation contrast plot for Policy Awareness Sub-Scale items

5.3.6 Quality assurance sub-scale

As shown in Table 5.20, the Quality Assurance sub-scale yielded a Cronbach alpha coefficient of .83 which is acceptable. About 99.6% of the responses to this sub-scale were valid. The results in Table 5.20 show a wider person spread of 7.44 logits.

Table 5.20

Summary Statistics for Quality Assurance Sub-Scale

INPUT: 652 PERSONS 4 ITEMS MEASURED: 586 PERSONS 4 ITEMS 6 CATS 1.0.0									
SUMMARY OF 330 MEASURED (NON-EXTREME) PERSONS									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	7.0	4.0	-3.47	1.01	.96	-.2	.96	-.2	
S.D.	2.1	.1	1.67	.14	1.06	1.1	1.09	1.2	
MAX.	20.0	4.0	2.02	1.22	9.90	4.6	9.90	4.3	
MIN.	4.0	3.0	-5.42	.46	.02	-2.6	.02	-2.5	
REAL RMSE	1.13	ADJ.SD	1.22	SEPARATION	1.08	PERSON RELIABILITY	.54		
MODEL RMSE	1.02	ADJ.SD	1.32	SEPARATION	1.29	PERSON RELIABILITY	.63		
S.E. OF PERSON MEAN = .09									
MINIMUM EXTREME SCORE: 256 PERSONS									
LACKING RESPONSES: 66 PERSONS									
VALID RESPONSES: 99.6%									
SUMMARY OF 586 MEASURED (EXTREME AND NON-EXTREME) PERSONS									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	5.7	4.0	-4.94	1.40					
S.D.	2.2	.2	2.09	.45					
MAX.	20.0	4.0	2.02	2.16					
MIN.	1.0	1.0	-6.84	.46					
REAL RMSE	1.52	ADJ.SD	1.43	SEPARATION	.94	PERSON RELIABILITY	.47		
MODEL RMSE	1.47	ADJ.SD	1.48	SEPARATION	1.01	PERSON RELIABILITY	.50		
S.E. OF PERSON MEAN = .09									
PERSON RAW SCORE-TO-MEASURE CORRELATION = .95 (approximate due to missing data)									
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .83 (approximate due to missing data)									
SUMMARY OF 4 MEASURED (NON-EXTREME) ITEMS									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	578.5	328.8	.00	.11	.99	-.3	.97	-.5	
S.D.	30.6	.8	.32	.00	.25	2.5	.19	2.3	
MAX.	626.0	330.0	.39	.11	1.38	3.6	1.27	3.1	
MIN.	542.0	328.0	-.48	.10	.78	-2.5	.78	-2.8	
REAL RMSE	.11	ADJ.SD	.30	SEPARATION	2.69	ITEM RELIABILITY	.88		
MODEL RMSE	.11	ADJ.SD	.30	SEPARATION	2.82	ITEM RELIABILITY	.89		
S.E. OF ITEM MEAN = .18									
UMEAN=.000 USCALE=1.000									
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00 (approximate due to missing data)									
1315 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 1863.36									

The mean score of -3.47 for the measure shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 1.08$) could only separate respondents into one statistically distinct stratum of persons with a low person reliability coefficient of .54. The reliability coefficient can be improved by adding more items to the measure, by improving sample-item targeting or by stretching the sample ability variance.

However, the reliability for the items is very good ($\alpha = .88$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show a good item separation ($G = 2.69$) which is broader than that of a person. This index translates to about three levels of item difficulty, these being, easy, moderate and difficult. An item reliability of .88 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.6.1 *Person-Measure targeting*

Figure 5.32 depicts the Person-Item Map for the Quality Assurance (QA) sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot.

On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.32 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 3.5 logits above the mean person ability.

A close inspection of figure 5.32 reveals that the width of the measure is less than 1 logit, whereas the width of the person distribution is 8 logits. All the items of the measure are located between -.5 logit and +.5 logit, but only a small fraction of persons can be found in this range. All items are placed above the item mean except for item B8.6. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.21. The differences between the two are

called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

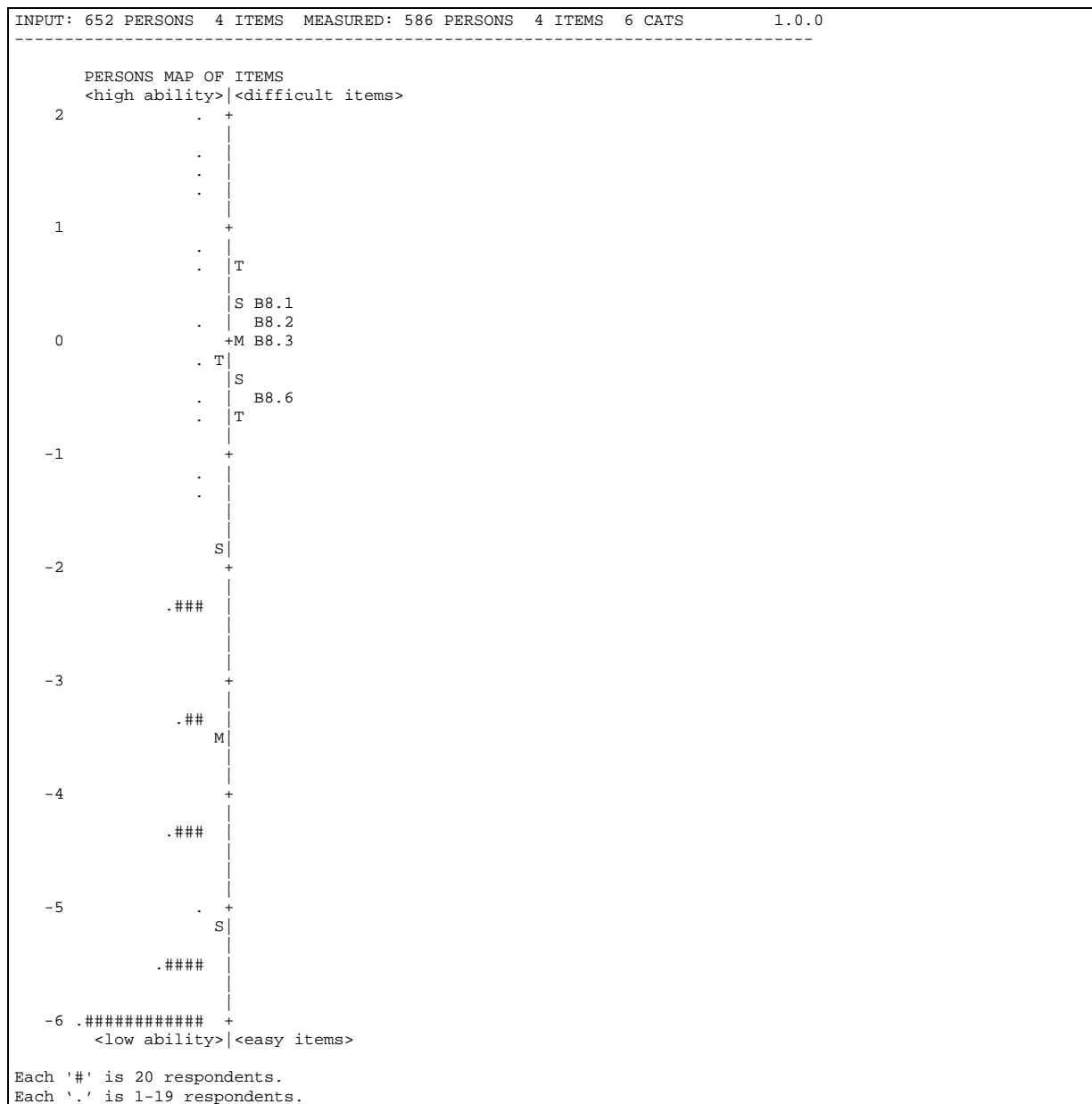


Figure 5.32. Items-Persons Map for Quality Assurance Sub-Scale

5.3.6.2 Item fit statistics

It is evident in Table 5.21 that the spread of logit scale of item measure yielded a maximum value of .39 logits and a minimum value of -.48 logit. The difference between logit_{\max} where

item B8.1 is and logit_{\min} where item B8.6 is, $\delta = .87$. This indicates that the item difficulty spread over .87 logit units.

Table 5.21

Item Fit Statistics for Quality Assurance Sub-Scale

INPUT: 652 PERSONS 4 ITEMS MEASURED: 586 PERSONS 4 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.08 REL.: .54 ... ITEM: REAL SEP.: 2.69 REL.: .88												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
1	797	583	.39	.11	1.00	.0	.99	-.1	.75	71.3	69.7	B8.1
2	821	583	.12	.11	.79	-2.5	.78	-2.8	.81	75.6	68.1	B8.2
3	834	583	-.02	.11	.78	-2.5	.83	-2.2	.82	71.4	66.8	B8.3
4	880	584	-.48	.10	1.38	3.6	1.27	3.1	.75	61.8	66.2	B8.6
MEAN	578.5	328.8	.00	.11	.99	-.3	.97	-.5		70.0	67.7	
S.D.	30.6	.8	.32	.00	.25	2.5	.19	2.3		5.1	1.3	

Table 5.21 shows the average infit and outfit mean values of .99 and .97 respectively and these are slightly lower than the value expected by the model (MNSQ = 1). However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the QA sub-scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The results depicted in Table 5.21 show that the point measure correlation (PTMEA CORR) ranged from .75 to .82, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the QA construct and met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and *vice versa*. For this to be true, the correlations must be positive as shown in Table 5.21. The lowest correlation is .75 for item B8.1 and its value is positive. There are no misfitting items shown in the table.

5.3.6.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.22. The PCA results in Table 5.22 show that only 44.7% of the variance was explained by the measure. The unexplained variance explained by the first contrast had an eigenvalue of 1.6, which is slightly lower than the chance value of 2.0 (Smith, 2002). The fact that the raw variance explained by the measure (44.7%) is about two times the variance explained by the first contrast (22.4%) is an indication of unidimensionality of the measure. There is no noticeable evidence of a secondary dimension emerging in the items.

Table 5.22

Principal Component Analysis of Standardised Residuals for Quality Assurance Sub-Scale

INPUT: 652 PERSONS 4 ITEMS MEASURED: 586 PERSONS 4 ITEMS 6 CATS 1.0.0									
STANDARDISED RESIDUAL VARIANCE SCREE PLOT									
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)									
				Empirical		Modelled			
Total variance in observations		=		7.2		100.0%		100.0%	
Variance explained by measures		=		3.2		44.7%		44.0%	
Unexplained variance (total)		=		4.0		55.3%		56.0%	
Unexplained variance in 1st contrast		=		1.6		22.4%		40.6%	
Unexplained variance in 2nd contrast		=		1.4		18.9%		34.1%	
Unexplained variance in 3rd contrast		=		1.0		13.9%		25.2%	
Unexplained variance in 4th contrast		=		.0		.1%		.1%	
Unexplained variance in 5th contrast		=		.0		.0%		.0%	

CON-TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ENTRY ITEM	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ENTRY ITEM
1	.97	-.48	1.38	1.27	4	4 B8.6	-.71	.12	.79	.78	2	2 B8.2
							-.36	-.02	.78	.83	3	3 B8.3
							-.22	.39	1.00	.99	1	1 B8.1

CON-TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ENTRY ITEM
1	.97	-.48	1.38	1.27	4	4 B8.6
1	-.71	.12	.79	.78	2	2 B8.2
1	-.36	-.02	.78	.83	3	3 B8.3
1	-.22	.39	1.00	.99	1	1 B8.1

As a result, the QA sub-scale fits the Rasch model and is unidimensional. Individual items are not calibrated too far apart and they all contribute to the underlying construct (QA). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well separated with sufficient width.

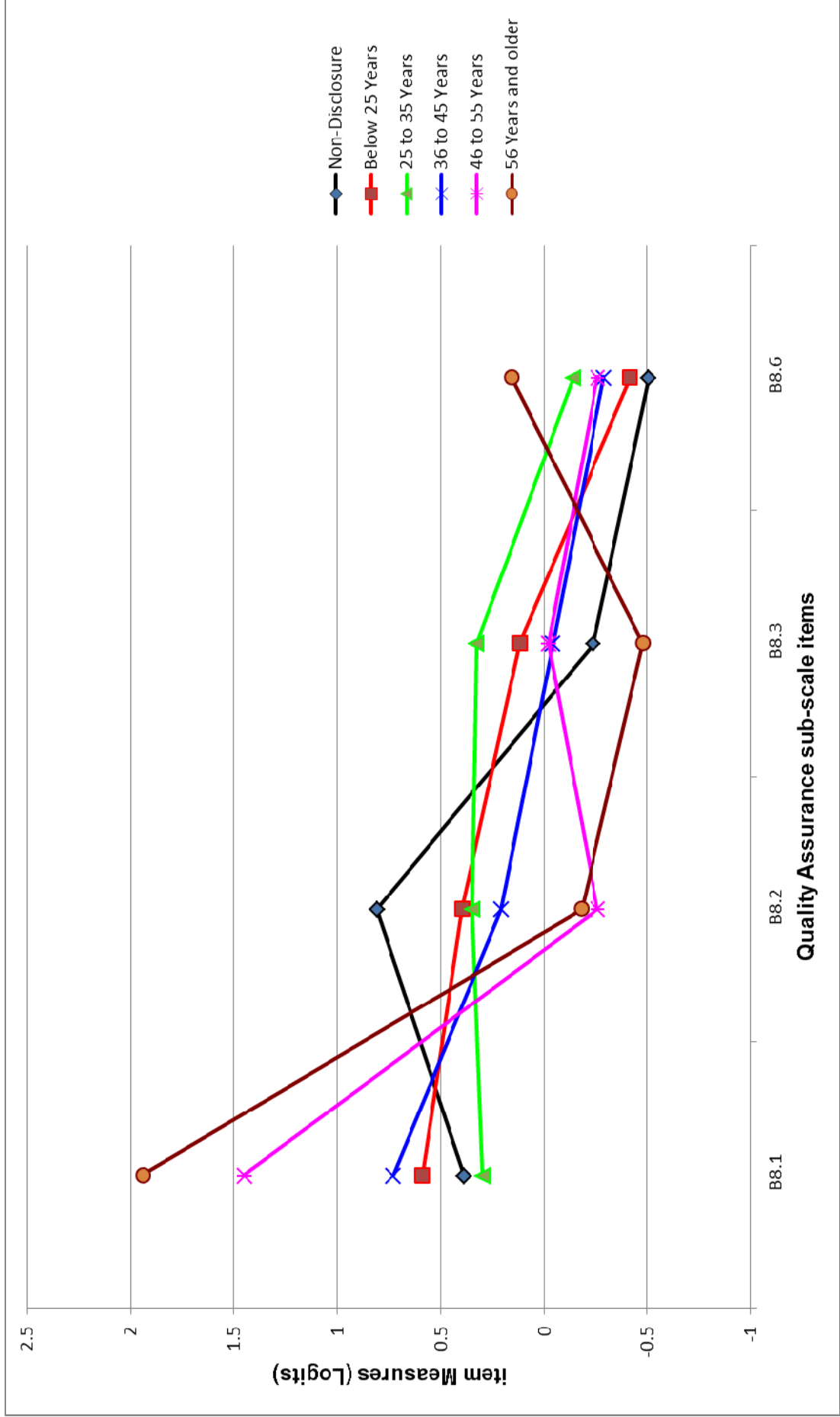
However, several problems are noticeable: poor targeting of the measure on the sample; poor person separation index (only one stratum identified: $G = 1.06$); and a poor person reliability coefficient at .54. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.6.4 *Differential Item Functioning*

The age contrast DIF results for the QA sub-scale items are shown in figure 5.33. It is evident that all respondents above 45 years found item B8.1 to be extremely difficult to endorse relative to other age groups which also experienced slight difficulties. In contrast, the same age groups (46 years and older) found item B8.2 to be easy to endorse while the rest of the other groups found the item to be difficult. For item B8.3, all age groups found the item to be slightly difficult to endorse, except for those aged 56 years and older who perceived the item as easy. For item B8.6, all other age groups found the item to be easy to endorse except those aged 56 years and older who found the item to be slightly difficult to endorse.

Figure 5.34 shows the gender contrast DIF for QA sub-scale items. It is evident that there was no significant gender DIF for all items of the sub-scale. Both male and female respondents perceived items B8.1, B8.2 and B8.3 as difficult to endorse, while item B8.6 was perceived as easy to endorse.

The educational achievement contrast DIF for the QA sub-scale items is shown in figure 5.35. While all respondents with different educational achievements experienced some difficulty with item B8.1, extreme and significant levels of difficulty were reported for all respondents with educational achievement above the occupational certificate/NHC. The most extreme level of difficulty with this item was experienced by those respondents with a Doctorate Degree. For item B8.2, respondents with educational achievement below matric/N1/N2 reported extreme difficulty with the item, while those with a Doctorate Degree perceived the item as very easy to endorse. For item B8.3, respondents with an occupational certificate/NHC found the item to be difficult to endorse while those with Master's and Doctorate Degree found the item to be easy. All groups perceived item B8.6 to be easy except for respondents with a Master's Degree who found the item to be difficult.

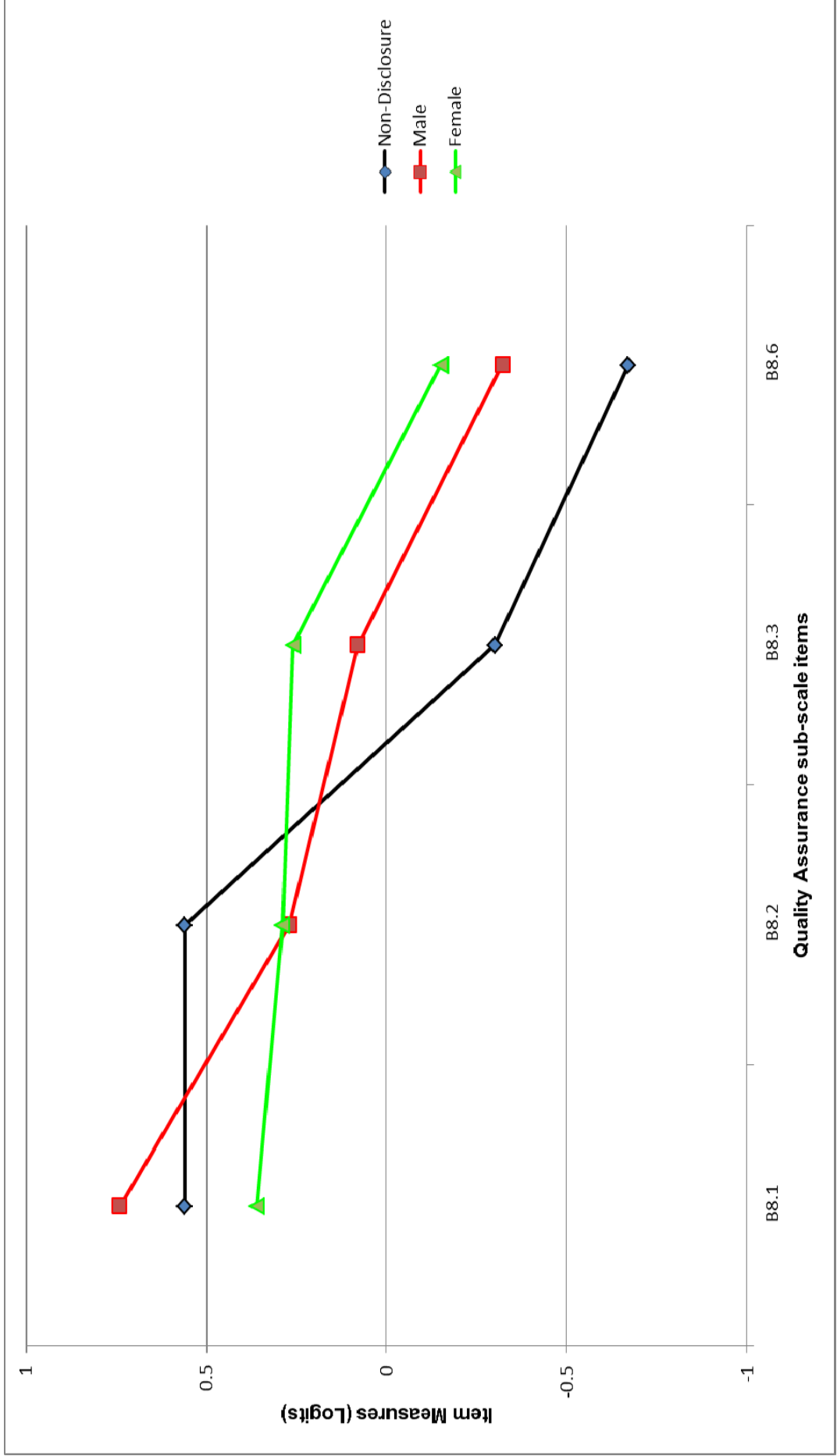


DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.33. Age contrast plot for Quality Assurance Sub-Scale items

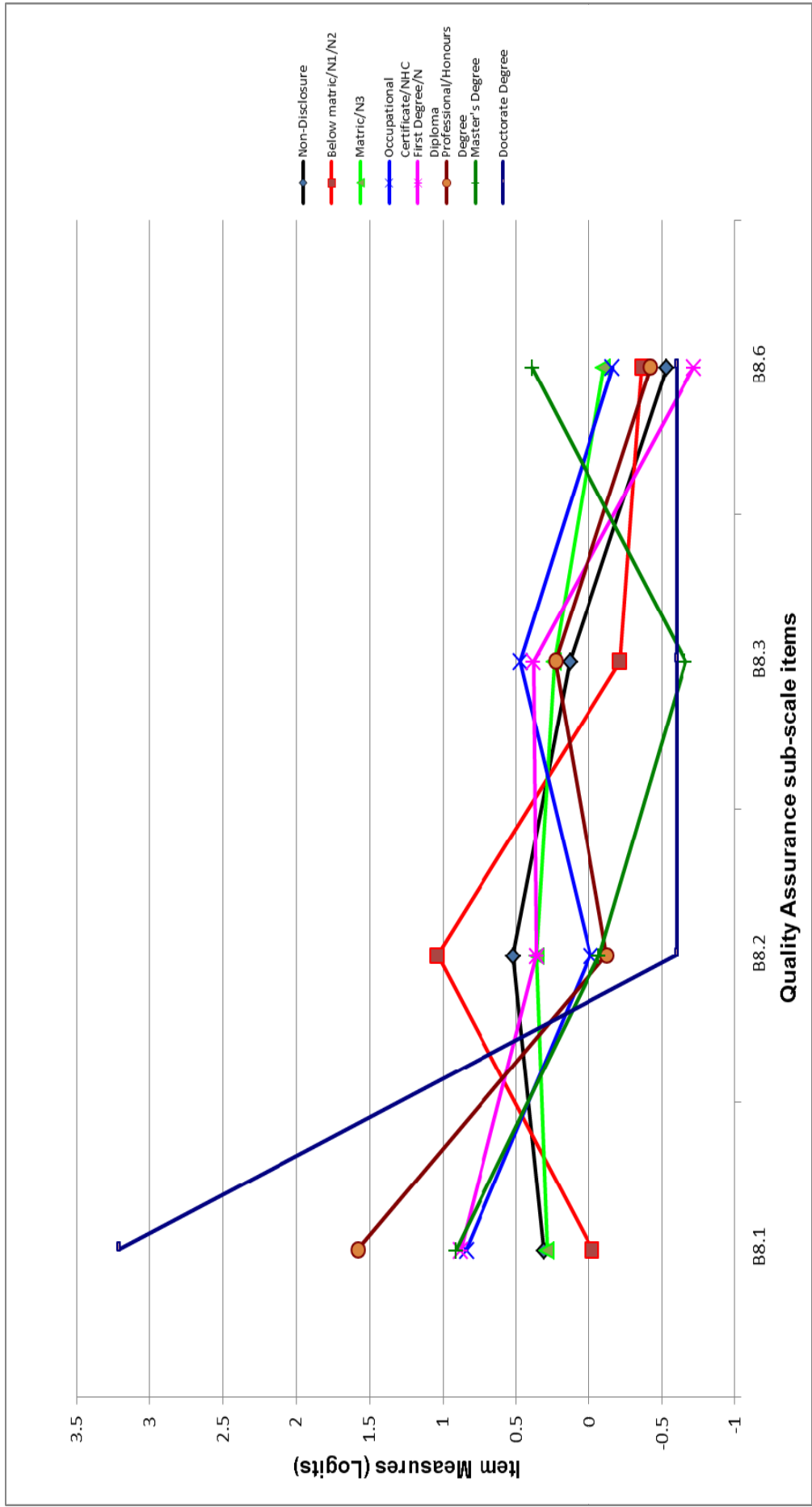
The DIF analysis was also performed on the type of learning programme in which respondents are involved, and the results are presented in figure 5.36. It is clear that there were no significant DIF variations between the respondents (those involved in apprenticeship and those involved in learnership) for all items of the QA sub-scale. Both groups of respondents perceived items B8.1, B8.2 and B8.3 as slightly difficult to endorse, while item B8.6 was perceived as easy to endorse.

The occupation contrast DIF was also analysed and the results are presented in figure 5.37. All identified occupations experienced some difficulty with item B8.1 except for Assessors/Facilitators. Extreme levels of difficulty were experienced by Mentors/Supervisors, Employers/Managers and Skills Development Officers/Providers. For item B8.2, Skills Development Officers/Providers perceived the item as very easy to endorse. Assessors/Facilitators perceived item B8.3 as very difficult to endorse while Employers/Managers are the only group that found this item easy. For item 8.6, Mentors/Supervisors found it very easy to endorse while Assessors/Facilitators and Employers/Managers found the item slightly difficult.



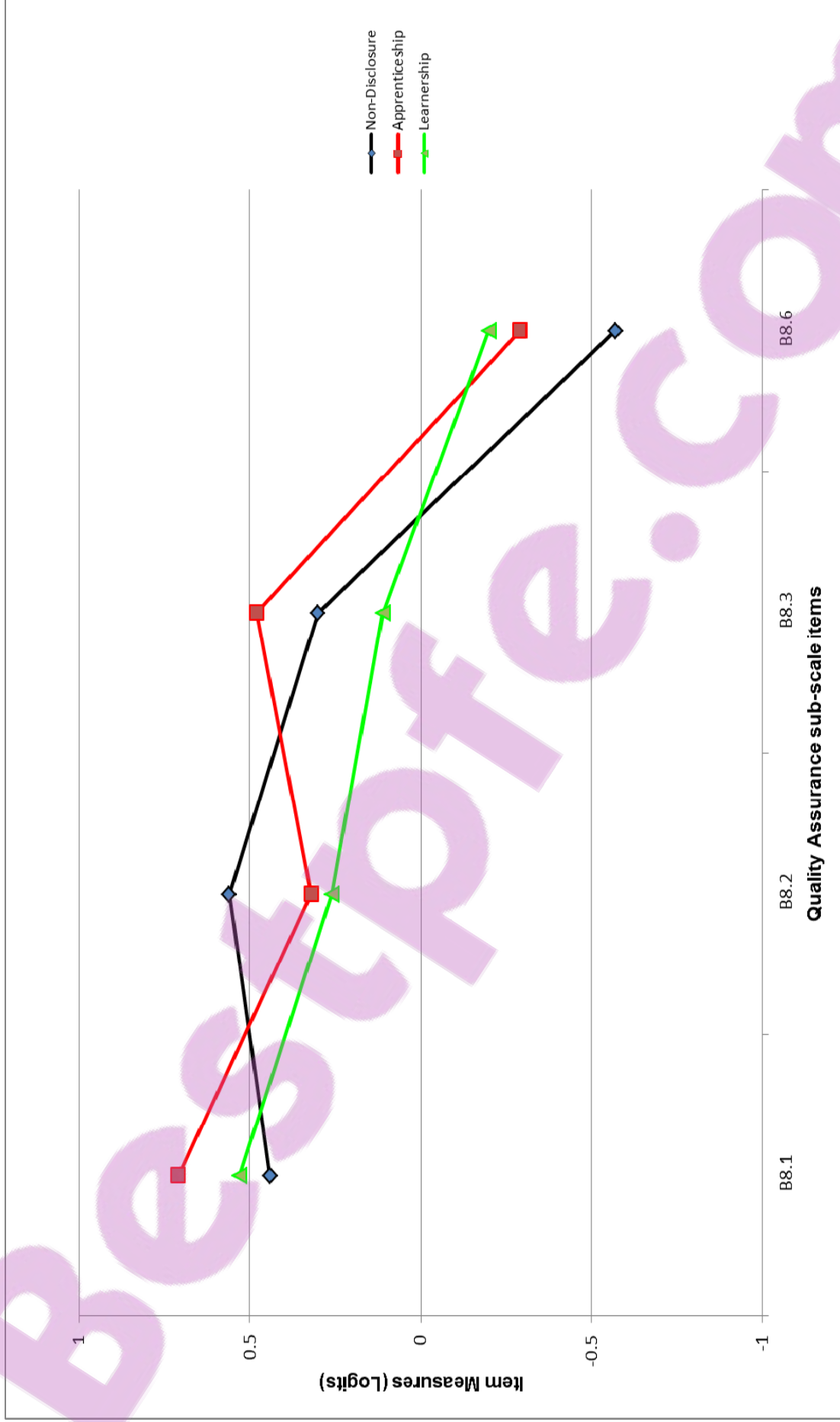
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.34. Gender contrast plot for Quality Assurance Sub-Scale items



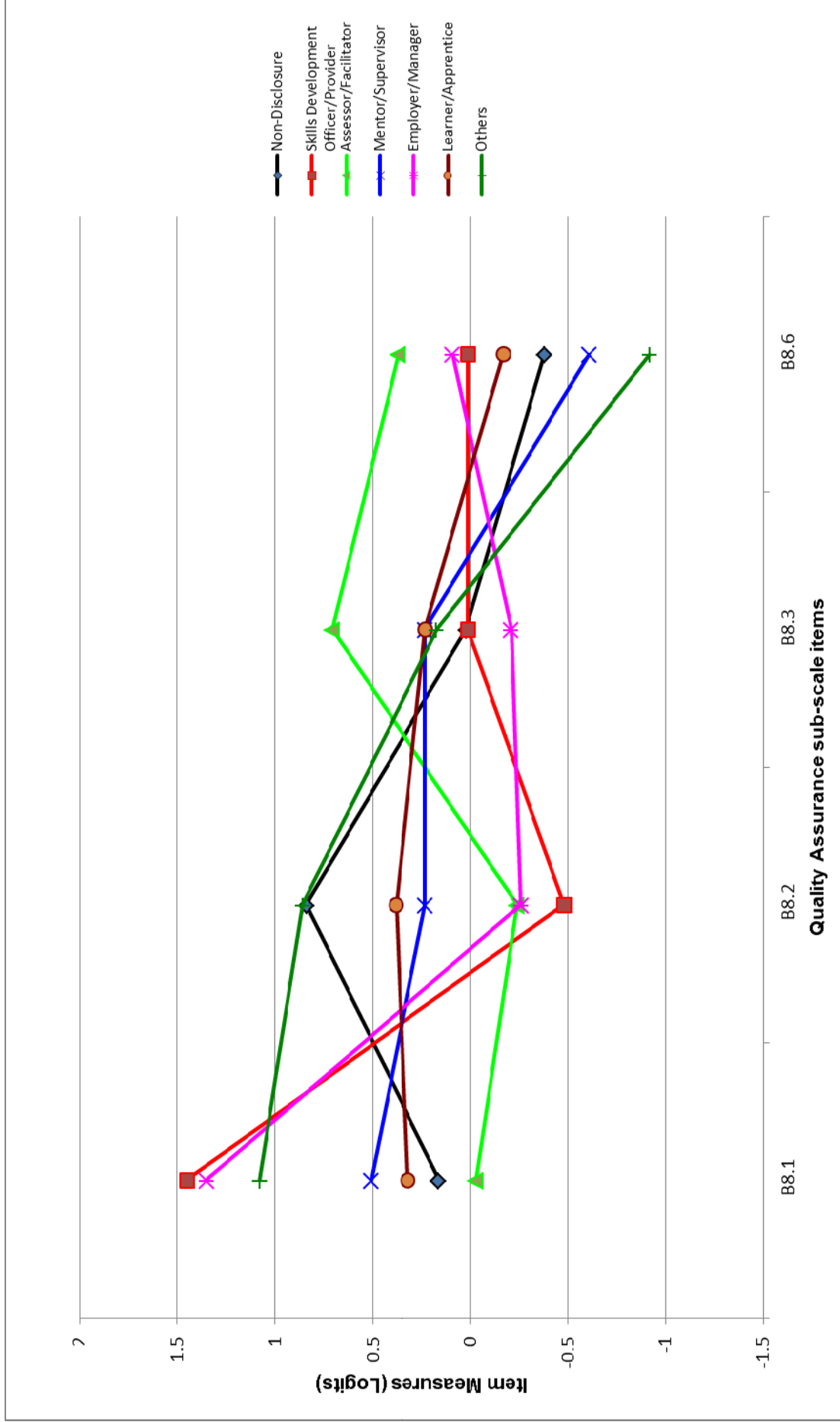
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.35. Educational achievement contrast plot for Quality Assurance Sub-Scale items
408



DIF parameters: <math><0.50</math> Logits = Insignificant;

Figure 5.36. Learning Programme contrast plot for Quality Assurance Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.37. Occupation contrast plot for Quality Assurance Sub-Scale items

5.3.7 Stakeholder Inputs sub-scale

As shown in Table 5.23, the Stakeholder Inputs (SI) sub-scale yielded a Cronbach alpha coefficient of .93 which is acceptable. About 99.4% of the responses to this sub-scale were valid. The results in Table 5.23 show a wider person spread of 6.91 logits.

Table 5.23

Summary Statistics for Stakeholder Inputs Sub-Scale

INPUT: 652 PERSONS 16 ITEMS MEASURED: 608 PERSONS 16 ITEMS 6 CATS 1.0.0								

SUMMARY OF 460 MEASURED (NON-EXTREME) PERSONS								

	RAW			MODEL	INFIT		OUTFIT	
	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	MNSQ	ZSTD

MEAN	25.8	15.9	-2.86	.50	1.02	-.1	1.01	-.1
S.D.	8.2	.3	1.32	.19	.66	1.6	.67	1.6
MAX.	80.0	16.0	1.53	1.03	5.58	7.1	5.75	7.3
MIN.	16.0	13.0	-5.38	.22	.02	-6.1	.02	-5.8

REAL RMSE	.57	ADJ.SD	1.19	SEPARATION	2.09	PERSON RELIABILITY	.81	
MODEL RMSE	.53	ADJ.SD	1.21	SEPARATION	2.26	PERSON RELIABILITY	.84	
S.E. OF PERSON MEAN = .06								

MINIMUM EXTREME SCORE: 148 PERSONS								
LACKING RESPONSES: 44 PERSONS								
VALID RESPONSES: 99.4%								

SUMMARY OF 608 MEASURED (EXTREME AND NON-EXTREME) PERSONS								

	RAW			MODEL	INFIT		OUTFIT	
	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	MNSQ	ZSTD

MEAN	23.4	15.9	-3.77	.82				
S.D.	8.4	.7	1.98	.60				
MAX.	80.0	16.0	1.53	1.90				
MIN.	3.0	3.0	-6.63	.22				

REAL RMSE	1.03	ADJ.SD	1.69	SEPARATION	1.63	PERSON RELIABILITY	.73	
MODEL RMSE	1.02	ADJ.SD	1.69	SEPARATION	1.66	PERSON RELIABILITY	.73	
S.E. OF PERSON MEAN = .08								

PERSON RAW SCORE-TO-MEASURE CORRELATION = .86 (approximate due to missing data)								
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .93 (approximate due to missing data)								

SUMMARY OF 16 MEASURED (NON-EXTREME) ITEMS								

	RAW			MODEL	INFIT		OUTFIT	
	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	MNSQ	ZSTD

MEAN	742.0	457.1	.00	.08	1.00	.0	1.01	.1
S.D.	40.1	2.0	.26	.00	.11	1.3	.13	1.4
MAX.	844.0	460.0	.46	.09	1.18	2.1	1.26	2.9
MIN.	676.0	452.0	-.62	.07	.79	-2.6	.80	-2.1

REAL RMSE	.08	ADJ.SD	.24	SEPARATION	3.01	ITEM RELIABILITY	.90	
MODEL RMSE	.08	ADJ.SD	.24	SEPARATION	3.07	ITEM RELIABILITY	.90	
S.E. OF ITEM MEAN = .07								

UMEAN=.000 USCALE=1.000								
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00 (approximate due to missing data)								
7313 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 11421.48								



The mean score of -2.86 for the measure shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 2.09$) could clearly separate respondents into three statistically distinct strata of persons (high-ability, medium-ability and low-ability persons) with a good person reliability coefficient of .81.

However, the reliability for the items is extremely good ($\alpha = .90$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show a good item separation ($G = 3.01$) which is broader than that of a person. This index translates to about four levels of item difficulty. An item reliability of .90 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.7.1 *Person-Measure targeting*

Figure 5.38 depicts the Person-Item Map for the SI sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot. On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.38 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is just under 3 logits above the mean person ability.

A close inspection of figure 5.38 reveals that the width of the measure is less than 1.5 logits, whereas the width of the person distribution is just over 7 logits. All the items of the measure are located between $-.1$ logit and $+.5$ logit, but only a small fraction of persons can be found in this range. Items B3.18, B3.19 and B3.22 are similar in difficulty, and so are items B3.13, B3.14, B3.16, B3.21, B3.24 and B3.9. Items B3.10 and B3.15 were also placed on the same level of difficulty as items B3.12 and 3.20. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.24. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

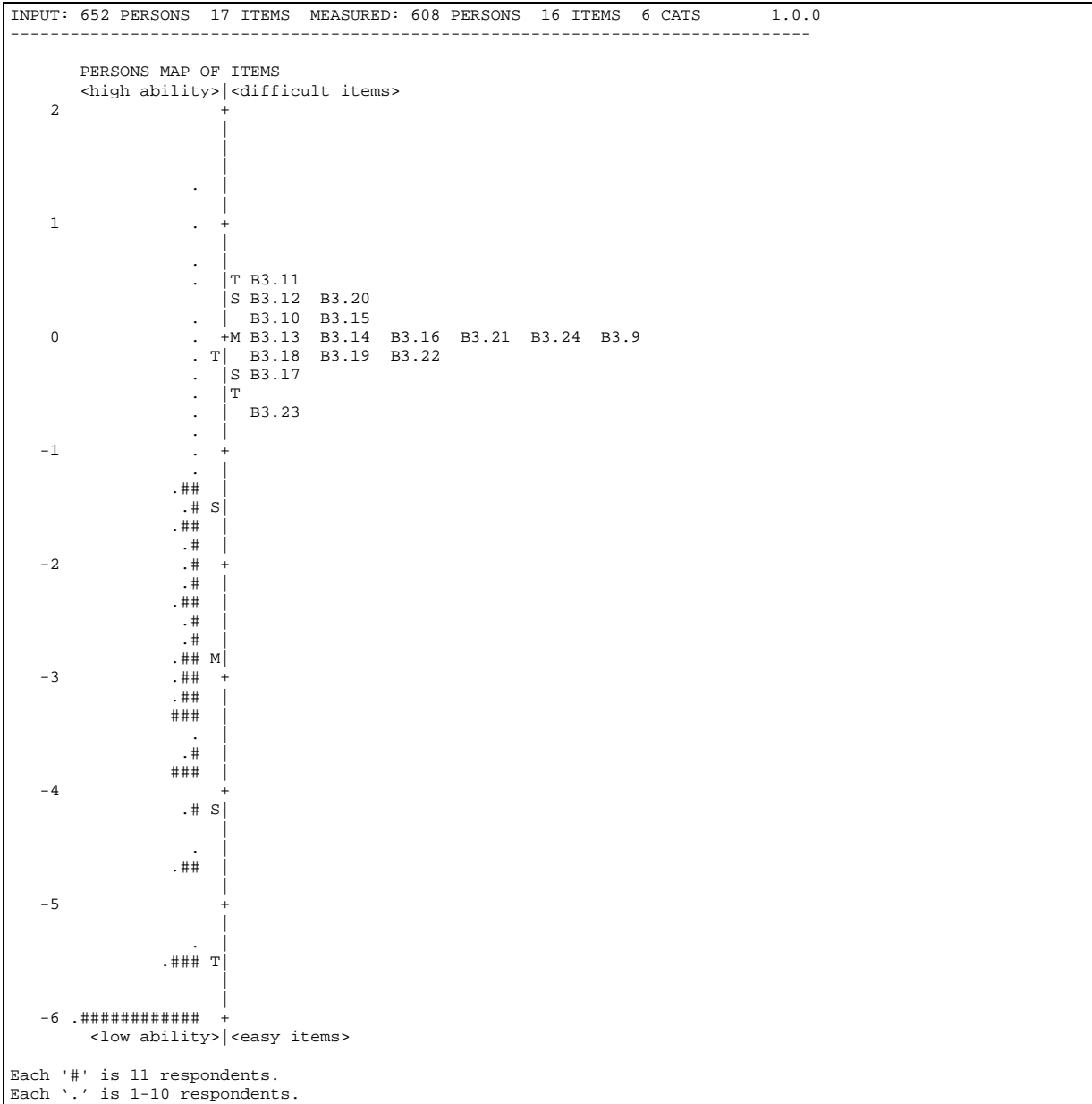


Figure 5.38. Items-Persons Map for Stakeholder Inputs Sub-Scale

5.3.7.2 Item fit statistics

It is evident in Table 5.24 that the spread of logit scale of item measure yielded a maximum value of .46 logits and a minimum value of -.62 logits. The difference between logit_{\max} where item B3.11 is and the logit_{\min} where item B3.23 is, is $\delta = 1.08$. This indicates that the item difficulty is spread over 1.08 logit units.

Table 5.24

Item Fit Statistics for Stakeholder Inputs Sub-Scale

INPUT: 652 PERSONS 16 ITEMS MEASURED: 608 PERSONS 16 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 2.09 REL.: .81 ... ITEM: REAL SEP.: 3.01 REL.: .90												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
3	824	606	.46	.09	1.04	.5	1.02	.2	.56	69.7	67.8	B3.11
4	833	605	.38	.09	.79	-2.6	.80	-2.1	.61	72.3	67.3	B3.12
12	852	606	.25	.08	.94	-.7	.89	-1.2	.61	68.8	66.1	B3.20
7	864	605	.15	.08	1.00	.0	.96	-.4	.61	68.1	65.0	B3.15
2	867	604	.11	.08	1.01	.2	1.26	2.6	.59	64.9	64.8	B3.10
6	875	603	.07	.08	1.03	.4	.93	-.8	.61	67.0	64.5	B3.14
16	880	603	.04	.08	.96	-.4	.98	-.2	.62	65.9	64.2	B3.24
13	881	603	.02	.08	.85	-1.8	.89	-1.3	.64	66.9	64.3	B3.21
5	886	605	.02	.08	1.18	2.0	1.10	1.1	.59	64.3	64.2	B3.13
1	891	608	.01	.08	.99	-.1	1.13	1.4	.61	66.1	64.2	B3.9
8	893	603	-.05	.08	1.12	1.4	1.09	1.0	.61	62.1	63.4	B3.16
11	914	606	-.14	.08	1.02	.3	.96	-.5	.64	66.3	62.8	B3.19
14	910	601	-.16	.08	.84	-2.0	.86	-1.6	.67	65.5	62.7	B3.22
10	914	601	-.20	.08	.92	-1.0	.96	-.4	.64	65.3	62.5	B3.18
9	944	602	-.36	.07	1.10	1.2	1.10	1.2	.64	61.2	61.1	B3.17
15	989	597	-.62	.07	1.18	2.1	1.25	2.9	.64	56.9	58.0	B3.23
MEAN	742.0	457.1	.00	.08	1.00	.0	1.01	.1		65.7	63.9	
S.D.	40.1	2.0	.26	.00	.11	1.3	.13	1.4		3.5	2.3	

Table 5.24 shows the average infit mean value of 1.00 (expected by the model) and an outfit mean value of 1.01 which is slightly above the value expected by the model. However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the SI sub-scale demonstrated infit and outfit values within the expected range of 0.60 and 1.40.

The results depicted in Table 5.24 show that the point measure correlation (PTMEA CORR) ranged from 0.56 to 0.67, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the SI construct and met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and vice versa. For this to be true, the correlations

must be positive as shown in Table 5.24. The lowest correlation is .56 for item B3.11 and its value is positive. There are no misfitting items shown in the table.

5.3.7.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.25.

Table 5.25

Principal Component Analysis of Standardised Residuals for Stakeholder Inputs Sub-Scale

INPUT: 652 PERSONS 16 ITEMS MEASURED: 608 PERSONS 16 ITEMS 6 CATS 1.0.0													
STANDARDISED RESIDUAL VARIANCE SCREE PLOT													
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)													
				Empirical		Modelled							
Total variance in observations	=	32.6	100.0%	100.0%									
Variance explained by measures	=	16.6	50.9%	51.0%									
Unexplained variance (total)	=	16.0	49.1%	100.0%	49.0%								
Unexplained variance in 1st contrast	=	1.6	5.0%	10.2%									
CON-	TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ENTRY ITEM	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ENTRY ITEM
1		.52	-.62	1.18	1.25	A	15 B3.23	-.49	.46	1.04	1.02	a	3 B3.11
1		.46	.04	.96	.98	B	16 B3.24	-.44	.01	.99	1.13	b	1 B3.9
1		.40	-.16	.84	.86	C	14 B3.22	-.41	.38	.79	.80	c	4 B3.12
1		.31	.02	.85	.89	D	13 B3.21	-.35	.11	1.01	1.26	d	2 B3.10
1		.24	.25	.94	.89	E	12 B3.20	-.24	-.20	.92	.96	e	10 B3.18
1		.16	-.05	1.12	1.09	F	8 B3.16	-.13	-.14	1.02	.96	f	11 B3.19
								-.09	.07	1.03	.93	g	6 B3.14
								-.05	.15	1.00	.96	h	7 B3.15
								-.04	-.36	1.10	1.10	H	9 B3.17
								.00	.02	1.18	1.10	G	5 B3.13

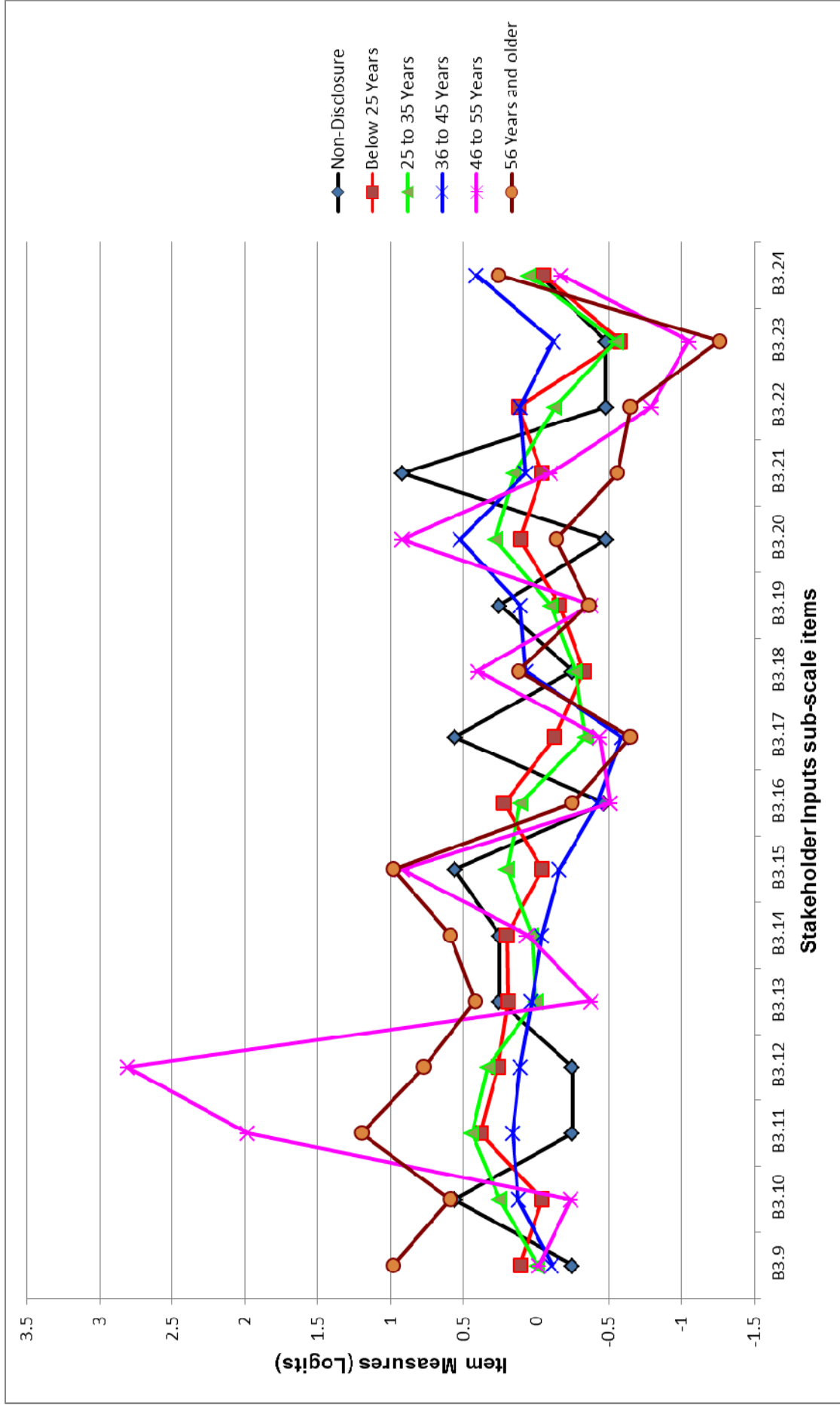
The PCA results in Table 5.25 show that only 50.9% of the variance was explained by the measure. The unexplained variance explained by the first contrast had an eigenvalue of 1.6 (5.0%), which is slightly lower than the chance value of 2.0 (Smith, 2002). The fact that items of the SI sub-scale fit the model and that the variance explained by the SI sub-scale is 5 times higher than the unexplained variance in the 1st contrast is an indication of the unidimensionality of the construct.

As a result, the SI sub-scale fits the Rasch model, is unidimensional and has successfully distinguished three strata of respondents ($G = 2.09$) with a person reliability coefficient of .81. Individual items are not calibrated too far apart and they all contribute to the underlying construct (SI). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well-separated with sufficient width. Nevertheless, the only problem is that the measure is poorly targeted to the sample. It is evident from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.7.4 Differential Item Functioning

The age contrast DIF for the items of the SI sub-scale was analysed and the results are shown in figure 5.39. It is evident that respondents aged 56 years and older experienced extreme levels of difficulty with items B3.9 and 3.10 relative to other age groups. For item B3.11 and B3.12, extreme levels of difficulty to endorse these items were reported for respondents aged 45 to 55 years and those aged 56 years and older. There is no significant DIF for item B3.13, except to say that respondents aged 45 to 55 years found this item to be easy. A significant DIF was reported for respondents aged 56 years and older with respect to their difficulty in endorsing item B3.14. For item B3.15, those respondents in the age groups above 45 years experienced extreme difficulty in endorsing this item.

Respondents aged 45 to 55 years found item B3.16 to be very easy to endorse relative to other age groups. Item B3.17 was found to be very easy to endorse by those respondents aged 36 to 45 years and those aged 56 years and older. There were no statistically significant DIFs across all age groups for items B3.18 and B3.19. However, for item B3.20, respondents aged between 36 and 55 years found it difficult to endorse this item.



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.39. Age contrast plot for Stakeholder Inputs Sub-Scale items

Item B3.21, as shown in figure 5.39, was very easy to endorse for those respondents aged 56 years and older. Those respondents aged 46 and older found item B3.22 to be very easy to endorse. All age groups, except those between 36 and 45 years, found item B3.23 to be very easy to endorse. There were no significant DIFs reported across all ages for item 3.24.

The results for the gender contrast DIF are shown in figure 5.40. It is evident that there is no significant gender DIF reported for all items of the SI sub-scale. Both male and female respondents reported item B3.11 as being difficult to endorse while item B3.23 was perceived to be easy.

The educational achievement contrast DIF is shown in figure 5.41. Respondents with educational achievement below matric/N1/N2 reported some difficulty in endorsing item B3.9, while those with an occupational certificate/NHC felt the same for item B3.10. Item B3.11 was reportedly difficult to endorse by the respondents with matric/N3, Professional/Honours Degree, Masters Degree and Doctorate Degree. However, extreme levels of difficulty with this item were experienced by those with a Professional/Honours Degree and those with a Doctorate Degree. For item B3.12, the endorsement difficulty was experienced by all groups with educational achievement above the level of occupational certificate/NHC. The groups that experienced the most extreme difficulty with this item are those with a First Degree/N Diploma and those with a Doctorate Degree. Surprisingly, all groups experienced moderate levels of difficulty with items B3.13 and B3.14, except for those whose educational achievement is below matric/N1/N2 who reported extreme difficulty with the items. Whilst item B3.15 was reportedly very difficult for respondents with a Professional/Honours Degree, it was perceived as being very easy by those whose educational achievement is below matric/N1/N2.

For item B3.16, respondents whose educational achievement is below matric/N1/N2 and those with a Doctorate Degree found it extremely difficult to endorse, while those with a Professional/Honours Degree and those with a Master's Degree found it very easy to endorse. Item B3.17 was extremely easy for respondents with an occupational certificate/NHC, those with a First Degree/N Diploma and those with a Doctorate Degree. Those respondents whose educational achievement is below matric/N1/N2 found item B3.18 to be very easy whereas those with a Doctorate Degree found the item to be extremely difficult to endorse. There are no significant DIF variations reported for all groups with regard to item B3.19. Item 3.20 proved difficult to endorse for holders of occupational certificate/NHC, First Degree/N Diploma and Doctorate Degree. For item B3.21, only Master's Degree holders perceived the item as very easy relative to other groups.

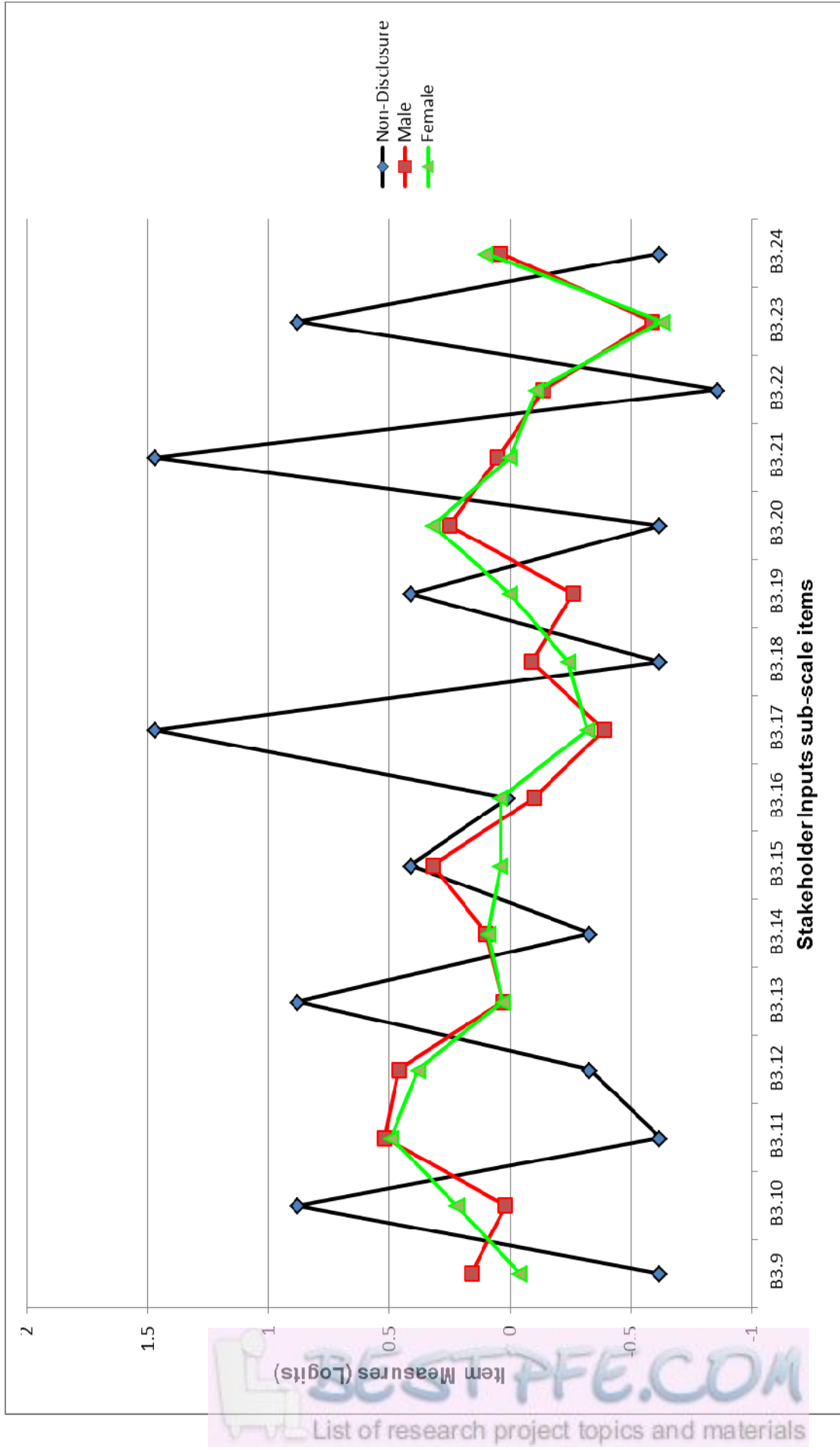
Respondents with First Degree/N Diploma and those with Doctorate Degrees perceived item B2.22 as very easy to endorse. All groups of respondents perceived item B3.23 as very easy. Of more interest is the fact that those below matric/N1/N2 and those with a Doctorate Degrees found item B3.24 to be very easy to endorse.

The results of the DIF contrast for the type of learning programme in which respondents are involved are shown in figure 5.42. There are no statistically significant DIFs observed between the two groups (apprenticeship and learnership groups) for items B3.9, B3.10, B3.11, B3.12, B3.13 and B3.14. Whilst the respondents involved in apprenticeships perceived items B3.9 and B3.10 as being easy to endorse, those involved in learnerships perceived these items as being difficult. Respondents involved in apprenticeships perceived items B3.15 and B3.16 as being extremely difficult to endorse relative to those involved in learnerships. While both groups were comfortable with item B3.17, those involved in apprenticeships experienced the item as very easy to endorse. Equally important, while the two groups were not comfortable with item B3.20, those involved in apprenticeships reported extreme levels of difficulty with the item. Both groups perceived item B3.23 as being very easy to endorse.

The results for the occupation contrast DIF are shown in figure 5.43. It is evident that extreme levels of difficulty to endorse item B3.9 were experienced by the skills development officers/providers relative to other identified occupational groups. Assessors/Facilitators perceived item B3.10 as being extremely difficult to endorse while Mentors/Supervisors perceived the item as very easy. For item B3.11, Mentors/Supervisors perceived the item as very easy to endorse, whereas Skills Development Officers/Providers, Employers/Managers and Assessors/Facilitators reported extreme levels of difficulty with the item. While Assessors/Facilitators perceived item B3.12 as relatively easy, Skills Development Officers/Providers and Employers/Managers found this item to be extremely difficult to endorse.

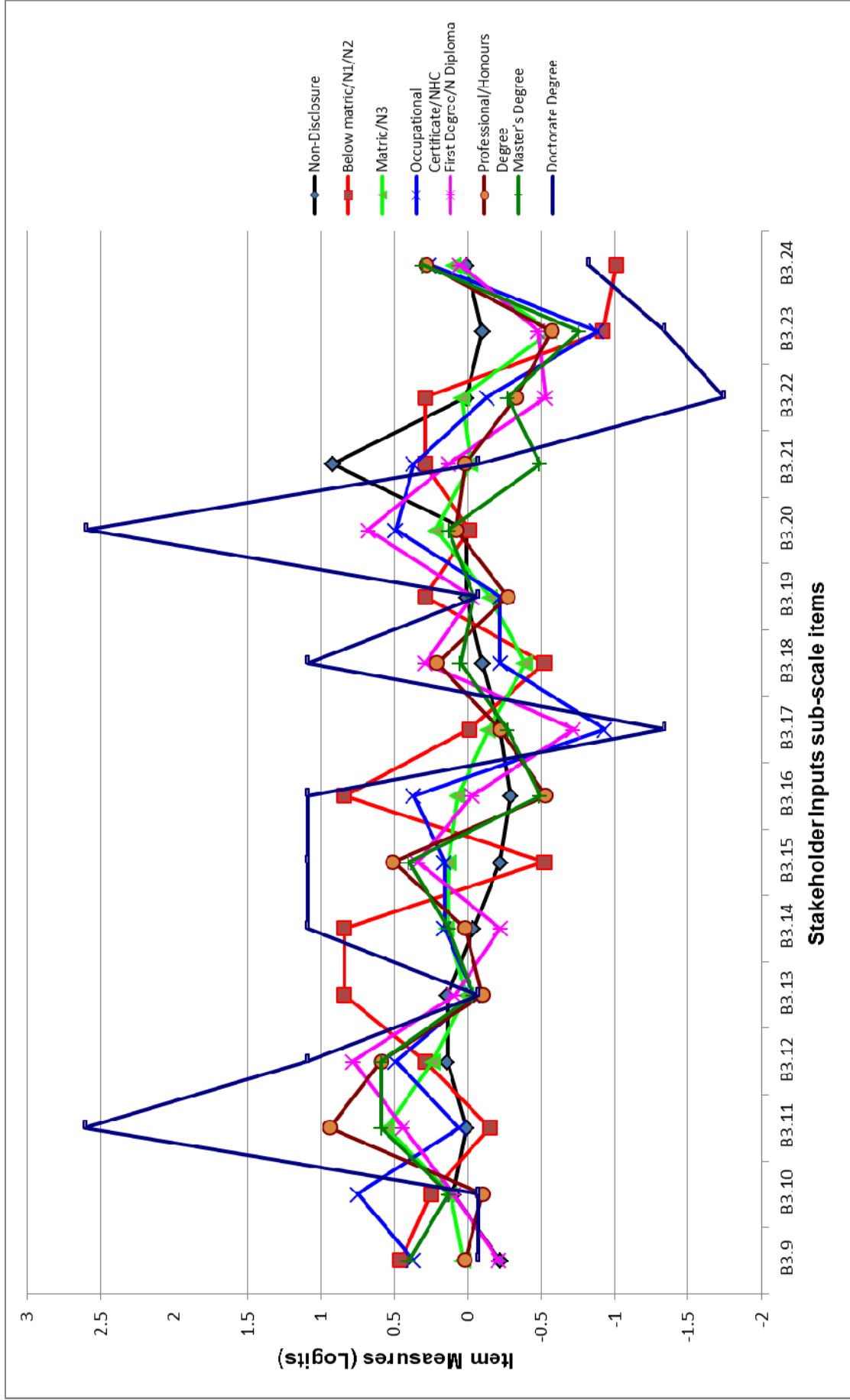
There were no significant DIFs reported across all groups for items B3.13 and B3.14. While all groups perceived some level of discomfort in endorsing item B3.15, Mentors/Supervisors found it extremely difficult to endorse this item. For item B3.16, Employers/Managers found the item to be extremely easy to endorse. Whilst all groups perceived some comfort with item B3.17, Assessors/Facilitators found it extremely easy to endorse this item. No

significant DIFs were reported across all groups for item B3.18. Skills Development Officers/Providers and Assessors/Facilitators found item B3.19 extremely easy to endorse. For item B3.20, Employers/Managers experienced extreme difficulty in endorsing the item relative to other groups. Only Assessors/Facilitators reported extreme levels of difficulty in endorsing item B3.20 relative to other occupational groups. For item B3.22, Employers/Managers reported extreme ease in endorsing the item. All occupational groups reported extreme ease in endorsing item B3.23, except for Mentors/Supervisors who reported slight comfort. For Item B3.24, Assessors/Facilitators reported extreme difficulty and extreme ease respectively relative to all other identified occupational groups.



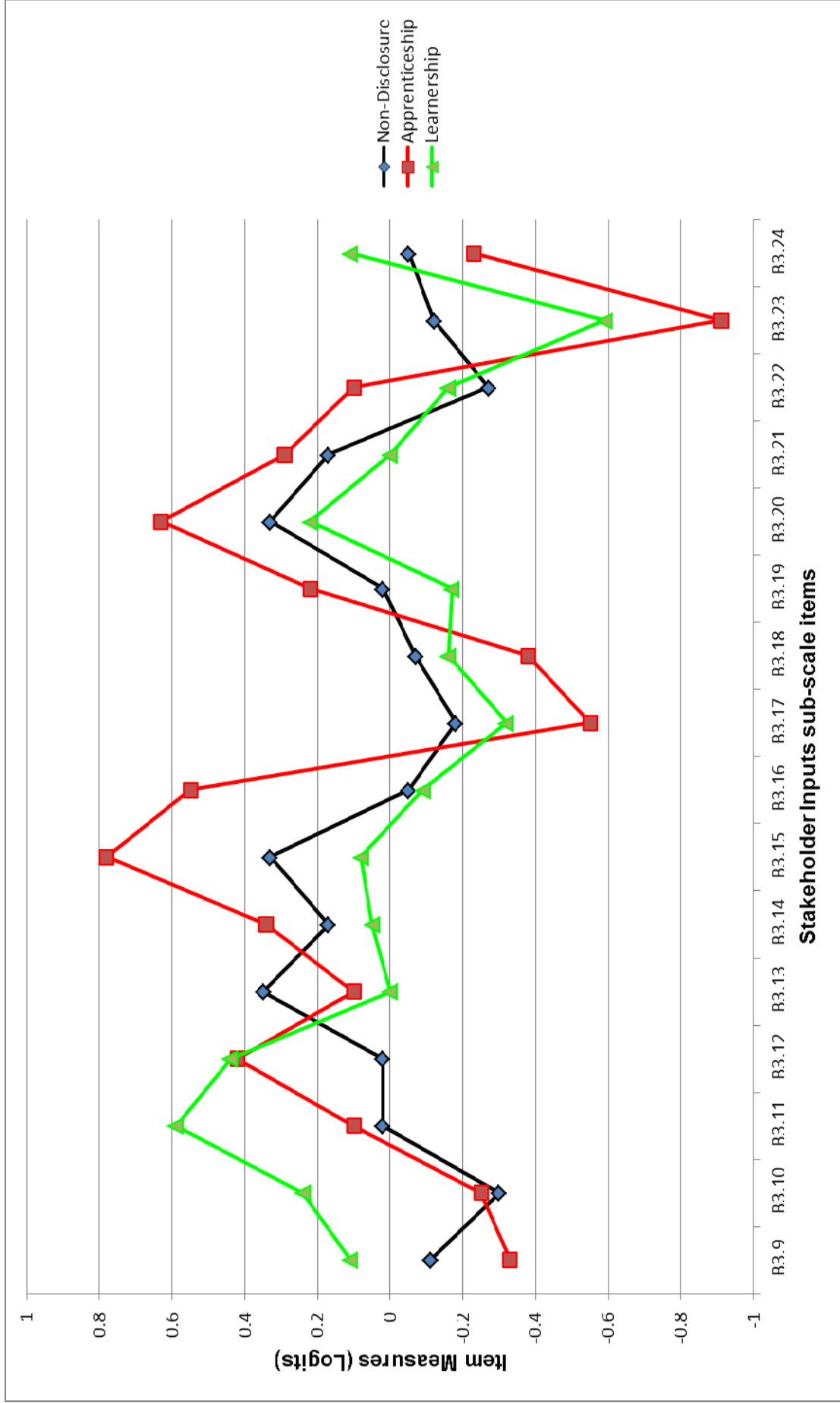
DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.40. Gender contrast plot for Stakeholder Inputs Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.41. Educational achievement contrast plot for Stakeholder Inputs Sub-Scale items



DIF parameters: <math><0.50</math> Logits = Insignificant;

Figure 5.42. Learning programme contrast plot for Stakeholder Inputs Sub-Scale items

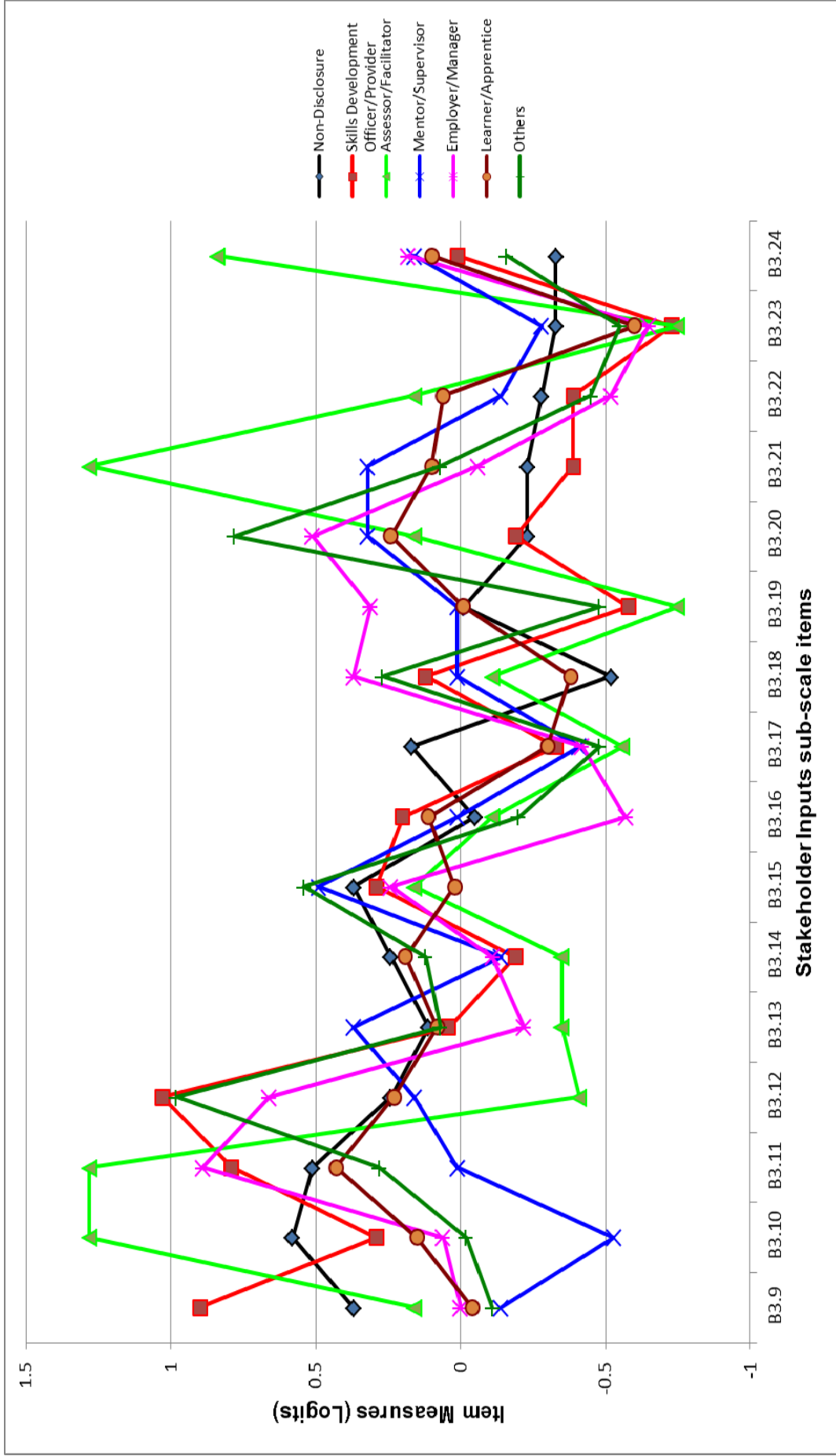


Figure 5.43. Occupation contrast plot for Stakeholder Inputs Sub-Scale items

5.3.8 Strategic Leadership Sub-Scale

As shown in Table 5.26, the Strategic Leadership (SL) sub-scale yielded a Cronbach alpha coefficient of .85 which is acceptable. About 99.1% of the responses to this scale were valid. The results in Table 5.26 show a wider person spread of 9.03 logits.

Table 5.26

Summary Statistics for Strategic Leadership Sub-Scale

```

INPUT: 652 PERSONS 4 ITEMS MEASURED: 619 PERSONS 4 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 420 MEASURED (NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |          |
|      SCORE      COUNT | MEASURE | MODEL  | INFIT   | OUTFIT  |          |          |
|-----|-----|-----|-----|-----|-----|-----|-----|
| MEAN      7.3      4.0 |   -3.00 |   .95  |   .95   |   .95   |   -.1   |
| S.D.      2.6      .2  |   1.63  |   .15  |   .87   |   1.1   |   .88   |
| MAX.     23.0      4.0 |   3.98  |   1.21  |   6.78  |   4.5   |   6.33  |
| MIN.      4.0      1.0 |  -5.05  |   .48  |   .00   |  -3.1   |   .00   |
|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE 1.06 ADJ.SD | 1.24 SEPARATION | 1.17 PERSON RELIABILITY | .58 |
| MODEL RMSE .96 ADJ.SD | 1.32 SEPARATION | 1.37 PERSON RELIABILITY | .65 |
| S.E. OF PERSON MEAN = .08 |
+-----+-----+-----+-----+-----+-----+-----+
MINIMUM EXTREME SCORE: 199 PERSONS
LACKING RESPONSES: 33 PERSONS
VALID RESPONSES: 99.1%
-----
SUMMARY OF 619 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |
|      SCORE      COUNT | MEASURE | MODEL  | INFIT   | OUTFIT  |          |          |
|-----|-----|-----|-----|-----|-----|-----|-----|
| MEAN      6.2      4.0 |  -4.11  |  1.25  |          |          |          |
| S.D.      2.7      .2  |   2.09  |   .46  |          |          |          |
| MAX.     23.0      4.0 |   3.98  |   2.14  |          |          |          |
| MIN.      1.0      1.0 |  -6.45  |   .48  |          |          |          |
|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE 1.38 ADJ.SD | 1.57 SEPARATION | 1.14 PERSON RELIABILITY | .56 |
| MODEL RMSE 1.33 ADJ.SD | 1.61 SEPARATION | 1.21 PERSON RELIABILITY | .59 |
| S.E. OF PERSON MEAN = .08 |
+-----+-----+-----+-----+-----+-----+-----+
PERSON RAW SCORE-TO-MEASURE CORRELATION = .92 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .85 (approximate due to missing data)
-----
SUMMARY OF 4 MEASURED (NON-EXTREME) ITEMS
-----
+-----+-----+-----+-----+-----+-----+-----+-----+
|          RAW          |          |          |          |          |          |          |
|      SCORE      COUNT | MEASURE | MODEL  | INFIT   | OUTFIT  |          |          |
|-----|-----|-----|-----|-----|-----|-----|-----|
| MEAN     769.7     416.2 |    .00  |    .09  |    .99  |    .96  |    -.7  |
| S.D.     27.9      1.3  |    .22  |    .00  |    .14  |    1.7  |    .16  |
| MAX.    805.0     418.0 |    .26  |    .09  |    1.21 |    2.4  |    1.22 |
| MIN.    741.0     415.0 |   -.27  |    .09  |    .83  |   -2.1  |    .81  |
|-----|-----|-----|-----|-----|-----|-----|
| REAL RMSE .09 ADJ.SD | .21 SEPARATION | 2.27 ITEM RELIABILITY | .84 |
| MODEL RMSE .09 ADJ.SD | .21 SEPARATION | 2.34 ITEM RELIABILITY | .85 |
| S.E. OF ITEM MEAN = .13 |
+-----+-----+-----+-----+-----+-----+-----+
UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00 (approximate due to missing data)
1665 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 2566.29

```

The mean score of -3.00 for the measure shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 1.17$) could only separate respondents into one statistically distinct stratum of persons with a marginal person reliability coefficient of .58. The reliability coefficient can be improved by adding more items to the measure, by improving sample-item targeting or by stretching the sample ability variance.

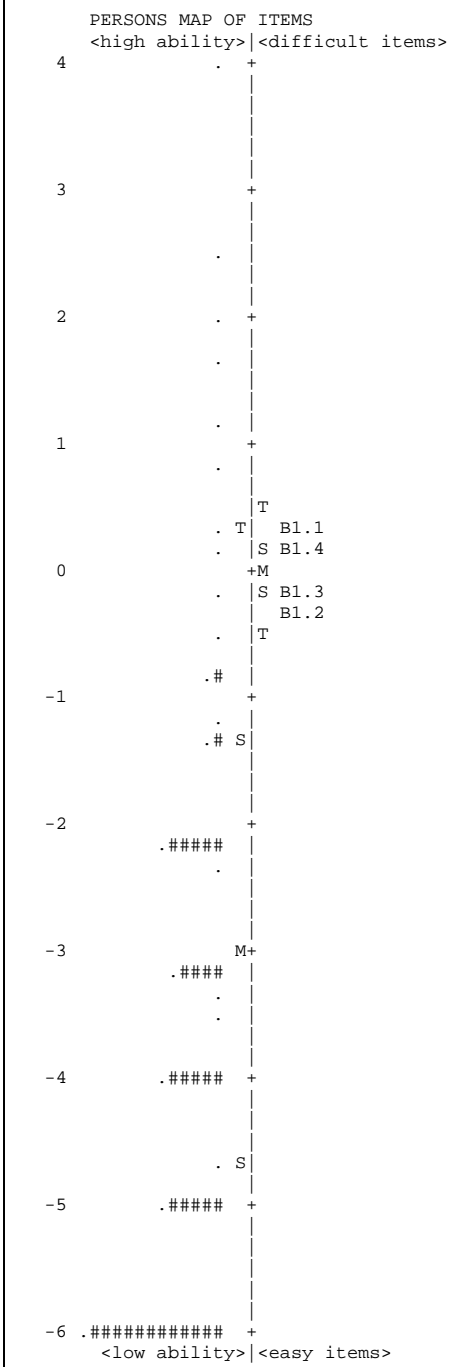
However, the reliability for the items is very good ($\alpha = .84$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show a good item separation ($G = 2.27$) which is broader than that of a person. This index translates to about three levels of item difficulty, these being, easy, moderate and difficult. An item reliability of .84 indicates that a similar item hierarchy along the construct is highly reproducible with a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.8.1 *Person-Measure targeting*

Figure 5.44 depicts the Person-Item Map for the SL sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot.

On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.44 depict that the items were difficult for the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 3 logits above the mean person ability.

A close inspection of figure 5.44 reveals that the width of the measure is slightly above 0.5 logits, whereas the width of the person distribution is 10 logits. All the items of the measure are located between -.5 logits and +.5 logits, but only a small fraction of persons can be found in this range. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.27. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).



Each '#' is 16 respondents.
 Each '.' is 1-15 respondents.

Figure 5.44. Items-Persons Map for Strategic Leadership Sub-Scale

5.3.8.2 Item fit statistics

It is evident in Table 5.27 that the spread of logit scale of item measure yielded a maximum value of .26 logits and a minimum value of -.27 logits. The difference between logit_{\max} where item B1.1 is and the logit_{\min} where item B1.2 is, is $\delta = 0.53$. This indicates that the item difficulty is spread over .53 logit units.

Table 5.27

Item Fit Statistics for Strategic Leadership Sub-Scale

INPUT: 652 PERSONS 4 ITEMS MEASURED: 619 PERSONS 4 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.17 REL.: .58 ... ITEM: REAL SEP.: 2.27 REL.: .84												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
1	935	612	.26	.09	.96	-.4	.93	-.9	.75	69.6	66.4	B1.1
4	943	614	.18	.09	1.21	2.4	1.22	2.8	.72	60.7	66.2	B1.4
3	987	613	-.17	.09	.94	-.7	.87	-1.8	.81	67.2	63.6	B1.3
2	1001	613	-.27	.09	.83	-2.1	.81	-2.8	.82	71.0	63.7	B1.2
MEAN	769.8	416.3	.00	.09	.99	-.2	.96	-.7		67.1	65.0	
S.D.	27.9	1.3	.22	.00	.14	1.7	.16	2.1		3.9	1.3	

Table 5.27 shows average mean values of .99 and .96 respectively for both the infit and outfit and these are slightly lower than the values expected by the model (MNSQ = 1). However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between 0.6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the SL sub-scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The results depicted in Table 5.27 show that the point measure correlation (PTMEA CORR) ranged from .72 to .82, with no items containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the SL construct and met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and *vice versa*. For this to be true, the correlations

must be positive as shown in Table 5.27. The lowest correlation is .72 for item B1.4 and its value is positive. There are no misfitting items shown in the table.

5.3.8.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.28.

Table 5.28

Principal Component Analysis of Standardised Residuals for Strategic Leadership Sub-Scale

INPUT: 652 PERSONS 4 ITEMS MEASURED: 619 PERSONS 4 ITEMS 6 CATS 1.0.0											
STANDARDISED RESIDUAL VARIANCE SCREE PLOT											
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)											
Total variance in observations	=										
Variance explained by measures	=	5.3	56.9%							56.3%	
Unexplained variance (total)	=	4.0	43.1%	100.0%						43.7%	
Unexplained variance in 1st contrast	=	1.6	16.9%	39.3%							
Unexplained variance in 2nd contrast	=	1.3	13.8%	32.0%							
Unexplained variance in 3rd contrast	=	1.1	12.3%	28.6%							
Unexplained variance in 4th contrast	=	.0	.0%	.1%							
Unexplained variance in 5th contrast	=	.0	.0%	.0%							

CON-											
TRAST	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM	LOADING	MEASURE	MNSQ	MNSQ	NUMBER
1	.78	.18	1.21	1.22	4	4 B1.4	-.65	.26	.96	.93	1 1 B1.1
1	.38	-.17	.94	.87	3	3 B1.3	-.63	-.27	.83	.81	2 2 B1.2

CON-											
TRAST	LOADING	MEASURE	MNSQ	MNSQ	NUMBER	ITEM					
1	.78	.18	1.21	1.22	4	4 B1.4					
1	.38	-.17	.94	.87	3	3 B1.3					
1	-.65	.26	.96	.93	1	1 B1.1					
1	-.63	-.27	.83	.81	2	2 B1.2					

The PCA results in Table 5.28 show that only 56.9% of the variance was explained by the measure. The unexplained variance explained by the first contrast had an eigenvalue of 1.6, which is slightly lower than the chance value of 2.0 (Smith, 2002). The fact that all items of the SL sub-scale fit the model and that the raw variance explained by the measure is 56.9% support the unidimensionality of the measure. There is no noticeable evidence of a secondary dimension emerging in the items.

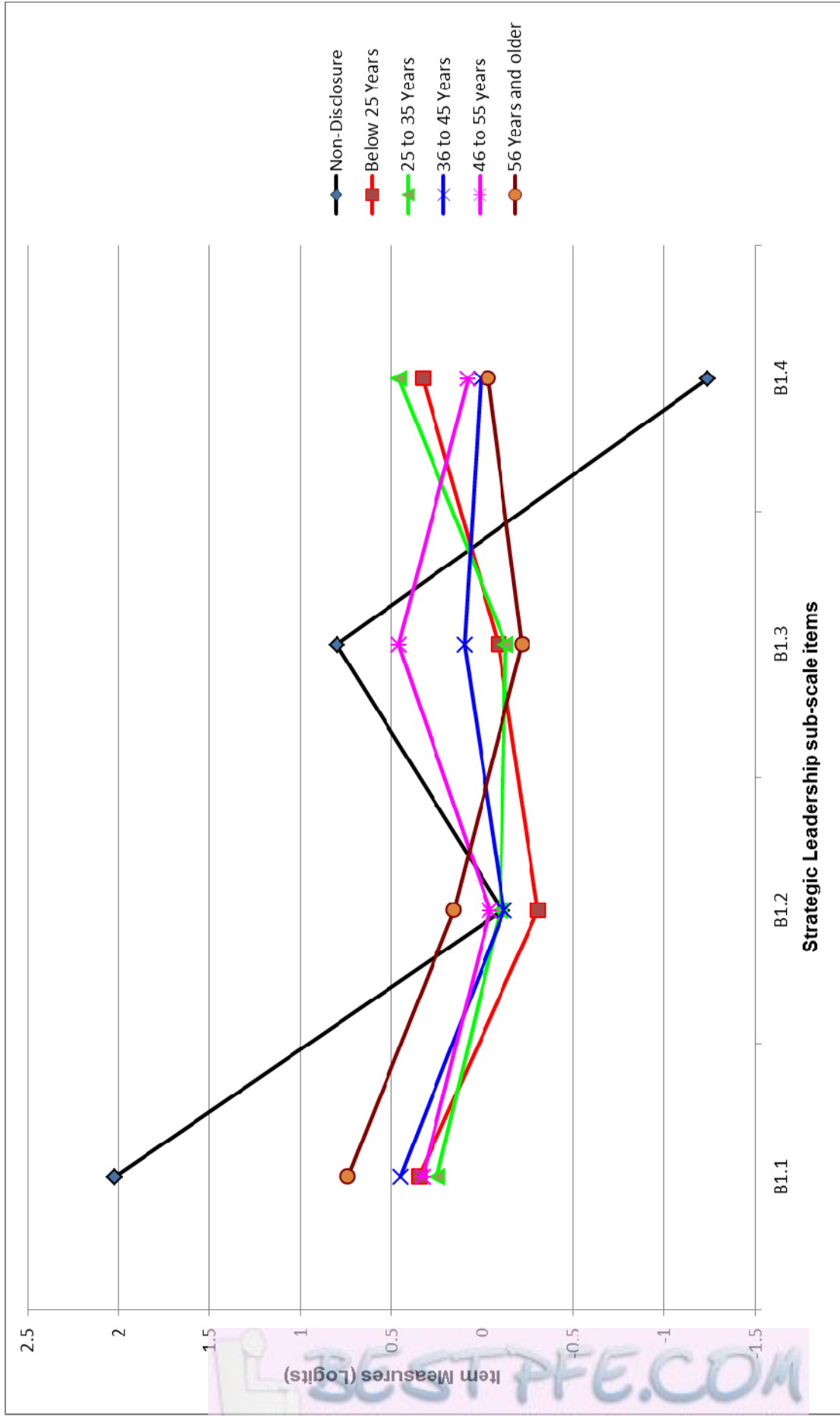
As a result, the SL sub-scale fits the Rasch model and is unidimensional. Individual items are not calibrated too far apart and they all contribute to the underlying construct (SL). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well separated with sufficient width. However, several problems are noticeable: poor targeting of the measure on the sample; poor person separation index (only one stratum identified: $G = 1.17$); and a poor person reliability coefficient at .58. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.8.4 Differential Item Functioning

The results of the age contrast DIF for the items of SL sub-scale are presented in figure 5.45. Whilst all age groups demonstrated some level of discomfort with item B1.1, it was extremely difficult for those aged 56 years and older to endorse this item. No significant DIF variations were reported across all age groups for items B1.2, B1.3 and B1.4.

The gender contrast DIF is shown in figure 5.46. No statistically significant DIF variations were reported between male and female respondents across all items of the SL sub-scale.

The educational achievement contrast DIF results are shown in figure 5.47. It is quite evident that extreme levels of difficulty in endorsing item B1.1 were experienced by those respondents whose educational achievement is below matric/N1/N2, those with First Degree/N Diploma and those with a Doctorate Degree. While those with Professional/Honours Degrees reported extreme difficulty in endorsing item B1.2, those with a Doctorate Degree found it very easy to endorse this item. Of more interest is the fact that those respondents with a Doctorate Degree found item B1.3 to be extremely difficult to endorse while those below matric/N1/N2 found it very easy. For item B1.4, Doctorate Degree holders found the item very easy to endorse while the opposite is the case for those below matric/N1/N2 and those who hold occupational certificates/NHC.

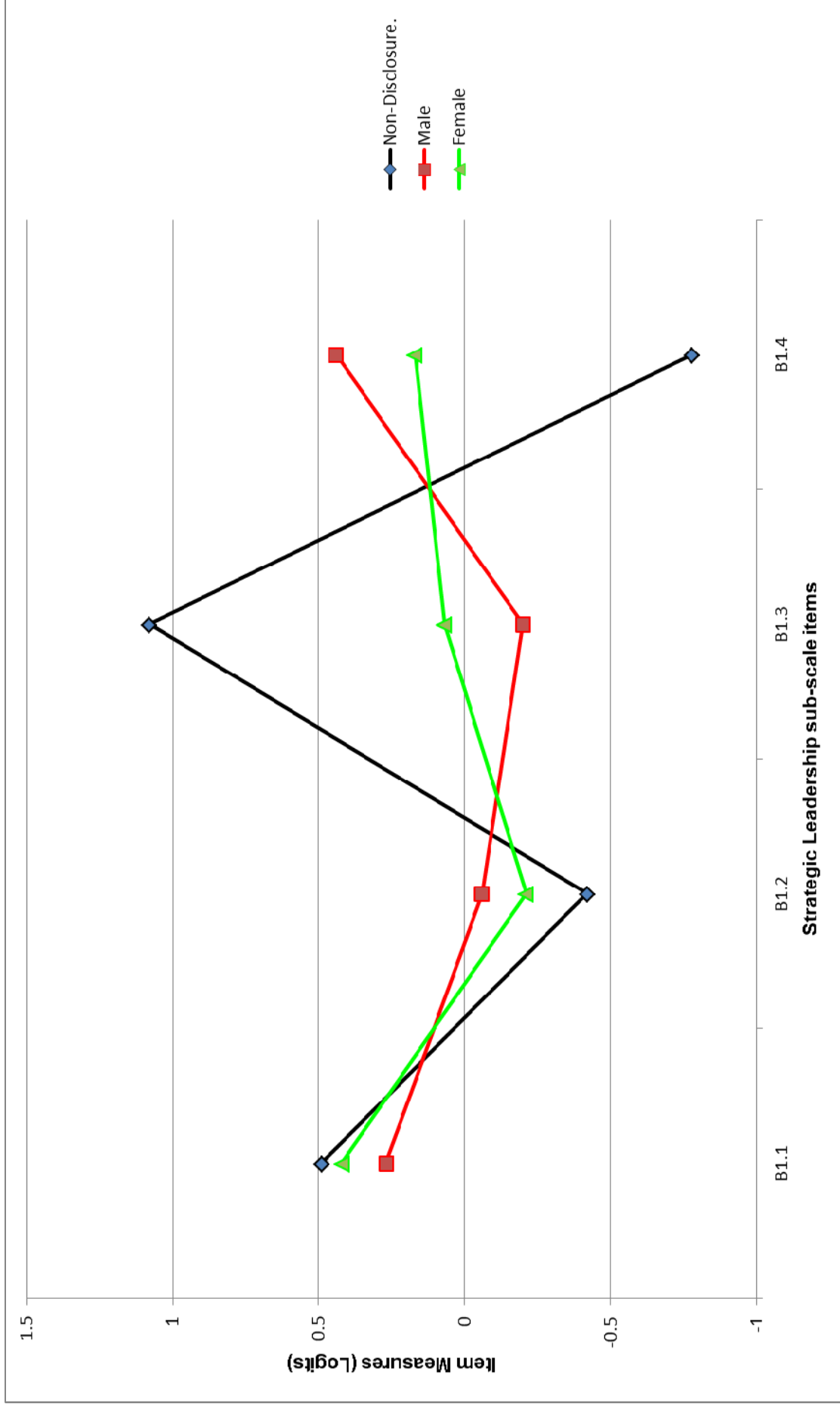


DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.45. Age contrast plot for Strategic Leadership Sub-Scale items

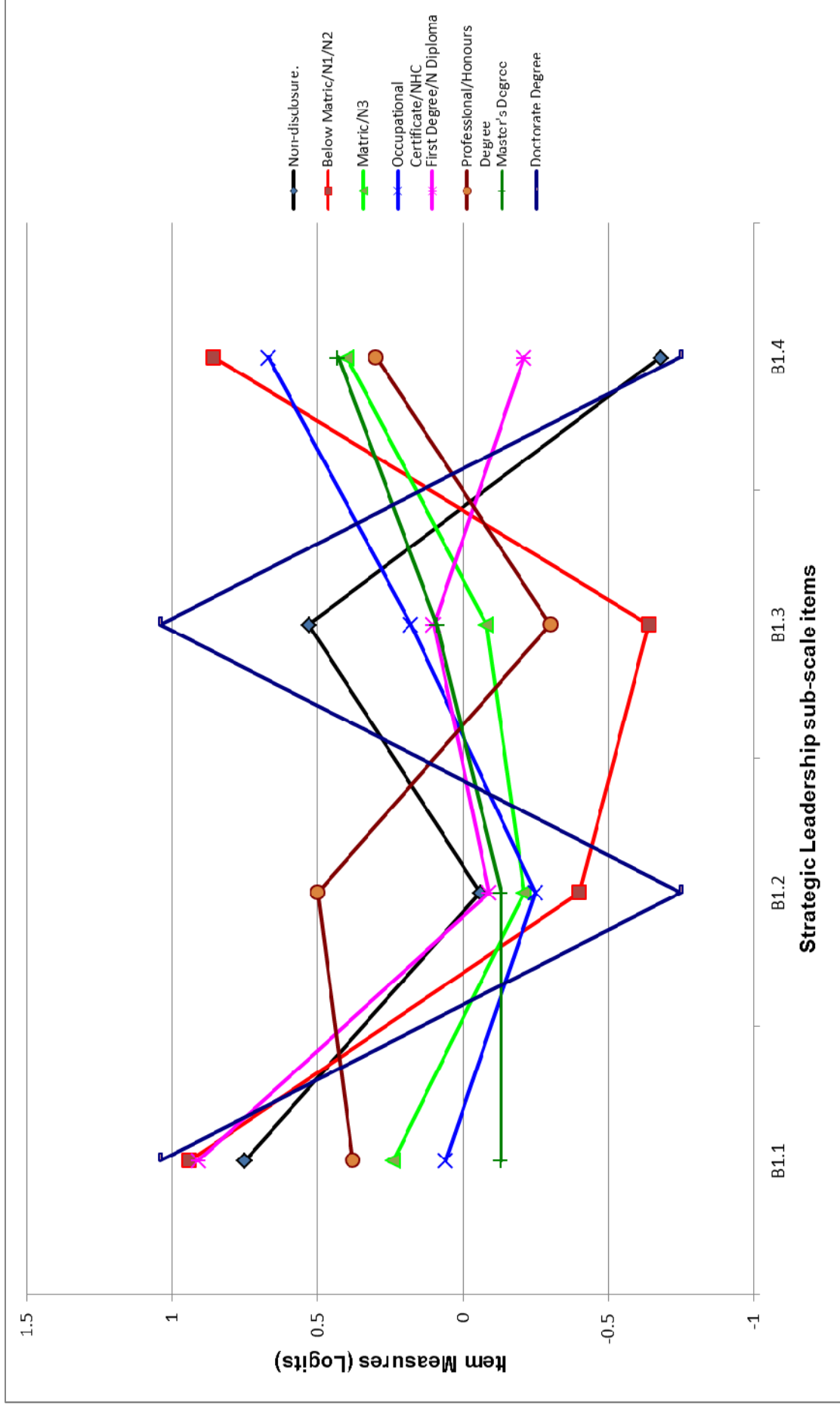
Figure 5.48 shows the results of the DIF contrast between the type of learning programme in which respondents are involved. There were no statistically significant DIFs reported for items B1.1, B1.2 and B1.3 for both groups of respondents (those involved in apprenticeships and those involved in learnerships). However, a significant DIF was reported for item B1.4. Respondents involved in apprenticeships reported extreme levels of difficulty in endorsing item B1.4 relative to those involved in learnerships.

The results of the occupation contrast DIF are presented in figure 5.49. It is evident that all occupational groups identified in this research experienced extreme levels of difficulty with item B1.1, except for Apprentices/Learners whose level of difficulty is only slight. For item B1.2, Assessors/Facilitators experienced extreme levels of difficulty relative to other groups. There were no significant DIF variations reported for item B1.3 across all occupations. However, Skills Development Officers/Providers and Mentors/Supervisors are at the opposing ends of the plot for item B1.4. While Skills Development Officers/Providers reported extreme difficulty in endorsing item B1.4, Mentors/Supervisors found this item very easy to endorse.



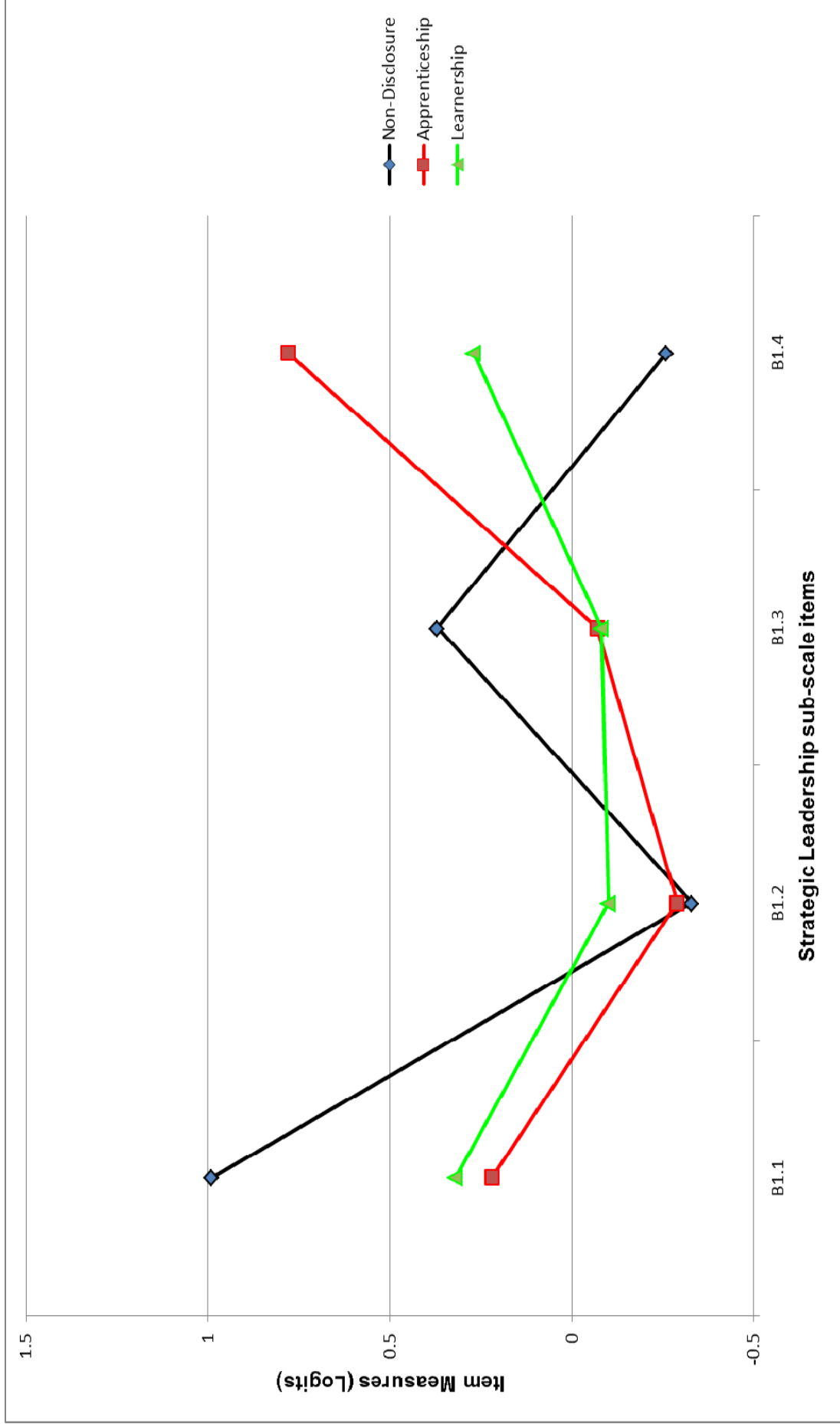
DIF parameters: -0.50 Logits = Insignificant;

Figure 5.46. Gender contrast plot for Strategic Leadership Sub-Scale items



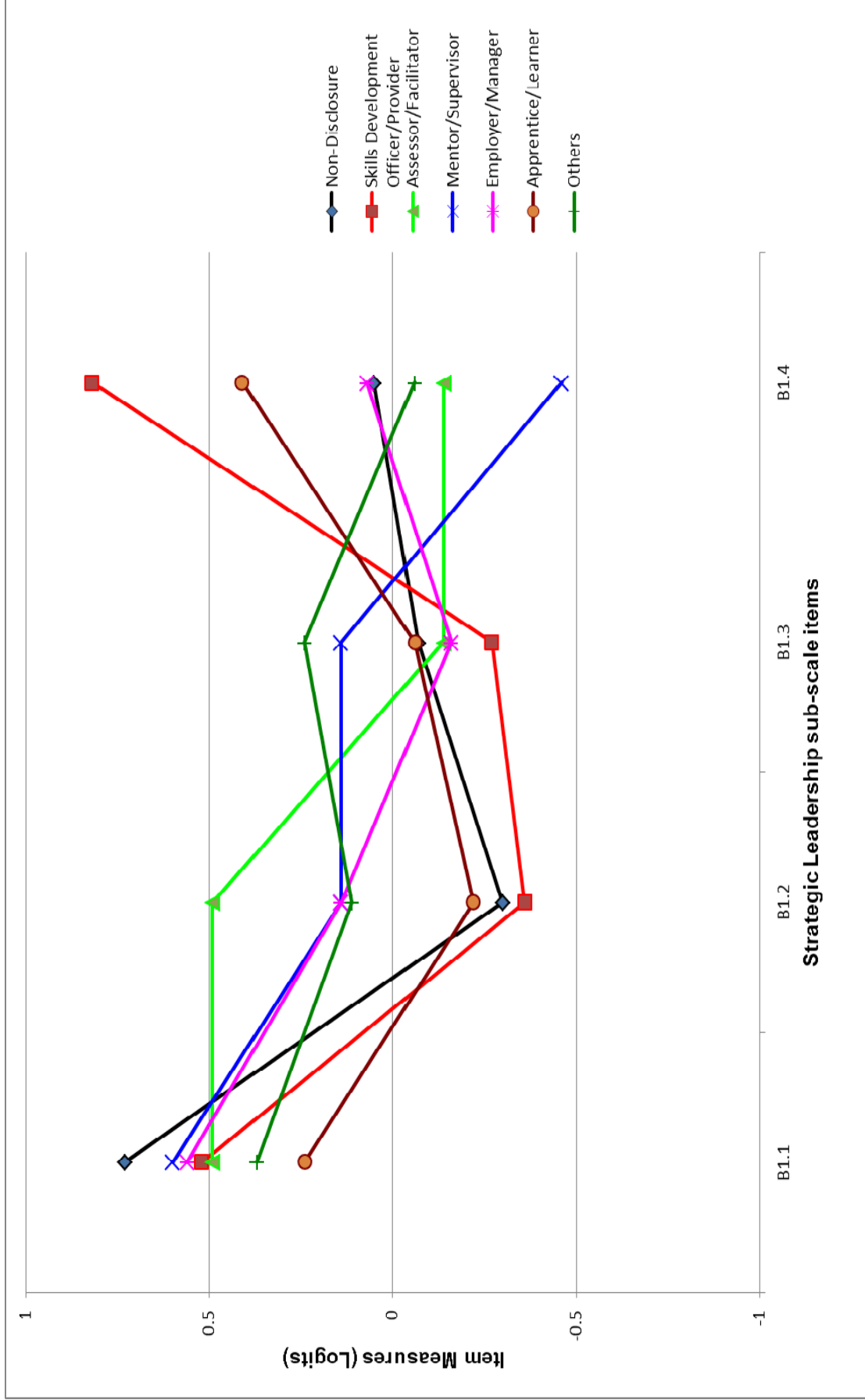
DIF parameters: <math>< -0.50</math> Logits = Insignificant;

Figure 5.47. Educational achievement contrast plot for Strategic Leadership Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 4.48. Learning programme contrast plot for Strategic Leadership Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.49. Occupation contrast plot for Strategic Leadership Sub-Scale items

STANDARDISED RESIDUAL CORRELATIONS FOR ITEMS (SORTED BY LOADING)

Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)

			Empirical	Modelled
Total variance in observations	=	34.8	100.0%	100.0%
Variance explained by measures	=	17.8	51.1%	51.5%
Unexplained variance (total)	=	17.0	48.9%	48.5%
Unexplained variance in 1st contrast =		2.5	7.2%	14.7%

CON-TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM
1	.73	-.16	.97	.92	A	16 B6.2	-.39	.19	1.28	1.11	a	12 B8.9
1	.71	-.26	.90	.94	B	13 B6.3	-.38	.26	.88	.95	b	6 B7.2
1	.63	-.31	.82	.83	C	14 B6.4	-.38	.32	1.10	1.05	c	11 B8.8
1	.50	-.33	1.13	1.23	D	15 B6.1	-.32	.05	1.07	1.20	d	5 B7.1
1	.08	.26	1.14	1.08	E	1 B6.5	-.27	-.05	.81	.83	e	7 B7.3
							-.26	.35	1.09	1.15	f	2 B6.6
							-.25	.10	1.05	.99	g	3 B6.7
							-.18	.30	.99	.90	h	10 B8.7
							-.14	.03	.90	.94	I	9 B7.5
							-.12	-.25	1.03	1.02	H	8 B7.4
							-.11	-.31	1.15	1.23	G	4 B6.8
							-.02	-.18	.82	.99	F	17 B7.6

CON-TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM
1	.73	-.16	.97	.92	A	16 B6.2
1	.71	-.26	.90	.94	B	13 B6.3
1	.63	-.31	.82	.83	C	14 B6.4
1	.50	-.33	1.13	1.23	D	15 B6.1
1	.08	.26	1.14	1.08	E	1 B6.5
1	-.39	.19	1.28	1.11	a	12 B8.9
1	-.38	.26	.88	.95	b	6 B7.2
1	-.38	.32	1.10	1.05	c	11 B8.8
1	-.32	.05	1.07	1.20	d	5 B7.1
1	-.27	-.05	.81	.83	e	7 B7.3
1	-.26	.35	1.09	1.15	f	2 B6.6
1	-.25	.10	1.05	.99	g	3 B6.7
1	-.18	.30	.99	.90	h	10 B8.7
1	-.14	.03	.90	.94	I	9 B7.5
1	-.12	-.25	1.03	1.02	H	8 B7.4
1	-.11	-.31	1.15	1.23	G	4 B6.8
1	-.02	-.18	.82	.99	F	17 B7.6

However, a further analysis of unidimensionality of the scale in the data through Principal Component Analysis (PCA) revealed evidence of multidimensionality as shown in Table 5.29. The eigenvalue for the unexplained variance in the 1st contrast is very high at 2.5, and this shows the presence of an additional construct. The factor plot shows that items B6.1, B6.2, B6.3 and B6.4 measure a different construct. As a result, the LPDD sub-scale was split into two sub-scales. The revised sub-scale consisted of 13 items after items B6.1, B6.2, B6.3 and B6.4 were separated and grouped into a different new construct. The new construct was named Learning Programme Specifications (LPS) and its statistical analysis results are presented in section 5.3.10 in this chapter.

The results of the revised LPDD sub-scale are presented in Table 5.30. As can be seen in this table, the revised LPDD sub-scale yielded a Cronbach alpha coefficient of .93 which is acceptable. About 98.9% of the responses to this scale were valid.

Table 5.30

Summary Statistics for the Revised Learning Programme Design and Development Sub-Scale

INPUT: 652 PERSONS 13 ITEMS MEASURED: 593 PERSONS 13 ITEMS 6 CATS 1.0.0									

SUMMARY OF 434 MEASURED (NON-EXTREME) PERSONS									

	RAW			MODEL	INFIT		OUTFIT		
	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	MNSQ	ZSTD	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
MEAN	21.9	12.9	-2.69	.55	1.04	-.2	1.04	-.2	
S.D.	6.4	.8	1.44	.17	.90	1.8	.91	1.8	
MAX.	61.0	13.0	1.18	1.05	8.22	8.3	8.21	8.1	
MIN.	6.0	4.0	-5.47	.22	.01	-4.5	.01	-4.3	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
REAL RMSE	.63	ADJ.SD	1.29	SEPARATION	2.05	PERSON RELIABILITY	.81		
MODEL RMSE	.57	ADJ.SD	1.32	SEPARATION	2.30	PERSON RELIABILITY	.84		
S.E. OF PERSON MEAN	= .07								

MINIMUM EXTREME SCORE: 159 PERSONS									
LACKING RESPONSES: 59 PERSONS									
VALID RESPONSES: 98.9%									

SUMMARY OF 593 MEASURED (EXTREME AND NON-EXTREME) PERSONS									

	RAW			MODEL	INFIT		OUTFIT		
	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	MNSQ	ZSTD	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
MEAN	19.5	12.9	-3.77	.89					
S.D.	6.8	1.0	2.16	.59					
MAX.	61.0	13.0	1.18	2.12					
MIN.	1.0	1.0	-6.73	.22					
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
REAL RMSE	1.10	ADJ.SD	1.86	SEPARATION	1.70	PERSON RELIABILITY	.74		
MODEL RMSE	1.07	ADJ.SD	1.88	SEPARATION	1.75	PERSON RELIABILITY	.75		
S.E. OF PERSON MEAN	= .09								

PERSON RAW SCORE-TO-MEASURE CORRELATION = .89 (approximate due to missing data)									
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .93 (approximate due to missing data)									

SUMMARY OF 13 MEASURED (NON-EXTREME) ITEMS									

	RAW			MODEL	INFIT		OUTFIT		
	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	MNSQ	ZSTD	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
MEAN	732.1	429.3	.00	.08	1.01	.1	1.04	.4	
S.D.	33.1	2.4	.23	.00	.13	1.4	.12	1.4	
MAX.	799.0	434.0	.28	.09	1.23	2.3	1.28	3.0	
MIN.	691.0	425.0	-.41	.08	.82	-2.0	.84	-2.0	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
REAL RMSE	.09	ADJ.SD	.21	SEPARATION	2.42	ITEM RELIABILITY	.85		
MODEL RMSE	.08	ADJ.SD	.21	SEPARATION	2.50	ITEM RELIABILITY	.86		
S.E. OF ITEM MEAN	= .07								

UMEAN=.000 USCALE=1.000									
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.99 (approximate due to missing data)									
5581 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 8630.62									

The results in Table 5.30 show a wider person spread of 6.65 logits. The mean score of 2.69 for the revised LPDD sub-scale shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 2.05$) could clearly separate respondents into three statistically distinct strata of persons (high-ability, medium-ability and low-ability persons) with a high person reliability coefficient of .81. However, reliability for the items is also very good ($\alpha = .85$). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is very high. The results show good item separation ($G = 2.42$) which is broader than that of persons. This index translates to about three levels of item difficulty, these being, easy, moderate and difficult. An item reliability of .85 indicates that a similar item hierarchy along the construct is highly reproducible in a similar sample from the population. If another sample with a wider spread of abilities were to be tested, these statistics would improve.

5.3.9.1 *Person-Measure targeting*

Figure 5.50 depicts the Person-Item Map for LPDD sub-scale. On the right hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot. On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.50 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 3 logits above the mean person ability. Close inspection of figure 5.50 reveals that the width of the measure is less than 1 logit, whereas the width of the person distribution is just over 7 logits. All the items of the measure are located between -0.5 logit and $+0.5$ logit, but only a small fraction of persons can be found in this range. Items B6.5, B7.2, B8.7 and B8.9 have the same level of difficulty as do items B6.7, B7.1 and B7.5.

Furthermore, items B6.8, B7.4 and B7.6 are of similar difficulty, as are items B6.6 and B8.8. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.32. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

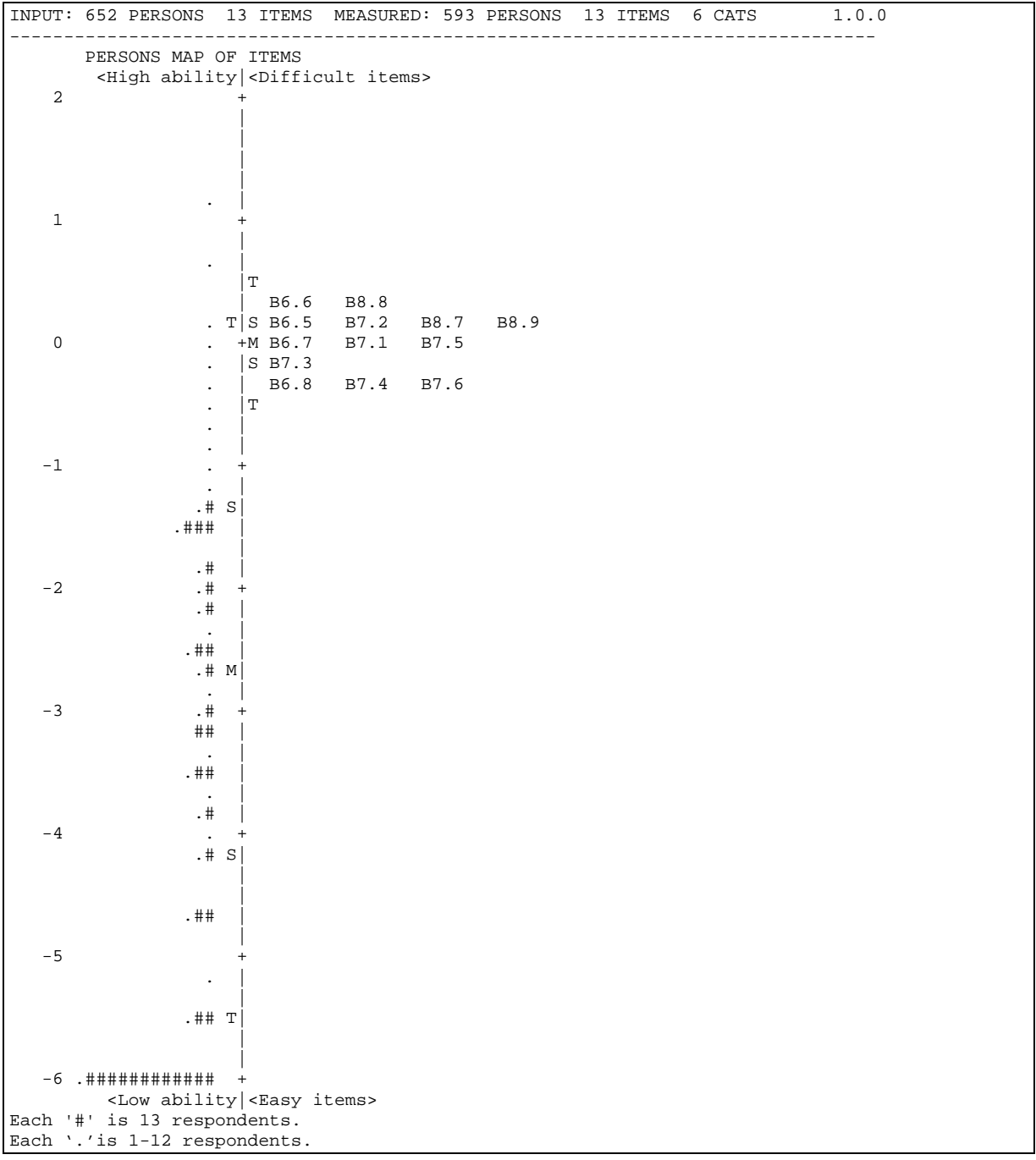


Figure 5.50. Items-Persons Map for Learning Programme Design and Development Sub-Scale

5.3.9.2 Item fit statistics

It is evident in Table 5.31 that the spread of logit scale of item measures yielded a maximum value of .28 logit and a minimum value of -.41 logit. The difference between logit_{max} where

item B6.6 is and the \logit_{min} where item B6.8 is $\delta = .69$. This indicates that item difficulty spread over .69 logit units.

Table 5.31

Item Fit Statistics for Learning Programme Design and Development Sub-Scale

INPUT: 652 PERSONS 13 ITEMS MEASURED: 593 PERSONS 13 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 2.05 REL.: .81 ... ITEM: REAL SEP.: 2.42 REL.: .85												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
2	858	591	.28	.09	1.03	.4	1.09	1.0	.64	69.1	66.6	B6.6
12	847	582	.25	.09	1.06	.7	1.01	.1	.64	70.4	66.6	B8.8
11	848	581	.23	.09	.98	-.1	.97	-.3	.65	69.4	66.5	B8.7
6	862	587	.19	.09	.83	-1.9	.89	-1.3	.69	71.9	66.4	B7.2
1	868	591	.19	.09	1.21	2.1	1.28	3.0	.61	65.0	66.3	B6.5
13	871	585	.11	.09	1.23	2.3	1.06	.7	.64	70.4	65.6	B8.9
3	889	588	.02	.08	.99	.0	.96	-.5	.67	67.5	65.1	B6.7
5	892	587	-.03	.08	1.03	.4	1.07	.8	.67	69.8	65.1	B7.1
9	895	586	-.06	.08	.87	-1.4	.93	-.8	.68	64.8	65.0	B7.5
7	910	587	-.14	.08	.82	-2.0	.84	-2.0	.71	67.0	64.0	B7.3
10	925	584	-.27	.08	.87	-1.4	1.02	.3	.70	62.3	63.6	B7.6
8	936	584	-.35	.08	1.05	.6	1.10	1.2	.69	67.2	63.0	B7.4
4	956	588	-.41	.08	1.17	1.8	1.25	2.8	.67	62.6	62.3	B6.8
MEAN	732.1	429.3	.00	.08	1.01	.1	1.04	.4		67.5	65.1	
S.D.	33.1	2.4	.23	.00	.13	1.4	.12	1.4		2.9	1.4	

Table 5.31 shows the average infit and outfit mean values of 1.01 and 1.04 and these are slightly higher than the values expected by the model (MNSQ = 1). However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the LPDD sub-scale demonstrate infit and outfit values within the expected range of .60 and 1.40. The results depicted in Table 5.31 show that the point measure correlation (PTMEA CORR) ranges from .61 to .71, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the LPDD construct and meet all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and *vice versa*. For this

to be true, the correlations must be positive as shown in Table 5.31. The lowest correlation is .61 for item B6.5 and its value is positive. There are no misfitting items shown in the table.

5.3.9.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.32.

Table 5.32

Principal Component Analysis of Standardised Residuals for Learning Programme Design and Development Sub-Scale

INPUT: 652 PERSONS 13 ITEMS MEASURED: 593 PERSONS 13 ITEMS 6 CATS 1.0.0											
STANDARDISED RESIDUAL VARIANCE SCREE PLOT											
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)											
						Empirical			Modelled		
Total variance in observations	=	24.9	100.0%			100.0%			100.0%		
Variance explained by measures	=	11.9	47.9%			48.6%			48.6%		
Unexplained variance (total)	=	13.0	52.1%	100.0%		51.4%			51.4%		
Unexplnd variance in 1st contrast	=	1.8	7.4%	14.1%							
Unexplnd variance in 2nd contrast	=	1.7	6.7%	12.9%							
Unexplnd variance in 3rd contrast	=	1.5	6.0%	11.5%							
Unexplnd variance in 4th contrast	=	1.3	5.1%	9.8%							
Unexplnd variance in 5th contrast	=	1.1	4.6%	8.8%							

CON-	TRAST	LOADING	MEASURE	MNSQ	MNSQ	INFIT	OUTFIT	ENTRY	NUMBER	ITEM
1		.75	.25	1.06	1.01	A	12	B8.8		
1		.71	.11	1.23	1.06	B	13	B8.9		
1		.35	.23	.98	.97	C	11	B8.7		
1		.19	.19	.83	.89	D	6	B7.2		
1		.06	-.14	.82	.84	E	7	B7.3		
1		.03	-.03	1.03	1.07	F	5	B7.1		

CON-	TRAST	LOADING	MEASURE	MNSQ	MNSQ	INFIT	OUTFIT	ENTRY	NUMBER	ITEM
		-.40	.28	1.03	1.09	a	2	B6.6		
		-.34	.02	.99	.96	b	3	B6.7		
		-.34	-.27	.87	1.02	c	10	B7.6		
		-.32	-.41	1.17	1.25	d	4	B6.8		
		-.23	-.06	.87	.93	e	9	B7.5		
		-.23	-.35	1.05	1.10	f	8	B7.4		
		-.05	.19	1.21	1.28	G	1	B6.5		

The PCA results in Table 5.32 show that only 47.9% of the variance was explained by the LPDD sub-scale. The unexplained variance explained by the first contrast had an eigenvalue of 1.8 (14.1%), which is lower than the chance value of 2.0 (Smith, 2002). The unexplained variance explained in the second, third, fourth and fifth contrasts is 12.9%, 11.5%, 9.8% and 8.8% respectively. Taken together, the fact that the items of the LPDD sub-scale fit the model and the higher variance explained by the measure (more than 3 times the unexplained variance in the first contrast) supports the unidimensionality of the LPDD sub-scale. There is no noticeable evidence of a secondary dimension emerging in the items.

As a result, the LPDD sub-scale fits the Rasch model, is unidimensional and has successfully identified three strata of responses ($G = 2.05$) with a person reliability coefficient of .81. Individual items are not calibrated too far apart and they all contribute to the underlying construct (LPDD). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are well separated having sufficient width. Nevertheless, the only noticeable problem is poor targeting of the measure on the sample. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the LPDD sub-scale.

5.3.9.4 Differential Item Functioning

The age contrast DIF results for the items of the LPDD sub-scale are presented in figure 5.51. It is clear that all respondents aged 36 and older experienced extreme levels of difficulty in endorsing item B6.5. While no statistically significant DIF was reported for items B6.6 and B6.7 for other age groups, respondents aged 56 years and older reported extreme levels of difficulty in endorsing these items. For item B6.8, all respondents aged 46 years and older found this item very easy to endorse. Those respondents who are 56 years and older found item B7.1 to be very easy relative to other age groups.

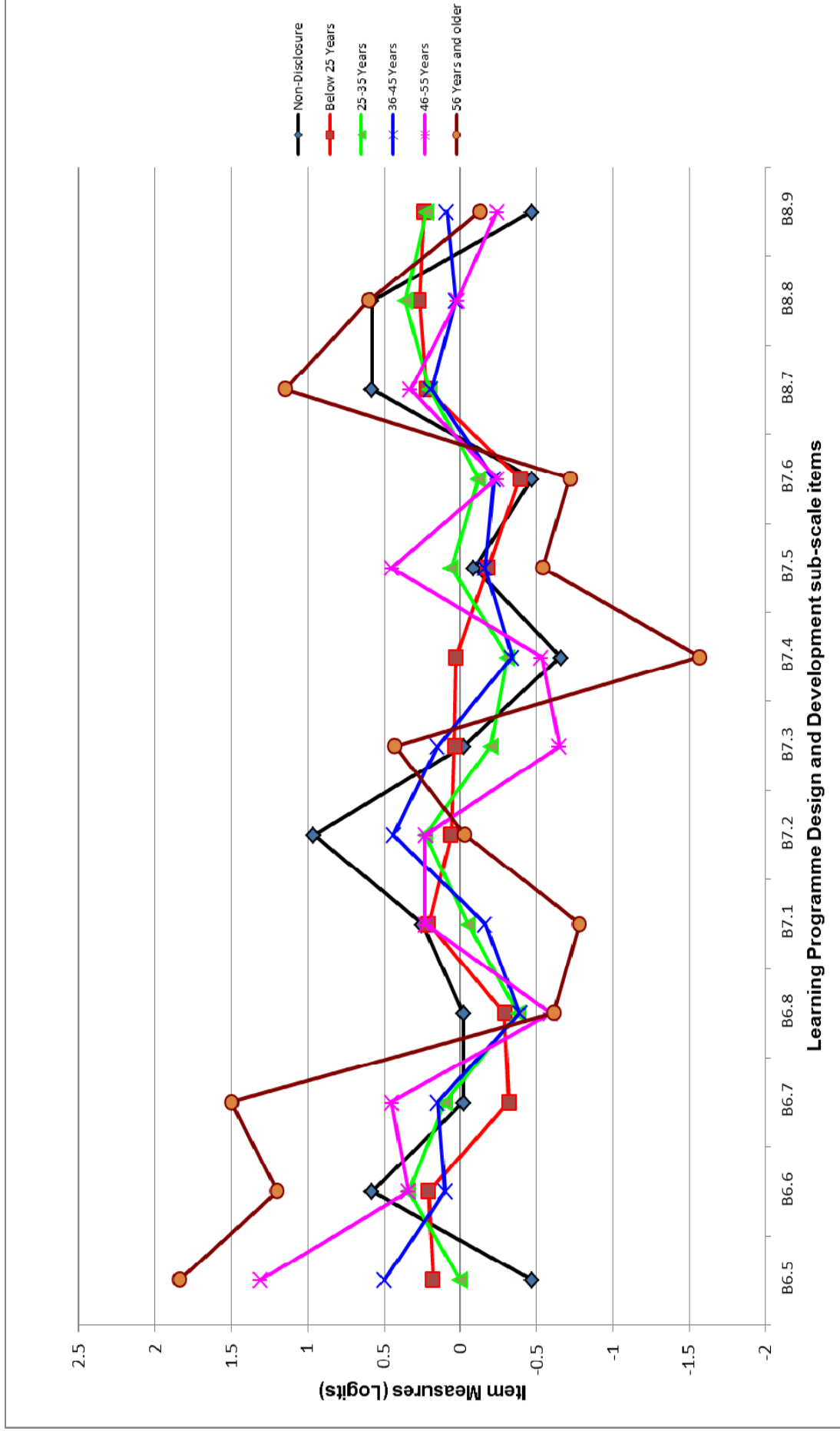


Figure 5.51. Age contrast plot for Learning Programme Design and Development Sub-Scale items

No significant DIF was reported for item B7.2 across all age groups. Respondents aged between 46 and 55 years found it very easy to endorse item B7.3. Whilst all age groups experienced some comfort with item B7.4, respondents aged above 46 years found it extremely easy to endorse this item. For item B7.5, respondents aged between 46 and 55 years are placed at the opposing end of those who are 56 years and older. It is evident that those between 46 and 55 years old found it difficult to endorse item B7.5, whereas those aged 56 years and older found it extremely easy to endorse the same item. For items B7.6 and B8.7, respondents who are 56 years and older found these items to be extremely easy and difficult respectively. While there are no statistically significant DIF variations reported between the different age groups for items B8.8 and B8.9, only those respondents' aged 56 years and older reported extreme difficulties in endorsing item B8.8.

The gender contrast DIF results are reported in figure 5.52. There were no statistically significant DIF variations reported between male and female respondents for all items of the LPDD sub-scale.

The results of the educational achievement contrast DIF are presented in figure 5.53. It is evident that respondents who hold occupational certificates/NHC, First Degree/N Diploma, Professional/Honours Degrees and Doctorate Degrees reported extreme levels of difficulty in endorsing item B6.5. For item B6.6, those respondents with occupational certificates/NHC and Professional/Honours Degrees experienced extreme difficulties in endorsing the item. On the other end, those respondents with an educational achievement below matric/N1/N2 and those with a Doctorate Degree reported extreme ease in endorsing the same item (B6.6). Professional/Honours Degree and Doctorate Degree holders reported extreme difficulties in endorsing item B6.7. Despite the fact that all groups perceived this item to be fairly easy, extreme comfort was reported for respondents with Matric/N3, Occupational Certificates/NHC, Master's Degrees and Doctorate Degrees. For item B7.1, respondents with First Degrees/N Diplomas and those with a Professional/Honours Degrees reported extreme ease in endorsing this item, meanwhile those with a Doctorate Degrees reported extreme difficulty in endorsing the item.

Respondents with educational achievements below matric/N1/N2, those with Occupational Certificates/NHC, those with Professional/Honours Degrees and those with Doctorate Degrees found it extremely difficult to endorse item B7.2. No statistically significant DIF variations were reported for all groups with respect to item B7.3. Whilst item B7.4 appeared to be very difficult for Occupational Certificate/NHC holders, the opposite is the case for those respondents with qualifications above Professional/Honours Degrees. These groups

experienced extreme ease in endorsing item B7.4. For item B7.5, Occupational Certificate holders reported extreme ease in endorsing the item. Whilst all groups experienced some comfort with item B7.6, Occupational Certificate/NHC and Doctorate Degree holders experienced extreme ease with the item. All groups experienced some discomfort with item B8.7, but the results show that respondents below matric/N1/N2 and those with Doctorates are the ones that experienced extreme difficulty in endorsing item B8.7. There were no statistically significant DIF variations reported for items B8.8 and B8.9 across all groups.

The results of the DIF contrast for the type of learning programme in which respondents are involved are shown in figure 5.54. It is clear that while both groups (those involved in apprenticeships and those in learnerships) experienced some discomfort with items B6.5 and B6.6, and it is those who are involved in apprenticeships who reported extreme difficulty in endorsing both items. There were no significant DIF variations between the two groups for items B6.7, B6.8, B7.1, B7.2, B7.3 and B7.4. It is item B7.6 in which those involved in apprenticeships reported extreme ease. For item B8.7, although not statistically significant, respondents involved in learnerships experienced some difficulty while those involved in apprenticeships reported great ease in endorsing the item. No significant DIF variations were reported for item B8.8 for both groups. Those involved in apprenticeships reported extreme levels of difficulty with item B8.9, relative to those involved in learnerships.

The occupation contrast DIF results are presented in figure 5.55. It is quite clear that while Professional/Honours Degree holders are placed on the borderline, the rest of the other occupational groups identified extreme difficulty in endorsing item B6.5. No statistically significant DIF variations were reported for item B6.6. For item B6.7, Employers/Managers experienced extreme difficulty in endorsing the item. Whilst all groups reported that item B6.8 is easy, Skills Development Officers/Providers and Assessors/Facilitators reported that the item is extremely easy to endorse. Skills Development Officers/Providers consider item B7.1 very difficult whereas Assessors/Mentors reported that the same item is very easy to endorse. No statistically significant DIF variations were reported for item B7.2. While Assessors/Moderators consider item B7.3 to be difficult, Skills Development Officers/Providers rate this item as easy to endorse. Despite the fact that all groups perceive item B7.4 as easy, Employers/Managers and Assessors/Facilitators reported that this item is extremely easy to endorse. For item B7.5, it is Mentors/Supervisors who reported extreme levels of ease in endorsing the item.

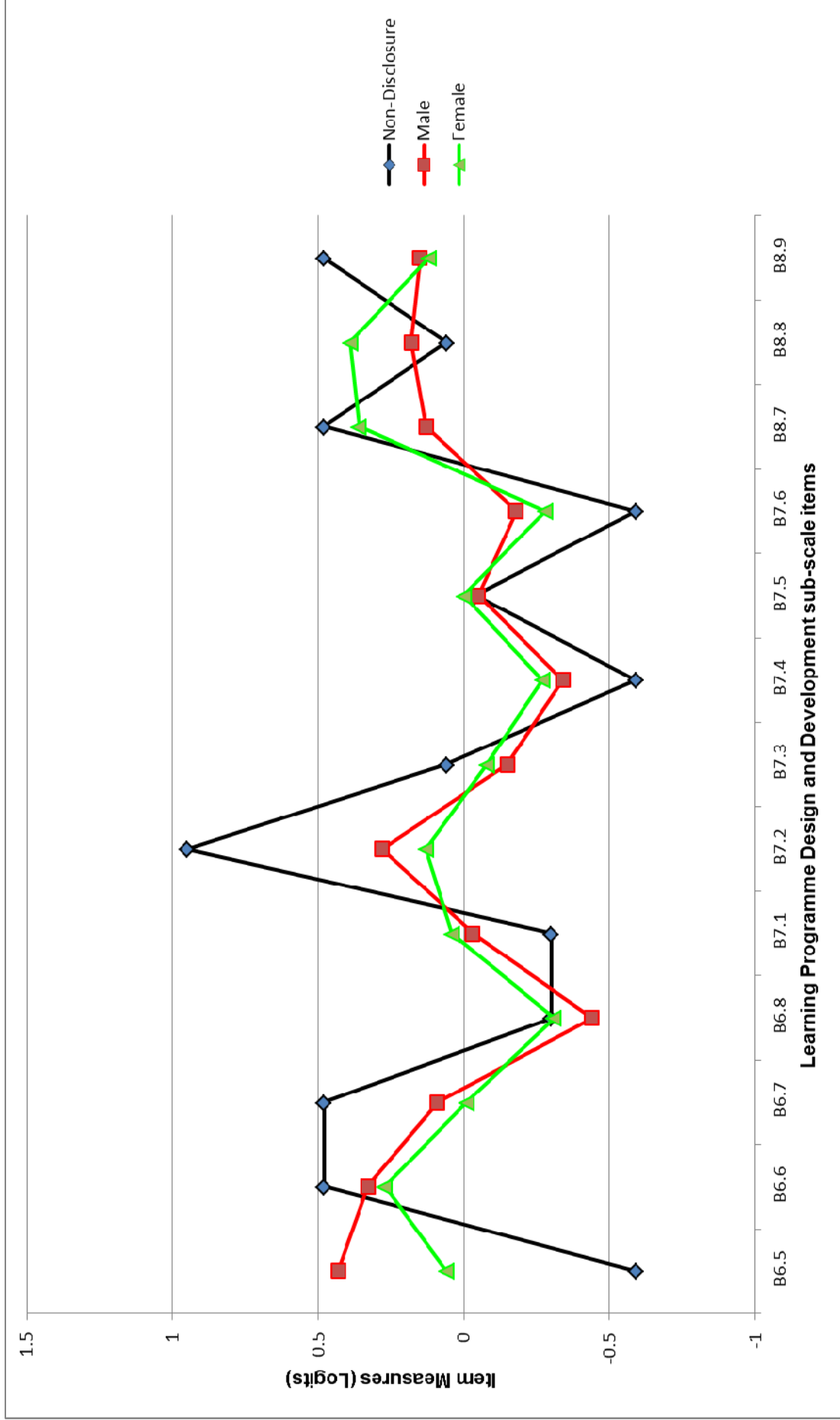
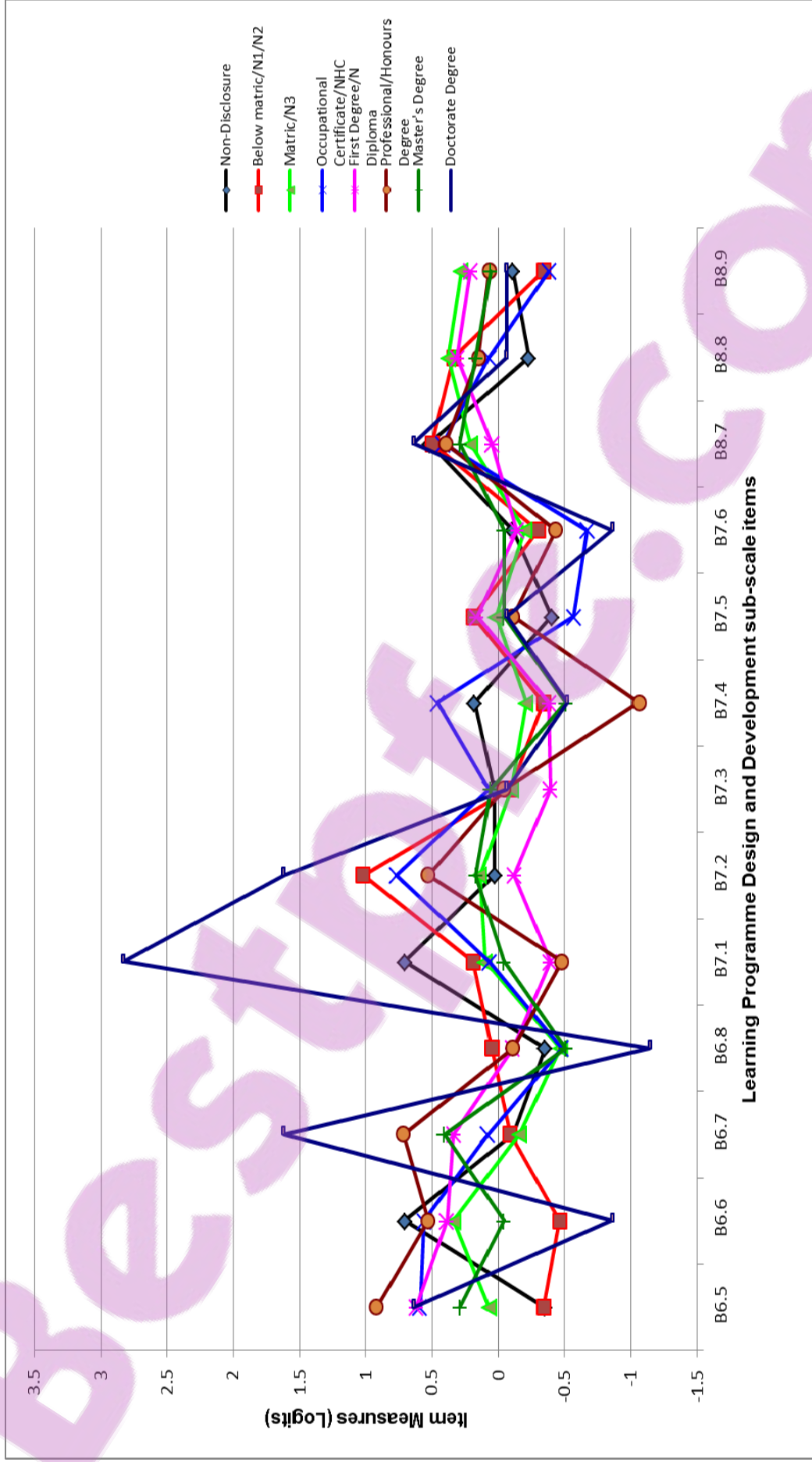


Figure 5.52. Gender contrast plot for Learning Programme Design and Development Sub-Scale items



DIF parameters: <math><0.50</math> Logits = Insignificant;

Figure 5.53. Educational achievement contrast plot for Learning Programme Design and Development Sub-Scale items

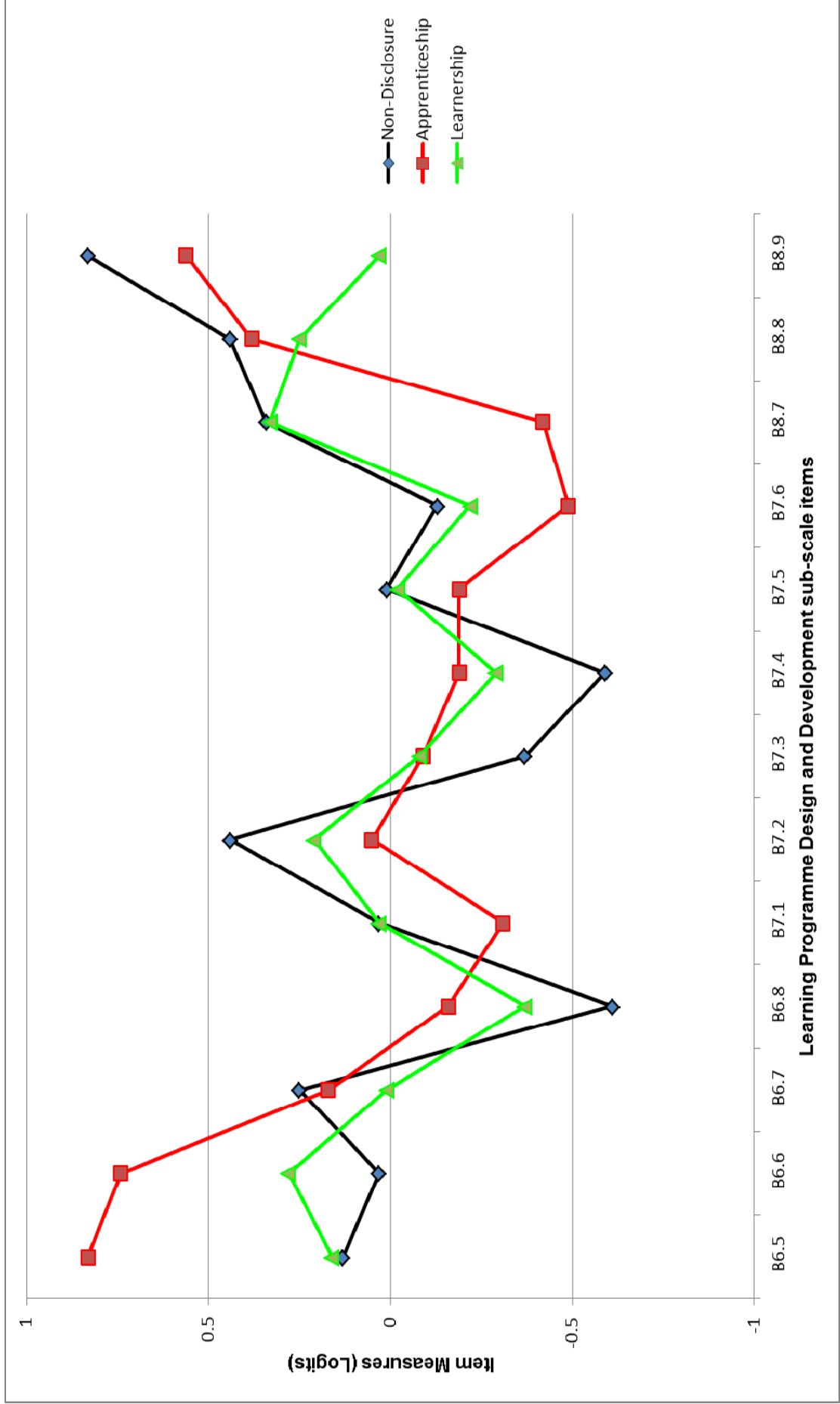


Figure 5.54. Learning programme contrast plot for Learning Programme Design and Development Sub-Scale items

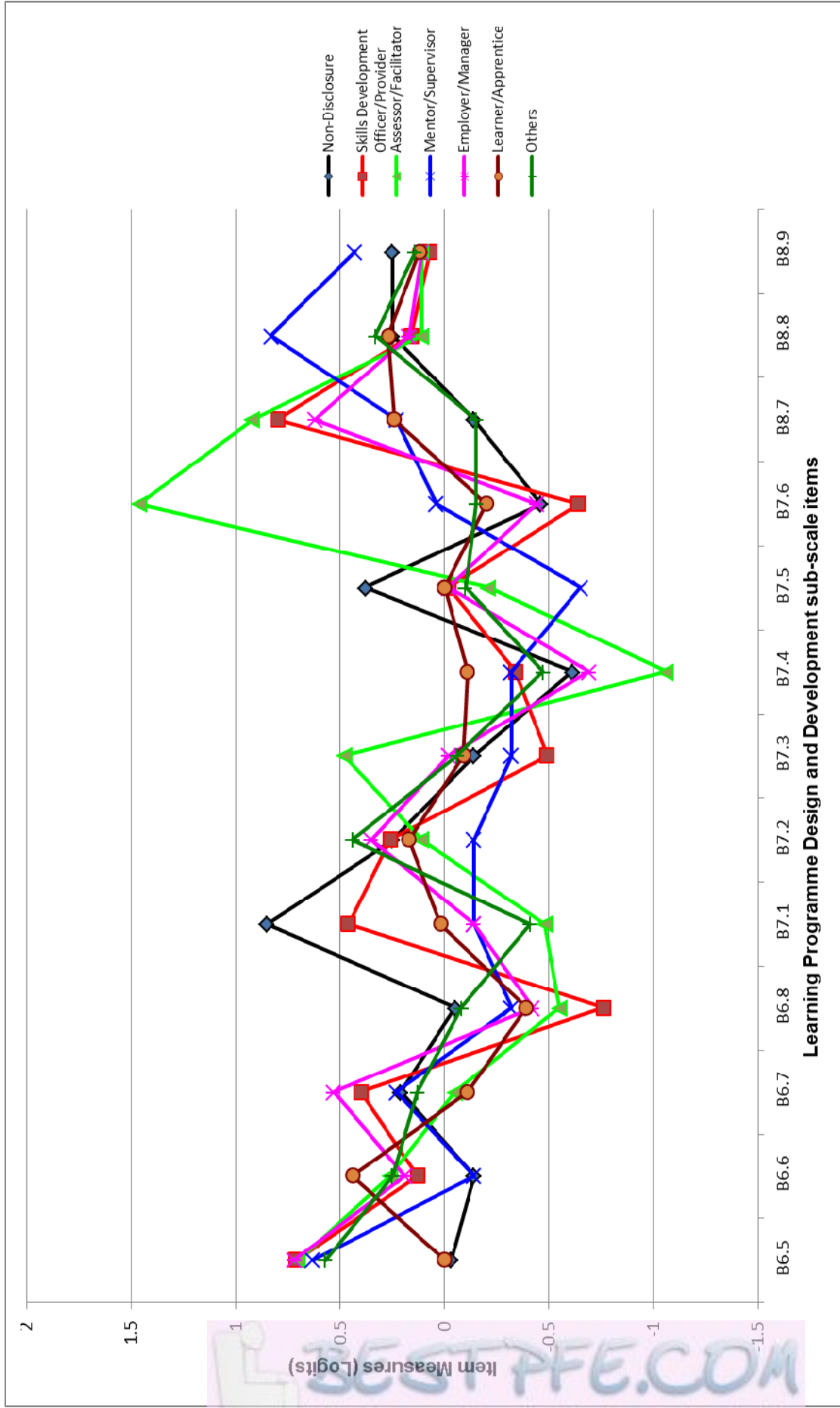


Figure 5.55. Occupation contrast plot for Learning Programme Design and Development Sub-Scale items

As shown in figure 5.55, whilst Skills Development Officers/Providers report that item B7.6 is easy, Assessors/Moderators reported extreme difficulty in endorsing the item. For item B8.7, Skills Development Officers/Providers, Assessors/Facilitators and Employers/Managers reported extreme difficulty in endorsing the item. While there is no statistically significant DIF variation across all occupational groups for items B8.9, Mentors/Supervisors reported extreme difficulty in endorsing item B8.8 relative to the other groups.

5.3.10 Learning Programme Specifications sub-scale

The Learning Programme Specifications (LPS) sub-scale is a new sub-scale that emanated from the Principal Component Analysis (PCA) outcome of the initial LPDD sub-scale. Table 5.33 depicts a summary of statistics for the LPS sub-scale.

This new LPS sub-scale consisted of four items in total as drawn from the PCA. However, after conducting a measure order analysis, the researcher found that the fourth item (B6.1) shows a gross misfit to the Rasch model and had to be deleted. After deletion of the misfit, the analysis yielded the results as shown in Table 5.33. The LPS sub-scale yielded a Cronbach alpha coefficient of .89 which is acceptable.

About 99.5% of the responses to this sub-scale were valid. The mean score for the sub-scale is -5.19 with a standard deviation of 3.31, and this shows that respondents had some difficulty in answering the items of the sub-scale. The person separation index ($G = 1.20$) distinguished two strata of persons (high ability and low ability persons) with a moderate person reliability coefficient of .59. The reliability coefficient can be improved by adding more items to the measure, by improving sample-item targeting or by stretching the sample ability variance.

However, the results show that the items were not well-targeted and distinguished only one stratum ($G = .90$) of respondents with an item reliability coefficient of .45. This low item separation index translates to only one level of item difficulty. The low item reliability coefficient indicates that the sample size may not be adequate for stable comparisons between items. Perhaps an expanded sample with a wider spread of abilities needs to be tested in order to improve these statistics.

Table 5.33

Summary Statistics for Learning Programme Specifications Sub-Scale

```

INPUT: 652 PERSONS 17 ITEMS MEASURED: 592 PERSONS 3 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 343 MEASURED (NON-EXTREME) PERSONS
-----+-----+-----+-----+-----+-----+-----+-----+
      RAW          MODEL          INFIT          OUTFIT
      SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD
-----+-----+-----+-----+-----+-----+-----+-----+
MEAN      6.0          3.0          -5.19          1.76          .73          .0          .73          .0
S.D.      1.9          .1          3.31          .73          1.43         1.0         1.42         1.0
MAX.      16.0         3.0          4.73          3.20          9.90         7.4         9.90         7.1
MIN.      3.0          2.0          -9.21          .66          .00         -3.6         .00         -3.6
-----+-----+-----+-----+-----+-----+-----+
REAL RMSE 2.12 ADJ.SD 2.55 SEPARATION 1.20 PERSON RELIABILITY .59
MODEL RMSE 1.90 ADJ.SD 2.71 SEPARATION 1.43 PERSON RELIABILITY .67
S.E. OF PERSON MEAN = .18
-----+-----+-----+-----+-----+-----+
MAXIMUM EXTREME SCORE:      1 PERSONS
MINIMUM EXTREME SCORE:     248 PERSONS
LACKING RESPONSES:         60 PERSONS
VALID RESPONSES:           99.5%
-----+-----+-----+-----+-----+-----+
SUMMARY OF 592 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----+-----+-----+-----+-----+-----+-----+-----+
      RAW          MODEL          INFIT          OUTFIT
      SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD
-----+-----+-----+-----+-----+-----+-----+-----+
MEAN      4.8          3.0          -7.49          1.83
S.D.      2.2          .1          3.76          .56
MAX.      18.0         3.0          7.31          3.20
MIN.      2.0          2.0         -10.72         .66
-----+-----+-----+-----+-----+-----+-----+
REAL RMSE 2.04 ADJ.SD 3.16 SEPARATION 1.55 PERSON RELIABILITY .71
MODEL RMSE 1.91 ADJ.SD 3.24 SEPARATION 1.70 PERSON RELIABILITY .74
S.E. OF PERSON MEAN = .15
-----+-----+-----+-----+-----+-----+
PERSON RAW SCORE-TO-MEASURE CORRELATION = .97 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .89 (approximate due to missing data)
-----+-----+-----+-----+-----+-----+
SUMMARY OF 3 MEASURED (NON-EXTREME) ITEMS
-----+-----+-----+-----+-----+-----+-----+-----+
      RAW          MODEL          INFIT          OUTFIT
      SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD
-----+-----+-----+-----+-----+-----+-----+-----+
MEAN     691.3         341.3          .00          .13          .99         -.2          .78        -1.4
S.D.     12.1          .5          .18          .00          .15         1.6          .09         .7
MAX.     704.0         342.0          .22          .13          1.20         2.0          .91         -.5
MIN.     675.0         341.0         -.21          .13          .86         -1.5         .69         -2.1
-----+-----+-----+-----+-----+-----+-----+
REAL RMSE .13 ADJ.SD .12 SEPARATION .90 ITEM RELIABILITY .45
MODEL RMSE .13 ADJ.SD .12 SEPARATION .97 ITEM RELIABILITY .48
S.E. OF ITEM MEAN = .13
-----+-----+-----+-----+-----+-----+
DELETED:      14 ITEMS
UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00 (approximate due to missing data)
1024 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 1026.36

```

5.3.10.1 *Person-Measure targeting*

Figure 5.56 depicts the Person-Item Map for the LPS sub-scale. On the right-hand side of the ruler are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot. On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top. The results shown on the plot in figure 5.56 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is just over 5 logits above the mean person ability.

A close inspection of figure 5.56 reveals that the width of the measure is less than .5 logit, whereas the width of the person distribution is 16 logits. All the items of the measure are located between -.5 logit and +.5 logit, but only a small fraction of persons can be found in this range. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.35. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

item B6.2 is and logit_{\min} where item B6.4 is, is $\delta = .43$. This indicates that the item difficulty spread over .43 logit units.

Table 5.34

Item Fit Statistics for Learning Programme Specifications Sub-Scale

INPUT: 652 PERSONS 17 ITEMS MEASURED: 592 PERSONS 3 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.20 REL.: .59 ... ITEM: REAL SEP.: .90 REL.: .45												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
14	675	341	.22	.13	.90	-1.1	.75	-1.6	.89	78.0	77.5	B6.2
15	695	342	-.02	.13	.86	-1.5	.69	-2.1	.91	82.2	77.8	B6.3
16	704	341	-.21	.13	1.20	2.0	.91	-.5	.87	78.3	77.6	B6.4
MEAN	691.3	341.3	.00	.13	.99	-.2	.78	-1.4		79.5	77.6	
S.D.	12.1	.5	.18	.00	.15	1.6	.09	.7		1.9	.1	

Table 5.34 shows the average infit and outfit mean values of .99 and .75 respectively and these are lower than the value expected by the model (MNSQ = 1). However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40. Items which are sufficiently in accordance with the Rasch model to be productive must have infit and outfit values between .6 and 1.4 for a rating scale (Wright & Linacre, 1994). The results show that the amount of distortion of the measurement is nil as all individual items for the LPS sub-scale demonstrated infit and outfit values within the expected range of .60 and 1.40.

The results depicted in Table 5.34 show that the point measure correlation (PTMEA CORR) ranged from .87 to .91, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the LPS and have met all the criteria of a quality question, and thus review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. However, even if x exceeds the specified value (For item B6.3, $x = .91$), the Rasch model requires verification by looking at the Outfit Mean-Square value to ensure that it is within the range of $.5 > y > 1.5$. Furthermore, the Rasch model also requires an examination of the Z-Std value to ensure that it falls within the range of $-2 > z > +2$ (Aziz, Mohamad, Arshad, Zakaria, Ghulman & Masodi, 2008). As shown in Table 5.34, the verification reveals that no anomalies were observed in the data, except a slightly higher Z-Std value of -.21 for item B6.3, which is not significant.

5.3.10.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using the Principal Component Analysis (PCA) as shown in Table 5.35.

Table 5.35

Principal Component Analysis of Standardised Residuals for Learning Programme Specifications Sub-Scale

```

INPUT: 652 PERSONS 3 ITEMS MEASURED: 592 PERSONS 3 ITEMS 6 CATS 1.0.0
-----
          STANDARDISED RESIDUAL VARIANCE SCREE PLOT
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)
          Empirical      Modelled
Total variance in observations =          7.7 100.0%      100.0%
Variance explained by measures =          4.7 61.1%       55.2%
Unexplained variance (total)   =          3.0 38.9% 100.0%  44.8%
Unexplnd variance in 1st contrast =          1.6 21.4%  55.0%
Unexplnd variance in 2nd contrast =          1.3 17.5%  45.0%
Unexplnd variance in 3rd contrast =           .0  .0%   .0%
Unexplnd variance in 4th contrast =           .0  .0%   .0%
Unexplnd variance in 5th contrast =           .0  .0%   .0%
-----
+-----+-----+
| CON- | |          | | INFIT | | OUTFIT | | ENTRY | |
| TRAST | | LOADING | | MEASURE | | MNSQ | | MNSQ | | NUMBER | | ITEM | |
|-----+-----+-----+-----+-----+-----+-----+
| 2 | | .87 | | -.02 | | .86 | | .69 | | 2 | | 2 | | B6.3 | |
|-----+-----+-----+-----+-----+-----+-----+
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----+-----+-----+-----+-----+-----+-----+
| CON- | |          | | INFIT | | OUTFIT | | ENTRY | |
| TRAST | | LOADING | | MEASURE | | MNSQ | | MNSQ | | NUMBER | | ITEM | |
|-----+-----+-----+-----+-----+-----+-----+
| 2 | | .87 | | -.02 | | .86 | | .69 | | 2 | | 2 | | B6.3 | |
|-----+-----+-----+-----+-----+-----+-----+
| 2 | | -.76 | | .22 | | .90 | | .75 | | 1 | | 1 | | B6.2 | |
|-----+-----+-----+-----+-----+-----+-----+
| 2 | | -.06 | | -.21 | | 1.20 | | .91 | | 3 | | 3 | | B6.4 | |
|-----+-----+-----+-----+-----+-----+-----+
+-----+-----+

```

The PCA results in Table 5.35 show that 61.1% of the variance was explained by the measure as compared to the 55.0% modelled. The unexplained variance explained by the first contrast had an eigenvalue of 1.6, which is lower than the chance value of 2.0 (Smith, 2002). Taken together, the fact that the items of the LPS scale fit the model and the higher variance of 61.1% explained by the measure, these results support the unidimensionality of the LPS sub-scale. As a result, the LPS sub-scale fits the Rasch model and is unidimensional. Individual items are not calibrated too far apart and they all contribute to the underlying construct (LPS). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the measure are neither difficult nor easy as shown in the Person-Item Map, and they are

well-separated with sufficient width. However, several problems are noticeable: poor targeting of the measure on the sample; poor person separation index (only one stratum identified: $G = 1.20$); and a poor person reliability coefficient at .59. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the sub-scale.

5.3.10.4 Differential Item Functioning

The results of the age contrast DIF for the LPS sub-scale items are presented in figure 5.57. It is evident that while those respondents aged between 36 and 45 years are placed towards the borderline, all other age groups reported extreme difficulties in endorsing item B6.2. For item B6.3, respondents aged between 36 and 45 years reported extreme difficulty in endorsing the item. There are no statistically significant DIF variations reported across all age groups for item B6.4. The gender contrast DIF results are presented in figure 5.58. Female respondents reported difficulties in endorsing item B6.3 relative to their male counterparts. No significant DIF were reported regarding items B6.3 and B6.4 for both male and female respondents.

The results of the educational achievement contrast DIF are shown in figure 5.59. While those with a Doctorate Degree experienced item B6.2 as very easy to endorse, those with Matric/N3, First Degrees/N Diplomas and those with Professional/Honours Degrees reported extreme difficulty in endorsing this item. For item B6.3, extreme endorsement difficulties were reported by those with Professional/Honours Degrees and those with Doctorate Degrees. Respondents with an Occupational Certificate/NHC reported extreme difficulty in endorsing item B6.4 relative to other groups. The results of the DIF contrast for the type of learning programme in which respondents are involved are reported in figure 5.60. It is clear that both groups (those involved in apprenticeships and those involved in learnerships) experienced some difficulty with all items of the LPS sub-scale. However, no statistically significant DIF variations were reported between the two groups. The occupation contrast DIF results are presented in figure 5.61. It is clear that Skills Development Officers/Providers, Employers/Managers and Apprentices/Learners reported extreme levels of difficulty in endorsing item B6.2. For item B6.3, Employers/Managers reported extreme difficulty in endorsing the item. Assessors/Facilitators and Mentors/Supervisors reported extreme levels of difficulty in endorsing item B6.4 relative to other occupational groups.

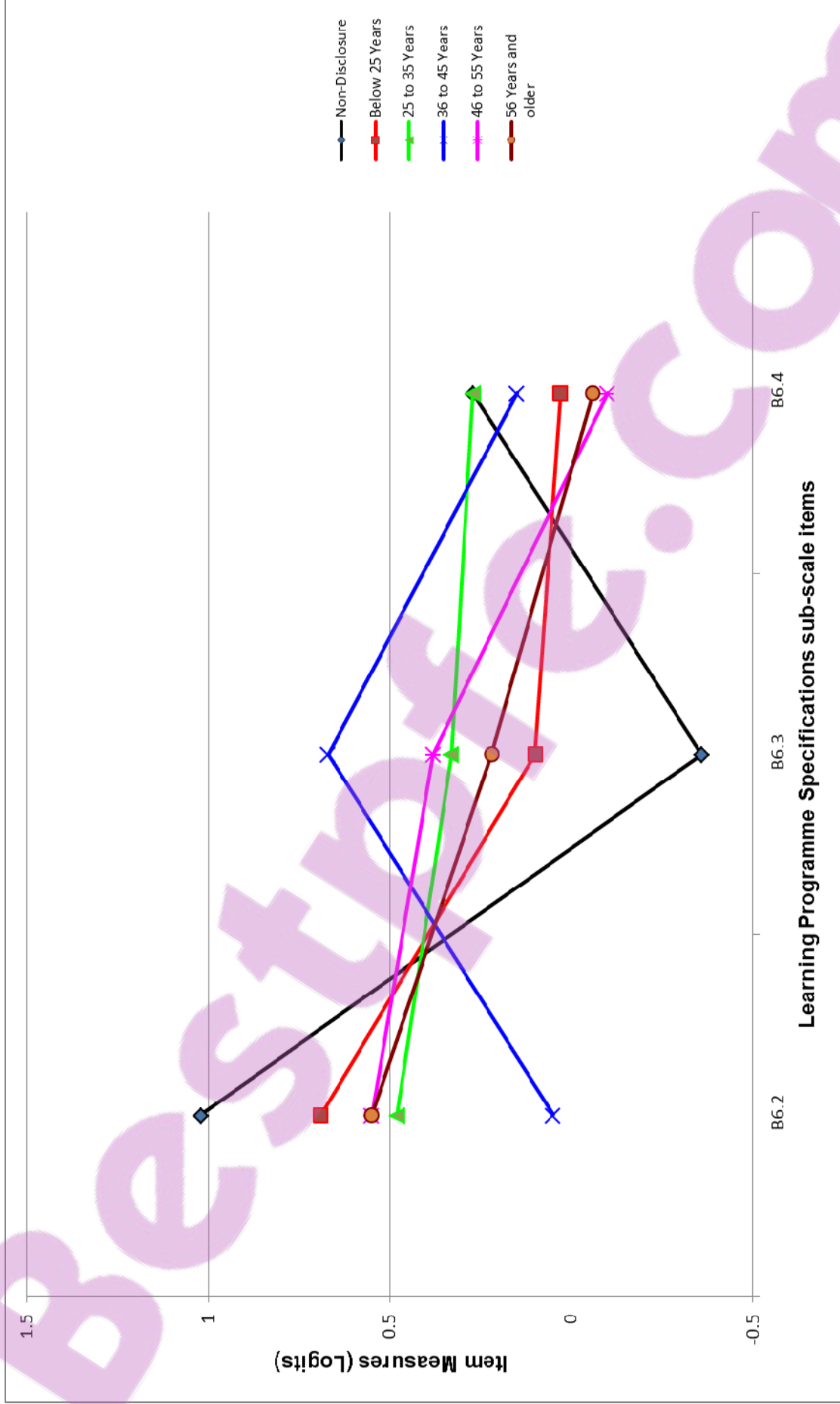


Figure 5.57. Age contrast plot for Learning Programme Specifications Sub-Scale items

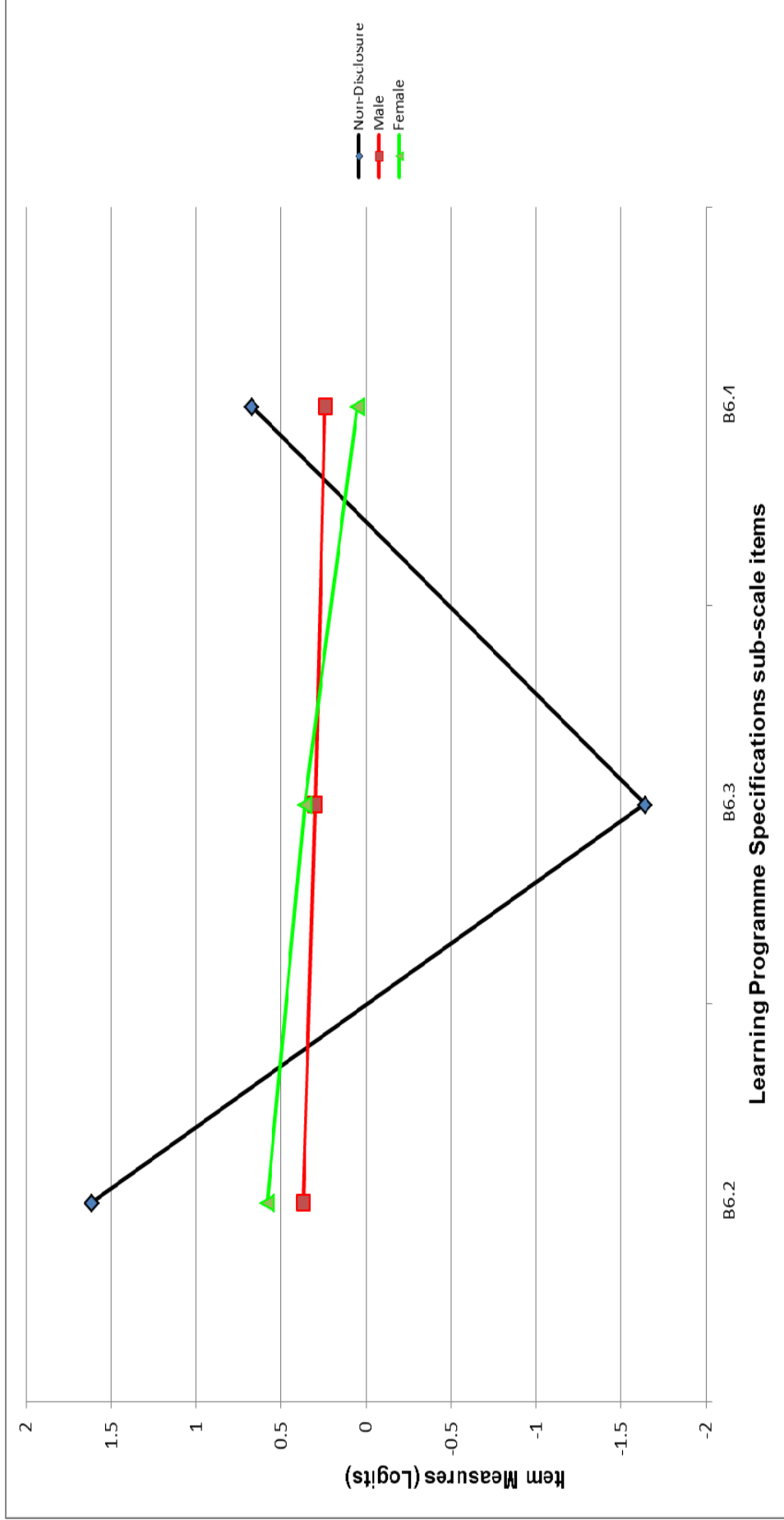
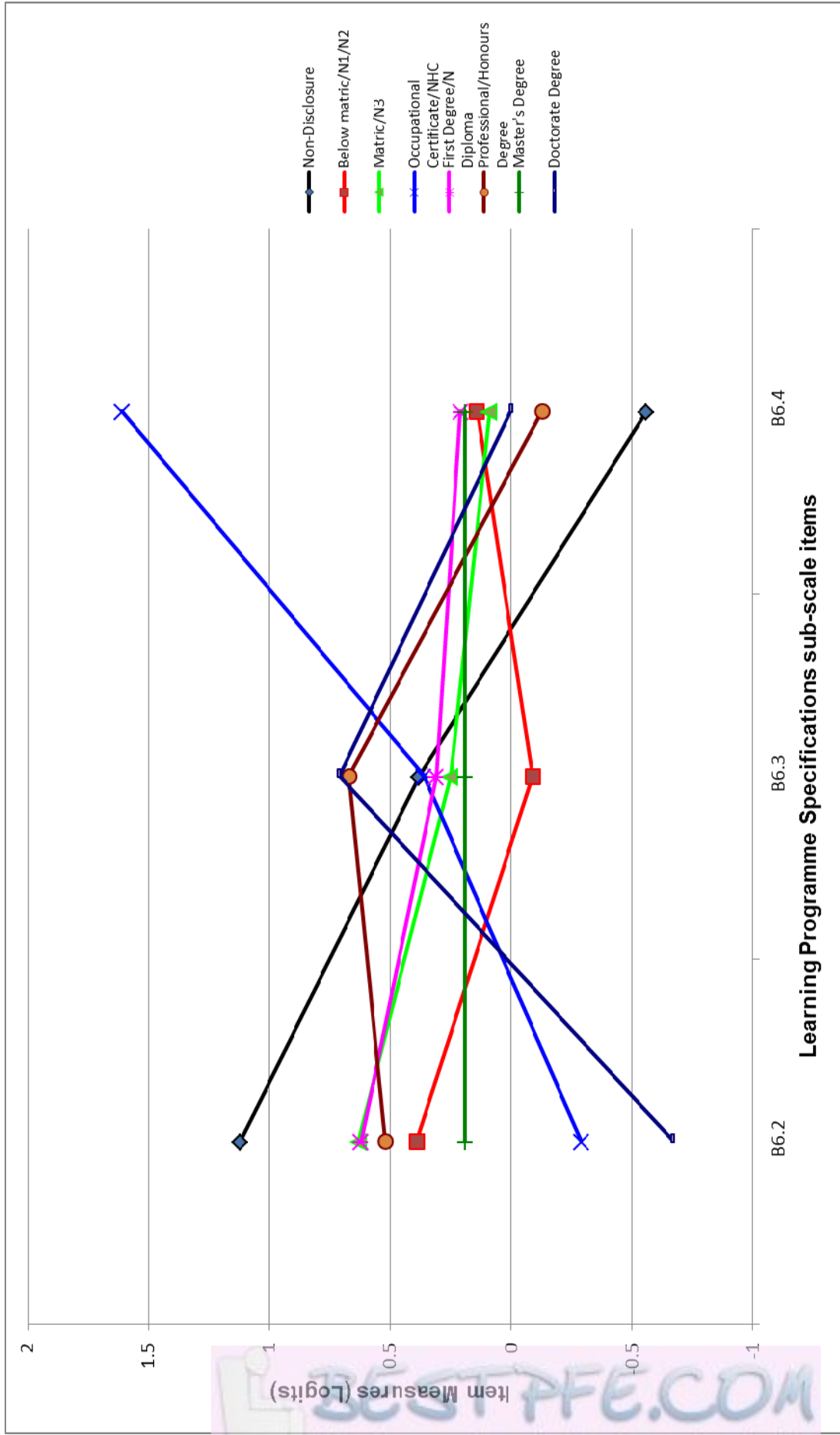
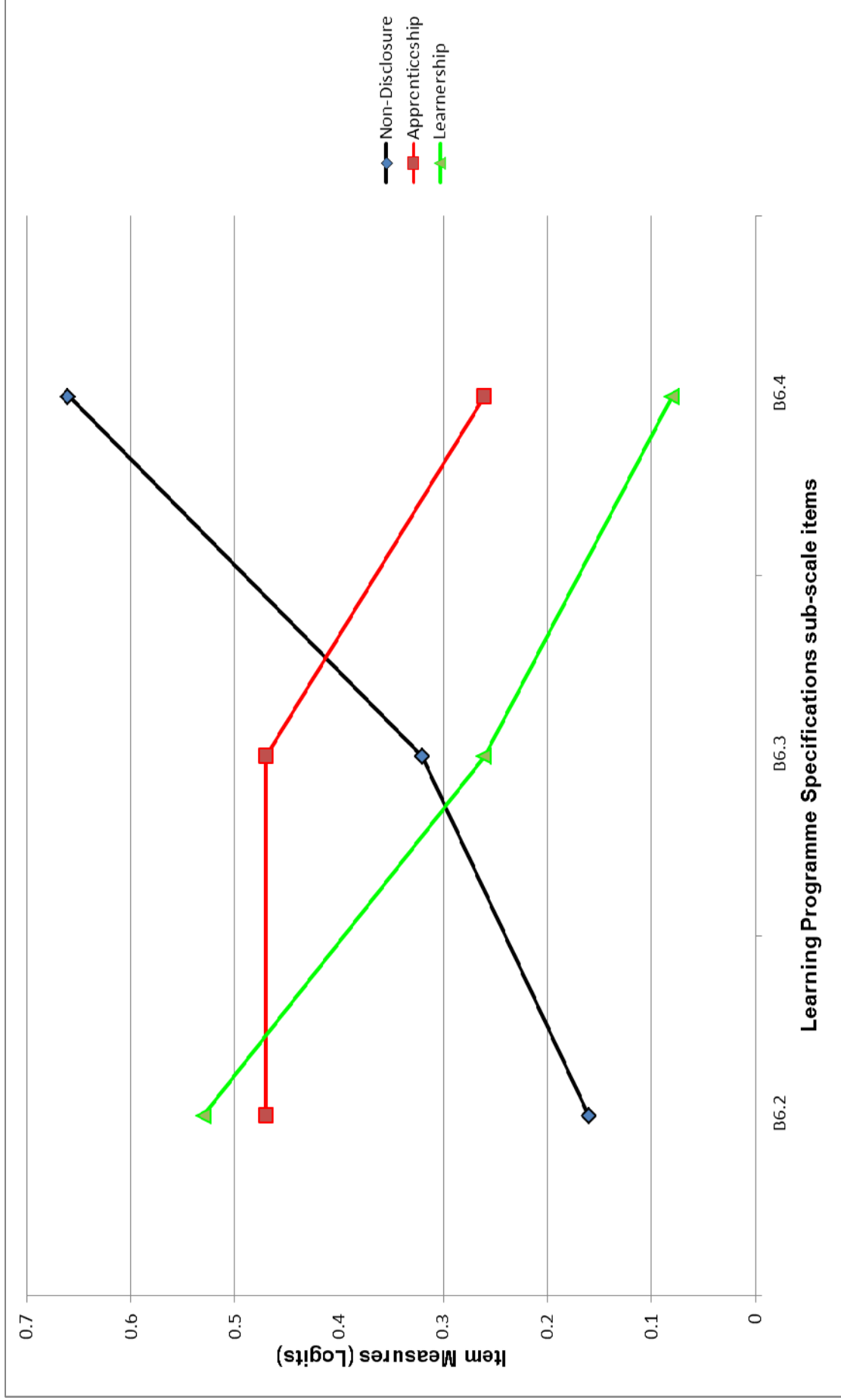


Figure 5.58: Gender contrast plot for Learning Programme Specifications Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.59. Educational achievement contrast plot for Learning Programme Specifications Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.60. Learning programme contrast plot for Learning Programme Specifications Sub-Scale items

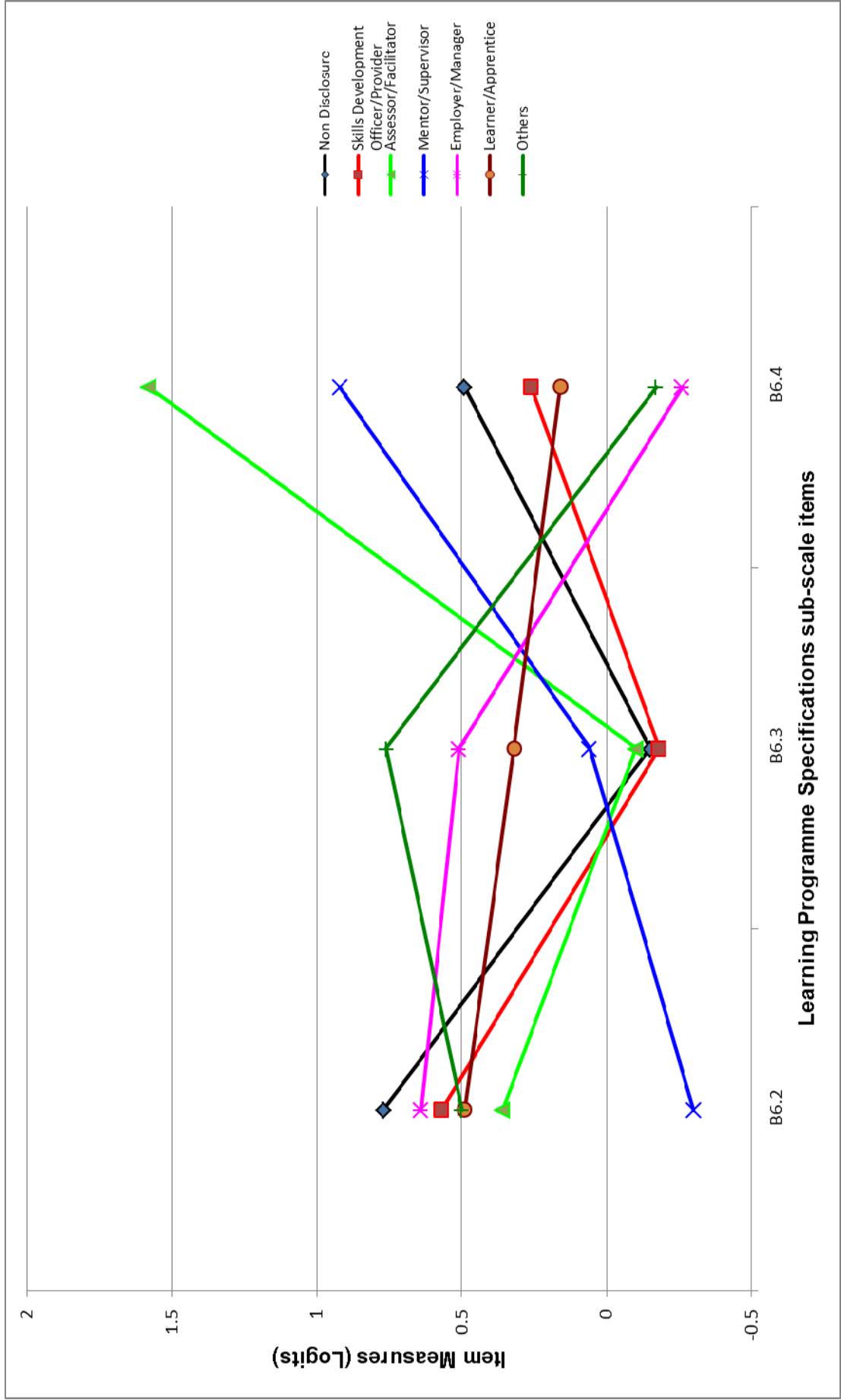


Figure 5.61. Occupation contrast plot for Learning Programme Specifications Sub-Scale items

5.3.11 Occupational Competence sub-scale

Occupational Competence (OC) is a new name for the Competence Assessment sub-scale that came about after the deletion of about 5 items from the original scale which had 16 items. As a first intervention to deal with misfit and multidimensionality (1st contrast eigenvalue = 2.1), the researcher deleted item B13.5 which exhibited a major misfit (Infit MNSQ = 1.93). After this item was deleted, the scale still showed evidence of multidimensionality.

The results of Principal Component Analysis (PCA) indicated a need to split the sub-scale into two. The suggested new sub-scale would have consisted of 4 items. Unfortunately, the new sub-scale had very poor person separation and item separation indices, the items had poor MNSQ infit and outfit, and the eigenvalue in the 1st contrast fell outside the expected parameters. Thereafter, the researcher took a decision to discard the option for a new sub-scale and the four items were deleted from the revised OC sub-scale.

Consequently, the new OC sub-scale consists of 11 items as reported in Table 5.36. As can be seen in Table 5.36, the OC sub-scale yielded a Cronbach alpha coefficient of .92 which is acceptable. About 99.0% of the responses to this scale were valid. The results in Table 5.37 show a wider person spread of 6.84 logits. The mean score of -3.01 for the measure shows that respondents had some difficulty in answering the items of the measure and therefore fall below the expected performance. The person separation index ($G = 1.91$) could clearly separate respondents into two statistically distinct strata of persons (high-ability and low-ability persons) with a good person reliability coefficient of .79.

However, the reliability for the items is poor (.54). That is, the chances that the difficulty ordering of the items would be repeated if the measure were given to another group of respondents is low. The results show a poor item separation ($G = 1.08$) which is narrower than that of a person. This index translates to only one level of item difficulty.

The low item reliability coefficient indicates that the sample size may not be adequate for stable comparisons between items. An improved item difficulty variance may improve the item reliability coefficient. In addition, an expanded sample with a wider spread of abilities may have to be tested in order to improve these statistics.

Table 5.36

Summary Statistics for Occupational Competence Sub-Scale

```

INPUT: 652 PERSONS 11 ITEMS MEASURED: 584 PERSONS 11 ITEMS 6 CATS 1.0.0
-----
SUMMARY OF 418 MEASURED (NON-EXTREME) PERSONS
-----
      RAW          MODEL          INFIT          OUTFIT
      SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD
-----
MEAN      18.5         10.9         -3.01          .60          1.01         -.3         1.01         -.3
S.D.       5.3            .5           1.47           .16           .82          1.8         .83          1.9
MAX.      48.0          11.0          1.19           1.04          6.79         7.3         6.76         7.6
MIN.       5.0            3.0          -5.65          .25           .01         -4.5         .01         -4.5
-----
REAL RMSE  .68 ADJ.SD  1.30 SEPARATION  1.91 PERSON RELIABILITY  .79
MODEL RMSE  .62 ADJ.SD  1.33 SEPARATION  2.14 PERSON RELIABILITY  .82
S.E. OF PERSON MEAN = .07
-----
MINIMUM EXTREME SCORE: 166 PERSONS
LACKING RESPONSES: 68 PERSONS
VALID RESPONSES: 99.0%

SUMMARY OF 584 MEASURED (EXTREME AND NON-EXTREME) PERSONS
-----
      RAW          MODEL          INFIT          OUTFIT
      SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD
-----
MEAN      16.3         10.9         -4.11          .95
S.D.       5.6            .6           2.15           .58
MAX.      48.0          11.0          1.19           1.96
MIN.       2.0            2.0          -6.91          .25
-----
REAL RMSE  1.14 ADJ.SD  1.82 SEPARATION  1.60 PERSON RELIABILITY  .72
MODEL RMSE  1.12 ADJ.SD  1.84 SEPARATION  1.65 PERSON RELIABILITY  .73
S.E. OF PERSON MEAN = .09
-----
PERSON RAW SCORE-TO-MEASURE CORRELATION = .92 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .92 (approximate due to missing data)

SUMMARY OF 11 MEASURED (NON-EXTREME) ITEMS
-----
      RAW          MODEL          INFIT          OUTFIT
      SCORE        COUNT        MEASURE        ERROR        MNSQ        ZSTD        MNSQ        ZSTD
-----
MEAN      701.7         413.7         .00            .09          1.00         -.1         1.01         .0
S.D.      15.4           2.0           .13            .00          .16          1.8         .19          2.2
MAX.      723.0         417.0         .29            .09          1.35         3.8         1.47         5.0
MIN.      672.0         410.0         -.15           .09          .77         -2.8         .81         -2.4
-----
REAL RMSE  .09 ADJ.SD  .10 SEPARATION  1.08 ITEM RELIABILITY  .54
MODEL RMSE  .09 ADJ.SD  .10 SEPARATION  1.14 ITEM RELIABILITY  .57
S.E. OF ITEM MEAN = .04
-----
UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.98 (approximate due to missing data)
4551 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 6891.07

```


On the right-hand side of the ruler in figure 5.62 are the sub-scale items sorted by difficulty, with the most difficult items on the top and the easiest items on the bottom of the plot. On the left-hand side of the ruler are the persons, sorted by their ability to successfully respond to the items and with the most successful persons on the top.

The results shown on the plot in figure 5.62 depict that the items were difficult to the respondents since the distribution of item difficulties and of person abilities are significantly shifted with respect to each other. The mean item difficulty is 3 logits above the mean person ability. A close inspection of figure 5.62 reveals that the width of the measure is less than .5 logits, whereas the width of the person distribution is just over 7 logits. All the items of the measure are located between -.5 logits and +.5 logits, but only a small fraction of persons can be found in this range. Items B11.1, B11.5, B13.13 and B13.14 have the same level of difficulty, as do items B13.11, B13.2, B13.6 and B13.7. Furthermore, items B12.3 and B13.9 also have the same level of difficulty. The theoretical probabilities for the success of each person on each item were calculated and compared with the observed scores as shown in Table 5.38. The differences between the two are called residuals and they are used to evaluate the fit of data to the model (Bond & Fox, 2001).

5.3.11.2 *Item fit statistics*

It is evident from Table 5.37 that the spread of logit scale of item measure yielded a maximum value of .29 logits and a minimum value of -.15 logits. The difference between logit_{\max} where item B13.1 is and the logit_{\min} where item B13.14 is, is $\delta = .44$. This indicates that the item difficulty is spread over .44 logit units. Table 5.38 shows the average infit mean value of 1.00 (as expected by the model) and an outfit mean value of 1.01 (slightly higher than the model expectation). However, the data for the items show goodness-of-fit satisfying the condition that the values should not exceed 1.40, with the exception of item B12.3 which has an outfit mean value of 1.47. This item poses no threat to the measure since the researcher paid attention to infit mean values as they are weighted to take less notice of extreme responses. The results show that the amount of distortion of the measurement is nil as all individual items for the OC sub-scale demonstrated infit values within the expected range of .60 and 1.40.

Table 5.37

Item Fit Statistics for Occupational Competence Sub-Scale

INPUT: 652 PERSONS 11 ITEMS MEASURED: 584 PERSONS 11 ITEMS 6 CATS 1.0.0												
PERSON: REAL SEP.: 1.91 REL.: .79 ... ITEM: REAL SEP.: 1.08 REL.: .54												
ITEM STATISTICS: MEASURE ORDER												
ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
4	837	582	.29	.09	1.09	1.1	1.12	1.3	.65	69.5	67.3	B13.1
3	848	578	.15	.09	1.35	3.8	1.47	5.0	.61	61.8	66.1	B12.3
8	852	579	.12	.09	.77	-2.8	.81	-2.4	.73	73.7	66.2	B13.9
9	861	581	.07	.09	.84	-1.9	.82	-2.3	.72	74.3	65.9	B13.11
5	863	577	.00	.09	1.18	2.0	1.23	2.6	.66	66.7	65.8	B13.2
7	870	577	-.04	.09	.87	-1.5	.85	-2.0	.72	71.4	65.6	B13.7
6	874	579	-.06	.09	.87	-1.5	.87	-1.6	.73	69.1	65.5	B13.6
1	873	575	-.10	.09	1.01	.1	1.04	.5	.70	64.1	65.3	B11.1
2	880	577	-.12	.09	1.03	.4	1.05	.7	.69	64.3	65.2	B11.5
10	887	580	-.15	.09	1.04	.5	1.00	.0	.70	69.9	65.0	B13.13
11	888	580	-.15	.09	.91	-1.1	.88	-1.6	.73	72.5	65.0	B13.14
MEAN	701.7	413.7	.00	.09	1.00	-.1	1.01	.0		68.9	65.7	
S.D.	15.4	2.0	.13	.00	.16	1.8	.19	2.2		3.9	.6	

Further, the results depicted in Table 5.37 show that the point measure correlation (PTMEA CORR) ranged from .61 to .73, with no item containing zero or negative values. This correlation indicates that all items were working together in the same way in defining the OC sub-scale and met all the criteria of a quality question and review is not required. If the Point Measure = x ; $.4 < x < .8$, an item is acceptable. The theory is that higher response values to the items imply higher person measures and *vice versa*. For this to be true, the correlations must be positive as shown in Table 5.37. The lowest correlation is .64 for item B12.3 and its value is positive. There are no misfitting items shown in the table except B12.3.

5.3.11.3 Principal Component Analysis (PCA)

A further examination of unidimensionality was conducted using Principal Component Analysis (PCA) as shown in Table 5.38. The PCA results in Table 5.38 show that only 45.1% of the variance was explained by the measure. The unexplained variance explained by the first contrast had an eigenvalue of 1.6 (14.5%), which is lower than the chance value of 2.0 (Smith, 2002). The unexplained variance explained in the second contrast is 12.6%. Taken together, the fact that the items of the OC sub-scale fit the model and the higher variance explained by the measure (more than 3 times the unexplained variance in 1st contrast)

supports the unidimensionality of the OC sub-scale. There is no noticeable evidence of a significant secondary dimension emerging in the items.

Table 5.38

Principal Component Analysis of Standardised Residuals for Occupational Competence Sub-Scale

INPUT: 652 PERSONS 11 ITEMS MEASURED: 584 PERSONS 11 ITEMS 6 CATS 1.0.0												
STANDARDISED RESIDUAL VARIANCE SCREE PLOT												
Table of STANDARDISED RESIDUAL variance (in Eigenvalue units)												
Empirical Modelled												
Total variance in observations		=			20.0		100.0%		100.0%			
Variance explained by measures		=			9.0		45.1%		45.6%			
Unexplained variance (total)		=			11.0		54.9%		54.4%			
Unexplnd variance in 1st contrast		=			1.6		8.0%		14.5%			
Unexplnd variance in 2nd contrast		=			1.4		6.9%		12.6%			
CON-TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM
1	.54	.29	1.09	1.12	A	4 B13.1	-.50	.12	.77	.81	a	8 B13.9
1	.50	.00	1.18	1.23	B	5 B13.2	-.46	.07	.84	.82	b	9 B13.11
1	.40	-.10	1.01	1.04	C	1 B11.1	-.45	-.04	.87	.85	c	7 B13.7
1	.26	.15	1.35	1.47	D	3 B12.3	-.30	-.15	.91	.88	d	11 B13.14
1	.04	-.12	1.03	1.05	E	2 B11.5	-.25	-.15	1.04	1.00	e	10 B13.13
							-.03	-.06	.87	.87	F	6 B13.6
CON-TRAST	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM	LOADING	MEASURE	INFIT MNSQ	OUTFIT MNSQ	ENTRY NUMBER	ITEM
1	.54	.29	1.09	1.12	A	4 B13.1						
1	.50	.00	1.18	1.23	B	5 B13.2						
1	.40	-.10	1.01	1.04	C	1 B11.1						
1	.26	.15	1.35	1.47	D	3 B12.3						
1	.04	-.12	1.03	1.05	E	2 B11.5						
1	-.50	.12	.77	.81	a	8 B13.9						
1	-.46	.07	.84	.82	b	9 B13.11						
1	-.45	-.04	.87	.85	c	7 B13.7						
1	-.30	-.15	.91	.88	d	11 B13.14						
1	-.25	-.15	1.04	1.00	e	10 B13.13						
1	-.03	-.06	.87	.87	F	6 B13.6						

As shown in Table 5.38, the OC sub-scale fits the Rasch model, is unidimensional and has successfully identified two strata of responses ($G = 1.91$) with a person reliability coefficient of .79. Individual items are not calibrated too far apart and they all contribute to the underlying construct (OC). It can be concluded that the unidimensionality requirement has been realised sufficiently well and that all items work together and fit the model. The items of the OC sub-scale are neither difficult nor easy as shown in the Person-Item Map, and they are well-separated with sufficient width. Nevertheless, the only noticeable problem is poor

targeting of the measure on the sample. It is clear from the Person-Item Map plot that respondents did not have the required ability to respond to the items of the measure.

5.3.11.4 Differential Item Functioning

The results of the age contrast DIF for the OC sub-scale items are presented in figure 5.63. It is evident that respondents aged 46 years and older experienced difficulty with item B11.1 when compared to their counterparts. There is no significant difference across all age groups when it comes to items B11.5 and B 12.2 as they all find the items neither difficult nor easy. For item B13.1, respondents aged 56 years and older found it extremely difficult to endorse the item. There were no significant differences across all groups for items B13.2, B13.6, B13.7 and B13.9. However, respondents aged between 36 and 45 found item B13.11 to be difficult when compared to other groups. No significant differences were reported for item B13.13. Item B13.14 was very easy for respondents aged 56 years and older to endorse.

The results of the gender contrast DIF for OC sub-scale items are presented in figure 5.64. There were no significant differences reported between male and female respondents on all items of this sub-scale.

With regard to educational achievement, the contrast DIF results are depicted in figure 5.65. While those respondents with occupational certificates/NHC experienced some discomfort in endorsing item B11.1, those with Doctorates found this item to be extremely difficult. For items B11.5 and 12.3, only respondents with Doctorates found the items difficult to endorse. No significant differences were experienced for items B13.1 and B13.2 by all respondents as they found these items to be neither difficult nor easy. While respondents with a Professional/Honours degree found item B13.6 to be difficult, those with a Master's degree found this item to be easy to endorse. Item B13.7 was found to be easier to endorse by respondents with a Doctorate degree, while item B13.9 was easier for those respondents with educational achievement below matric/N1/N2. Master's degree holders found item B13.11 to be slightly difficult. Those respondents with occupational certificates/NHC found item B13.13 to be easy while item B13.14 was difficult for them to endorse.

The results for the contrast DIF with regard to the type of learning programme are depicted in figure 5.66. It is evident that there were no significant differences experienced between apprenticeship and learnership respondents when it came to items B11.1, B11.5, B13.1,

B13.2, B13.7, B13.11 and B13.13. However, respondents involved in apprenticeships found item B12.3 to be easier to endorse while they perceived item B13.6 to be difficult. These respondents also reported slight difficulty with items 13.9 and 13.14 when compared to those involved in learnerships.

Respondents were also compared in terms of the type of occupation in which they are involved and the DIF contrast results are depicted in figure 5.67. Assessors/Facilitators and Mentors/Supervisors experienced some level of difficulty with regard to item B11.1. For item B11.5, Skills Development Officers/Providers and Assessors/Facilitators found the item easier to endorse. There were no significant differences across occupations for items B12.3, B13.7, B13.9 and B13.13 as respondents found the items to be neither difficult nor easy. Skills Development Officers/Providers reported some difficulty in endorsing item B13.1, while Assessors/Facilitators found items B13.2 and B13.6 to be easier. While Skills Development Officers/Providers found item B13.11 slightly difficult to endorse, Assessors/Facilitators found items B13.11 and B13.13 extremely difficult. However, item 13.14 appeared to be easier for Assessors/Facilitators.

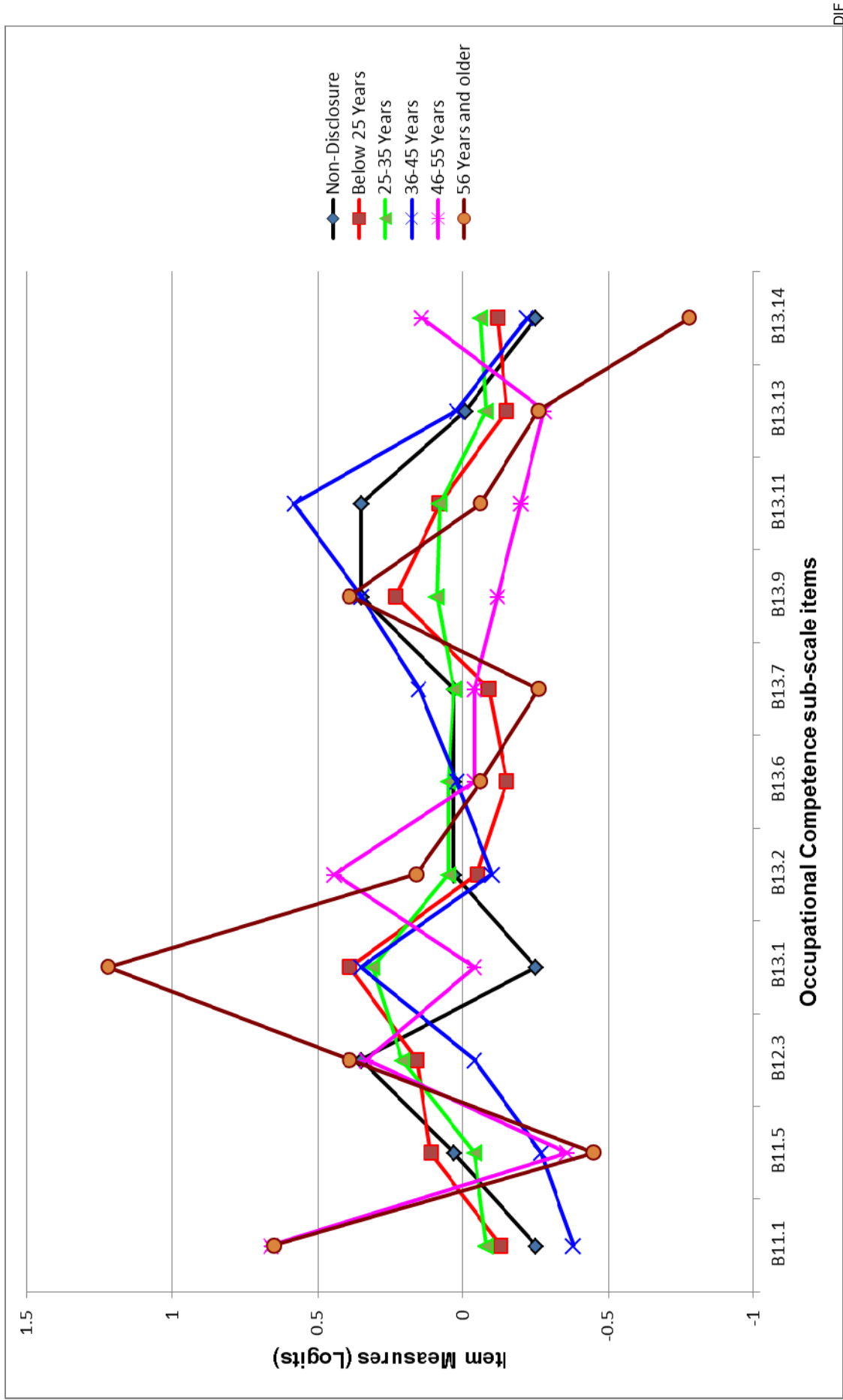
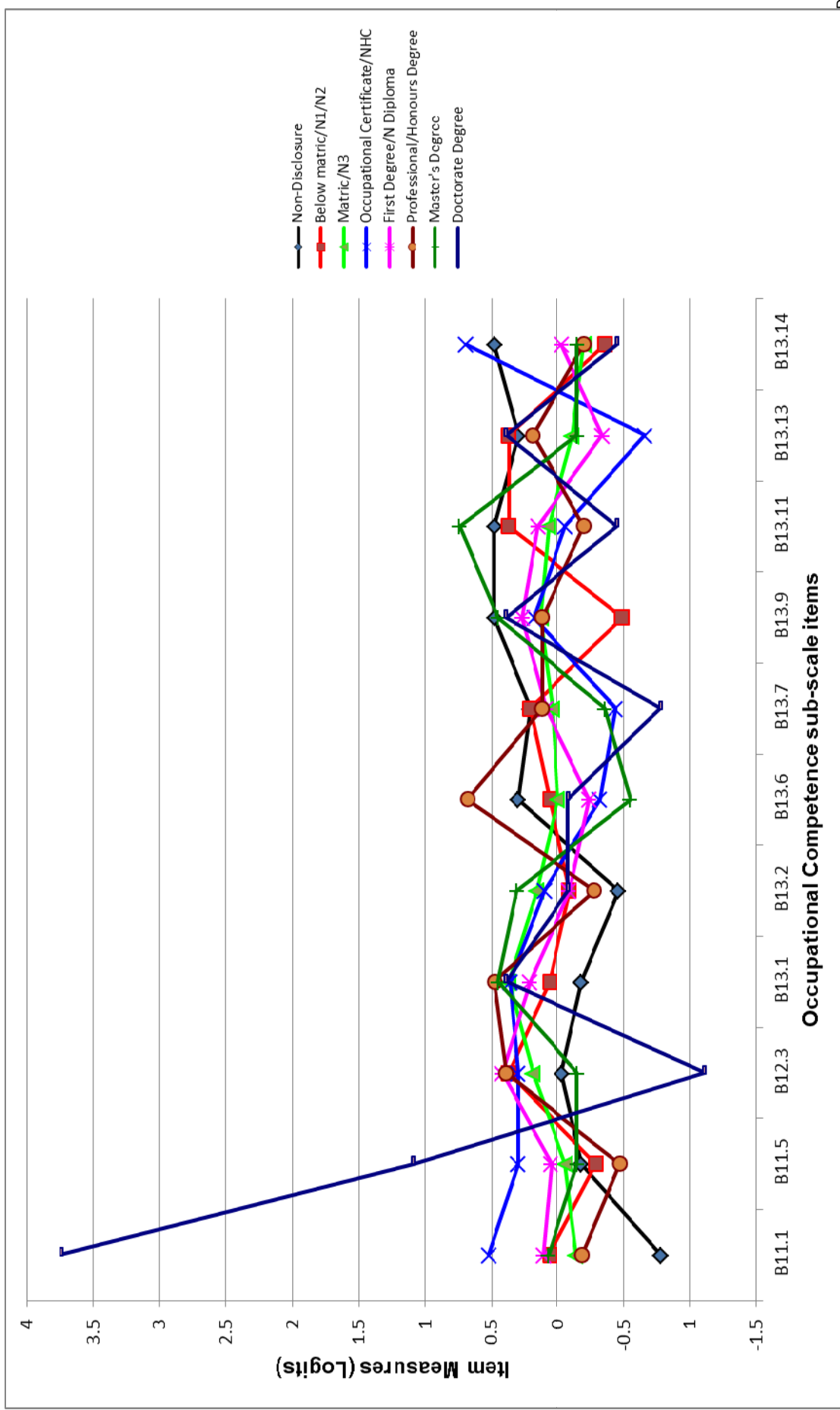


Figure 5.63. Age contrast plot for Occupational Competence Sub-Scale items

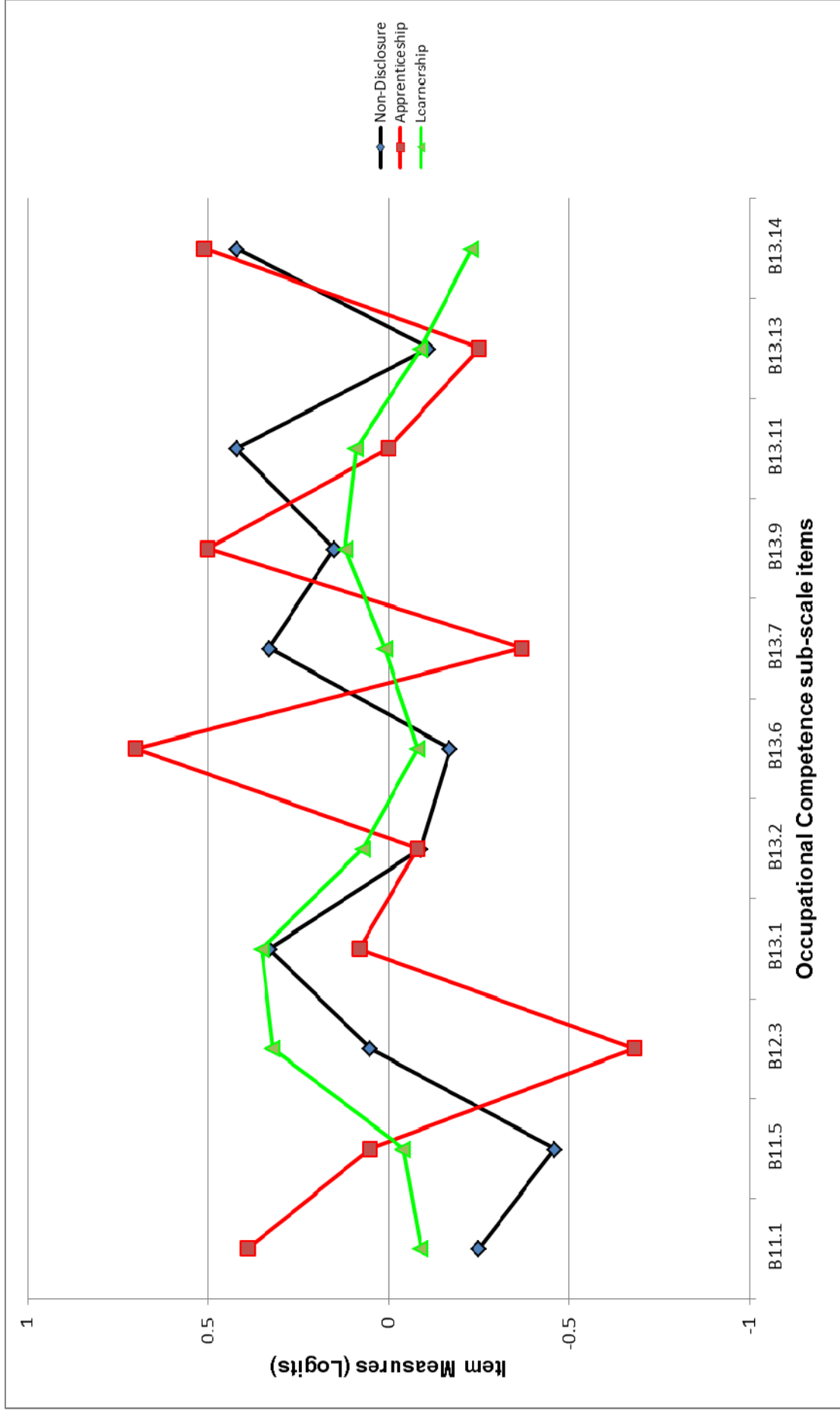


Figure 5.64. Gender contrast plot for Occupational Competence Sub-Scale items



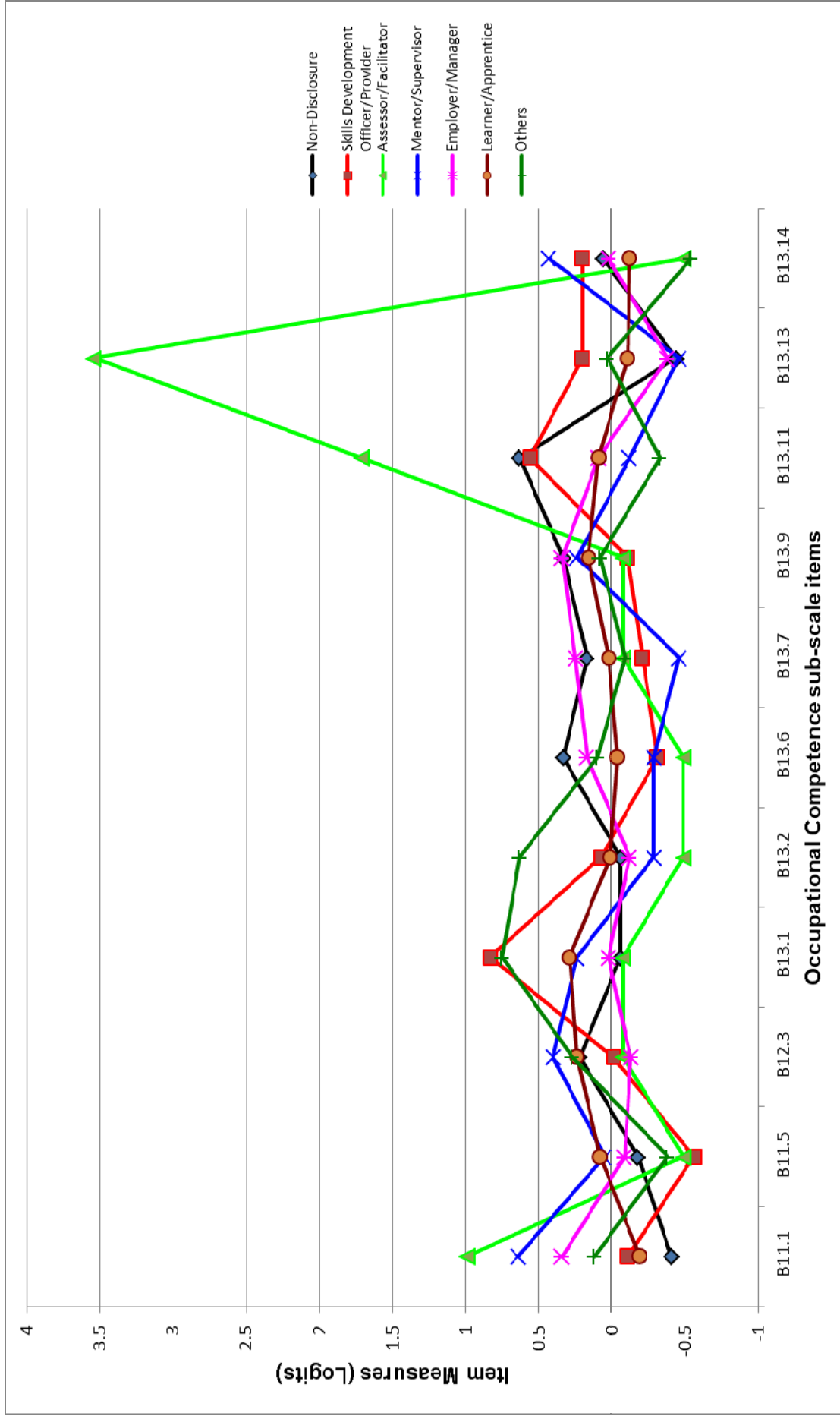
IF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.65. Educational achievement contrast plot for Occupational Competence Sub-Scale items



DIF parameters: <0.50 Logits = Insignificant; 0.5 – 1.00 Logits = Mild (but probably inconsequential); ≥1.00 Logits = Notable and significant.

Figure 5.66. Learning programme contrast plot for Occupational Competence Sub-Scale items



DIF parameters: ≤ -0.50 Logits = Insignificant; \geq 1.00</math> Logits = Notable and significant.

Figure 5.67. Occupation contrast plot for Occupational Competence Sub-Scale items

5.4 CONCLUSIONS

The findings of this research in terms of the exploratory factor analysis phase are summarised as follows relative to the relevant empirical research aims:

Research aim 1: To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable Learning Programme Management and Evaluation (LPME) scale.

The results of the principal component analysis (PCA) reported in sub-section 5.2.2 in this chapter show that the draft measure developed in this research as reported in Chapter 4 (Empirical Study) was successfully operationalised into an 11 dimension LPME scale. Thus, this research aim was achieved in this chapter.

Sub-aim 1.1: To assess the psychometric properties of the newly developed LPME scale.

The focus of this sub-aim was to assess the psychometric properties of the new LPME scale. The results reported in section 5.3 in this chapter show that the sub-scales of the LPME scale were valid and reliable in terms of item separation index, item fit and unidimensionality. Although the person-item maps show an uneven distribution in addition to a weak person-separation index in some sub-scales, the fit statistics confirm that the items were well-designed and are valid in terms of measuring the sub-scales of the LPME scale.

Therefore, the challenge lies with the respondents whose ability seems to fall below the average mean score of the scales. However, it is possible to suggest that the low ability of the respondents could be attributed to the new vocabulary used in the LPME scale, with which the respondents may not have been familiar with at the time of data collection. The present research was carried out at the time when the implementation of the new skills development policy, particularly the third National Skills Development Strategy (NSDS III), had begun. Despite all these, the empirical sub-aim 1.1 was achieved in this chapter.

5.5 CHAPTER SUMMARY

This chapter presented and interpreted the results for exploratory factor analysis in this research. The results of the test for sample adequacy were presented, followed by the factorial structure computed through a principal component analysis (PCA) using the varimax rotation technique. Furthermore, the detailed Rasch analysis results for all the sub-scales of the LPME scale were presented and interpreted. These include a summary of statistics, person-measure targeting, fit statistics, principal component analysis and differential item functioning. The conclusions regarding the empirical aims relevant to this chapter were also presented.

The next chapter (Chapter 6) presents the Confirmatory Factor and Inferential Analyses results of this research.

CHAPTER 6

RESEARCH RESULTS: CONFIRMATORY FACTOR AND INFERENTIAL ANALYSES

This chapter presents the results of confirmatory factor, correlational and inferential analyses of this research following an empirical investigation. The chapter addresses the following empirical research aims:

- Research aim 1: *To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable Learning Programme Management and Evaluation (LPME) scale.*
 - Sub-aim 1.1: *To assess the psychometric properties of the newly developed LPME scale.*
 - Sub-aim 1.2: *To assess the nature of the interrelationships between the sub-scale dimensions of the LPME scale.*
- Research aim 2: *To assess the sample sub-group differences in relation to the factorial structure of the LPME scale.*
- Research aim 3: *To determine whether the biographical characteristics (age, gender, educational achievement, type of learning programme and occupation) of the sample significantly and positively predict the sub-scale dimensions of the LPME scale.*
- Research aim 4: *To investigate the sample sub-group (age, gender, educational achievement, type of learning programme and occupational position) differences and to assess whether these sub-groups differ in terms of each sub-scale dimensions of the LPME scale.*

The results include scale and item reliability analysis, inter-correlations, structural equation modelling, structural equivalence, multiple regression analysis, a test for distribution normality and tests for significant mean differences. The chapter integrates the results of exploratory factor analysis (EFA), confirmatory factor analysis (CFA), as well as correlational and inferential statistical analyses. Towards the end, the chapter demonstrates evidence as to whether or not the research hypotheses of this research were supported by the findings. The chapter concludes with a summary.

6.1 LPME SCALE, SUB-SCALES AND ITEMS RELIABILITY ANALYSIS

The results of the internal consistency reliability analysis for the Learning Programme Management and Evaluation (LPME) scale, its sub-scales and items are presented in this section. Reliability reflects the consistency of items over time, tests and groups (Kline, 2005; Nunnally & Bernstein, 1994). The LPME scale consists of 81 items in total which were dispersed in 11 sub-scales. As is evident in Table 6.1, Cronbach's reliability coefficient for the total measure is .86, while that of its scales range from .78 to .93. Generally, Cronbach's $\alpha \geq .70$ is considered acceptable (Kline, 2005; Polit & Beck, 2004). A reliability coefficient of .70 marks a threshold evidencing high degree of internal consistency (Nunnally, 1978). All sub-scales of the LPME scale achieved a good reliability coefficient, which was considered adequate to proceed with further statistical analysis. Thus, the LPME scale, its sub-scales and items were found to be very reliable in the current research.

Table 6.1

Internal Consistency Reliability Analysis for the LPME Scale and its Sub-Scales

Sub-scale	α	Number of items
1. Administrative Processes (AP)	.83	4
2. Environmental Scanning (ES)	.83	6
3. Monitoring and Evaluation (ME)	.78	5
4. Observation and Problem Solving (OPS)	.88	6
5. Policy Awareness (PA)	.89	8
6. Quality Assurance (QA)	.83	4
7. Stakeholder Inputs (SI)	.93	17
8. Strategic Leadership (SL)	.79	4
9. Learning Programme Design and Development (LPDD)	.92	13
10. Learning Programme Specifications (LPS)	.90	3
11. Occupational Competence (OC)	.92	11
Total Scale	.86	81

6.1.1 Administrative Processes (AP) Sub-Scale

The mean score for items of the AP sub-scale ranged from 1.49 to 1.74, while the Cronbach's reliability coefficients for the items ranged from .78 to .83 as shown in Table 6.2.

The reliability coefficients for all items of the AP sub-scale were considered adequate to perform further statistical analysis.

Table 6.2

Item Total Statistics for Administrative Processes Sub-Scale

Items	Mean	Std. Deviation	n	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B4.1	1.49	.720	591	6.79	6.816	.539	.829
B4.2	1.69	.783	591	6.62	6.434	.604	.812
B4.3	1.69	.709	591	6.62	6.399	.709	.787
B4.4	1.74	.900	591	6.58	5.652	.697	.787
B4.5	1.67	.815	591	6.65	6.151	.655	.798

6.1.2 Environmental Scanning (ES) Sub-Scale

As can be seen in Table 6.3, the mean score for items of the ES sub-scale ranged from 1.30 to 1.43, while the Cronbach's reliability coefficients for items ranged from .78 to .82. However, the reliability coefficients for all items of the ES sub-scale were considered adequate to perform further statistical analysis.

Table 6.3

Item Total Statistics for Environmental Scanning Sub-Scale

Items	Mean	Std. Deviation	n	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B2.1	1.40	.767	577	6.77	6.534	.534	.821
B2.2	1.30	.639	577	6.86	6.497	.695	.788
B2.3	1.33	.612	577	6.83	6.956	.570	.812
B2.4	1.43	.763	577	6.74	6.132	.655	.794
B2.5	1.38	.710	577	6.78	6.419	.615	.803
B3.3	1.37	.710	577	6.78	6.577	.577	.811

6.1.3 Monitoring and Evaluation (ME) Sub-Scale

As shown in Table 6.4, the mean score for items of the ME sub-scale ranged from 1.50 to 1.68, while the Cronbach's reliability coefficients for items ranged from .71 to .76. However, the reliability coefficients for all items of the ME sub-scale were considered adequate to perform further statistical analysis.

Table 6.4

Item Total Statistics for Monitoring and Evaluation Sub-Scale

Items	Mean	Std. Deviation	<i>n</i>	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B3.6	1.50	.726	557	6.54	6.954	.569	.741
B3.7	1.67	.880	557	6.36	6.163	.623	.718
B3.8	1.54	.785	557	6.50	6.617	.601	.729
B9.1	1.68	.907	557	6.36	6.536	.496	.763
B14.1	1.64	.936	557	6.39	6.329	.521	.756

6.1.4 Observation and Problem Solving (OPS) Sub-Scale

Table 6.5 depicts the reliability results for the OPS sub-scale items. As can be seen, the mean score for items of the OPS sub-scale ranged from 1.52 to 1.70, while the Cronbach's reliability coefficients for items ranged from .84 to .86. However, the reliability coefficients for all items of the OPS sub-scale were considered adequate to perform further statistical analysis.

Table 6.5

Item Total Statistics for Observation and Problem Solving Sub-Scale

Items	Mean	Std. Deviation	<i>n</i>	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B9.2	1.70	.866	566	7.91	9.182	.663	.866
B9.3	1.63	.808	566	7.99	9.359	.688	.860
B9.4	1.58	.771	566	8.04	9.247	.761	.848
B9.5	1.63	.765	566	7.99	9.503	.703	.858
B10.1	1.56	.733	566	8.05	9.734	.685	.861
B10.2	1.52	.672	566	8.09	10.168	.650	.867

6.1.5 Policy Awareness (PA) Sub-Scale

The reliability coefficients for items of the PA sub-scale are shown in Table 6.6. It is evident that the mean score for items of this sub-scale ranged from 1.47 to 1.56. The Cronbach's reliability coefficients for all items of the PA sub-scale ranged from .88 to .89, and were considered adequate for further statistical analysis.

Table 6.6

Item Total Statistics for Policy Awareness Sub-Scale

Items	Mean	Std. Deviation	<i>n</i>	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B5.2	1.56	.712	578	10.77	16.423	.644	.889
B5.3	1.56	.788	578	10.77	15.785	.674	.887
B5.4	1.60	.755	578	10.73	15.906	.704	.884
B5.5	1.47	.749	578	10.86	16.423	.601	.893
B5.6	1.51	.759	578	10.82	16.193	.643	.889
B5.7	1.54	.737	578	10.79	15.976	.714	.883
B5.8	1.55	.734	578	10.78	15.822	.739	.881
B5.9	1.55	.743	578	10.78	15.672	.747	.880

6.1.6 Quality Assurance (QA) Sub-Scale

The reliability coefficients for items of the QA sub-scale are shown in Table 6.7. It is evident that the mean score for items of this sub-scale ranged from 1.37 to 1.50. The Cronbach's reliability coefficients for all items of the QA sub-scale ranged from .75 to .84, and were considered adequate for further statistical analysis.

Table 6.7

Item Total Statistics for Quality Assurance Sub-Scale

Items	Mean	Std. Deviation	<i>n</i>	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B8.1	1.37	.634	577	4.33	2.984	.664	.786
B8.2	1.41	.650	577	4.30	2.841	.726	.758
B8.3	1.43	.666	577	4.28	2.786	.730	.755
B8.6	1.50	.748	577	4.20	2.903	.541	.847

6.1.7 Stakeholder Inputs (SI) Sub-Scale

The reliability coefficients for items of the SI sub-scale are shown in Table 6.8. It is evident that the mean score for items of this sub-scale ranged from 1.34 to 1.63. The Cronbach's reliability coefficients for all items of the SI sub-scale ranged from .93 to .94, and were considered adequate for further statistical analysis.

Table 6.8

Item Total Statistics for Stakeholder Inputs Sub-Scale

Items	Mean	Std. Deviation	n	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B3.9	1.44	.725	560	23.20	64.176	.684	.935
B3.10	1.43	.675	560	23.22	65.438	.618	.937
B3.11	1.34	.639	560	23.29	65.688	.630	.936
B3.12	1.36	.626	560	23.27	65.181	.703	.935
B3.13	1.45	.776	560	23.20	64.036	.647	.936
B3.14	1.44	.744	560	23.21	63.813	.710	.935
B3.15	1.41	.684	560	23.24	65.074	.667	.936
B3.16	1.45	.731	560	23.19	64.581	.640	.936
B3.17	1.55	.803	560	23.10	63.886	.635	.936
B3.18	1.50	.733	560	23.14	63.914	.705	.935
B3.19	1.49	.761	560	23.15	63.661	.698	.935
B3.20	1.40	.674	560	23.24	64.743	.687	.935
B3.21	1.45	.721	560	23.20	63.804	.730	.934
B3.22	1.49	.713	560	23.15	64.232	.693	.935
B3.23	1.63	.802	560	23.02	64.494	.582	.948
B3.24	1.43	.673	560	23.21	65.980	.657	.936

6.1.8 Strategic Leadership (SL) Sub-Scale

The reliability coefficients for items of the SL sub-scale are shown in Table 6.9. It is evident that the mean score for items of this sub-scale ranged from 1.52 to 1.63. The Cronbach's reliability coefficients for all items of the SL sub-scale ranged from .71 to .77, and were considered adequate for further statistical analysis.

Table 6.9

Item Total Statistics for Strategic Leadership Sub-Scale

Items	Mean	Std. Deviation	n	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B1.1	1.52	.771	600	4.70	3.371	.593	.745
B1.2	1.63	.835	600	4.58	2.975	.652	.713
B1.3	1.61	.858	600	4.60	2.956	.628	.727
B1.4	1.54	.802	600	4.68	3.341	.537	.771

6.1.9 Learning Programme Design and Development (LPDD) Sub-Scale

The reliability coefficients for items of the LPDD sub-scale are shown in Table 6.10. It is evident that the mean score for items of this sub-scale ranged from 1.44 to 1.63. The Cronbach's reliability coefficients for all 13 items of the LPDD sub-scale are .92 and above, and were considered adequate for further statistical analysis.

Table 6.10

Item Total Statistics for Learning Programme Design and Development Sub-Scale

Items	Mean	Std. Deviation	<i>n</i>	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B6.5	1.46	.707	560	18.15	39.447	.649	.923
B6.6	1.45	.672	560	18.16	39.675	.659	.923
B6.7	1.50	.740	560	18.11	38.760	.694	.921
B6.8	1.63	.830	560	17.98	38.416	.643	.924
B7.1	1.51	.682	560	18.10	39.739	.640	.923
B7.2	1.47	.654	560	18.14	39.504	.702	.921
B7.3	1.54	.709	560	18.07	38.779	.728	.920
B7.4	1.59	.739	560	18.02	39.187	.648	.923
B7.5	1.51	.669	560	18.10	39.246	.718	.921
B7.6	1.57	.717	560	18.04	38.877	.706	.921
B8.7	1.45	.650	560	18.16	39.787	.658	.923
B8.8	1.44	.687	560	18.17	39.200	.701	.921
B8.9	1.47	.754	560	18.14	38.769	.678	.922

6.1.10 Learning Programme Specifications (LPS) Sub-Scale

The reliability coefficients for items of the LPS sub-scale are shown in Table 6.11. It is evident that the mean score for items of this sub-scale ranged from 1.57 to 1.62.

Table 6.11

Item Total Statistics for Learning Programme Specifications Sub-Scale

Items	Mean	Std. Deviation	<i>n</i>	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B6.2	1.57	.778	585	3.23	2.214	.822	.844
B6.3	1.60	.799	585	3.20	2.145	.829	.838
B6.4	1.62	.796	585	3.19	2.257	.763	.894

As depicted in Table 6.11, the Cronbach's reliability coefficients for all items of the LPS sub-scale ranged from .83 to .89, and were considered adequate for further statistical analysis.

6.1.11 Occupational Competence (OC) Sub-Scale

The reliability coefficients for items of the OC sub-scale are shown in Table 6.12. It is evident that the mean score for items of this sub-scale ranged from 1.42 to 1.53. The Cronbach's reliability coefficients for all 11 items of the OC sub-scale are .91 and above, and were considered adequate for further statistical analysis.

Table 6.12

Item Total Statistics for Occupational Competence Sub-Scale

Items	Mean	Std. Deviation	n	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B11.1	1.51	.685	549	14.85	27.019	.657	.915
B11.5	1.51	.690	549	14.85	26.953	.660	.915
B12.3	1.45	.694	549	14.91	27.417	.587	.918
B13.1	1.42	.656	549	14.94	27.188	.665	.914
B13.2	1.49	.685	549	14.87	27.276	.618	.917
B13.6	1.51	.682	549	14.85	26.641	.718	.912
B13.7	1.50	.716	549	14.86	26.212	.742	.911
B13.9	1.46	.637	549	14.90	26.933	.730	.911
B13.11	1.47	.682	549	14.89	26.459	.747	.910
B13.13	1.52	.763	549	14.84	26.006	.717	.912
B13.14	1.53	.698	549	14.83	26.625	.702	.913

6.2 INTER-CORRELATIONS BETWEEN THE SUB-SCALES OF THE LPME SCALE

Correlations between the sub-scales of the LPME scale were computed and the results are shown in Table 6.13. It is clear from Table 6.13 that the inter-correlations among the variables were found to be within the acceptable range because no value is $\geq .85$ (Bollen, 1989; Almost, 2010) or $\geq .9$ (Maiyaki, 2012). Therefore, this is an indication of the absence of multicollinearity problems among the constructs under investigation. Multicollinearity is a problem that occurs when the exogenous variables are highly correlated to as high as .9 and above (Tabachnick & Fidell, 2007). When two or more variables are highly correlated, it means that they contain redundant information and therefore, not all of them are needed in the same analysis (Maiyaki, 2012).

In the current research, the following parameters were used to determine the practical effect size of the inter-correlation coefficient values as suggested by Cohen (1988; 1992) and supported by Osteen and Bright (2012): coefficient values around .10 or below were considered small; those around .30 were considered moderate; and those around .50 were

considered large in terms of practical significance. The results in Table 6.13 show that the variable learning programme design and development relates significantly and positively to the following variables: policy awareness ($r = .73$; $p \leq .01$, large practical effect size); observation and problem solving ($r = .68$; $p \leq .01$, large practical effect size); quality assurance ($r = .68$; $p \leq .01$, large practical effect size); administrative processes ($r = .65$; $p \leq .01$, large practical effect size); stakeholder inputs ($r = .72$; $p \leq .01$, large practical effect size); strategic leadership ($r = .40$; $p \leq .01$, moderate practical effect size); learning programme specifications ($r = .68$; $p \leq .01$, large practical effect size); monitoring and evaluation ($r = .53$; $p \leq .01$, large practical effect size); occupational competence ($r = .73$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .56$; $p \leq .01$, large practical effect size).

Table 6.13
Correlations Among the Sub-scales of the LPME Scale

Sub-scale	1	2	3	4	5	6	7	8	9	10
1. Learning Programme Design and Development	1									
2. Policy Awareness	.732**	1								
3. Observation & Problem Solving	.688**	.657**	1							
4. Quality Assurance	.684**	.604**	.584**	1						
5. Administrative Processes	.650**	.661**	.642**	.521**	1					
6. Stakeholder Inputs	.728**	.676**	.704**	.635**	.693**	1				
7. Strategic Leadership	.408**	.413**	.427**	.361**	.450**	.484**	1			
8. Learning Programme Specifications	.684**	.675**	.586**	.526**	.551**	.593**	.342**	1		
9. Monitoring & Evaluation	.533**	.509**	.577**	.468**	.512**	.613**	.445**	.533**	1	
10. Occupational Competence	.734**	.640**	.690**	.605**	.581**	.667**	.444**	.565**	.534**	1
11. Environmental Scanning	.565**	.550**	.574**	.602**	.508**	.685**	.454**	.520**	.519**	.531**

** Correlation is significant at .01 level (2-tailed).

$r \geq .50$ (large practical effect size); $r \geq .30 \leq .50$ (moderate practical effect size); $r \geq .10 \leq .30$ (small practical effect size)

As depicted in Table 6.13, the policy awareness variable relates significantly and positively to the following variables: observation and problem solving ($r = .65$; $p \leq .01$, large practical effect size); quality assurance ($r = .60$; $p \leq .01$, large practical effect size); administrative processes ($r = .66$; $p \leq .01$, large practical effect size); stakeholder inputs ($r = .67$; $p \leq .01$, large practical effect size); strategic leadership ($r = .41$; $p \leq .01$, moderate practical effect size); learning programme specifications ($r = .67$; $p \leq .01$, large practical effect size); monitoring and evaluation ($r = .50$; $p \leq .01$, large practical effect size); occupational competence ($r = .64$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .55$; $p \leq .01$, large practical effect size). Observation and problem solving variables relates

significantly and positively to the following variables: quality assurance ($r = .58$; $p \leq .01$, large practical effect size); administrative processes ($r = .64$; $p \leq .01$, large practical effect size), stakeholder inputs ($r = .70$; $p \leq .01$, large practical effect size); strategic leadership ($r = .42$; $p \leq .01$, moderate practical effect size); learning programme specifications ($r = .58$; $p \leq .01$, large practical effect size); monitoring and evaluation ($r = .57$; $p \leq .01$, large practical effect size); occupational competence ($r = .69$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .57$; $p \leq .01$, large practical effect size).

The quality assurance variable relates positively and significantly to the following variables: administrative processes ($r = .52$; $p \leq .01$, large practical effect size); stakeholder inputs ($r = .63$; $p \leq .01$, large practical effect size); strategic leadership ($r = .36$; $p \leq .01$, moderate practical effect size); learning programme specifications ($r = .52$; $p \leq .01$, large practical effect size); monitoring and evaluation ($r = .46$; $p \leq .01$, moderate practical effect size); occupational competence ($r = .60$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .60$; $p \leq .01$, large practical effect size).

The administrative processes variable relates positively and significantly to the following variables: stakeholder inputs ($r = .69$; $p \leq .01$, large practical effect size); strategic leadership ($r = .45$; $p \leq .01$, moderate practical effect size); learning programme specifications ($r = .55$; $p \leq .01$, large practical effect size); monitoring and evaluation ($r = .51$; $p \leq .01$, large practical effect size); occupational competence ($r = .58$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .50$; $p \leq .01$, large practical effect size).

The stakeholder inputs variable relates positively and significantly to the following variables: strategic leadership ($r = .48$; $p \leq .01$, moderate practical effect size); learning programme specifications ($r = .59$; $p \leq .01$, large practical effect size); monitoring and evaluation ($r = .61$; $p \leq .01$, large practical effect size); occupational competence ($r = .66$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .68$; $p \leq .01$, large practical effect size).

The strategic leadership variable relates significantly and positively to the following variables: learning programme specifications ($r = .34$; $p \leq .01$, moderate practical effect size); monitoring and evaluation ($r = .44$; $p \leq .01$, moderate practical effect size); occupational competence ($r = .44$; $p \leq .01$, moderate practical effect size); and environmental scanning ($r = .45$; $p \leq .01$, moderate practical effect size).

The learning programme specifications variable relates positively and significantly to the following variables: monitoring and evaluation ($r = .53$; $p \leq .01$, large practical effect size); occupational competence ($r = .56$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .52$; $p \leq .01$, large practical effect size).

The monitoring and evaluation variable relates positively and significantly to occupational competence ($r = .53$; $p \leq .01$, large practical effect size); and environmental scanning ($r = .51$; $p \leq .01$, large practical effect size); whereas occupational competence relates positively and significantly to environmental scanning ($r = .53$; $p \leq .01$, large practical effect size).

6.3 MEASUREMENT MODEL

A measurement model first specifies the relationships among latent variables (unobserved variables or constructs) and their indicators (observed variables or manifest variables), for example, how the latent variables are measured in terms of the observed variables, including description of the measurement properties (validity and reliability) of the observed variables (Kline, 1998). A single indicator may be acceptable if the researcher is confident in the measure's validity and reliability (Garson, 2009). If the researcher is not confident then a factor analysis is used to evaluate the nature and validity of the major constructs by determining the underlying dimensionality of a large number of items (Polit & Hungler, 1999).

In the current research, a confirmatory factor analysis (CFA) was conducted within the framework of structural equation modelling (SEM) to empirically assess whether the measurement model underlying the LPME scale has a good fit with the empirically derived structural model. Therefore, this analysis was intended to assess whether the 11 factorial dimensions generated from exploratory factor analysis fit the structural equation model.

The 11 factorial dimensions from EFA which were included in this analysis are as follows: learning programme design and development; policy awareness; observation and problem solving; quality assurance; administrative processes; stakeholder inputs; strategic leadership; learning programme specifications; monitoring and evaluation; occupational competence; and environmental scanning. The next sub-section presents the 11 dimensions of a measurement model for the effective management and evaluation of occupational learning programmes.

6.3.1 A measurement model for the effective management and evaluation of occupational learning programmes

The measurement model for this research which is an outcome of an exploratory factor analysis (EFA) process and which was subjected to CFA (SEM), is depicted in figure 6.1. The original theoretical model for effective management and evaluation of occupational learning programmes which was developed as part of the literature review is presented in Chapter 3 (Training Management and Evaluation Models). An occupational learning programme is a latent variable that depends on multiple observed variables. Each observed variable is measured by multiple indicators. This measurement model provides the basis upon which the initial hypothesised SEM model was computed as shown below in this section.

The 11 dimensions of the measurement model depicted in figure 6.1 were hypothesised to explain the effectiveness of management and evaluation of an occupational learning programme. It is this assumed relationship that led to the initial hypothesised structural model of this study as shown in figure 6.2. The measurement model tests how well the latent construct (occupational learning programme) was measured by its indicators (sub-scale dimensions). The hypothesised structural model was tested by examining both overall model fit and the contribution of each indicator to the latent construct. The model was tested to determine if the expected linear relationships existed between the latent construct and its indicators of interest. A chi-square statistic close to zero, CFI above .90, and Root Mean Square Error of Approximation (RMSEA) below .08 indicates adequate fit in the measurement model (Kline, 2005). A Standardised Root Mean Square Residual (SRMR) of $\leq .80$ indicates a good model fit (Hu & Bentler, 1999). A standardised regression estimate (coefficient from an indicator variable to its construct) of .30 or above indicates that a variable adequately contributes to the construct it was intended to measure (Kline, 2005). The results of the structural equation modelling are presented in the sub-section below.

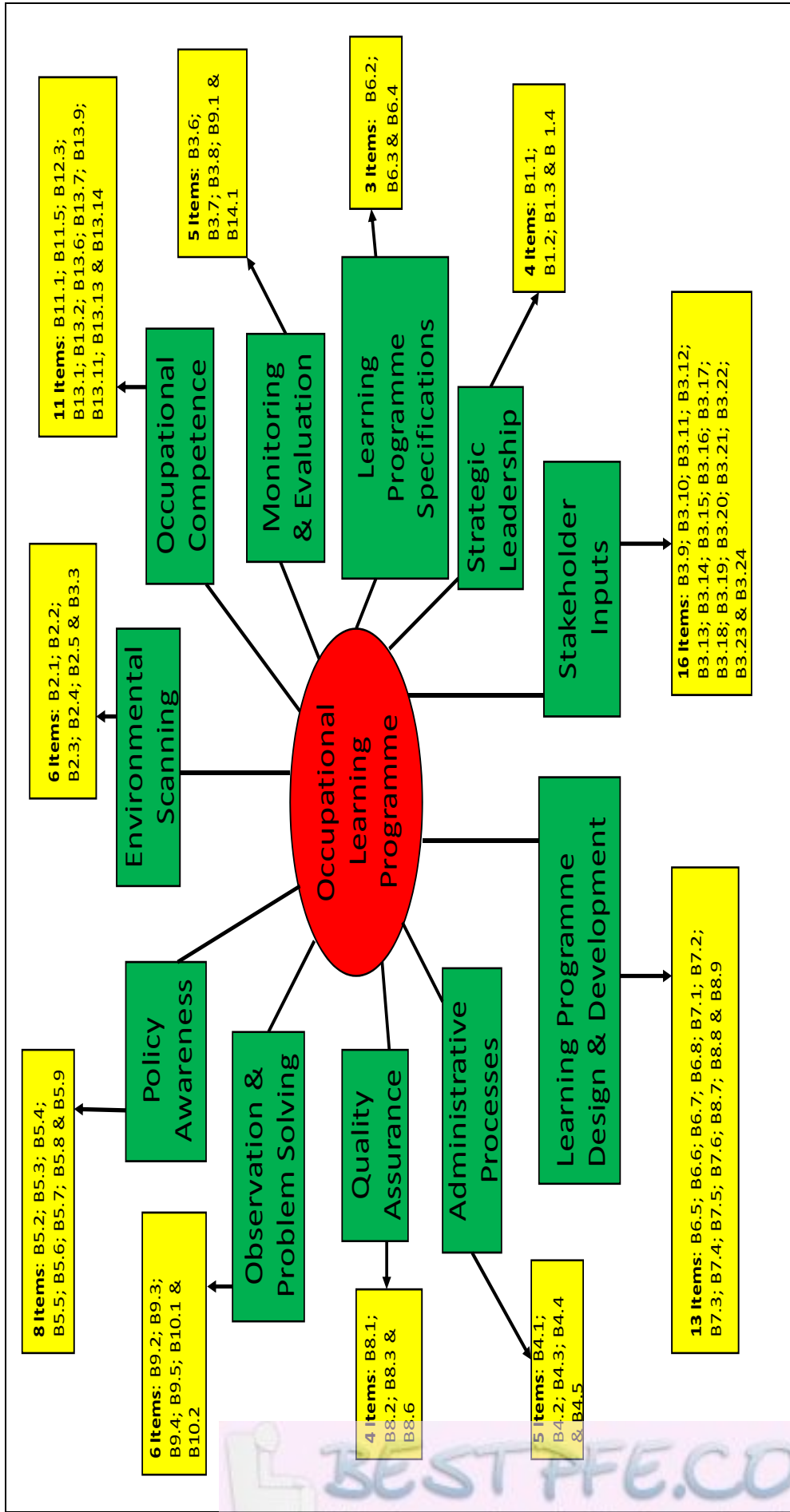


Figure 6.1. A measurement model for the effective management and evaluation of occupational learning programmes

6.3.2 Evaluation of structural equation model fit

The initial hypothesised structural model as presented in figure 6.2 shows no sign of item weaknesses since all dimensions have higher squared multiple correlations (R^2) ranging from $R^2 = .28$ to $R^2 = .74$ and all values were below $R^2 = .85$ indicating absence of multicollinearity (Bollen, 1989; Maiyaki, 2012; Tabachnick & Fidell, 2007). All the dimensions have standardised regression weights above .50 at $p \leq .01$. However, it is rare that a model fits well at first. Sometimes model modification is required to obtain a better-fitting model. This initial hypothesised model as presented in Figure 6.2, exhibits evidence of misfit as reflected by its RMSEA value of .09; PCLOSE $\leq .000$ and a significant chi-square ($\chi^2 = 248.994$; $p = .000$; $df = 44$; $\chi^2/df = 5.659$). The χ^2 was statistically significant as depicted in Table 6.15, indicating that the model did not fit the data exactly, but with a relatively large sample size as in the current research ($n = 652$) even minor differences between the observed and implied covariance matrix may result in statistical significance (Schumaker & Lomax, 2004). In other words, with large sample size, the test has an excessive type I error rate (Bollen, 1989), hence using other indices to determine the appropriateness of the model was justifiable.

In order to ascertain the sources of poor fit, the researcher reviewed the data. This involved an examination of data for missing values in order to establish if these were random. In this regard, a full information Maximum Likelihood Estimation (MLE) method was used to examine missing values in the data. This method maximises the statistical power of a sample, because it does not require list-wise deletion when variables can be assumed to be generally missing at random (Kline, 2005). As individual pathways were tested, the strength of correlation coefficients and critical ratio provided an opportunity to examine the influence of residual measurement errors as part of model trimming to improve RMSEA. An examination of dimensions whose residual errors were later correlated revealed substantive inter-correlation as demonstrated by the strength of variances and critical ratio. Consequently, the researcher paired the residual measurement errors which were strongly correlated and thereafter re-specified the model with great circumspection and parsimony. Thus, the error correlation was justifiable on both substantive and statistical grounds. The decision to correlate measurement errors was ignited by the strength of the theoretical alignment between the dimensions as well as the statistical results.

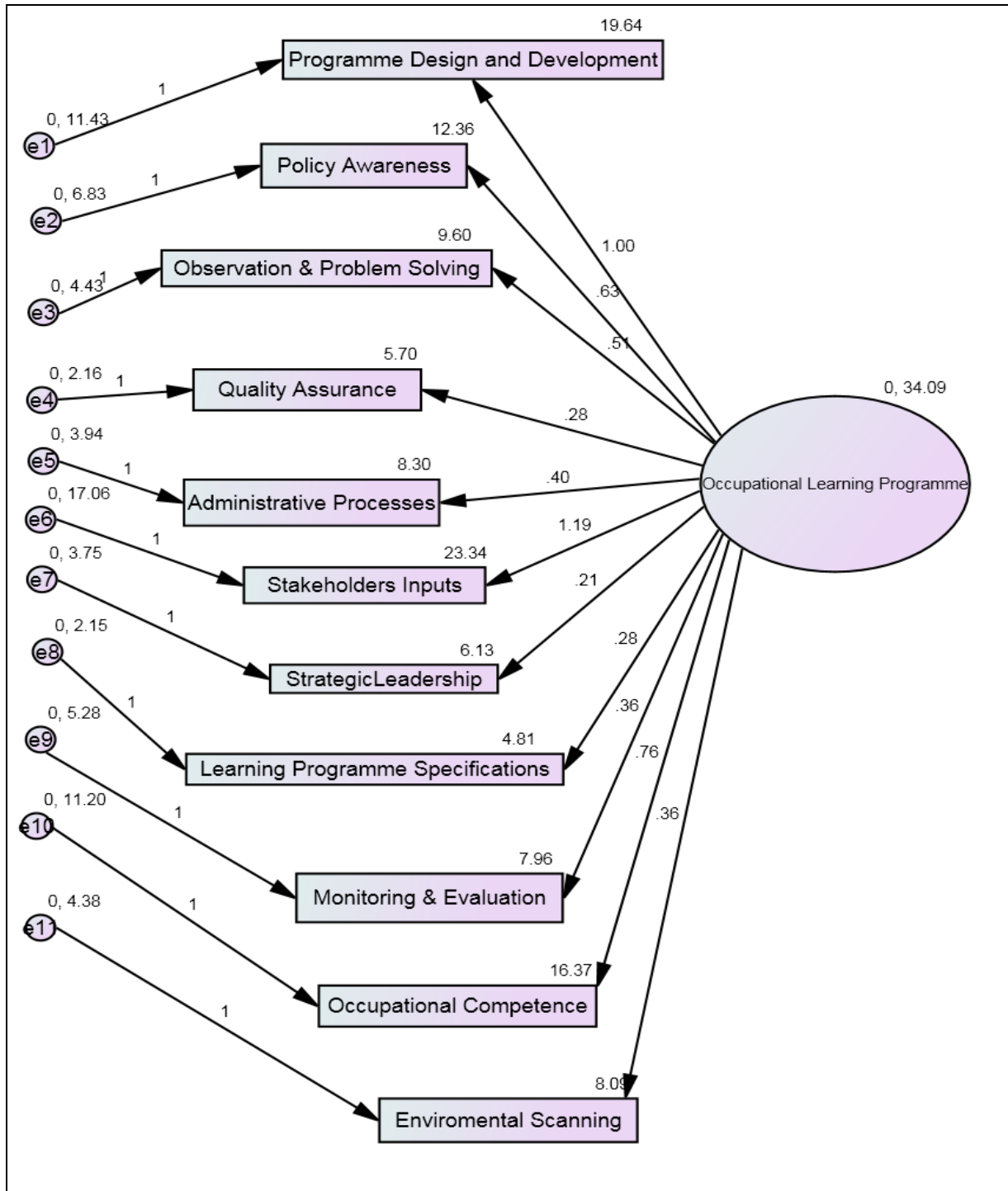


Figure 6.2. The initial hypothesised Structural Equation Model

Consequently, the revised structural model (with error covariance) is shown in figure 6.3. The results depicted in Table 6.15 show that the revised model fits very well with the data ($\chi^2 = 42.48$; $df = 23$; $\chi^2/df = 1.84$; $p \leq .008$; $NFI = .99$; $IFI = .99$; $TLI = .98$; $CFI = .99$ and $RMSEA = .03$; $PCLOSE \leq .85$). When individual parameters were analysed, the results showed that all the eleven dimensions were significant predictors of an occupational learning programme. Unstandardised regression weights as shown in figure 6.3 range from .52 to .87; Critical ratios (CR) range from 13.135 to 26.015. Although labelled CR, this statistic is also referred to as both the t -statistic and Wald-statistic. Values below 2 indicate that the value of the estimate is not significantly different from zero and is a parameter that should not be included in the model (Stevens, 1996).

Table 6.14 displays the unstandardised estimate, its standard error (abbreviated S.E.), and the estimate divided by the standard error (abbreviated C.R. for Critical Ratio). The probability value associated with the null hypothesis that the test is zero, is displayed under the P column. All of the standardised regression weights in this model are significantly different from zero beyond the .001 level. Standardised regression weights tend to vary between +1 and -1 (Shah, 2012).

However, the size of standardised loadings in Table 6.14 confirms that all sub-scales of the LPME scale are strongly related to their associated construct (Occupational Learning Programme) and are one indication of construct validity (Hair *et al.*, 2006). Hair and his colleagues (2006) suggest that standardised loading estimates should be at least .5 and ideally .7 or higher. All the standardised regression weights in this research for the initial hypothesised structural model (Table 6.14), the revised structural model (Table 6.16) and the final structural model (Table 6.18) were found to be higher than the recommended cut-off value of .5. Consequently, all eleven sub-scale dimensions of the LPME scale were found to be significant predictors ($p \leq .001$) of the overall effective occupational learning programme construct.

Table 6.14

Regression Weights for the Initial Hypothesised Structural Equation Model

Observed variables		Latent variable	Estimate	S.E.	STD Regression weights	C.R.	P
Learning Programme_DD	<---	OLP.	1.000		.865		
Policy_Awareness	<---	OLP.	.634	.025	.817	25.403	***
Observation_PS	<---	OLP.	.507	.020	.815	25.310	***
Quality_Assurance	<---	OLP.	.280	.013	.743	21.752	***
Administrative_Processes	<---	OLP.	.402	.018	.764	22.697	***
Stakeholder_Inputs	<---	OLP.	1.188	.043	.859	27.869	***
Strategic_Leadership	<---	OLP.	.209	.015	.533	13.815	***
Learning_PS	<---	OLP.	.276	.013	.740	21.572	***
Monitoring_Evaluation	<---	OLP.	.360	.019	.675	18.844	***
Occupational_Com	<---	OLP.	.764	.031	.800	24.524	***
Enviromental_Scanning	<---	OLP.	.365	.018	.713	20.412	***

The values of standard error for dimensions ranged from .013 to .043, while the standard regression weights ranged from .533 to .865. Each unstandardised regression coefficient represents the amount of change in the dependent or mediating variable for each one unit change in the variable predicting it. For example, policy awareness increases by .634 for each 1.00 increase in an occupational learning programme (OLP). Standardised estimates allow the researcher to evaluate the relative contributions of each predictor variable to each outcome variable. The standardised estimates for the initial hypothesised structural equation model appear in Table 6.14.

A closer examination of the results revealed measurement error with statistically significant correlations. Consequently, the researcher decided to only include the measurement errors showing a statistically significant correlation in the final structural equation model as shown in figure 6.4. The theoretical explanation to justify error correlation was the statistical significance of the relationship between observed variables and between the residual errors. This justification is summarised as follows: a good learning programme design and development (e_1) leads to occupational competence (e_{10}); the process of environmental scanning (e_6) takes into account the roles and responsibilities of stakeholders (e_{11}); learning programme design and development (e_1) is based on learning programme specifications (e_8); policy awareness (e_2) guides the formulation of accurate learning programme specifications (e_8); quality assurance

(e4) mechanisms are infused during learning programme design and development (e1); and, the process of environmental scanning (e11) is closely aligned to the quality assurance (e4) principles. Table 6.15 presents a summary of the structural equation models computed in the current research.

Table 6.15

Summary of Structural Equation Models

Model	CMIN/DF	NFI	TLI	CFI	RMSEA	PCLOSE	ΔCMIN/DF	SRMR
Criteria for a good fit	≤ 2	≥ .95	≥ .95	≥ .95	≤ .06	≤ .05	≥ .01	≤ .08
1. Initial model	5.659	.943	.929	.953	.090	.000	-	-
2. Revised model	1.847	.990	.987	.995	.038	.854	-3.812	-
3. Final model	3.363	.971	.964	.979	.064	.030	1.516	.0254

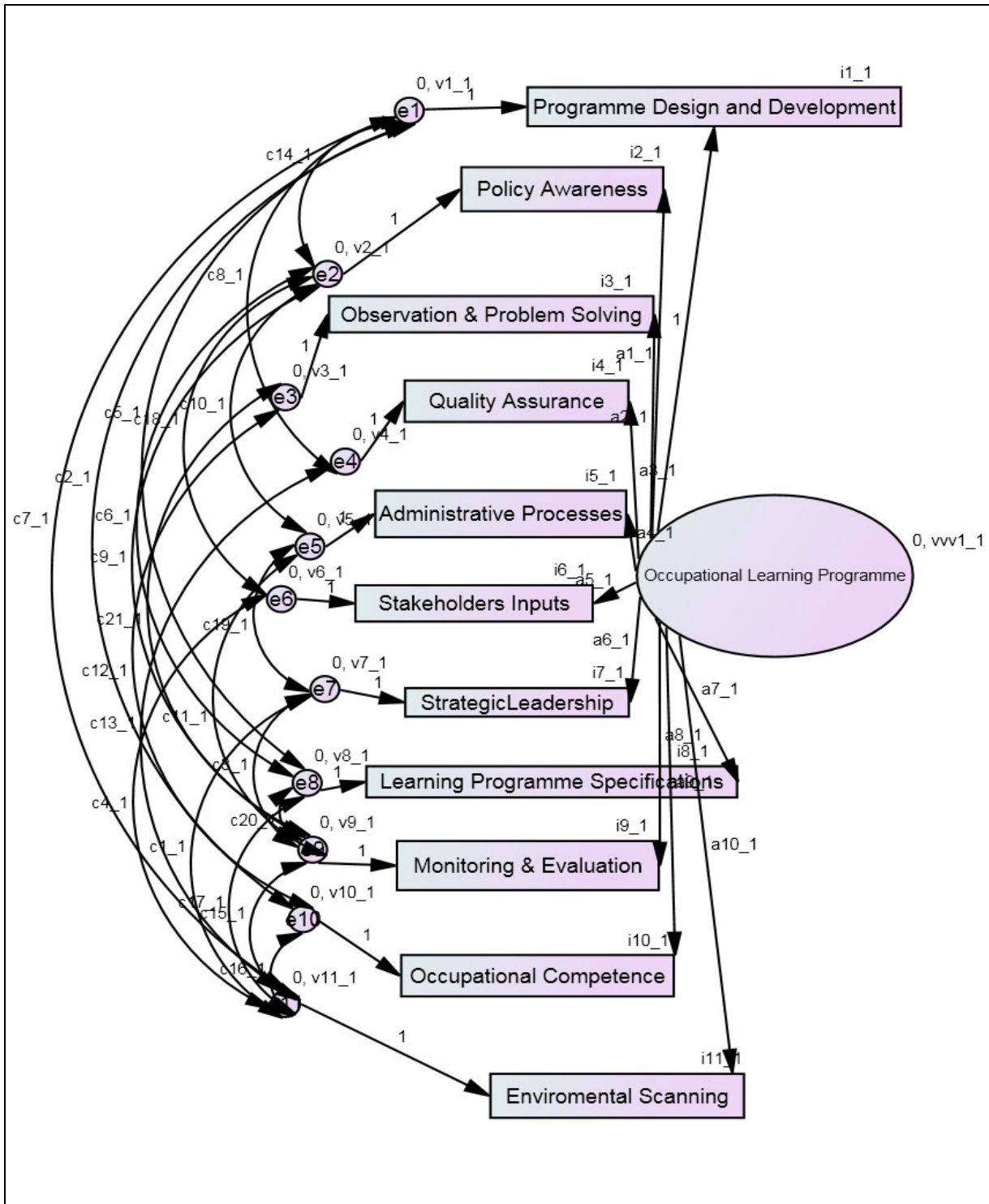


Figure 6.3. A revised Structural Equation Model

Table 6.16

Regression Weights for the Revised Structural Equation Model

Observed variables	Latent variable	Estimate	S.E.	STD Regression Weights	C.R.	P
Learning Programme_DD	<--- OLP.	1.000		.839		
Policy_Awareness	<--- OLP.	.649	.027	.811	24.484	***
Observation_PS	<--- OLP.	.524	.022	.814	23.327	***
Quality_Assurance	<--- OLP.	.283	.013	.726	21.727	***
Administrative_Processes	<--- OLP.	.421	.020	.773	21.545	***
Stakeholder_Inputs	<--- OLP.	1.250	.048	.875	26.015	***
Strategic_Leadership	<--- OLP.	.213	.016	.526	13.135	***
Learning_PS	<--- OLP.	.270	.013	.698	21.266	***
Monitoring_Evaluation	<--- OLP.	.372	.021	.675	17.624	***
Occupational_Com	<--- OLP.	.772	.031	.782	24.630	***
Enviromental_Scanning	<--- OLP.	.362	.020	.686	17.699	***

It is evident through the strength of standardised regression weights in Table 6.16 that all dimensions of the LPME measure are significant predictors of the overall construct of an effective occupational learning programme.

Table 6.17

Correlations of Measurement Error in the Revised Structural Equation Model

Measurement error (ME)	ME	Estimate	S.E.	C.R.	P	Correlation estimate
e7	<--> e11	.644	.173	3.726	***	.152
e1	<--> e10	2.625	.591	4.445	***	.207
e7	<--> e9	.663	.198	3.347	***	.148
e6	<--> e11	1.964	.471	4.173	***	.231
e1	<--> e8	1.419	.269	5.272	***	.248
e2	<--> e8	1.051	.215	4.885	***	.254
e1	<--> e11	-.122	.373	-.327	.744	-.015
e1	<--> e4	.938	.252	3.716	***	.170
e2	<--> e9	-.409	.291	-1.404	.160	-.067
e2	<--> e5	.444	.258	1.721	.085	.086
e5	<--> e9	-.081	.208	-.390	.697	-.018
e3	<--> e10	1.060	.360	2.948	.003	.145
e4	<--> e11	.702	.149	4.697	***	.214
e1	<--> e2	1.453	.513	2.835	.005	.150
e9	<--> e11	.460	.215	2.137	.033	.092
e10	<--> e11	-.273	.321	-.850	.395	-.036
e8	<--> e11	.319	.136	2.344	.019	.094
e2	<--> e6	-.998	.555	-1.800	.072	-.096
e5	<--> e7	.331	.169	1.962	.050	.087
e8	<--> e9	.497	.155	3.211	.001	.138
e3	<--> e9	.269	.226	1.191	.234	.056

Table 6.17 presents the results of inter-correlations among residual measurement errors. The results show a positive and statistically significant correlation between measurement error e7 and e11 ($r = .152$), e1 and e10 ($r = .207$), e7 and e9 ($r = .148$), e6 and e11 ($r = .231$), e1 and e8 ($r = .248$), e2 and e8 (.254), e1 and e4($r = .170$), and e4 and e11 ($r = .214$). All other measurement errors did not show a statistically significant correlation and were not paired in the final structural equation model which is presented in Figure 6.4.

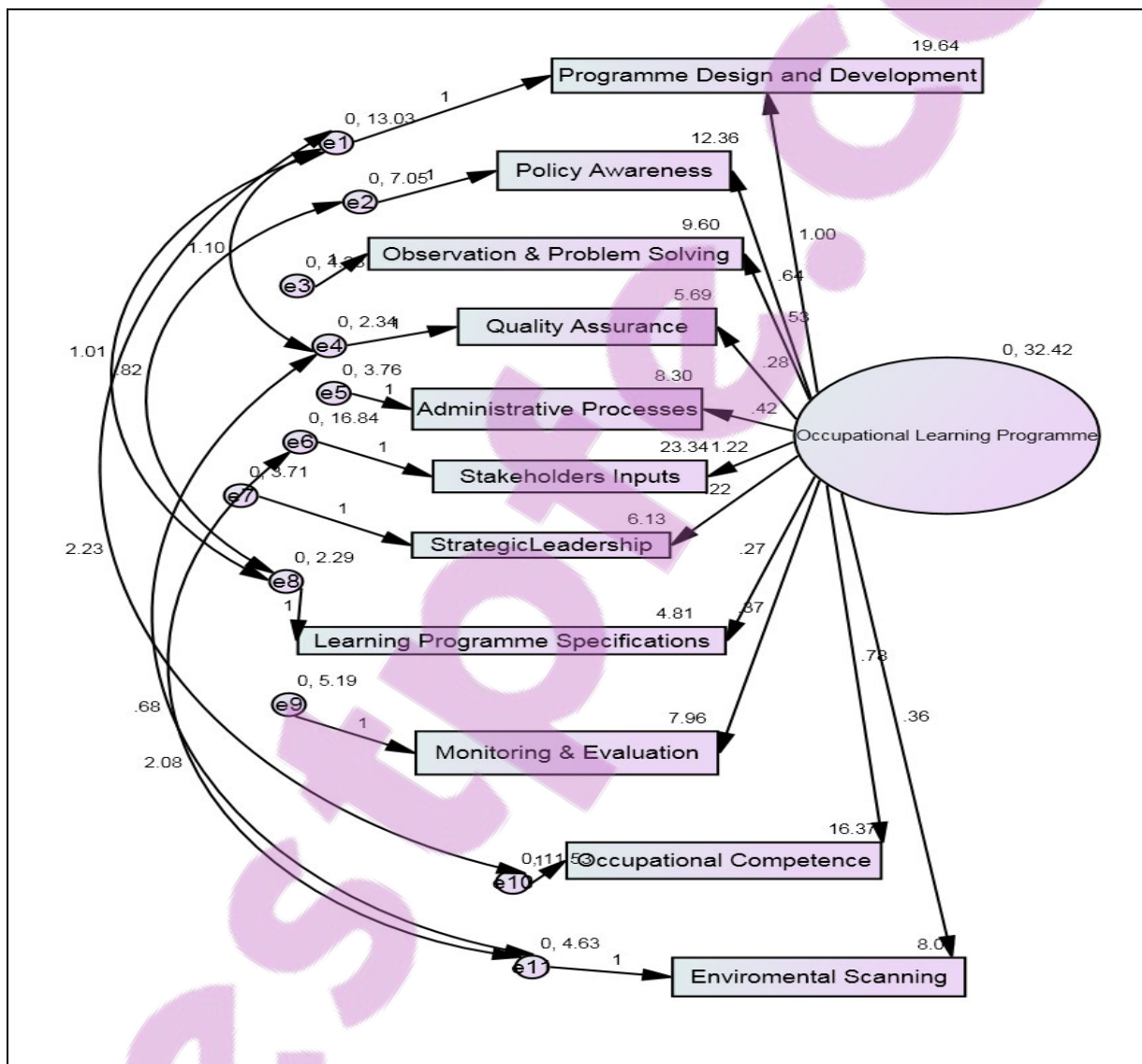


Figure 6.4. The final Structural Equation Model

The final structural equation model was re-specified and only residual measurement errors which showed statistical significance were correlated. Individual parameters were analysed and the results showed that all eleven dimensions were significant predictors of occupational learning programmes (unstandardised regression weights as shown in figure 6.3 range from .541 to .861; Critical ratios (CR) range from 13.790 to 25.528).

The results of the final model as depicted in Table 6.15 show that χ^2 is significant at 127.81 ($df = 38$; $\chi^2/df = 3.36$). However, all other fit indices show that the final model fits the data perfectly (NFI = .97; IFI = .97; TLI = .96; CFI = .97 and RMSEA = .06; PCLOSE \leq .03; SRMR = .02). The factorial structure of the final model was accepted and was used for subsequent multi-group structural equivalence in this research.

Table 6.18

Regression Weights for the Final Structural Equation Model

Observed variables	Latent variable	Estimate	S.E.	STD Regression weights	C.R.	P
Learning Programme_DD	<--- OLP.	1.000		.845		
Policy_Awareness	<--- OLP.	.645	.027	.810	23.773	***
Observation_PS	<--- OLP.	.526	.022	.825	24.456	***
Quality_Assurance	<--- OLP.	.279	.013	.720	22.100	***
Administrative_Processes	<--- OLP.	.419	.019	.776	22.262	***
Stakeholder_Inputs	<--- OLP.	1.221	.047	.861	26.257	***
Strategic_Leadership	<--- OLP.	.218	.016	.541	13.790	***
Learning_PS	<--- OLP.	.274	.013	.717	21.659	***
Monitoring_Evaluation	<--- OLP.	.373	.020	.681	18.492	***
Occupational_Com	<--- OLP.	.777	.030	.793	25.528	***
Enviromental_Scanning	<--- OLP.	.363	.019	.692	18.754	***

As depicted in Table 6.26, the standardised regression estimates for the final SEM ranged between .541 and .861, while the standard error coefficients ranged between .013 and .047. All dimensions are the significant predictors of the overall effective occupational learning programme construct ($p \leq .001$).

6.4 MULTI-GROUP STRUCTURAL EQUIVALENCE

Using the final structural equation model as a framework, a multi-group structural equation model (SEM) analysis was conducted to test the equivalence of the model among the target sample sub-groups (*i.e.*, gender and type of learning programme). Multi-group SEM analysis compares groups by measurement weights, measurement intercepts, and structural covariances. Examining differences in these additional parameters provides a clearer understanding of the nature of any potential moderating effects. Moderation is indicated by a significant change in model fit, when the structural coefficients were constrained to be equal between groups. In testing for structural equivalence, the models of interest are necessarily nested and thus can be compared in pairs by computing the difference in their overall Chi-Square values and the related degrees of freedom (*df*) ($p \geq .01$ for significance) (Cheung & Rensvold, 2002). In this research, all model parameters were systematically constrained to be equal between groups, with each constraint being applied in an additive manner as depicted in Table 6.19 and Table 6.21. More specifically, the first model constrained only measurement residuals; the second constrained measurement residuals and structural covariances; the third constrained measurement residuals, structural covariances and measurement intercepts (scalar equivalence); and the fourth and final iteration added measurement weights (metric equivalence) to the constrained parameters.

At each stage, any constraint that failed to result in a significant Chi-Square change was retained in subsequent comparisons, to improve parsimony, while narrowing the source of variability between groups and freeing degrees of freedom in the model (Cole & Maxwell, 2003; Kline, 2005). Moderation was evident when constraining the structural weights in the measurement residual model to be equal between the two moderator groups, which precipitated a significant increase in chi-square. Differences in structural covariances and intercepts are also presented in Table 6.19 and Table 6.21 respectively, as they may aid in interpretation of potential moderator effects. The baseline model fit was estimated as shown in Table 6.19 and Table 6.21, and it provided the values against which all subsequently specified invariance models were compared. The two categorical variables included in the multi-group analysis are gender and type of learning programme as discussed below.

6.4.1 Gender

Multiple-group SEM analysis was performed to determine whether respondents' perceptions that the LPME sub-scales describe an effective occupational learning programme were equivalent across the two groups (*i.e.*, male and female). To conduct multi-group SEM analysis, the final structural model had already been summarised by computing all the observed variables/indicators to their respective dimensions. The model was therefore, reduced from a second-order factor model to a first-order factor model. Both male and female respondents were tested separately to check for adequate model fit.

Table 6.19

Structural Equation Model Comparisons for Gender

NESTED MODEL COMPARISONS							
Assuming model Unconstrained to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	10	18.787	.043	.004	.004	-.004	-.004
Measurement intercepts	21	27.512	.155	.006	.006	-.011	-.011
Structural covariances	22	29.998	.119	.007	.007	-.011	-.011
Measurement residuals	39	138.193	.000	.031	.031	.005	.005
Assuming model Measurement weights to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement intercepts	11	8.724	.647	.002	.002	-.007	-.007
Structural covariances	12	11.211	.511	.002	.003	-.007	-.007
Measurement residuals	29	119.406	.000	.027	.027	.009	.009
Assuming model Measurement intercepts to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural covariances	1	2.487	.115	.001	.001	.000	.000
Measurement residuals	18	110.681	.000	.025	.025	.016	.016
Assuming model Structural covariances to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement residuals	17	108.195	.000	.024	.024	.016	.016

As depicted in Table 6.19, all model parameters were systematically constrained to be equal between male and female respondents for the measurement residual model, with the $\chi^2 =$

108.195; $df = 17$; ΔNFI and $\Delta IFI = .024$ respectively, and an ΔRFI and $\Delta TLI = .016$ respectively ($p \geq .01$ for significance) (Cheung & Rensvold, 2002). By adding one constraint (structural covariances) to obtain the measurement residual model, both ΔNFI and ΔIFI increased by .001 while the ΔRFI and ΔTLI did not increase. By adding two constraints to obtain the measurement residual model, ΔNFI and ΔIFI increased by .002 respectively, while the ΔRFI and ΔTLI respectively changed by -.007. Adding an additional three constraints to obtain this model resulted in an increase of .004 for ΔNFI and ΔIFI respectively, while the ΔRFI and ΔTLI respectively changed by a further -.004. As depicted in Table 6.20, a comparison of the constrained model (measurement weights) with the non-constrained model (unconstrained) yielded a χ^2 difference of 18.787 with a difference in degrees of freedom of 10 ($\chi^2/CMIN, = 1.87$) which is non-significant at $p \leq .01$ (Cheung & Rensvold, 2002). At this level of statistical significance, it can be said that the final structural model of the current research is equivalent for both male and female respondents. A further analysis of incremental fit indices shows that the model fits the data well for both groups ($TLI = .93$; $CFI = .96$; and $RMSEA = .06$, $PCLOSE = .029$).

Table 6.20

Multi-Group Analysis Results for Male and Female Respondents

Model	NPAR	CMIN	DF	P	CMIN/DF	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	RMSEA	PCLOSE
Unconstrained	78	233.171	76	.000	3.068	.949	.911	.965	.938	.964	.060	.029
Measurement weights	68	251.958	86	.000	2.930	.944	.915	.963	.942	.962	.058	.054
Measurement intercepts	57	260.682	97	.000	2.687	.943	.922	.963	.949	.963	.054	.181
Structural covariances	56	263.169	98	.000	2.685	.942	.922	.963	.949	.962	.054	.182
Measurement residuals	39	371.364	115	.000	3.229	.918	.906	.942	.933	.942	.062	.002
Saturated model	154	.000	0			1.000		1.000		1.000		
Independence model	22	4533.998	132	.000	34.348	.000	.000	.000	.000	.000	.241	.000

The CFI value of .96 and the RMSEA value of .06 indicate that the hypothesised eleven dimension model for the effective management and evaluation of occupational learning programmes fit the data well for the two groups of respondents (*i.e.*, male and female). However, the change in chi square ($\Delta\chi^2 = 18.787$), the change in degrees of freedom ($\Delta df = 10$), and the difference in ΔCFI values (.002) between the unconstrained and constrained models as depicted in Table 6.21 serves as a strong confirmation that the final structural model was invariant across the two groups. The ΔCFI difference was found to be less than the recommended cut-off criterion of $\geq .01$ for significance (Cheung & Rensvold, 2002).

6.4.2 Type of learning programme

A multi-group analysis was performed to examine whether the final structural model is equivalent between respondents who are/were involved in apprenticeships as compared to those who are/were involved in learnerships.

Table 6.21
Model Comparisons for the Type of Learning Programme

Nested Model Comparisons							
Assuming model Unconstrained to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	10	11.782	.300	.003	.003	-.005	-.005
Measurement intercepts	21	28.628	.123	.007	.007	-.008	-.008
Structural covariances	22	32.018	.077	.008	.008	-.008	-.008
Measurement residuals	39	97.211	.000	.024	.025	.000	.000
Assuming model Measurement weights to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement intercepts	11	16.846	.113	.004	.004	-.003	-.003
Structural covariances	12	20.236	.063	.005	.005	-.003	-.003
Measurement residuals	29	85.429	.000	.021	.022	.005	.005
Assuming model Measurement intercepts to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural covariances	1	3.390	.066	.001	.001	.000	.000
Measurement residuals	18	68.583	.000	.017	.018	.008	.008
Assuming model Structural covariances to be correct:							
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement residuals	17	65.193	.000	.016	.017	.008	.008

As depicted in Table 6.21, all model parameters were systematically constrained to be equal between the two groups of respondents for the measurement residual model, with $\chi^2 = 65.193$; $df = 17$; ΔNFI and $\Delta IFI = .016$ and $.017$ respectively, and ΔRFI and ΔTLI both = $.008$. By adding

one constraint (structural covariances) to obtain the measurement residual model, both Δ NFI and Δ IFI increased by .001 while the Δ RFI and Δ TLI did not increase. By adding two constraints to obtain the measurement residual model, Δ NFI and Δ IFI increased by .004 respectively, while the Δ RFI and Δ TLI respectively changed by -.003. Putting an additional three constraints to obtain this model resulted in an increase of .003 for Δ NFI and Δ IFI respectively, while the Δ RFI and Δ TLI respectively changed by a further -.005. A comparison of constrained model (measurement weights) with the non-constrained model (unconstrained) as depicted in Table 6.40 yielded a χ^2 difference of 11.782 with a difference in degrees of freedom of 10 ($\chi^2/\text{CMIN} = 1.17$) which is non-significant at $p \leq .01$. At this level of statistical significance, it can be said that the final structural model of this research is equivalent for both respondents involved in apprenticeships and those involved in learnerships. A further analysis of incremental fit indices shows that the model fits the data well for both groups as shown in Table 6.22.

Table 6.22

Multi-Group Analysis for Respondents Involved in Apprenticeships and Learnerships

Model	NPAR	CMIN	DF	P	CMIN/D F	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	RMSEA	PCLOSE
Unconstrained	78	188.209	76	.000	2.476	.953	.918	.971	.950	.971	.053	.297
Measurement weights	68	199.991	86	.000	2.325	.950	.923	.971	.955	.971	.050	.478
Measurement intercepts	57	216.837	97	.000	2.235	.946	.926	.969	.958	.969	.048	.609
Structural covariances	56	220.227	98	.000	2.247	.945	.926	.969	.958	.968	.049	.593
Measurement residuals	39	285.420	115	.000	2.482	.929	.918	.956	.950	.956	.053	.254
Saturated model	154	.000	0			1.000		1.000		1.000		
Independence model	22	4010.271	132	.000	30.381	.000	.000	.000	.000	.000	.236	.000

The CFI value of .97 and the RMSEA value of .05 indicate that the hypothesised eleven dimension model for the effective management and evaluation of occupational learning programmes fits the data well for the two groups of respondents (apprenticeship versus learnerships). However, the change in chi square ($\Delta\chi^2 = 11.782$), the change in degrees of freedom ($\Delta df = 10$), and the fact that there is no difference in Δ CFI values (Δ CFI = .000) between the unconstrained and constrained models as depicted in Table 6.22 serves as a strong confirmation that the final structural model is invariant across the two groups. The Δ CFI difference was found to be less than the recommended cut-off criterion of $p \geq .01$ for significance (Cheung & Rensvold, 2002).

6.5 MULTIPLE REGRESSION ANALYSIS

In order to investigate the relationship between the demographic variables and the sub-scales of the LPME scale, a multiple regression analysis was undertaken. Such an analysis however assumes variables to have been measured on interval, ratio or dichotomous scales (Tabachnick & Fidell, 2001).

6.5.1 Learning Programme Design and Development Sub-Scale

As depicted in Table 6.23, a multiple linear regression was conducted with the Learning Programme Design and Development (LPDD) sub-scale presented as a dependent variable and age, gender, education, type of learning programme and occupation presented as independent variables.

Table 6.23

Multiple Regression Analysis for Learning Programme Design and Development Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.340	.116	.083	.884	
Dependent Variable: Learning Programme Design and Development					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	56.025	17	3.296	3.588	.000
Residual	427.975	466	.918		
Total	484.000	483			
Dependent Variable: Learning Programme Design and Development					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients				
	B	Std. Error	df	F	Sig.
Age	.13	.047	4	8.176	.000
Gender	-.072	.046	1	2.474	.116
Education	.246	.060	6	17.019	.000
Type of learning programme	.133	.044	1	9.149	.003
Occupational position	.181	.063	5	8.188	.000
Dependent Variable: Learning Programme Design and Development					
$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)					

The regression model shown in Table 6.23 explained a small percentage of variance ($R^2 = .116$) in the dependent variable (LPDD). Thus, the regression coefficient was found to be significantly different from zero with 11.6% of the variance in the dependent variable explained by the set of independent variables ($R = .340$, adjusted $R^2 = .083$ (small practical effect size), $F(3.58) = 3.296$; $p \leq .001$). Furthermore, the results in Table 6.27 show that age ($\beta = .133$; $p \leq .001$), education ($\beta = .246$; $p \leq .001$), type of learning programme ($\beta = .133$; $p \leq .01$) and occupation ($\beta = .181$; $p \leq .001$) contribute positively and significantly to explaining the variance in the learning programme design and development variable.

6.5.2 Policy Awareness Sub-Scale

The results of a multiple linear regression analysis for Policy Awareness (PA) sub-scale are depicted in Table 6.24.

Table 6.24

Multiple Regression Analysis for Policy Awareness Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.325	.106	.073	.894	
Dependent Variable: Policy Awareness					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	51.168	17	3.010	3.241	.000
Residual	432.832	466	.929		
Total	484.000	483			
Dependent Variable: Policy Awareness					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients		Df	F	Sig.
	B	Bootstrap (1000) Estimate of Std. Error			
Age	.119	.045	4	6.880	.000
Gender	-.027	.046	1	.354	.552
Education	.285	.057	6	24.704	.000
Type of learning programme	.079	.043	1	3.398	.066
Occupational position	.121	.049	5	6.029	.000
Dependent Variable: Policy Awareness					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale PA was presented in Table 6.24 as a dependent variable with age, gender, education, type of learning programme and occupation presented as independent variables. The regression model explained a small percentage of variance ($R^2 = .106$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 10.6% of the variance in the dependent variable explained by the set of independent variables ($R = .325$, adjusted $R^2 = .073$ (small practical effect size), $F(3,24) = 3.010$; $p \leq .001$). Furthermore, the results show that age ($\beta = .119$; $p \leq .001$), education ($\beta = .285$; $p \leq .001$) and occupation ($\beta = .121$; $p \leq .001$) contribute positively and significantly to explaining the variance in the policy awareness variable.

6.5.3 Observation and Problem Solving Sub-Scale

The results of the multiple linear regression analysis for the Observation and Problem Solving (OPS) sub-scale are depicted in Table 6.25.

Table 6.25

Multiple Regression Analysis for Observation and Problem Solving Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.398	.158	.128	.842	
Dependent Variable: Observation and Problem Solving					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	76.356	17	4.492	5.138	.000
Residual	405.644	464	.874		
Total	482.000	481			
Dependent Variable: Observation and Problem Solving					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients		df	F	Sig.
	Beta	Bootstrap (1000) Estimate of Std. Error			
Age	.106	.049	4	4.743	.001
Gender	-.087	.045	1	3.650	.057
Education	.283	.060	6	22.594	.000
Type of learning programme	.082	.045	1	3.320	.069
Occupational position	.211	.058	5	13.070	.000
Dependent Variable: Observation and Problem Solving					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale OPS was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model explained a moderate percentage of variance ($R^2 = .158$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 15.8% of the variance in the dependent variable explained by the set of independent variables ($R = .398$, adjusted $R^2 = .128$ (small practical effect size), $F(5.13) = 4.492$; $p \leq .001$). Furthermore, the results show that age ($\beta = .106$; $p \leq .001$), education ($\beta = .283$; $p \leq .001$) and occupation ($\beta = .211$; $p \leq .001$) contribute positively and significantly to explaining variance in the observation and problem solving variable.

6.5.4 Quality Assurance Sub-Scale

The results of the multiple linear regression analysis for the Quality Assurance (QA) sub-scale are shown in Table 6.26.

Table 6.26

Multiple Regression Analysis for Quality Assurance Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.329	.108	.075	.892	
Dependent Variable: Quality Assurance					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	52.145	17	3.067	3.310	.000
Residual	430.855	465	.927		
Total	483.000	482			
Dependent Variable: Quality Assurance					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients		Bootstrap (1000) Estimate of Std.		
	β	Error	Df	F	Sig.
Age	.145	.050	4	8.443	.000
Gender	-.049	.047	1	1.087	.298
Education	.240	.061	6	15.447	.000
Type of learning programme	.115	.042	1	7.547	.006
Occupational position	.167	.073	5	5.280	.000
Dependent Variable: Quality Assurance					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale QA was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model explained a small percentage of variance ($R^2 = .108$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 10.8% of the variance in the dependent variable explained by the set of independent variables ($R = .329$, adjusted $R^2 = .075$ (small practical effect size), $F(3,31) = 3.067$; $p \leq .001$). Furthermore, the results show that age ($\beta = .145$; $p \leq .001$), education ($\beta = .240$; $p \leq .001$), type of learning programme ($\beta = .115$; $p \leq .01$) and occupation ($\beta = .167$; $p \leq .001$) contribute positively and significantly to explaining the variance in the quality assurance variable.

6.5.5 Administrative Processes Sub-Scale

The results of the multiple linear regression analysis for the Administrative Processes (AP) sub-scale are depicted in Table 6.27.

Table 6.27

Multiple Regression Analysis for Administrative Processes Sub-Scale

Model summary				
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
Standardised Data	.292	.085	.052	.915

Dependent Variable: Administrative Processes
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.

ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	41.072	17	2.416	2.542	.001
Residual	441.928	465	.950		
Total	483.000	482			

Dependent Variable: Administrative Processes
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.

Coefficients					
	Standardised Coefficients		<i>d</i>	<i>F</i>	Sig.
	<i>B</i>	Bootstrap (1000) Estimate of Std. Error			
Age	.124	.046	4	7.334	.000
Gender	-.028	.046	1	.364	.547
Education	.026	.065	6	12.098	.000
Type of learning programme	.026	.034	1	.602	.438
Occupational position	.136	.053	5	6.693	.000

Dependent Variable: Administrative Processes

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The AP sub-scale was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model explained a small percentage of variance ($R^2 = .085$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 8.5% of the variance in the dependent variable explained by the set of independent variables ($R = .292$, adjusted $R^2 = .052$ (small practical effect size), $F(2,54) = 2.416$; $p \leq .001$). Furthermore, the results show that age ($\beta = .124$; $p \leq .001$), education ($\beta = .226$; $p \leq .001$) and occupation ($\beta = .136$; $p \leq .001$) contribute positively and significantly to explaining the variance in the administrative processes variable.

6.5.6 Stakeholder Inputs Sub-Scale

The results of the multiple linear regression analysis for the Stakeholder Inputs (SI) sub-scale are depicted in Table 6.28.

Table 6.28

Multiple Regression Analysis for Stakeholder Inputs Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.353	.125	.093	.875	
Dependent Variable: Stakeholder Inputs Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	60.431	17	3.555	3.911	.000
Residual	423.569	466	.909		
Total	484.000	483			
Dependent Variable: Stakeholder Inputs Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients Bootstrap (1000) Estimate of Std.				
	B	Error	df	F	Sig.
Age	.110	.046	4	5.787	.000
Gender	-.056	.044	1	1.633	.202
Education	.286	.074	6	15.122	.000
Type of learning programme	.121	.040	1	9.191	.003
Occupational position	.169	.057	5	8.740	.000
Dependent Variable: Stakeholder Inputs					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale SI was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model in Table 6.28 explained a small percentage of variance ($R^2 = .125$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 12.5% of the variance in the dependent variable explained by the set of independent variables ($R = .353$, adjusted $R^2 = .093$ (small practical effect size), $F(3.91) = 3.555$; $p \leq .001$). Furthermore, the results show that age ($\beta = .110$; $p \leq .001$), education ($\beta = .286$; $p \leq .001$), type of learning programme ($\beta = .121$; $p \leq .01$) and occupation ($\beta = .169$; $p \leq .001$) contribute positively and significantly to explaining the variance in the stakeholder inputs variable.

6.5.7 Strategic Leadership Sub-Scale

The results of the multiple linear regression analysis for the Strategic Leadership (SL) sub-scale are depicted in Table 6.29.

Table 6.29

Multiple Regression Analysis for Strategic Leadership Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.375	.141	.109	.859	
Dependent Variable: Strategic Leadership					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	67.934	17	3.996	4.477	.000
Residual	415.066	465	.893		
Total	483.000	482			
Dependent Variable: Strategic Leadership					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients		df	F	Sig.
	β	Bootstrap (1000) Estimate of Std. Error			
Age	.122	.045	4	7.422	.000
Gender	-.080	.043	1	3.508	.062
Education	.245	.053	6	21.257	.000
Type of learning programme	.051	.035	1	2.070	.151
Occupational position	.212	.080	5	7.009	.000
Dependent Variable: Strategic Leadership					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The regression model explained a moderate percentage of variance ($R^2 = .141$) in the dependent variable (SL). The multiple regression coefficient was found to be significantly different from zero with 14.1% of the variance in the dependent variable explained by the set of independent variables ($R = .375$, adjusted $R^2 = .109$ (small practical effect size), $F(4,47) = 3.996$; $p \leq .001$). Furthermore, the results show that age ($\beta = .122$; $p \leq .001$), education ($\beta = .245$; $p \leq .001$) and occupation ($\beta = .212$; $p \leq .001$) contribute positively and significantly to explaining the variance in the strategic leadership variable.

6.5.8 Learning Programme Specifications Sub-Scale

The results of the multiple linear regression analysis for the Learning Programme Specifications (LPS) sub-scale are depicted in Table 6.30.

Table 6.30

Multiple Regression Analysis for Learning Programme Specification Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.336	.113	.080	.887	

Dependent Variable: Learning Programme Specifications
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.

ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	54.606	17	3.212	3.486	.000
Residual	429.394	466	.921		
Total	484.000	483			

Dependent Variable: Learning Programme Specifications
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.

Coefficients					
	Standardised Coefficients		df	F	Sig.
	β	Bootstrap (1000) Estimate of Std. Error			
Age	.059	.049	4	1.439	.220
Gender	-.028	.050	1	.311	.578
Education	.290	.072	6	16.225	.000
Type of learning programme	.052	.042	1	1.547	.214
Occupational position	.099	.049	5	3.990	.001

Dependent Variable: Learning Programme Specifications

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale LPS was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model in Table 6.30 explained a small percentage of variance ($R^2 = .113$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 11.3% of the variance in the dependent variable explained by the set of independent variables ($R = .336$, adjusted $R^2 = .080$ (small practical effect size), $F(3.48) = 3.212$; $p \leq .001$). Furthermore, the results show that education ($\beta = .290$; $p \leq .001$) and occupation ($\beta = .099$; $p \leq .001$) contribute positively and significantly to explaining the variance in the learning programme specifications variable.

6.5.9 Monitoring and Evaluation Sub-Scale

The results of the multiple linear regression analysis for the Monitoring and Evaluation (ME) sub-scale are depicted in Table 6.31.

Table 6.31

Multiple Regression Analysis for Monitoring and Evaluation Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.359	.129	.097	.871	
Dependent Variable: Monitoring and Evaluation Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	62.123	17	3.654	4.037	.000
Residual	420.877	465	.905		
Total	483.000	482			
Dependent Variable: Monitoring and Evaluation Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients		Bootstrap (1000) Estimate of Std.		
	β	Error	df	F	Sig.
Age	.108	.046	4	5.559	.000
Gender	-.085	.047	1	3.288	.070
Education	.291	.066	6	19.558	.000
Type of learning programme	.078	.041	1	3.629	.057
Occupation	.120	.049	5	6.067	.000
Dependent Variable: Monitoring and Evaluation					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale ME was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model explained a small percentage of variance ($R^2 = .129$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 12.9% of the variance in the dependent variable explained by the set of independent variables ($R = .359$, adjusted $R^2 = .097$ (small practical effect size), $F(4,03) = 3.654$; $p \leq .001$). Furthermore, the results show that age ($\beta = .108$; $p \leq .001$), education ($\beta = .291$; $p \leq .001$) and occupation ($\beta = .120$; $p \leq .001$) contribute positively and significantly to explaining the variance in the monitoring and evaluation variable.

6.5.10 Occupational Competence Sub-Scale

The results of the multiple linear regression analysis for the Occupational Competence (OC) sub-scale are depicted in Table 6.32.

Table 6.32

Multiple Regression Analysis for Occupational Competence Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent Prediction Error	
Standardised Data	.394	.155	.125	.845	
Dependent Variable: Occupational Competence Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	75.188	17	4.423	5.041	.000
Residual	408.812	466	.877		
Total	484.000	483			
Dependent Variable: Occupational Competence Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients		df	F	Sig.
	Beta	Bootstrap (1000) Estimate of Std. Error			
Age	.130	.046	4	7.863	.000
Gender	-.005	.041	1	.016	.900
Education	.309	.067	6	21.592	.000
Type of learning programme	.111	.040	1	7.609	.006
Occupation	.200	.060	5	11.019	.000
Dependent Variable: Occupational Competence					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale OC was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model depicted in Table 6.32 explained a moderate percentage of variance ($R^2 = .155$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 15.5% of the variance in the dependent variable explained by the set of independent variables ($R = .394$, adjusted $R^2 = .125$ (small practical effect size), $F(5.04) = 4.423$; $p \leq .001$). Furthermore, the results show that age ($\beta = .130$; $p \leq .001$), education ($\beta = .309$; $p \leq .001$), type of learning programme ($\beta = .111$; $p \leq .01$) and occupation ($\beta = .200$; $p \leq .001$) contribute positively and significantly to explaining the variance in the occupational competence variable.

6.6.11 Environmental Scanning Sub-Scale

The results of the multiple linear regression analysis for the Environmental Scanning (ES) sub-scale are depicted in Table 6.33.

Table 6.33

Multiple Regression Analysis for Environmental Scanning Sub-Scale

Model summary					
	Multiple R	R Square	Adjusted R Square	Apparent	Prediction
Standardised Data	.344	.118	.086	Error	.882
Dependent Variable: Environmental Scanning β					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	57.27	17	3.369	3.680	.000
Residual	426.721	466	.916		
Total	484.000	483			
Dependent Variable: Environmental Scanning					
Predictors: Age, Gender, Education, Type of learning programme and Occupational position.					
Coefficients					
	Standardised Coefficients				
	β	Bootstrap (1000) Estimate of Std. Error	df	F	Sig.
Age	.131	.052	4	6.454	.000
Gender	-.039	.045	1	.733	.392
Education	.217	.073	6	8.769	.000
Type of learning programme	.139	.035	1	15.575	.000
Occupational position	.143	.072	5	3.934	.002
Dependent Variable: Environmental Scanning					

$R^2 \geq .26$ (large practical effect size); $R^2 \geq .13 \leq .26$ (moderate practical effect size); $R^2 \geq .02 \leq .13$ (small practical effect size)

The sub-scale ES was presented as a dependent variable with age, gender, education, type of learning programme and occupation as independent variables. The regression model in Table 6.33 explained a small percentage of variance ($R^2 = .118$) in the dependent variable. The multiple regression coefficient was found to be significantly different from zero with 11.8% of the variance in the dependent variable explained by the set of independent variables ($R = .344$, adjusted $R^2 = .086$ (small practical effect size), $F(3.68) = 3.369$; $p \leq .001$). Furthermore, the results show that age ($\beta = .131$; $p \leq .001$), education ($\beta = .217$; $p \leq .001$), type of learning programme ($\beta = .139$; $p \leq .001$) and occupation ($\beta = .143$; $p \leq .01$) contribute positively and significantly to explaining the variance in the environmental scanning variable.

A summary of the results of multiple regression analysis is presented in Table 6.34. As shown in this table, age (except for the Learning Programme Specification Sub-Scale), education and occupations were found to be significant predictors of all the sub-scales of the LPME scale. The next section presents the results of the distribution normality test.

Table 6.34

Summary of the Multiple Regression Results

INDEPENDENT VARIABLES						
Evidence of prediction (YES/NO)						
	Age	Gender	Education	Learning programme type	Occupation	
DEPENDENT VARIABLES						
1. Learning Programme Design and Development (LPDD)	Yes	No	Yes	Yes	Yes	Yes
2. Policy Awareness (PA)	Yes	No	Yes	No	Yes	Yes
3. Observation and Problem Solving (OPS)	Yes	No	Yes	No	Yes	Yes
4. Quality Assurance (QA)	Yes	No	Yes	Yes	Yes	Yes
5. Administrative Processes (AP)	Yes	No	Yes	No	Yes	Yes
6. Stakeholder Inputs (SI)	Yes	No	Yes	Yes	Yes	Yes
7. Strategic Leadership (SL)	Yes	No	Yes	No	Yes	Yes
8. Learning Programme Specifications (LPS)	No	No	Yes	No	Yes	Yes
9. Monitoring and Evaluation (ME)	Yes	No	Yes	No	Yes	Yes
10. Occupational Competence (OC)	Yes	No	Yes	Yes	Yes	Yes
11. Environmental Scanning (ES)	Yes	No	Yes	Yes	Yes	Yes

6.7 DISTRIBUTION OF NORMALITY

The sub-scales of the Learning Programme Management and Evaluation (LPME) scale were examined for their normality distribution. The Kolmogorov-Sminov Z test was applied and the results are presented in Table 6.35. Prior to normality distribution testing, the assumption is that data were sampled from a normal distribution or at least from a distribution which is sufficiently close to a normal distribution (Zvi, Turel & Zerom, 2008). The Kolmogorov-Smirnov test compares the cumulative distribution of the data with the expected cumulative normal distribution, and bases its p value ($p \leq .05$) on the largest discrepancy (Öztuna, Elhan & Tüccar, 2006). When normality and homogeneity of variance assumptions are not satisfied, the equivalent non-parametric test must be applied to test mean differences. The results in Table 6.35 were significant ($p \leq .001$) for all the sub-scales of the LPME measure.

Table 6.35

Test for Data Distribution Normality on the Sub-Scales of a LPME Scale

Sub-scales	n	Normal Parameters ^{a,b}		Most Extreme Differences			Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)
		Mean	Std. Deviation	Absolute	Positive	Negative		
LPDD	582	19.636	6.7532	.161	.127	-.161	3.888	.000
Policy Awareness	581	12.355	4.5366	.165	.137	-.165	3.980	.000
Observation & Problem Solving	580	9.603	3.6379	.159	.151	-.159	3.835	.000
Quality Assurance	581	5.699	2.2004	.215	.215	-.215	5.192	.000
Administrative Processes	581	8.299	3.0771	.140	.122	-.140	3.377	.000
Stakeholder Inputs	582	23.338	8.0816	.178	.112	-.178	4.306	.000
Strategic Leadership	580	6.134	2.2927	.166	.152	-.166	3.988	.000
Learning Programme Specifications	581	4.806	2.1818	.214	.214	-.201	5.165	.000
Monitoring & Evaluation	581	7.952	3.1158	.158	.148	-.158	3.807	.000
Occupational Competence	582	16.368	5.5826	.165	.137	-.165	3.974	.000
Environmental Scanning	581	8.091	2.9891	.227	.204	-.227	5.462	.000

LPDD = Learning programme design and development

a. Test distribution is Normal.

b. Calculated from data

At the level of significance depicted in Table 6.35 for all the sub-scales of the LPME scale, the normality assumption was not held. The null hypotheses that 'the distribution of the sub-scales of the LPME scale is normal' were rejected. Based on these results, it can be concluded that normality assumptions were untenable and the non-parametric data analyses were justifiable.

The next section presents the results of the non-parametric tests for significant mean differences.

6.8 TESTS FOR SIGNIFICANT MEAN DIFFERENCES

The results of the inferential tests for significant mean differences are presented in this section. The non-parametric tests conducted were the Kruskal-Wallis and Mann-Whitney tests. These tests were conducted in order to examine the significant mean differences across the sample based on biographical characteristics, that is, age, gender, education, type of learning programme and occupation. The results of these tests are presented in the next sub-sections.

6.8.1 Age

Age was initially categorised into five age groups (that is, those younger than 25 years; 25 to 35 years; 36 to 45 years, 46 to 55 years; and 56 years and older). The Kruskal-Wallis test results depicted in Table 6.36 show that age groups differ significantly in terms of four sub-scales of the LPME scale. These sub-scales are Observation and Problem Solving, Strategic Leadership, Monitoring and Evaluation, and Environmental Scanning. Respondents in the age group of 56 years and older scored significantly higher ($M = 11.47$; $p \leq .05$) on the sub-scale Observation and Problem Solving when compared to those in other age groups (younger than 25 years, $M = 9.67$; 25 to 35 years, $M = 9.09$; 36 to 45 years, $M = 10.35$; 46 to 55 years, $M = 11.02$).

On the Strategic Leadership sub-scale, respondents aged younger than 25 scored significantly higher ($M = 6.60$; $p \leq .001$) than the other age groups (25 to 35 years, $M = 5.99$; 36 to 45 years, $M = 6.24$; 46 to 55 years, $M = 5.27$; and 55 years and older, $M = 6.05$). Regarding the sub-scale Monitoring and Evaluation, respondents aged 56 years and older scored significantly higher ($M = 9.10$, $p \leq .05$) when compared to the other age groups (younger than 25 years, $M = 7.97$; 25 to 35 years, $M = 7.59$; 36 to 45 years, $M = 8.59$; 46 to 55 years, $M = 9.02$).

The final sub-scale which showed significant mean difference in terms of age is Environmental Scanning. Respondents in the age group 36 to 45 years scored significantly higher ($M = 9.26$; $p \leq .05$) on the Environmental Scanning sub-scale when compared to the other age groups (younger than 25 years, $M = 7.81$; 25 to 35 years, $M = 7.84$; 46 to 55 years, $M = 8.37$; and 55 years and older, $M = 8.78$).

Table 6.36

Kruskal-Wallis Test and Mean and Standard Deviation: Age on LPME Sub-Scales (n =571)

Sub-scale	Kruskal-Wallis Test ^a																				
	Below 25 Years			25 to 35 Years			36 to 45 Years			46 to 55 Years			56 Years and older			Total					
	Mean	n	Std. Deviation	Mean	n	Std. Deviation	Mean	n	Std. Deviation	Mean	n	Std. Deviation	Mean	n	Std. Deviation	Mean	n	Std. Deviation	Chi-Square	df	Asymp. Sig.
LPDD	19.881	143	6.4780	18.955	308	6.1790	21.226	62	9.3728	20.475	40	6.9724	20.053	19	5.6909	19.575	572	6.7292	4.249	4	.373
Policy Awareness	12.720	143	4.2533	11.961	308	4.2608	12.968	62	5.6335	12.051	39	5.0729	14.316	19	5.2181	12.345	571	4.5331	8.638	4	.071
Observation & Problem Solving	9.671	143	3.2301	9.098	307	3.2323	10.355	62	4.7325	11.026	39	4.0942	11.474	19	5.9289	9.589	570	3.6484	11.658	4	.020
Quality Assurance	5.636	143	2.0124	5.554	307	2.0626	6.290	62	2.9609	5.875	40	2.0654	5.632	19	2.0605	5.680	571	2.1701	3.411	4	.492
Administrative Processes	8.490	143	3.1081	7.977	307	2.7433	9.065	62	4.1325	8.600	40	3.6781	8.632	19	2.8326	8.289	571	3.0971	4.829	4	.305
Stakeholder Inputs	23.441	143	6.7913	22.578	308	7.7374	25.032	62	11.2803	23.925	40	7.1876	26.316	19	9.5688	23.278	572	8.0379	8.613	4	.072
Strategic Leadership	6.601	143	2.1135	5.997	307	2.0965	6.246	61	3.0202	5.275	40	1.7095	6.053	19	3.9787	6.126	570	2.2935	19.795	4	.001
Learning Programme Specifications	4.734	143	1.8650	4.597	308	1.9656	5.000	62	2.3747	5.744	39	3.4998	6.000	19	2.8087	4.800	571	2.1801	6.613	4	.158
Monitoring & Evaluation	7.979	143	2.5356	7.599	307	2.8764	8.597	62	3.9483	9.025	40	4.1540	9.105	19	4.3448	7.953	571	3.1186	10.504	4	.033
Occupational Competence	16.462	143	4.7660	15.756	308	4.8719	17.290	62	7.5452	18.150	40	7.6913	17.684	19	6.4983	16.330	572	5.5171	5.623	4	.229
Environmental Scanning	7.818	143	2.3873	7.841	308	2.7615	9.262	61	4.5310	8.375	40	2.9672	8.789	19	2.7805	8.056	571	2.9688	10.503	4	.033

LPDD = Learning programme design and development
a. Kruskal-Wallis Test
b. Grouping Variable: Please provide your age range



6.8.2 Gender

Table 6.37 presents the results of the Mann-Whitney test for respondents' gender differences in relation to the sub-scales of the LPME scale. The results in Table 3.37 show no significant differences between male and female respondents with regard to all the sub-scales of the LPME scale.

Table 6.37

Mann-Whitney Test and Mean and Standard Deviation: Gender on LPME Sub-Scales (N = 574)

Sub-scale	Mann-Whitney Test ^a									Mann-Whitney Test ^a			
	Male			Female			Total			U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
	Mean	n	Std. Deviation	Mean	n	Std. Deviation	Mean	n	Std. Deviation				
LPDD	19.978	271	7.4520	19.227	304	6.0725	19.581	575	6.7623	39824.000	86184.000	-.695	.487
Policy Awareness	12.381	270	4.6200	12.313	304	4.4998	12.345	574	4.5529	40984.500	87344.500	-.028	.977
Observation & Problem Solving	9.859	269	3.9807	9.345	304	3.3205	9.586	573	3.6511	38400.000	84760.000	-1.282	.200
Quality Assurance	5.730	270	2.4076	5.641	304	1.9667	5.683	574	2.1837	40668.000	77253.000	-.197	.844
Administrative Processes	8.358	271	3.2228	8.238	303	2.9750	8.294	574	3.0923	40529.500	86585.500	-.269	.788
Stakeholder Inputs	23.483	271	7.9614	23.112	304	8.2290	23.287	575	8.0991	39658.000	86018.000	-.778	.437
Strategic Leadership	6.214	271	2.3251	6.033	302	2.2675	6.119	573	2.2947	39605.500	85358.500	-.680	.497
Learning Programme Specifications	4.848	270	2.3839	4.753	304	1.9955	4.798	574	2.1854	40608.000	77193.000	-.228	.819
Monitoring & Evaluation	8.066	271	3.3987	7.848	303	2.8593	7.951	574	3.1247	40830.000	86886.000	-.116	.908
Occupational Competence	16.321	271	5.6950	16.342	304	5.4155	16.332	575	5.5442	40777.000	77633.000	-.211	.833
Environmental Scanning	8.162	271	3.1463	7.983	303	2.8325	8.068	574	2.9835	40842.500	86898.500	-.112	.911

LPDD = Learning programme design and development

a. Grouping Variable: Provide your gender

6.8.3 Education

In order to establish the mean score differences of respondents relative to the sub-scales of the LPME scale, a Kruskal-Wallis test was performed and the results are presented in Table 6.38. It is evident in Table 6.38 that there are significant differences across all the sub-scales of the LPME scale in relation to the different levels of educational achievement of respondents. Respondents who have a Doctorate degree scored significantly higher ($M = 30.00$; $p \leq 0.01$) on the Learning Programme Design and Development sub-scale compared to the other groups (Below Matric/N1/N2, $M = 20.92$; Matric/N3, $M = 19.18$; Occupational Certificate/NHC, $M = 17.45$; First Degree/N Diploma, $M = 19.83$; Professional/Honours Degree, $M = 20.15$; Master's Degree, $M = 23.58$).

On the sub-scale Policy Awareness, respondents with a Doctorate degree scored significantly higher ($M = 22.33$, $p \leq .001$) compared to the other groups (Below Matric/N1/N2, $M = 13.80$; Matric/N3, $M = 12.12$; Occupational Certificate/NHC, $M = 10.72$; First Degree/N Diploma, $M = 12.34$; Professional/Honours Degree, $M = 12.09$; Master's Degree, $M = 15.12$).

On the sub-scale Observation and Problem Solving, respondents with a Master's Degree scored significantly higher ($M = 13.33$; $p \leq .01$) when compared to the other groups (Below Matric/N1/N2, $M = 10.04$; Matric/N3, $M = 9.20$; Occupational Certificate/NHC, $M = 8.44$; First Degree/N Diploma, $M = 9.87$; Professional/Honours Degree, $M = 10.59$; Doctorate Degree, $M = 10.66$).

On the sub-scale Quality Assurance, respondents with a Doctorate Degree scored significantly higher ($M = 8.33$; $p \leq .01$) when compared to the other groups (Below Matric/N1/N2, $M = 6.28$; Matric/N3, $M = 5.54$; Occupational Certificate/NHC, $M = 5.29$; First Degree/N Diploma, $M = 5.62$; Professional/Honours Degree, $M = 5.60$; Master's Degree, $M = 7.50$).

On the Administrative Processes sub-scale, respondents with a Doctorate Degree scored significantly higher ($M = 11.66$; $p \leq .05$) when compared to the other groups (Below Matric/N1/N2, $M = 8.60$; Matric/N3, $M = 8.16$; Occupational Certificate/NHC, $M = 7.65$; First Degree/N Diploma, $M = 8.10$; Professional/Honours Degree, $M = 8.60$; Master's Degree, $M = 10.62$).

Regarding the sub-scale Stakeholder Inputs, respondents with a Master's Degree scored significantly higher ($M = 30.91$; $p \leq .05$) when compared to the other groups (Below Matric/N1/N2, $M = 23.48$; Matric/N3, $M = 22.52$; Occupational Certificate/NHC, $M = 21.40$; First Degree/N Diploma, $M = 24.30$; Professional/Honours Degree, $M = 23.54$; Doctorate Degree, $M = 26.33$).

On the Strategic Leadership sub-scale, respondents with a Master's Degree scored significantly higher ($M = 7.54$; $p \leq .001$) when compared to the other groups (Below Matric/N1/N2, $M = 6.32$; Matric/N3, $M = 6.33$; Occupational Certificate/NHC, $M = 5.34$; First Degree/N Diploma, $M = 5.75$; Professional/Honours Degree, $M = 5.35$; Doctorate Degree, $M = 4.66$).

Regarding the Learning Programme Specifications sub-scale, respondents with a Doctorate Degree scored significantly higher ($M = 11.00$; $p \leq .01$) when compared to the other groups (Below Matric/N1/N2, $M = 4.96$; Matric/N3, $M = 4.62$; Occupational Certificate/NHC, $M = 4.22$; First Degree/N Diploma, $M = 4.90$; Professional/Honours Degree, $M = 5.03$; Master's Degree, $M = 6.37$).

As shown in Table 6.38, with regard to the Monitoring and Evaluation sub-scale, respondents with a Master's Degree scored significantly higher ($M = 11.41$; $p \leq .01$) when compared to the other groups (Below Matric/N1/N2, $M = 7.96$; Matric/N3, $M = 7.72$; Occupational Certificate/NHC, $M = 7.18$; First Degree/N Diploma, $M = 8.00$; Professional/Honours Degree, $M = 8.29$; Doctorate Degree, $M = 9.00$).

On the Occupational Competence sub-scale, respondents with a Doctorate Degree scored significantly higher ($M = 28.66$; $p \leq .01$) when compared to the other groups (Below Matric/N1/N2, $M = 17.68$; Matric/N3, $M = 15.90$; Occupational Certificate/NHC, $M = 14.29$; First Degree/N Diploma, $M = 16.38$; Professional/Honours Degree, $M = 17.21$; Master's Degree, $M = 20.83$). Regarding the Environmental Scanning sub-scale, respondents with a Master's Degree scored significantly higher ($M = 11.33$; $p \leq .01$) when compared to the other groups (Below Matric/N1/N2, $M = 7.96$; Matric/N3, $M = 7.80$; Occupational Certificate/NHC, $M = 7.63$; First Degree/N Diploma, $M = 8.13$; Professional/Honours Degree, $M = 8.31$; Doctorate Degree, $M = 8.66$).

Table 6.38

Kruskal-Wallis Test and Mean and Standard Deviation: Education on LPME Sub-Scales (n =558)

	Below Matric/N1/N2			Matric/N3			Occupational Certificate/NHC			First Degree/N Diploma			Professional/Honours Degree			Master's Degree			Doctorate Degree			Total			Kruskal-Wallis Test ^{a,b}		
	Mean	n	Std.Dev	Mean	N	Std.Dev	Mean	n	Std.Dev	Mean	n	Std.Dev	Mean	n	Std.Dev	Mean	n	Std.Dev	Mean	n	Std.Dev	Mean	n	Std.Dev	Chi-Square	df	Asymp. Sig.
LPDD	20.920	25	5.2115	19.188	329	6.2893	17.455	44	4.5874	19.831	83	6.8979	20.157	51	6.7628	23.583	24	11.9743	30.000	3	4.5826	19.560	559	6.7050	16.139	6	.013
PA	13.800	25	3.8188	12.122	328	4.0693	10.727	44	3.6639	12.434	83	5.2013	12.068	51	4.4374	15.125	24	7.0174	22.333	3	1.5275	12.315	558	4.5328	22.551	6	.001
OPS	10.040	25	2.4235	9.207	329	3.1312	8.442	43	2.7107	9.878	82	4.2612	10.529	51	4.2865	13.333	24	6.0563	10.667	3	5.6862	9.591	557	3.6641	19.046	6	.004
QA	6.280	25	2.0720	5.543	328	2.0239	5.285	44	1.5833	5.627	83	2.2454	5.608	51	2.0306	7.500	24	3.8786	8.333	3	2.5166	5.674	558	2.1823	15.938	6	.014
AP	8.600	25	2.3979	8.162	328	2.8673	7.659	44	2.5604	8.108	83	3.2045	8.608	51	3.1501	10.625	24	5.1314	11.667	3	4.1633	8.299	558	3.0803	12.366	6	.054
SI	23.480	25	5.8674	22.532	329	7.1925	21.409	44	5.7154	24.301	83	8.8645	23.549	51	7.1311	30.917	24	15.9262	26.333	3	7.0238	23.222	559	8.0291	12.685	6	.048
SL	6.320	25	2.4104	6.330	327	2.1496	5.341	44	1.3867	5.759	83	2.1447	5.363	51	1.7067	7.542	24	4.9077	4.867	3	1.1547	6.120	557	2.3022	22.755	6	.001
LPS	4.960	25	2.4745	4.625	328	1.8164	4.227	44	1.6863	4.904	83	2.6942	5.039	51	2.4245	6.375	24	3.1042	11.000	3	2.6458	4.797	558	2.1927	17.965	6	.006
ME	7.960	25	2.5245	7.729	328	2.6767	7.182	44	2.4235	8.000	83	3.7023	8.294	51	3.2759	11.417	24	5.2990	9.000	3	4.0000	7.953	558	3.1214	16.672	6	.011
OC	17.680	25	5.4522	15.906	329	4.7914	14.295	44	3.6254	16.386	83	5.8806	17.216	51	6.2811	20.833	24	9.3700	28.667	3	11.3725	16.329	559	5.5464	18.347	6	.005
ES	7.960	25	1.7195	7.805	328	2.6942	7.636	44	2.4680	8.133	83	2.8745	8.314	51	2.9765	11.333	24	5.7307	8.667	3	2.0817	8.050	558	2.9619	16.924	6	.010

LPDD = Learning programme design and development; PA = Policy awareness; OPS = Observation and problem solving; QA = Quality Assurance; AP = Administrative processes; SI = Stakeholder inputs; SL = Strategic leadership; LPS = Learning programme specifications; ME = Monitoring and evaluation; OC = Occupational competence; ES = Environmental scanning

- a. Kruskal-Wallis Test
- b. Grouping Variable: Your highest educational qualification

6.8.4 Type of learning programme

The Mann-Whitney test results for the type of learning programme in which respondents are/were involved in relation to the sub-scales of the LPME scale are presented in Table 6.39. Only two of the eleven sub-scales of the LPME scale show significant differences among respondents relative to the type of learning programme. These two sub-scales are Learning Programme Design and Development and Environmental Scanning.

Regarding the Learning Programme Design and Development sub-scale, respondents who are/were involved in apprenticeships scored significantly higher ($M = 19.81$; $p \leq .01$) when compared to those who are/were involved in learnerships ($M = 18.05$). On the Environmental Scanning sub-scale, once again it is those respondents who are/were involved in apprenticeships who scored significantly higher ($M = 8.16$; $p \leq .01$) when compared to those who are/were involved in learnerships ($M = 7.22$).

Table 6.39

Mann-Whitney Test and Mean and Standard Deviation: Type of Learning Programme on LPME Sub-Scales (N = 529)

Sub-scale										Mann-Whitney Test ^a			
	Learnership			Apprenticeship			Total			Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation				
Learning Programme Design and Development	18.056	71	5.9519	19.815	459	6.8562	19.579	530	6.7635	13620.000	16176.000	-2.249	.024
Policy Awareness	11.535	71	4.0632	12.499	459	4.6433	12.370	530	4.5781	14281.500	16837.500	-1.699	.089
Observation & Problem Solving	9.257	70	3.2823	9.640	458	3.6832	9.589	528	3.6320	15368.000	17853.000	-.567	.571
Quality Assurance	5.268	71	1.7481	5.758	458	2.2754	5.692	529	2.2168	14229.000	16785.000	-1.775	.076
Administrative Processes	8.155	71	3.0126	8.345	458	3.1266	8.319	529	3.1094	15729.500	18285.500	-.448	.654
Stakeholder Inputs	21.620	71	5.9049	23.560	459	8.3980	23.300	530	8.1309	14432.500	16988.500	-1.563	.118
Strategic Leadership	5.817	71	1.9879	6.214	458	2.3524	6.161	529	2.3091	14652.500	17208.500	-1.369	.171
Learning Programme Specifications	4.577	71	2.1756	4.841	459	2.1794	4.806	530	2.1787	14748.000	17304.000	-1.348	.178
Monitoring & Evaluation	7.592	71	2.9060	8.041	458	3.1713	7.981	529	3.1382	14538.000	17094.000	-1.452	.146
Occupational Competence	14.986	71	4.3736	16.503	459	5.6404	16.300	530	5.5084	14087.500	16643.500	-1.860	.063
Environmental Scanning	7.225	71	2.0085	8.166	459	3.1106	8.040	530	3.0023	13086.000	15642.000	-2.782	.005

a. Grouping Variable: Type of learning programme in which you were/are involved

6.8.5 Occupation

The Kruskal-Wallis test was conducted to examine the mean difference of respondent's occupation in relation to the sub-scales of the LPME scale and the results are presented in Table 6.40. The results show that only three of the eleven sub-scales of the LPME scale obtained significant mean differences in terms of occupation, and these are Observation and Problem Solving, Strategic Leadership and Occupational competence. Regarding the Observation and Problem Solving sub-scale, Mentors/Supervisors scored significantly higher ($M = 12.37$; $p \leq .05$) when compared to the other groups (Skills Development Officers/Providers, $M = 10.90$; Assessors/Moderators, $M = 9.00$; Employers/Managers, $M = 10.51$; Learners/Apprentices, $M = 10.06$).

As is evident in Table 6.40, on the Strategic Leadership sub-scale, Mentors/Supervisors scored significantly higher ($M = 7.37$; $p \leq .01$) when compared to the other groups (Skills Development Officers/Providers, $M = 5.62$; Assessors/Moderators, $M = 5.43$; Employers/Managers, $M = 6.04$; Learners/Apprentices, $M = 6.30$). Once again, on the sub-scale Occupational Competence, the Mentors/Supervisors scored significantly higher ($M = 20.68$; $p \leq .05$) when compared to the other groups (Skills Development Officers/Providers, $M = 17.17$; Assessors/Moderators, $M = 14.00$; Employers/Managers, $M = 17.68$; Learners/Apprentices, $M = 15.85$).

A summary of the results showing the significant mean differences per biographical characteristic in relation to the sub-scales of the LPME scale is presented in Table 6.41. Overall, significant mean differences in terms of age were found in three sub-scales of the LPME scale, that is, observation and problem solving, strategic leadership and environmental scanning. The results show no significant mean difference across the sample in terms of gender. Significant mean differences among respondents were found across all sub-scales in terms of educational achievement. However, the results show that only Master's and Doctorate degree holders account for this significant difference. In terms of the type of learning programme, significant mean differences were found in the sub-scales learning programme design and development, and environmental scanning. Further, occupational category shows significant differences only in three sub-scales, namely, observation and problem solving, strategic leadership and environmental scanning. The next section integrates and discusses the results of this research.

Table 6.40

Kruskal-Wallis Test and Mean and Standard Deviation: Occupation on LPME Sub-Scales (n =546)

	Skills Development Officer/Provider			Assessor/Moderator			Mentor/Supervisor			Employer/Manager			Learner/Apprentice			Others			Total			Kruskal-Wallis Test ^{a,b}			
	Mean	Std. Dev	n	Mean	Std. Dev	n	Mean	Std. Dev	n	Mean	Std. Dev	n	Mean	Std. Dev	n	Mean	Std. Dev	n	Mean	Std. Dev	n	Chi-Square	Df	Asymp. Sig.	
LPDD	20.325	4.0	40	8.1473	18.063	16	6.1261	23.688	16	11.8531	20.560	50	8.7018	19.139	360	5.9189	20.800	65	7.0737	19.654	547	6.8057	5.263	5	.385
PA	12.500	4.0	40	4.8145	11.187	16	4.4455	14.250	16	6.2129	13.080	50	5.7847	12.217	360	4.0756	12.508	65	5.6572	12.380	547	4.5983	3.611	5	.607
OPS	10.900	4.0	40	4.3841	9.000	16	4.4572	12.375	16	6.2809	10.510	49	4.4959	9.178	360	2.9530	10.062	64	4.1476	9.617	545	3.6226	11.312	5	.046
OA	5.700	4.0	40	2.0153	6.000	16	3.6878	6.875	16	3.8622	5.980	50	2.5514	5.554	359	1.8795	5.892	65	2.6048	5.696	546	2.2016	3.320	5	.651
AP	9.100	4.0	40	4.1250	7.812	16	2.8100	9.875	16	3.9306	8.820	50	4.4341	8.142	359	2.6646	8.508	65	3.1030	8.359	546	3.0971	5.015	5	.414
SI	24.300	4.0	40	8.9391	21.125	16	6.8301	28.500	16	13.1301	25.420	50	10.8554	22.717	360	7.1305	24.262	65	9.0576	23.386	547	8.1909	8.498	5	.131
SL	5.625	4.0	40	1.8904	5.438	16	1.9311	7.375	16	4.8010	6.040	50	2.9274	6.306	359	2.1457	5.359	64	1.8027	6.127	545	2.3114	19.245	5	.002
LPS	5.300	4.0	40	2.9889	4.625	16	2.0616	5.375	16	2.5000	5.500	50	2.9641	4.614	360	1.8640	5.046	65	2.5704	4.819	547	2.2085	3.936	5	.559
ME	8.700	4.0	40	3.7635	7.062	16	2.6196	9.375	16	4.7732	9.000	50	4.5356	7.696	359	2.6657	7.938	65	3.0765	7.949	546	3.1186	6.240	5	.284
OC	17.175	4.0	40	5.7418	14.000	16	4.3512	20.687	16	9.6036	17.680	50	8.1126	15.858	360	4.6915	17.092	65	5.7926	16.355	547	5.5561	11.179	5	.048
ES	8.300	4.0	40	2.6718	9.000	16	5.8080	9.500	16	4.4721	9.100	50	4.2534	7.753	360	2.4557	8.078	64	3.1386	8.042	546	2.9966	9.268	5	.099

LPDD = Learning programme design and development; PA = Policy awareness; OPS = Observation and problem solving; OA = Administrative processes; AP = Stakeholder inputs; SL = Strategic leadership; LPS = Learning programme specifications; ME = Monitoring and evaluation; OC = Occupational competence; ES = Environmental scanning

a. Kruskal Wallis Test

b. Grouping Variable: State your current occupational position

Table 6.41

Summary of the Results Showing the Significant Mean Score Differences per Sub-group per Biographical Characteristic

BIOGRAPHICAL CHARACTERISTICS

Sub-group category with significant mean score difference

Sub-scale	Age	Gender	Education	Learning programme type	Occupation
1. Learning programme design and development	None	None	Doctorate	Apprenticeship	None
2. Policy awareness	None	None	Doctorate	None	None
3. Observation and problem solving	56 years and older	None	Master's	None	Mentors/supervisors
4. Quality assurance	None	None	Doctorate	None	None
5. Administrative processes	None	None	Doctorate	None	None
6. Stakeholder inputs	None	None	Master's	None	None
7. Strategic leadership	Below 25 years	None	Master's	None	Mentors/supervisors
8. Learning programme specifications	None	None	Doctorate	None	None
9. Monitoring and evaluation	None	None	Master's	None	None
10. Occupational competence	None	None	Doctorate	None	Mentors/supervisors
11. Environmental scanning	36 to 45 years	None	Master's	Apprenticeship	None

6.9 INTEGRATION AND DISCUSSION OF RESEARCH RESULTS

This section integrates the research results reported in Chapter 5 (Research Results: Exploratory Factor Analysis) and Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses) in terms of each of the research aims.

6.9.1 Sample profile

The sample of this research was described in section 4.1 in Chapter 4 (Empirical Study). This sample was comprised mainly of young people (about 78.8%) who were below the age of 35 years. The gender composition shows that female respondents were in the majority (52.9%) relative to their male counterparts (47.1%). The majority of the respondents were involved in learnerships relative to apprenticeships, and this is a mirror image of the actual population registered for the two learning programmes in South Africa.

A close inspection of the sample shows that half the respondents in the sample had achieved a school-leaving certificate as their highest qualification, and this also is congruent to the purpose of these learning programmes. In terms of occupational affiliation, more than half the sample were learners or apprentices (65.8%). Therefore, the sample seems to be well-targeted for the purposes of the current research, particularly considering that occupational learning programmes target young people in order to equip them with the requisite work experience, given the high rate of youth unemployment in South Africa (National Treasury, 2011).

Occupational learning in the form of learnerships and apprenticeships is an important mechanism established to fast track the development of employees, offer current and potential employees opportunities to acquire accredited qualifications, and they serve as an entry point for young people into jobs (National Treasury, 2011; Grawitzky, 2007; Visser & Kruss, 2009). Therefore, occupational learning programmes are a necessary intervention in South Africa today in view of the high rate of youth unemployment. High levels of youth unemployment have increasingly been a concern even in developed economies since the 1990s (OECD, 2000), ranging widely from 7% in countries like Austria and Japan to 34% in Italy and Spain (Breen, 2005).

Nevertheless, the scale of youth unemployment in South Africa tends to the upper range, and relative to most OECD countries, is severe (CDE, 2008; Marock, 2008). About 42 % of young people under the age of 30 are unemployed compared with less than 17 % of adults over 30 (National Treasury, 2011). The unemployment rate for youth between the ages of 16 and 24 was 39.4% and between the ages of 25-34 was 21.5% in 2008 (Leibbrandt, Woolard, Finn & Argent, 2010). High youth unemployment means young people are not acquiring the skills or experience needed to drive the economy forward (National Treasury, 2011).

A number of explanations why young people are unemployed in South Africa were given including the fact that employers look for skills and experience; and they regard unskilled, inexperienced jobseekers as a risky investment. Hence it is significant to consider how effective apprenticeship and learnership pathway systems are managed to respond to the demand for education and training opportunities for young school leavers preparing for labour market transitions. Enrolment evidence during the NSDS II show that the majority of those pursuing learnerships and apprenticeships are the young unemployed, although a shift to enrol more employed participants motivated to improve their skills may be occurring in some sectors (Wildschut, Kruss, Janse Van Rensburg, Haupt & Visser, 2012), thus, making the sample for this study suitable in terms of age distribution.

There is considerable evidence that young people are still disadvantaged in the labour market in South Africa (National Treasury, 2011). The shortfalls in the education system constrain the prospects of young people, leaving them ill-equipped for the workplace, in many cases without basic competencies. Young people also lack work experience, which provides critical on-the-job learning and training; contact with the job market; and the potential to develop networks (an important factor in improving employment prospects).

Experience is vital: a young person with some work experience is in a far better situation than one without (National Treasury, 2011). To increase their chances of employability, young people need skills that are adaptable and relevant to the demands of today's societies, which require individuals to possess a combination of knowledge, practical, social skills and positive attitudes and the ability to adapt to rapidly changing work environments (McLean & Wilson, 2009). The next sub-sections discusses and integrates the results of this research with the empirical research aims.

6.9.2 Research aim 1: *To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable LPME scale*

This research aim sought to operationalise the dimensions of the theoretical model developed in the current research into a measurement scale, and thereafter test the validity and reliability of the operationalised scale. The development of the scale 'Learning Programme Management and Evaluation (LPME)' followed the established scale development procedure that is reported in section 4.2 in Chapter 4 (Empirical Study). The scale development process is of critical importance and specific steps should be carried out in order for the researcher to construct a reliable and valid measure and to have any confidence in drawing conclusions about the construct(s) being measured (DeVellis, 2003). About 182 items were generated and developed into a draft scale which was later evaluated and refined.

The item generation process was guided by the elements and dimensions of the theoretical model developed and presented in Chapter 3 (Training Management and Evaluation Models). In item generation, the primary concern is content validity, which may be viewed as the minimum psychometric requirement for measurement adequacy and is the first step in construct validation of a new measure (Schriesheim, Powers, Scandura, Gardiner & Lankau, 1993). Content validity must be built into the measure through the development of items. This is to ensure that all items in the draft scale are linked to each element and dimension.

The process of evaluating the draft scale was done using a pool of experts in the area of inquiry. The rationale for engaging experts at this stage was to ensure that the scale is valid and all items were clear and unambiguous. As Benson and Clark (1982) state, an instrument is considered to be content valid when the items adequately reflect the process and content dimensions of the specified aims of the instrument as determined by expert opinion. Feedback from the experts was distilled and some items from the initial pool were deleted. The remaining items (113 items remained) were subjected to an exploratory factor analysis (EFA) in order to establish the factorial structure of the draft scale, and the results are reported in Chapter 5 (Research Results: Exploratory Factor Analysis). The goal of rotation was to simplify and clarify the data structure (Costello & Osborne, 2005). A principal component analysis (PCA) revealed a total of 19 factors, as shown in Table 5.3, Chapter 5

(Research Results: Exploratory Factor Analysis). A PCA is a data reduction technique used to identify a smaller number of underlying components in a set of observed variables or items. It accounts for the variance in the items, rather than the correlations among them (Harrington, 2009). Certain criteria were set to determine the factors which needed to be considered for further statistical tests (an eigenvalue cut-off of 1.45 units, a factor load of .4, and a minimum of four items per factor). When these criteria were applied, eleven out of 19 factors remained, and were considered for subsequent statistical analysis.

The eleven remaining factors were considered as sub-scales of the new LPME scale. Thereafter, a Rasch analysis process was undertaken in order to test the reliability and validity of the sub-scales and their associated items. A Rasch model is a probabilistic mathematical model which provides estimates of person ability and item difficulty along a common measurement continuum, expressed in log-odd units (logits). It focuses on constructing the measurement instrument with accurateness rather than fitting the data to suit a measurement model (Hamzah, Khoiry, Osman, Hamid, Jaafar & Arshad, 2009). The Rasch model parallels physical measurement processes by being largely concerned with the construction of linear measures along specific unidimensional constructs (Planinic *et al.*, 2010). Greater logit values for items indicate increasing item difficulty (Fendrich *et al.*, 2009). This model is intended for the development and examination of measurement instruments.

In the current research, sub-scales and items were evaluated using Rasch analysis in terms of person/item separation indices, reliability coefficients, person-item mapping, measure order and unidimensionality. The results of all these statistical tests were presented in section 5.3, Chapter 5 (Research Results: Exploratory Factor Analysis). These results support the dimensional structure of the LPME scale, its sub-scales and its items and therefore this research aim was achieved. The findings provided support for the following hypothesis:

Ha(1): The LPME scale is an 11-dimensional construct consisting of strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment.

The results of this research as presented in Chapter 4 (Empirical Study), sub-section 4.2.3 (The development of the LPME scale) and Chapter 5 (Research Results: Exploratory Factor Analysis), sub-section 5.2.2 (Factor structure for further rotation), show that this hypothesis is supported by the findings. Next is a discussion focusing on the integration of the research results with the sub-aims of this research.

6.9.2.1 *Sub-aim 1.1: To analyse the psychometric properties of the newly developed LPME scale*

This sub-aim focuses on the analysis of the psychometric properties of the LPME scale and its sub-scales. The scale was examined across a range of psychometric tests, such as reliability, item fit, unidimensionality and structural equations. Section 5.3 in Chapter 5 (Research Results: Exploratory Factor Analysis) presents the results of a Rasch analysis procedure which entails reliability testing, person-item targeting, item fit in terms of measure order and the test for sub-scale unidimensionality. Rasch analysis provides internal consistency reliability estimates for both persons and items ranging from .0 to 1.00 (Fendrich *et al.*, 2009). Person and item separation and reliability of separation assess instrument spread across the trait continuum (Green & Frantom, 2002).

Reliability of person separation was used in this research to demonstrate whether respondents were being adequately separated by items along the continuum representing the construct, as well as provided an indication of replicability for person placement across other items measuring the same construct (Green & Frantom, 2002). Conceptually, Rasch person reliability is analogous to Cronbach Alpha/KR 20 in the classical test theory in terms of interpretation and calculation (Smith, 2001). A cut-off point $\geq .70$ is considered acceptable (Kline, 2005; Polit & Beck, 2004). Rasch item reliability is an important aspect for construct validation as it indicates the spread of items along the continuum of interest. A spread of items is required to form a well-defined variable for interpretation (Smith, 2001).

The LPME scale was also evaluated for fit and dimensionality. Fit statistics, the infit and outfit, help detect discrepancies between the data and Rasch Model expectation (Linacre, 1994; Bond & Fox, 2007). Only when a test fits the model expectation, can it be considered as having the property of fundamental measurement (Khairani & Nordin, 2011). However, it is worth mentioning that fit statistics alone may be inadequate to determine dimensionality. A principal component analysis (PCA) of the residuals (observed minus expected scores) must

be performed as confirmation of dimensionality (Linacre, 2009; Smith, 2002). The findings of the current research showed a good item fit and unidimensionality of the LPME scale and its sub-scales.

Further, a confirmatory factor analysis was conducted to confirm the internal consistency of the LPME scale, its sub-scales and items, and the results are presented in section 6.1 of Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). Scale reliability is defined as the proportion of variance in participants' scores on an instrument due to true differences in their scores (Polit & Beck, 2004). Reliability reflects the consistency of items over time, tests, and groups (Kline, 2005; Nunnally & Bernstein, 1994). Nunnally (1978) states that newly developed measures can be accepted with $\geq .60$, otherwise $\geq .70$ should be the threshold (Kline, 2005; Polit & Beck, 2004). With a coefficient $\geq .80$ the measure is very reliable (Nunnally, 1978). A Cronbach Alpha internal consistency test confirmed the reliability of the LPME scale, its sub-scales and items as reported in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses).

A further psychometric test done on the LPME scale was structural equation modelling, and the results are presented in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). The purpose of this test was to confirm the dimensional fit of the LPME scale to the structural equation model (SEM). The SEM takes into account the modelling of interactions, nonlinearities, measurement error, correlated error terms and multiple latent independents, each measured by multiple indicators, and one or more latent dependents also each with multiple indicators (Shah, 2012). The structural equation model specifies the relationships among the latent variables, and describes the causal effects and amount of unexplained variance (Chavance *et al.*, 2010).

The following fit indices were computed in this research as part of the structural equation modelling (SEM): absolute fit indices (the Chi-Square (χ^2) and Standardised Root Mean Square Residual (SRMR)), relative fit indices (Normed Fit Index (NFI), Tucker Lewis Index (TLI) and Incremental Fit Index (IFI) and noncentrality-based indices (Comparative Fit Index (CFI) and Root Mean Square of Approximation (RMSEA)). The results show a good fit for the sub-scales of the LPME scale to the structural equation model. Thus, the psychometric properties of the LPME scale were successfully analysed. Taken together, these results

show that this research's sub-aim was achieved. Aligned to this empirical research sub-aim was the following hypothesis:

Ha(2): All sub-scales of the LPME scale (strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment) are valid across all persons in terms of item fitness, unidimensionality and bias.

The Rasch analysis results presented in section 5.3 (Rasch analysis results) in Chapter 5 (Research Results: Exploratory Factor Analysis) show that all sub-scales and items of the LPME scale were analysed as valid in terms of fitness, unidimensionality and bias (differential item functioning). These findings show that the LPME scale, its sub-scales and items are valid. Therefore, the findings provided support for this hypothesis.

Next is the second hypothesis that was also aligned to the empirical research sub-aim 1.1.

Ha(3): All sub-scales of the LPME scale (strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment) are reliable (Cronbach Alpha $\geq .70$).

This hypothesis (*Ha (3)*) sought to examine the reliability of the LPME scale and its sub-scales. The results of the reliability tests were reported in section 5.3 (Rasch analysis results) in Chapter 5 (Research Results: Exploratory Factor Analysis) and were confirmed in section 6.1 (LPME Scale, sub-scales and items reliability analysis) in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). Reliability reflects the consistency of items over time, tests, and groups (Kline, 2005; Nunnally & Bernstein, 1994). Nunnally (1978) states that newly developed measures can be accepted with $\geq .60$, otherwise $\geq .70$ should be the threshold (Kline, 2005; Polit & Beck, 2004). With a coefficient $\geq .80$ the measure is very reliable (Nunnally, 1978). The LPME scale, its sub-scales and items were found to be reliable in the current research, and therefore, the findings provided support for

this hypothesis (*Ha* (3)). Next is the third and last hypothesis that was aligned to the empirical research sub-aim 1.1.

Ha (4): The LPME sub-scales show a good fit with the measurement model.

This hypothesis (*Ha* (4)) sought to examine the fit between the sub-scales of the LPME scale and the measurement model. A structural equation analysis was conducted and the results were presented in section 6.3, in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). The results show that the sub-scales of the LPME scale fit the structural equation well as summarised in Table 6.15 in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). The final SEM model fits well to the theoretical model developed in the present research in terms of dimensional structure. Consequently, the findings of this research support the stated hypothesis (*Ha* (4)). The next sub-section discusses and integrates the results of this research with empirical sub-aim 1.2.

6.9.2.2 Sub-aim 1.2: To examine the nature of the interrelationships between the sub-scale dimensions of the refined version of the LPME scale

This sub-aim focused on the nature of the interrelationship between the sub-scales of the LPME scale. The relationship was examined in this research using Pearson's product moment correlation analysis, and the results were reported in section 6.2 in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). However, given the exploratory nature of the present research and the dearth of literature pertaining to the phenomenon under inquiry, the researcher could not establish previous studies in South Africa and elsewhere that investigated the interrelationships among dimensions similar or equivalent to the LPME sub-scales. However, the findings of the present research show a statistically-significant and positive relationship among all the sub-scales of the LPME scale. Therefore, this research sub-aim was achieved. The hypothesis that was aligned to this sub-aim is as follows:

Ha (5): The LPME sub-scales are significantly and positively interrelated.

Based on the results presented and discussed in section 6.2 in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses), the findings of the current research

provided support for this hypothesis. The next sub-section integrates the results of this research in line with empirical research aim 2.

6.9.3 Research aim 2: *To examine the sample sub-group (gender and type of learning programme) differences in relation to the factorial structure of the LPME scale.*

This research aim sought to examine whether or not there were sample sub-group differences in relation to the factorial structure of the LPME scale. The LPME scale is an 11-dimensional scale as found and presented earlier in this section. However, the researcher assumed that sample sub-groups would show some differences in terms of their perceptions of the sub-scales of the LPME scale. The two demographic variables that were considered for this analysis were gender and the type of learning programme. Differences were assumed to exist between male and female respondents, and between those respondents who are involved in learnerships relative to those involved in apprenticeships.

The phenomenon under inquiry is still new in South Africa, hence the dearth of literature. As a result, the researcher could not establish previous studies in South Africa and elsewhere that investigated the sample sub-group differences in relation to the LPME sub-scales dimensions or their equivalent. However, the results of a multi-group structural equivalence analysis are presented in section 6.4 in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses). The results show an insignificant change in the chi square and in the degrees of freedom, and there were no significant differences in ΔCFI values between the unconstrained and constrained models for both sub-groups (male and female, and learnership and apprenticeship). These findings serve as a strong confirmation that the final structural equation model was invariant across the two sub-groups. Therefore, this empirical research aim was achieved as the sample sub-group differences were examined. The hypothesis aligned to this empirical research aim was as follows:

Ha (6): The sample sub-groups (gender and type of learning programme) differ significantly in terms of the factorial structure of the LPME scale.

This hypothesis assumed the existence of sample sub-group differences in terms of the factorial structure of the LPME scale. However, the results of this research, as presented in section 6.4, in Chapter 6 (Research Results: Confirmatory Factor and Inferential Analyses)

show that there were no sample sub-group differences established. Therefore, the findings of this research did not provide support for this hypothesis (*Ha* (6)). In the next sub-section, an integration of the research results with the empirical research aim 3 is presented.

6.9.4 Research aim 3: *To determine whether or not the biographical characteristics of the sample significantly and positively predict the various sub-scale dimensions of the refined LPME scale*

This research aim sought to establish whether or not the biographical characteristics of the sample could positively and significantly predict the sub-scales of the LPME scale. The demographic variables investigated were age, gender, educational achievement, type of learning programme and occupational position. In order to establish the differences, a multiple regression analysis was conducted, and the results were reported in section 6.5 in this chapter. Each sub-scale was presented as a dependent variable and biographical characteristics were presented as independent variables as shown in Table 6.34 in this chapter.

Since, the phenomenon under inquiry is still new in South Africa, literature is sparse. As a result, the researcher could not establish previous studies in South Africa and elsewhere that investigated whether or not the biographical characteristics of respondents predict the sub-scale dimensions of the LPME scale or its equivalent. However, in the current research, the results of the regression analysis show that age (except for the Learning Programme Specifications sub-scale), education and occupation were found to be significant predictors of all the sub-scales of the LPME scale.

Further, the type of learning programme was found to be a significant predictor of some of the sub-scales of the LPME scale (Learning programme design and development, quality assurance, stakeholder inputs, occupational competence and environmental scanning). Contrary to these results, gender was found to be an insignificant predictor across all sub-scales. Consequently, this empirical research aim was achieved in the current research. Below is a hypothesis that was aligned to this empirical research aim:

Ha (7): The biographical characteristics of the sample significantly and positively predict the various sub-scales of the LPME scale.

This hypothesis (*Ha (7)*) assumed that the biographical characteristics of the sample were positive and significant predictors of the sub-scales of the LPME scale. The results of the multiple regression analysis presented in section 6.5 in this chapter show that, except for gender, all predictor variables are positive in relation to all sub-scale dimensions. Gender is the only predictor which is negatively related to all sub-scales of the LPME scale. In terms of the strength of the relationship, age (except for the sub-scale Learning Programme Specifications), education and occupation are significant predictors of all the sub-scales of the LPME scale. The predictor variable 'type of learning programme' is only significantly related to some of the sub-scales (Learning programme design and development, quality assurance, stakeholder inputs, occupational competence and environmental scanning). These findings provided adequate support for the hypothesis (*Ha (7)*). In the next sub-section the results are integrated with empirical research aim 4.

6.9.5 Research aim 4: *To investigate whether the sample sub-groups (age, gender, educational achievement, type of learning programme and occupation) differ in terms of each sub-scale dimensions of the refined LPME scale*

This empirical research aim sought to investigate how the sample differs in terms of its mean scores relative to the sub-scales of the LPME scale. In order to achieve this aim, the tests for significant mean difference were conducted and the results were presented in section 6.8 in this chapter. Acknowledging that the phenomenon under inquiry is still new in South Africa, the researcher could not establish previous studies that investigated the sample sub-group differences in terms of the LPME sub-scales or their equivalent. However, the findings of the present research show that in terms of age, the mean scores were significantly different in three sub-scales, namely, observation and problem solving, strategic leadership, and environmental scanning. Young respondents below the age of 25 years scored significantly higher on strategic leadership; those near the mid-age bracket (36 to 45 years) scored significantly higher on the environmental scanning sub-scale; and, those who are 56 years and older scored significantly higher on the sub-scale observation and problem solving.

Educational achievement is the only demographic characteristic that showed significant mean score differences across all the sub-scales of the LPME measure. On this sub-scale, respondents with Master's and Doctorate degrees scored significantly higher relative to the other groups. Further, the results show no significant difference among respondents in terms of gender. To this end, Mentors/Supervisors were the only group that scored significantly higher on the sub-scales observation and problem solving, strategic leadership and occupational competence relative to the other occupational groups. The hypothesis that is aligned to this empirical research aim is as follows:

Ha (8): The sample sub-groups differ significantly in terms of the sub-scales of the LPME scale.

Besides educational achievement, the results reported in section 6.8 do not show significant sub-group differences in terms of the sub-scales of the LPME scale. No significant differences were found for gender. Although significant differences are sparsely reported in a few sub-scales in terms of age, type of learning programme and occupation, the results are not conclusive in terms of supporting the hypothesis (*Ha(8)*). Table 6.42 presents supporting evidence as to whether or not the findings of this research support the stated hypotheses.

Table 6.42

Summary of the Integration of Empirical Research Aims and Hypotheses and Supportive Evidence

Research aim	Research hypotheses	Statistical procedures	Supportive evidence Yes/No
<p>Research aim 1: To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable LPME scale.</p>	<p><i>Ha</i>(1): The LPME scale is an 11 dimensional construct consisting of strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment.</p>	<p>Factorial validity (Exploratory Factor Analysis – EFA) Chapter 5</p>	<p>Yes</p>
<p><i>Sub-aim 1.1</i>: To assess the psychometric properties of the newly developed LPME scale.</p>	<p><i>Ha</i>(2): All sub-scales of the LPME scale (strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation,</p>	<p>RASCH Analysis Chapter 5</p>	<p>Yes</p>

and competence assessment) are valid across all persons in terms of item fitness, unidimensionality and bias.

Ha(3): All sub-scales of the LPME scale (strategic leadership, administrative processes, policy awareness, environmental scanning, stakeholder inputs, quality assurance, learning programme design and development, learning programme specifications, observation and problem solving, monitoring and evaluation, and competence assessment) are reliable (Cronbach Alpha $\geq .70$). Reliability Analysis Chapter 6

Yes

Ha (4): The LPME sub-scales show a good fit with the measurement model. Confirmatory Factor Analysis (Structural Equation Modelling) Chapter 6

Yes

Sub-question 1.2: To assess the nature of the interrelationships between the sub-scales of the refined version of the LPME scale. *Ha* (5): The LPME sub-scales are significantly and positively interrelated. Pearson Product Moment Correlations Chapter 6

Yes

<p><u>Research aim 2:</u> To assess the sample sub-group (gender and type of learning programme) differences regarding the factorial structure of the LPME scale.</p>	<p><i>Ha</i> (6): The sample sub-groups (gender and type of learning programme) differ significantly in terms of the factorial structure of the LPME scale.</p>	<p>Structural Equation Modelling Multi-group CFA Chapter 6</p>	<p>No</p>
<p><u>Research aim 3:</u> To determine whether the biographical characteristics (age, gender, educational achievement, type of learning programme and occupational position) of the sample significantly and positively predict the various subscales of the refined LPME scale.</p>	<p><i>Ha</i> (7): The biographical characteristics (age, gender, educational achievement, type of learning programme and occupational position) of the sample significantly and positively predict the various sub-scales of the LPME scale.</p>	<p>Multiple regression analysis Chapter 6</p>	<p>Yes</p>
<p><u>Research aim 4:</u> To investigate whether the sample subgroups (age, gender, educational achievement, type of learning programme and occupational position) differ in terms of each sub-scale of the refined LPME scale.</p>	<p><i>Ha</i> (8): The sample sub-groups (age, gender, educational achievement, type of learning programme and occupational position) differ significantly in terms of the subscales of the LPME scale.</p>	<p>Tests for Significant Mean differences Chapter 6</p>	<p>Partially</p>

6.10 SUMMARY

This chapter presented the results of the confirmatory factor and inferential analyses phase of the research. The reliability coefficients for both sub-scales and items of the LPME scale were presented. The results of correlations of the sub-scale were also presented followed by structural equation modelling. Thereafter, the results of structural equivalence and regression analysis were presented. Towards the end, the chapter presents the results of the tests for significant mean difference, and integrates and discusses the results of exploratory factor analysis, confirmatory factor and inferential analyses. Herewith the empirical research aims were achieved.

The next chapter (Chapter 7) presents the conclusions, limitations and recommendations of this research.

CHAPTER 7

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

This chapter addresses the following empirical research aim: *to formulate the conclusions, limitations and recommendations emanating from the empirical study*. The chapter outlines the conclusions of this research, discusses its limitations and makes recommendations for future research.

7.1 CONCLUSIONS

In this research, conclusions were made in terms of the literature and the empirical study.

7.1.1 Conclusions regarding the literature review

The general aim of the current research was to develop a holistic and integrated theoretical model and a valid and reliable measure of the elements that comprise the holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context. In view of this general aim, specific aims were also formulated in terms of the literature and the empirical study.

The literature review had six research aims. Conclusions in terms of each aim will be stated.

7.1.1.1 *Research aim 1: To conceptualise the concept of the occupational learning programme.*

This aim was addressed in Chapter 2 (Skills Development and the Occupational Learning System). The conceptualisation of an occupational learning programme is as follows: a learning programme is defined in the Skills Development Amendment Act 37 of 2008 as a programme which includes a learnership, an apprenticeship, a skills programme and any other prescribed learning programme, which includes a structured work experience component (Republic of South Africa, 2008a; Van Rooyen, 2009). A learnership is defined as a structured learning programme that leads to a qualification recognised by the NQF (Visser & Kruss, 2009). It is an integrated occupation-directed programme that combines learning at a training institution with practical, on-site experience and learning in a workplace. Learnerships must be related to a specific occupation and be registered by the relevant SETA with the DHET (Coetzee *et al.*, 2007). Simply defined, a learnership is a route to a nationally recognised qualification (DoL, 1997) that relates to an occupation and consists of a structured learning component and practical work experience (De Jager *et al.*, 2002). On the other hand, an apprenticeship is defined as a form of learning in which an apprentice undergoes induction

into a specific vocational sector, learning the appropriate technical skills and knowledge and absorbing the appropriate values and traditions (Hayward *et al.*, 2008, p. 4).

Based on the above definitions from the literature, it can be concluded that an occupational learning programme is a form of learning during which learners/apprentices acquire the requisite work-relevant skills and experience under the guidance of a workplace mentor in order to function effectively and competitively in the workplace at the end of the programme.

7.1.1.2 Research aim 2: To conceptualise the principles of effective management and evaluation in the context of occupational learning programmes.

This literature research aim was achieved in Chapter 3 (Training Management and Evaluation Model). Koontz and O'Donnell (1964, p. 1), define management as “the accomplishment of desired objectives by establishing an environment favourable to performance by people operating in organised groups”. Smit and Cronjé (1992) define management as a process or series of activities that give the necessary direction to an enterprise's resources so that its objectives can be achieved as productively as possible in the environment in which it functions. Trewatha and Newport (1976) define management as the process of planning, organising, actuating and controlling an organisational operation in order to achieve a coordination of human and material resources essential in the effective and efficient attainment of objectives. This definition mentions the coordination of people and resources. It complements what Davies and Farquharson (2004) refer to as multiple stakeholders. It also mentions resources that need to be managed. The management of occupational learning programmes includes both people and resources.

Evaluation is defined as the process of determining and/or assessing something's merit or worth (Aspinwall *et al.*, 1992; Hopkins, 2002; Scriven, 2003). However, Patton (1986) provides a definition that appears to be useful in the context of occupational learning. In his so-called “utilisation-focused evaluation”, he defines evaluation as follows (Patton, 2003, p. 14): “Programme evaluation is the systematic collection of information about the activities, characteristics, and outcomes of programmes for use by specific people to reduce uncertainties, improve effectiveness, and make decisions with regard to what those programmes are doing and affecting.” The primary focus in utilisation-focused evaluation is on intended use by intended users. This central premise of utility was initially controversial when Patton introduced it in 1978, but since then has become a commonly-accepted evaluation philosophy (Patton, 2003).

It can be concluded that based on the literature, effective management refers to the process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human and physical) in order to achieve the objectives of an occupational learning programme, while effective evaluation is the systematic process of collecting descriptive and judgemental information on the programme's components (e.g. context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcome. The primary focus of occupational learning programme evaluation must be on the utilisation of the evaluation outcomes by the relevant stakeholders in order to improve the programme's effectiveness.

7.1.1.3 Research aim 3: To investigate the current management and evaluation practices pertaining to occupational learning programmes in the South African skills development context according to the literature.

This literature aim was achieved in Chapter 3 (Training Management and Evaluation Models). However, a number of challenges were raised in the literature regarding the co-ordination and management of National Skills Fund (NSF) training projects for the unemployed in South Africa (du Toit, 2012). The challenges were mainly related to: timing and delays created by challenging co-ordination and project management (beneficiaries were reported to have 'lost hope' when training did not commence on time); the questionable quality of training in some instances; insufficient monetary compensation of beneficiaries; lack of ongoing mentoring to support self-employment of beneficiaries (beneficiaries expressed the need at some level for ongoing mentoring with self-employment enterprises, after the formal training was completed); the high cost of transport (absorbing most of the stipends trainees received); late payment of stipends; and conditions of placement being ignored.

However, in order to address some of these challenges, Vollenhoven (2007, p. 4) outlined five frameworks that are employed locally and internationally to manage training in the workplace as follows:

- (1) Skills management based on the South African legislative framework requires a skills development provider to be registered and accredited through a relevant SETA ETQA; to be qualified to manage skills development via policies, procedures, practices and review mechanisms; to develop, deliver and evaluate learning programmes to culminate in NQF credits or qualification; to link financial, administrative and physical resources; and to claim back skills levies via grants (SAQA, 2000a).

- (2) An internal management system for transforming organisations into learning organisations is required. Rhinesmith's (1996) framework for training providers to improve skills development focuses on developing key skills and characteristics through actively changing mindsets.
- (3) The cost benefit and return on investment framework measures the costs and benefits of developing skills (Birnbauer, 1986).
- (4) A quality performance management framework is required, which is similar to the learning programme agreement type framework offered by the South African skills development legislation (Kelly, 1996).
- (5) A project management framework for managing workplace training providers is required, which is similar to the skills development legislative framework (Duncan, 1996).

Project management stands out as the most effective tool for dealing with daily management issues such as time, cost, resources and risk issues (Govender, 2003). Davies and Farquharson (2004, p. 182) indicate that occupational learning programmes tend to be implemented in multiple stakeholder environments, and similarly, according to De Jager *et al.* (2002), these programmes are best managed as projects at various levels. The project management approach of skills development projects funded by the SETA or NSF is also supported by the DHET as it enables projects to be conceptualised, planned, implemented and monitored (DHET, 2012). It can be concluded that occupational learning programmes must be managed within a project management framework because of their limited duration. Project management principles must be applied when the implementation of occupational learning programmes is envisaged.

7.1.1.4 Research aim 4: To examine the elements and dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes within the context of the new occupational learning system in South Africa.

This literature aim was achieved in both Chapter 2 (Skills Development and the Occupational Learning System) and Chapter 3 (Training Management and Evaluation Models). A number of elements and dimensions were identified and incorporated into a holistic and integrated theoretical model developed in Chapter 3. An understanding of system deficiencies that emerged in the literature review facilitated the task of identifying elements and dimensions that could provide a possible solution to overcoming such deficiencies. After a careful analysis of the literature, only four elements were found to be theoretically important and crucial for the effective implementation of an occupational learning programme.

The conclusion drawn was that the theoretical model consisted of four elements, namely initiation, execution, progress monitoring and evaluation and review. Each of these elements had a number of dimensions that are specific for the effective implementation of an occupational learning programme, also emanating from the literature as follows:

- (1) Initiation - The dimensions in this element are leadership, environmental scanning, stakeholder focus and processes.
- (2) Execution - The dimensions in this element include policy awareness, learning design, programme structure and quality assurance.
- (3) Progress monitoring - The dimensions in this element include observation and assessment and progress reporting.
- (4) Evaluation and review - The dimensions involved in this element include self-evaluation, completion rate and qualification, work readiness, occupational competence and impact assessment.

7.1.1.5 Research aim 5: To analyse the international best practices regarding effective management and evaluation of occupational learning programmes and how these compare with the identified elements and dimensions of a theoretical model.

This research aim was achieved in Chapter 3 (Training Management and Evaluation Models). No clear and specific management framework has been developed for occupational learning programmes in South Africa (Bisschoff & Govender, 2004). Hence a project management framework was selected as the most effective in comparison with the others, although this framework does not clarify a number of key aspects of occupational learning programmes such as leadership, learning design, assessment and evaluation. Bisschoff and Govender (2004) used this framework as a basis for understanding the management dynamics surrounding learnerships in South Africa.

A number of quality management models were also analysed including the QCTO model and global quality management models. Various global models of training evaluation (Bushnell, 1990; Fitz-Enz, 1994; Kirkpatrick & Kirkpatrick, 2006; Phillips, 1994; Stuffelbeam & Shinkfield, 2007) were also analysed and valuable inputs earmarked, which also contributed to the selection of the elements of a proposed model. It can be concluded that these global frameworks and models provided a clear perspective in terms of the international best practices pertaining to the effective management and evaluation of training programmes in this research.

7.1.1.6 Research aim 6: To examine the final elements and dimensions of a holistic and integrated model for the effective management and evaluation of occupational learning programmes based on the literature review.

The experiences of other countries in the implementation of skills development interventions, particularly apprenticeships, indicated valuable lessons and contributions in selecting the elements that are relevant to and appropriate for the effective management and evaluation of occupational learning programmes. Equally significant were the lessons drawn from the quality management and training evaluation models that were analysed in the literature review. Some of the model dimensions such as leadership, stakeholder focus and processes were adapted from the existing models (Award Criteria, MBNQA, 2010; EFQM, 1999; CFBE [NQA, 2007]) even though they were described in the context of occupational learning programmes in this research. It can be concluded that the experiences of other countries in terms of implementation of skills development systems, quality management and evaluation of training interventions contributed much in decision making regarding which elements and dimensions should be considered for inclusion in the theoretical model.

7.1.2 Conclusions regarding empirical study

The empirical study had five research aims. Core conclusions will be stated in terms of each of these research aims.

7.1.2.1 Research aim 1: To operationalise the dimensions of the theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context into a valid and reliable LPME scale.

The first empirical aim focused on the operationalisation of the dimensions of a theoretical model into a valid and reliable measure. Three conclusions are drawn from the findings of this research:

- a) *Conclusion 1:* The LPME scale is a valid and reliable 11-dimensional scale (administrative processes, strategic leadership, environmental scanning, observation and problem solving, quality assurance, monitoring and evaluation, policy awareness, stakeholder inputs, learning programme design and development, learning programme specifications and occupational competence) that can be applied in South African workplaces to monitor and evaluate occupational learning programmes. These sub-scales would be useful for application by skills development practitioners and SETAs when managing and evaluating occupational learning programmes. The LPME sub-scales were grouped under each of the three elements (initiation,

execution, monitoring and evaluation) of the final empirical model as shown in figure 7.1. Eight of the eleven sub-scale dimensions were empirically confirmed from the theoretical model developed in Chapter 3 (Training Management and Evaluation Models). The other three sub-scales (Learning Programme Specifications, Observation and Problem Solving, and Monitoring and Evaluation) were derived from the Exploratory Factor Analysis (EFA) and Rasch analysis conducted in this research and as reported in Chapter 5 (Research Results: Exploratory Factor Analysis). A conclusion that can be drawn from the empirical findings is that the LPME scale is a valid and reliable 11-dimensional scale consisting of three key elements (Initiation, execution, and monitoring and evaluation). Another conclusion that can be drawn is that the empirical model fits the theoretical model in terms of elements and dimensions, although not exactly.

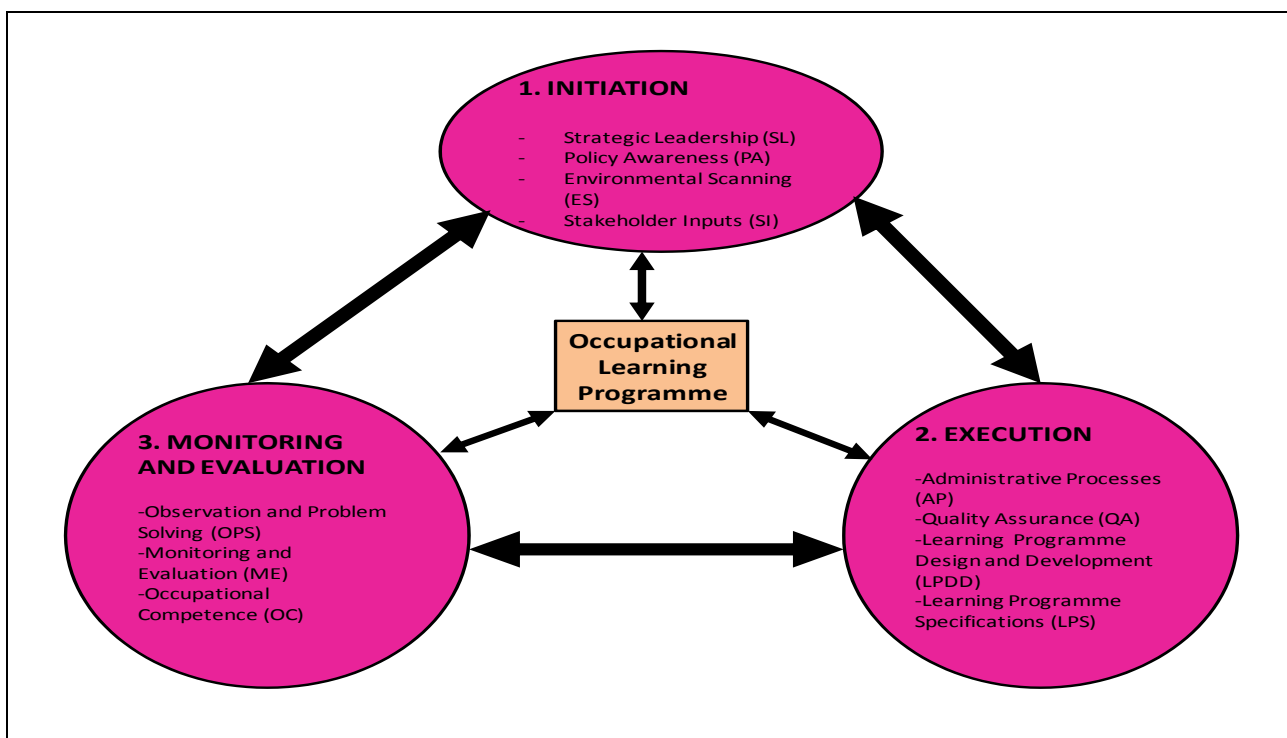


Figure 7.1. An empirical model for the effective management and evaluation of occupational learning programmes

- b) *Conclusion 2:* The LPME scale and its sub-scales comply with the psychometric requirements. The scale was examined for validity and reliability and it was found to have complied with the requirements in terms of item separation, item fit, unidimensionality, and measurement model fit. A conclusion that can be drawn is that the LPME scale and its sub-scales are valid and reliable, and the items are well-structured in terms of spread of difficulty, and that the scale and its sub-scales are unidimensional and fit the structural model.

- c) *Conclusion 3:* The sub-scales of the LPME measure are interrelated. A strong relationship exists between the sub-scales, although each one of them could be applied autonomously. This indicated that the LPME scale and its sub-scales show strong construct validity. It can be concluded, therefore, that the LPME scale and its sub-scales are valid and reliable in measuring effective management and evaluation of occupational learning programmes and therefore, can be applied successfully in the South African skills development context.

7.1.2.2 Research aim 2: To examine the sample sub-group (gender and type of learning programme) differences in relation to the factorial structure of the LPME scale.

This aim assessed the differences between sample sub-groups (gender and type of learning programme) in relation to factorial structure of the LPME scale. The findings of the present research show that the two sample sub-groups are invariant in terms of the factorial structure of the LPME scale. It can be concluded that the LPME scale is a reliable measure that can be applied to males and females, and to individuals involved in both learnerships and apprenticeships.

7.1.2.3. Research aim 3: To determine whether or not the biographical characteristics (age, gender, educational achievement, type of learning programme and occupation) of the sample significantly and positively predict the various sub-scale dimensions of the refined LPME scale.

This aim assessed whether biographical characteristics of the sample positively and significantly predict the sub-scales of the LPME scale. It can be concluded based on the findings of the current research that age, education and occupation are positive and significant predictors of the various sub-scales of the LPME scale. A conclusion that can be drawn is that age, education and occupation should be considered in the management and evaluation of occupational learning programmes.

7.1.2.4 Research aim 4: To investigate whether the sample sub-groups (age, gender, educational achievement, type of learning programme and occupation) differ in terms of each sub-scale dimensions of the refined LPME scale.

This aim assessed the sample mean differences based on biographical characteristics in relation to the sub-scales of the LPME scale. The findings of this research suggest that educational achievement is a key variable for distinguishing sample sub-group differences across all sub-scale dimensions of

the LPME scale. A conclusion that can be drawn is that the higher the level of educational achievement of respondents, the more likely they will be to endorse the sub-scale dimensions of the LPME scale.

7.1.3 Conclusions regarding the contributions to the sub-field of Human Resource Development (HRD) and skills development in South Africa

The following conclusions are made with regard to the contribution of this research to the field of Human Resource Development (HRD) and skills development.

7.1.3.1 Theoretical level

From a theoretical standpoint, this research contributes to the sparse body of knowledge regarding skills development in South Africa which is still in a process of transformation. It extends the current thinking and theory on occupational learning programme management and evaluation. Thus, this research adds to the theoretical body of knowledge on skills development by conceptualising a coherent and simplified understanding of how occupational learning programmes should be effectively managed and evaluated to ensure that the goals and objectives of the national skills development strategy (NSDS) are achieved. The significance of research becomes evident if it entails an investigation of an area of ambiguity to define new variables and explain their roles in accepted theory.

A theoretical contribution transforms the way people look at things and the way they talk about these things. Therefore, the conceptualisation of the dimensions that comprise a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context allows for the construction of a descriptive and theoretically valid and reliable measure of an effective management and evaluation system for occupational learning. This is an important step towards understanding the interrelationship and importance of each dimension that contributes to the effectiveness of the management and evaluation of occupational learning programmes in the South African skills development context.

7.1.3.2 Empirical level

Methodologically, this research contributes by developing and empirically testing a valid and reliable measure of the dimensions of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African skills development context. The LPME scale and its sub-scales provide a window of opportunity for future research projects focusing on the management and evaluation of occupational learning programmes. The sub-scales of

this measure could be applied autonomously. The LPME scale and its sub-scales are important mechanisms for ensuring the effective management and evaluation of occupational learning programmes. As a valid and reliable measure, it can be applied with confidence in South African workplaces. The rigour of the scale development process followed when building up this new measure plus its high reliability coefficient (including its sub-scales) open up opportunities for other researchers to conduct replication studies in specific sectors.

7.1.3.3 Practical level

The LPME scale heralds a revolution for the skills development stakeholders in their quest to effectively manage and evaluate occupational learning programmes in order to address the challenge of skills shortage in South Africa. This scale will help SETAs, skills development practitioners and providers to manage and evaluate occupational learning programmes effectively. The findings of this research will enable skills development stakeholders involved in occupational learning programmes to identify gaps in the system and develop interventions for improvement by means of a reliable and valid measure. This valid and reliable LPME scale and its sub-scales will enable stakeholders to diagnose weaknesses in the system so that appropriate remedial action can be taken in order to ensure the achievement of the objectives of an occupational learning programme. The new LPME scale will be useful for SETAs in their task of monitoring and evaluating the feasibility and success of learning programme implementation in their respective sectors. The measure can also be used as a checklist to determine eligibility for accreditation of providers and workplaces as learning sites for occupational learning programmes. The sub-scales of the LPME measure can be utilised autonomously depending on the needs of the end-user. From a managerial perspective, the findings of this research can be used to guide the development and review of HRD or learning programme policies in organisations.

7.2 LIMITATIONS OF THE RESEARCH

The limitations of the literature review and empirical investigation are presented below.

7.2.1 Literature review

The literature review was constrained due to the limited amount of previous research regarding occupational learning programmes in South Africa. The concept of an occupational learning programme is still new to South Africa and very limited research has been conducted.

7.2.2 Empirical study

The empirical study in this research has four limitations, as set out below.

The first limitation is related to the scope of the research. This research focused only on two types of learning programmes, that is, learnerships and apprenticeships. So, the interpretation or application of the findings of this research should be limited to these two learning programmes.

A second limitation relates to the sample composition. The sample was not analysed in terms of racial composition and, therefore, the results are limited with regard to diagnosing racial differences.

A third limitation of the research relates to the period during which the research was conducted. The research project took place during a period of transition from the old dispensation of the repealed SAQA Act 53 of 1995 into the new dispensation brought about by the NQF Act 67 of 2008. At the time this research was in progress, the Skills Development Amendment Act 37 of 2008 was being implemented including the new definition of a learning programme. A new vocabulary was being phased-in as part of the third NSDS (2011-2016). During the same period, the skills development unit migrated from the Department of Labour into the Department of Higher Education and Training. Consequently, the wording of the items in the new measure captured the new vocabulary which may have not been clearly understood by some of the respondents during the data collection phase. This limitation was prompted by a low person separation index and poor person-item targeting in most dimensions of the LPME measure as was observed when the researcher was conducting Rasch analysis during the exploratory factor analysis phase of this research. The item separation index was consistently high and acceptable, and the other fit statistics (MNSQ infit/outfit values, point measure correlation) also confirmed that the items were well-developed and measured the construct under enquiry. Therefore, the findings of this research may have to be interpreted with caution taking into cognizance this limitation.

A fourth limitation relates to the scope of application of the findings of this research. It must be noted that the model and LPME measure developed in this research are not the sole panacea to the learning programme challenges currently being experienced by organisations, and therefore should not be interpreted as such. These tools should be seen as outcomes of a scientific enquiry which may require further scrutiny. There may be other factors not examined in this research such as the size of the organisation, the nature of its HRD policy framework, the business imperatives, to name but a few, which may also require careful consideration to augment the successful application of these tools.

7.3 RECOMMENDATIONS

This research sought to contribute to the field of human resource development and in particular to skills development in the South African workplace context. Consequently, the recommendations are formulated for HRD/skills development practice, for effective management and evaluation of occupational learning programmes, and for future research as set out below.

7.3.1 Recommendations regarding HRD/skills development practice

- The role and function of HRD in organisations should be strengthened in order for it to realise the potential benefits of occupational learning programmes.
- HRD leadership must be strengthened in organisations in order to guide effective management and evaluation of occupational learning programmes by focusing on the 11 dimensions (administrative processes, strategic leadership, environmental scanning, observation and problem solving, quality assurance, monitoring and evaluation, policy awareness, stakeholder inputs, learning programme design and development, learning programme specifications and occupational competence).
- HRD/occupational learning policies must be aligned to the skills development legislation. Applying the LPME measure as a management and evaluation tool will help to achieve this.
- The business case for implementing occupational learning programmes must be established, and not just for levy reimbursement.
- Skills audit is imperative in order for organisations to draw future human resources from existing pools of learners/apprentices.
- Learners/apprentices must be informed of the value of occupational learning programmes during the orientation phase.
- It may be important to designate a project manager whose mandate is to oversee the management and evaluation of occupational learning programmes.
- Site visits by SETAs to conduct monitoring and evaluation must be constant.
- Role and responsibility clarity is very important to ensure that all occupational learning programme stakeholders are working towards the same goal of nurturing and empowering the learner/apprentice.

7.3.2 Recommendations regarding management and evaluation of occupational learning programmes

- HRD function must provide leadership and render oversight services to ensure effective implementation of occupational learning programmes.
- The environment within which occupational learning programmes are to be implemented must be thoroughly scanned to ensure that the goals of the programme are not compromised.
- Skills development providers must be knowledgeable regarding the theoretical component of the learning programme.
- The facilities in which learners/apprentices are to be trained must be in good condition.
- Learners must only be trained in occupations for which they are recruited.
- Regular feedback must be provided to the learners regarding their performance.
- All stakeholders must be informed of policies that relate to occupational learning programmes.
- The administrative processes pertaining to occupational learning programmes must be streamlined in order to enhance the effectiveness of the programme.
- The design of the learning programme material must be informed by appropriate occupational standards.
- Regular monitoring and evaluation of learners and mentors, and learners and providers must be conducted.
- The quality assurance principles must be built into the design of the learning programme.
- Workplace mentors and supervisors must be knowledgeable about the occupation in which the learner/apprentice is being trained.

7.3.3 Recommendations for further research

Given the seriousness of the skills shortage challenge facing South Africa, this research provides a solid base upon which other HRD scholars could further seek a lasting solution. The following recommendations are made:

- It is justifiable to suggest that the findings of this research point towards a need for action research whereby the new LPME scale could be applied practically.
- This research provides direction for future research that may focus on a single type of a learning programme.
- It may be interesting to also conduct a further study on a specific industry or sector in order to unravel other underlying issues pertaining to the management and evaluation of occupational learning programmes in South Africa and beyond.

- Further research could also be conducted to establish whether the challenges of management and evaluation are prevalent at the institutional level where theory is taught, or at the workplace where experienced is acquired.

7.4 EVALUATION OF THE RESEARCH

This research sought to identify and conceptualise the elements and dimensions of a holistic and integrated theoretical model, and to develop and refine a measurement scale for the effective management and evaluation of occupational learning programmes in the South African skills development context in order to address the challenges of ineffective management and evaluation of occupational learning programmes. The research intended to make a significant contribution on the theoretical, empirical and practical levels to the HRD/skills development field.

7.4.1 Theoretical

Theoretically, the study has provided a simplified understanding of the subtleties relating to the management and evaluation of occupational learning programmes. It extends current thinking and debate regarding the role of occupational learning programmes as pathways to address the skills shortage challenge, and it provides a conceptual model that provides a simplified understanding of the elements and dimensions pertaining to the effective management and evaluation of occupational learning programmes.

7.4.2 Empirical

The empirical contribution of this research is the new LPME scale and its associated sub-scales which are valid and reliable tools for the effective management and evaluation of occupational learning programmes.

7.4.3 Practically

The LPME scale is a versatile tool that can be applied wholly or in parts, depending on the needs of the individual. This tool will empower organisations, skills development providers, employees, learners and authorities to effectively manage and evaluate occupational learning programmes with less effort.

7.4.4 Personal

At first, when I started I was not sure of my readiness for a Doctorate degree. Quickly, I realised that was the best decision I have ever made for myself, and this research project has been an eye opener. Upon commencing with the literature review, I realised that the challenge of skills shortage in South Africa may not be addressed successfully in the foreseeable future owing to a lack of quality empirical research. Most studies I have read, even those commissioned by government, seem to be looking at the problems besieging the skills development system, particularly occupational learning, from the top of the hill. These studies have not looked at the underlying critical issues causing ineffectiveness in the skills supply system. The approach to the problem seem to be superficial and with a lack of purpose. I am not saying my research is a panacea to the challenge confronting us; it is a contribution to the challenge which I felt I needed to make. I am sure there are good researchers out there who will not give up until we conquer the paradoxical scourge of lack of skills and surging unemployment on the other end. Quite an interesting paradox at this moment in time.

This intellectual journey was a remarkable challenge for me, well timed and a bit frightening with a cloud of uncertainty in terms of the government's position with regard to skills development policy direction and institutional architecture. At the time I had to pursue my fieldwork just after requesting permission from the CEOs of SETAs, the court battle had ensued over constitutional imposition by the minister and some SETA CEOs (CETA, Service SETA) were placed under administration without replying to my permission request.

In the end, it has been worth it.

I trust that this research has paved the way for future research initiatives that contribute to solutions to the skills development challenges faced by South Africa.

7.5 CHAPTER SUMMARY

This chapter presented the conclusions, limitations and recommendations of this research that are based on the findings presented in Chapter 5 and Chapter 6. The conclusions were presented taking cognisance of the research aims. Limitations were formulated based on both the literature and empirical phases of this research. In the end, recommendations were made for practice and future research, and an evaluation of the research was made. Herewith the research project is concluded.

The next section presents the research article.

Development of the Learning Programme Management and Evaluation Scale for the South African skills development context

Abstract

Occupational learning programmes are an important pathway to skills development in South Africa. The present study developed and tested the construct validity and reliability of the Learning Programme Management and Evaluation Scale (LPMES) for measuring and enhancing the effectiveness of the management and evaluation of occupational learning programmes in the South African skills development context. The LPMES was administered to a sample of 652 skills development practitioners and learners/apprentices drawn from different South African industry sectors. The validity and reliability of the scale were tested through exploratory factor, Rasch and confirmatory factor analyses. The findings show that the LPMES is a valid and reliable 11 dimensional measure. Recommendations are made for the use of the LMPES in the South African workplace context and for future research.

Keywords: Human Resource Development; Skills development; occupational learning programme; management; evaluation

INTRODUCTION

It is now widely accepted that the skills of the workforce is a critical determinant of global competitiveness (Kruss, Wildschut, Janse Van Rensburg, Visser, Haupt & Roodt, 2012). In a time of global economic recession, debt crises and burgeoning unemployment, skills and capabilities are even more significant. In order to advance, or simply keep up, countries have to develop their technological capabilities, to increase their share of knowledge intensive and complex activities which require higher skills levels in general, and in relation to the technological trajectory of specific sectors (Kruss et al., 2012). South Africa faces a critical challenge of skills shortage and this is seriously threatening economic growth and employment creation (Arvanitis, 2006; Hermann, 2008; Lamont, 2001; SAIRR, 2008). Du Toit (2012) and Goga and Van der Westhuizen (2012) regard the situation as a paradox of skills shortages in the workplace with high levels of unemployment.

Occupational learning programmes are touted as a fundamental mechanism to address skills shortages in the South African context, hence vocational and occupational certification via learnership and apprenticeship programmes is at the core of the new skills creation system. An occupational learning programme is a learnership, an apprenticeship, a skills programme or any other prescribed learning programme that includes a structured work experience component (Republic of South Africa, 2008). These programmes are inserted into a complex and increasingly bureaucratised qualifications and quality assurance infrastructure. They are administered by the Sector Education and Training Authorities (SETAs), which are in effect, a set of newly created institutions that have yet to develop capacity to drive skills development (Marock, Harrison-Train, Soobrayan & Gunthorpe, 2008). This study took cognisance of the fact that policy concerns around a skills crisis that South Africa is not producing enough of the right levels and kinds of skills to support global competitiveness and economic development have intensified over the past five years (Janse Van Rensburg, Visser, Wildschut, Roodt & Kruss, 2012), thus making the present study very timely. A number of challenges have been raised regarding the co-ordination and management of skills development training projects in South Africa (Du Toit, 2012), including poor quality of training and lack of mentorship.

An *'Impact assessment study of the National Skills Development Strategy (NSDS) II'* (Mummenthey, Wildschut & Kruss, 2012) revealed the prevalence of difference in standards across the different occupational learning routes, which brought about inconsistencies regarding procedures to implement training. This was found to significantly impact on the uniformity and reliability of the outcome, resulting in confusion amongst providers and workplaces. The inconsistent implementation of workplace learning demonstrates that more guidance and improved quality assurance mechanisms are required. Further, the study (Mummenthey et al., 2012) revealed that there is a lack of structured

and sufficiently monitored practical work-exposure as well as full exposure to the trade, particularly in the case of apprenticeships in the workplace. The quality checks were found to be superficial: checking policies and procedures, but not thoroughly checking what is actually happening during training. The primarily paper-based checks (sometimes adding learner interviews) were found to be insufficient and “completely missing the point” (Mummenthey et al., 2012, p. 40). A lack in subject matter expertise often reduced the process of quality assurance to a paper proof instead of actually assuring the quality of training. However, overall alignment of theory and practice could be better achieved through setting and maintaining a consistent benchmark for training at institutional, and workplace level. Minimum standards in terms of learning content and workplace exposure, together with a common standard for exit level exams, can considerably strengthen consistency in outcomes, implementation and assessment (Mummenthey et al., 2012). This will positively affect transferability of skills between workplaces, and thus the overall employability of learners. The foregoing shortcomings are indicative of management and evaluation weaknesses impacting the South African skills development system and they raise serious concerns about the quality of occupational learning, hence the present study.

In a context of few post-school opportunities, learnerships and apprenticeships are thus potentially significant routes to such critical vocational and occupational qualifications in South Africa, and the promise of future employment (Wildschut *et al.*, 2012). They represent important alternative routes to enhance young peoples’ transition to the labour market, and to meet the demand for scarce and critical skills. A 2008 review of SETAs showed that the skills development system suffers from weak reporting requirements, underdeveloped capacity, lack of effective management, and inadequate monitoring and evaluation that limit the ability of these institutions to serve as primary vehicles for skills development (Marock *et al.*, 2008).

RESEARCH OBJECTIVE

The objective of the present study was to develop and test the construct validity and reliability of a Learning Programme Management and Evaluation (LMPE) scale based on the theoretical framework proposed by Tshilongamulenzhe (2012) for the effective management and evaluation of occupational learning programmes in the South African skills development context. The newly developed scale was necessitated by the need for an integrated and coherent approach towards occupational learning programme management and evaluation with a view to effectively promote the alignment of skills development goals with the needs of the workplace in support of the goals of the National Skills Development Strategy (NSDS) III (2011-2016).

LITERATURE REVIEW

The theoretical framework for the management and evaluation of occupational learning programmes in the South African skills development context proposed by Tshilongamulenzhe (2012) is of relevance to the current study. Tshilongamulenzhe (2012) identified three phases relevant to the effective management and evaluation of occupational learning programmes: (1) initiation, (2) execution and (3) monitoring and evaluation. As illustrated in figure 1, each of these three phases constitutes specific elements that are critical to the effective management and evaluation of a learning programme.

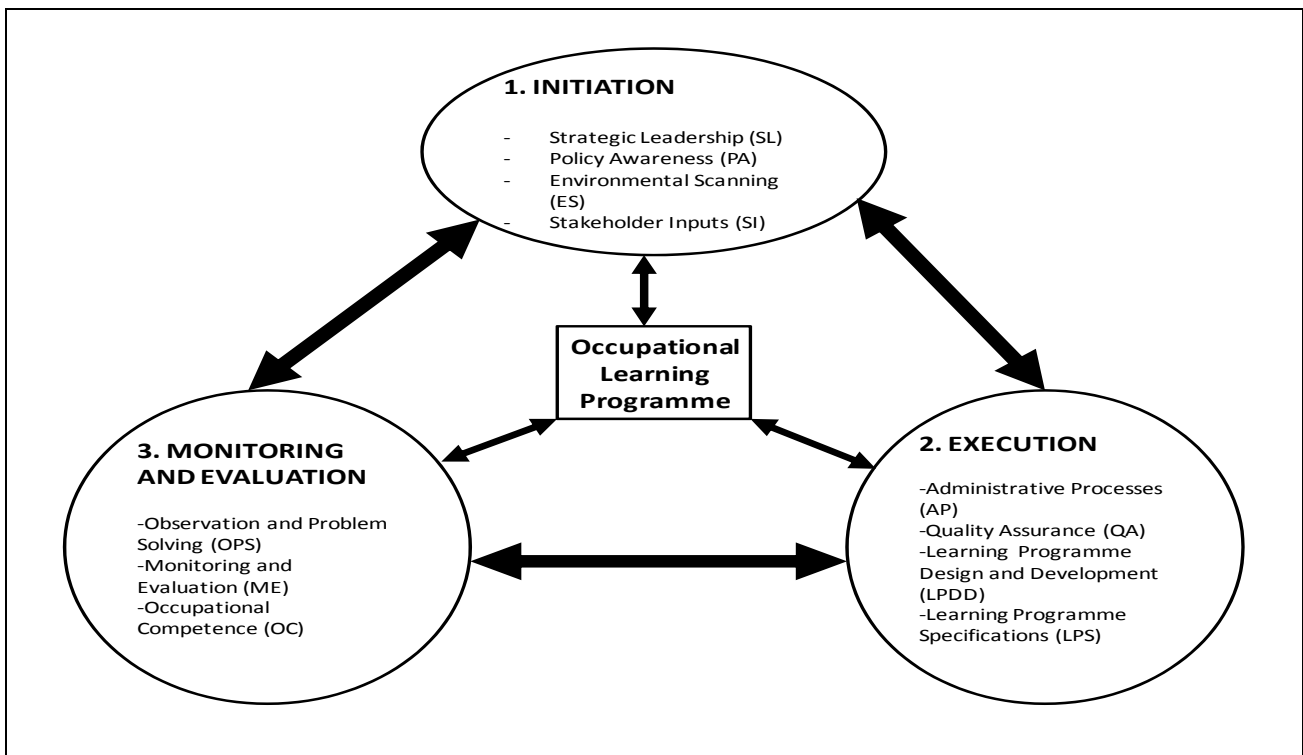


Figure 1. Phases and dimensions for the effective management and evaluation of occupational learning programmes (Tshilongamulenzhe, 2012)

Phase I: Initiation

In the context of this study, initiation refers to the way an organisation scans its environment (external and internal) and uses the inputs obtained to plan and organise for the successful delivery of an occupational learning programme. The relevant inputs include legislative guidelines, needs analysis results and the resources (both human and financial) required in order to achieve the objectives of an occupational learning programme. The elements in this phase are strategic leadership, policy awareness, environmental scanning and stakeholder inputs (Tshilongamulenzhe, 2012).

Strategic leadership

This element focuses on how organisational leaders drive human resource development (HRD) policy and strategy in order to facilitate the achievement of the objectives of an occupational learning programme. Also examined are the organisation's governance system and how an organisation fulfils its legal, ethical and societal responsibilities and supports its key communities. Senior leaders have a central role to play in setting values and directions, communicating, creating and balancing value for all stakeholders, and creating an organisational bias for action (Award Criteria, MBNQA, 2010). Strategic leadership also relates to the way leaders develop and facilitate the achievement of the mission and vision, develop values required for long-term success and implement these via appropriate actions and behaviours and how they are personally involved in ensuring that the organisation's management system is developed and implemented (EFQM, 1999). The NQI (2001) and the SAEF (2005) describe leadership as creating the culture, values and overall direction for lasting success in an organisation. The behaviour of the executive team and all other leaders inspires, supports and drives a culture of business excellence (SAEF, 2005). It is this behaviour that creates clarity and unity of purpose in the organisation and an environment in which the organisation and its people can excel (EFQM, 1999; SAEF, 2005). Since the skills development providers take operational custodianship of occupational learning programmes, it is significant that they exercise sound leadership in order to manage these programmes successfully (Bisschoff & Govender, 2004).

Policy awareness

Policy awareness involves an organisation's analysis of relevant legislation that entrenches occupational learning programmes to inform and guide the design and implementation of occupational learning programmes. The relevant legislations include the Skills Development Act (as amended) and the National Qualifications Framework Act. Based on the provisions of these two pieces of legislation, an organisation can clearly formulate and effectively implement its HRD policies and strategies. An organisation must implement its mission and vision via a clear stakeholder-focused strategy, supported by relevant policies, plans and objectives. A successful organisation formulates policy and strategy in collaboration with its people and this process should be based on relevant, up-to-date and comprehensive information and research (EFQM, 1999). The policy and strategy must be clearly formulated, deployed and revised and should be operationalised into plans and actions (SAEF, 2005). However, in the South African context, organisational policies for training need to be aligned with the skills development legislation. For example, training policies should make provision for cost benefit analysis since the skills development legislation demands that a cost benefit analysis be completed to determine the benefits to annual training investments (Bisschoff & Govender, 2004). In the Indian context, however, formal apprenticeships were introduced through the Apprenticeships Act of 1961,

which requires employers in notified industries to engage apprentices in specified ratios in relation to the workforce. The Central Apprenticeship Council outlines the policies and different norms and standards of apprenticeship training in the country (Palit, 2009). Hence knowledge of legislative instruments that influence organisational training policies is vital to the success of occupational learning programmes.

Environmental scanning

This element of the initiation phase entails an analysis of an organisation's external and internal environments in order to draw inputs necessary to plan and organise for the successful delivery of an occupational learning programme. This includes an analysis of the relevant legislation, facilities, relevant equipment and the availability of both the financial and human resources. The award criteria of the Malcolm Baldrige National Quality Award (Award Criteria, MBNQA, 2010) cites environment as one of the overarching guides for organisational performance management system. The MBNQA award stresses that long-term organisational sustainability and an organisation's competitive environment are key strategic issues that need to be integral parts of an organisation's overall planning. Organisational and personal learning are necessary strategic considerations in today's fast-paced environment. Knowledge of the way an organisation determines its key strengths, weaknesses, opportunities and threats, its core competencies and its ability to execute the strategy is essential for the organisation's survival (Award Criteria, MBNQA, 2010).

In the South African context, the Quality Council for Trades and Occupations (QCTO) model of quality management emphasises that workplace approval as learning sites for occupational learning programmes will be granted after evidence is produced that such workplaces have the ability to provide work experience component (DHET, 2010b). Hence environmental considerations are vital for the successful delivery of occupational learning programmes. It is imperative for skills development providers, who are the custodians of occupational learning programmes in South Africa, to define the scope of an occupational learning programme. The process of scoping could be done successfully once the environment in which these programmes are to be implemented is carefully analysed. The scope will identify the inputs, range, criteria, stakeholders and outcomes of the programme. Once the scope has been defined, the programme should be scheduled according to relevant times, dates and stakeholders (Bisschoff & Govender, 2004).

Similarly, Kirkpatrick and Kirkpatrick (2006) indicate that adequate consideration should be given to the learning environment and conditions when evaluating training. Stufflebeam and Shinkfield (2007) also focus on the importance of context when evaluating training programmes. They believe that the

training context defines the relevant environment, identifies needs and assets and diagnoses specific problems that need to be addressed. Furthermore, Bushnell (1990) emphasises the importance of evaluating system performance indicators such as trainee qualifications, the availability of materials and the appropriateness of training. This view is also supported by Fitz-Enz (1994) who states that collecting pre-training data to ascertain current levels of performance in the organisation and defining a desirable level of future performance are key aspects of training evaluation. He also emphasises the need to identify the reason for the existence of the gap between the present and desirable performance in order to ascertain whether training is the solution to the problem.

Stakeholder inputs

This element focuses on the way an organisation identifies and relates to its key stakeholders that are critical for the successful delivery of an occupational learning programme. These stakeholders include potential learners, skills development providers (including assessors and moderators), coaches and mentors (supervisors and managers). According to the European Foundation for Quality Management (EFQM, 1999; SAEF, 2005), excellence in the organisation is dependent upon balancing and satisfying the needs of all relevant stakeholders (this includes the people employed, customers, suppliers and society in general as well as those with financial interests in the organisation). An organisation is seen as part of society, with key responsibilities to satisfy the expectations of its people, customers, partners, owners and other stakeholders including exemplary concern for responsibility to society (NQI, 2007).

However, from an occupational learning programme perspective, skills development providers must integrate their activities in any organisation by working with the skills development facilitators, assessors, other skills development practitioners, managers and learners. They must employ project management skills in order to manage diverse roles and responsibilities of all key stakeholders and to evade crisis management situations (Bisschoff & Govender, 2004). Equally significant and from a training evaluation perspective, Kirkpatrick and Kirkpatrick (2006) suggest that along with the evaluation of learners, the programme coordinators, training managers and other qualified observers' reactions to the facilitator's presentation should also be evaluated. The success of learners during a training programme therefore also depends on the roles played by other stakeholders.

Phase II: Execution

This phase focuses on the ways in which an organisation plans, designs, implements and manages occupational learning programmes in accordance with the legislative guidelines and its policy and strategy in order to achieve the programme's objectives, and to fully satisfy and generate increasing

value to its stakeholders. The elements include policy awareness, learning design, programme structure and quality assurance (Tshilongamulenzhe, 2012).

Administrative processes

This element focuses on the critical activities required to support the successful delivery of an occupational learning programme. These include the recruitment, selection and placement of stakeholders. These processes also involve consultation with the successful candidates, clarification of roles and responsibilities, and finally, the conclusion of contractual arrangements (Davies & Faraquharson, 2004) The European Foundation for Quality Management (EFQM) emphasises the importance of the way in which an organisation designs, manages and plans its processes in order to support its policy and strategy and fully satisfy, and generate increasing value for, its customers and other stakeholders (EFQM, 1999). Organisations perform more effectively when all interrelated activities are understood and systematically managed, and decisions concerning current operations and planned improvements are made using reliable information that includes stakeholder perceptions (SAEF, 2005). This includes the way an organisation plans and manages its internal resources in order to support its policy and strategy and the effective operation of its processes.

An organisation's processes must be managed effectively to support its strategic direction, with a specific focus on prevention (as against correction), as well as continuous improvement. Process management applies to all activities in the organisation, in particular those that are critical for success (NQI, 2007). It should be borne in mind that an organisation is a network of interdependent value-adding processes, and improvement is achieved through understanding and changing these processes in order to improve the total system. To facilitate long-term improvements, a mindset of prevention as opposed to correction should be applied to eliminate the root causes of errors and waste. Hence an organisation's resources and information should be managed and utilised effectively and efficiently and its operating processes should be constantly reviewed and improved (SAEF, 2005). These work processes and learning initiatives should be aligned with an organisation's strategic directions, thereby ensuring that improvement and learning prepare an organisation for success.

From an evaluation perspective, Stuffelbeam and Shinkfield (2007) indicate that inputs should be evaluated in order to assess the system capabilities by looking into its resources and how they can best be applied to meet the programme's goal. Hence an effective and efficient management of organisational processes and resources is significant for the successful implementation of occupational learning programmes.

Quality assurance

This element relates to the way an organisation promotes and assures quality in the design and implementation of occupational learning programmes. Occupational learning programmes must be practice driven, relevant and responsive to the needs of an occupation (DoL, 2008a). The Canadian National Quality Institute (NQI, 2007) emphasises that the best way to keep things on track in an organisation is to apply a quality assurance method to everything that is done. This view is supported by the South African Excellence Foundation (SAEF) which based the South African Excellence Model (SAEM) on the concepts of formulating quality policies, assigning responsibility for quality to top management, managing quality procedures and control, reviewing improvement processes, delegating authority and empowering the workforce (SAEF, 2005). From an occupational learning programme perspective, however, Bisschoff and Govender, (2004) emphasise the importance of quality when stating that skills development providers, employers and learners must achieve quality standards of performance during these programmes. They contend that effective skills development providers should strive to promote excellence and quality in the occupational learning programme.

Furthermore, in the new Occupational Learning system (OLS) landscape in South Africa, the Quality Council for Trades and Occupations (QCTO) controls the quality of provision, assessment and certification by applying specified criteria in terms of the approval of regulated occupational learning programmes (DHET, 2010b). The regulatory and quality assurance functions of Sector Education and Training Authorities (SETAs) are coordinated through the QCTO in order to use the resources more effectively. Quality monitoring and audits by the QCTO will be conducted constantly as required on the basis of complaints and final assessment results. The SETAs' quality assurance role involves quality monitoring of programme implementation and programme evaluation research, including impact assessment.

Quality assurance of occupational learning programmes ensures the predictability and repeatability of processes under the organisation's control against the strategic criteria in the quality management system (Vorwerk, 2010). It is largely an issue of quality control (DHET, 2010b). In the Indian context, however, the quality of apprenticeship training is only as good as the skills of the master and his or her willingness and ability to pass on those skills (Palit, 2009). To this end, quality must permeate every aspect of an occupational learning programme, if such a programme is to succeed.

Learning programme specifications

This element focuses on the way an occupational learning programme is structured. Typically, an occupational learning programme contains three core aspects, namely knowledge and theory,

practical skills and work experience (DHET, 2010b; DoL, 2008b). The knowledge and theory component comprises various subject specifications (QCTO, 2011). Knowledge here refers to discipline or conceptual knowledge (including theory) from a recognised disciplinary field found on subject classification systems, such as the Classification of Educational Subject Matter (CESM), which an individual has to have in order to perform the tasks that are identified in the occupational profile proficiently. The knowledge identified is frequently common to a group of related occupations at the same level in the same National Occupational Pathways Framework (NOPF) family, and the level of knowledge to be covered will be built on the knowledge base held by those entering from lower level occupations within the relevant NOPF family (QCTO, 2011). The subjects specifications are developed by educationists based on inputs from expert practitioners and are packaged as standardised courses to enable providers to plan their delivery and access standardised funding.

The practical skills component derives from the roles to be performed (QCTO, 2011). It comprises various practical skill module specifications. Practical skills are defined as the ability to do something with dexterity and expertise. Skill grows with experience and practise and could lead to unconscious and automatic actions. Practical skills are more than just the following of rule-based actions and include practical/applied knowledge (QCTO, 2011). The purpose of practical skills training is to develop the needed skills (including applied/practical/functional knowledge) to operate safely and or accurately in the actual working environment (so as not to cause damage to people, equipment, systems and the business). Practical skills are, therefore, mostly developed in a safe, simulated environment (such as a workshop) in preparation for actual work (QCTO, 2011). The module specifications are developed by expert practitioners and trainers based on the practical skills (including the applied/practical/functional knowledge) required to execute the occupational responsibilities, in terms of the tasks identified in the occupational profile (QCTO, 2011).

Work experience is defined as the exposure and interactions required to practise the integration of knowledge, skills and attitudes required in the workplace. Work experience includes the acquiring of contextual or in-depth knowledge of the specific working environment. The work experience module specifications are developed by expert practitioners, based on the work experience activities required within the specific occupational context in terms of the tasks identified in the occupational profile. Work experience modules will be reflected as work experience unit standards in the occupational qualification (QCTO, 2011). The purpose of work experience is to structure the experiences and activities (including contextual knowledge) to which the learner needs to be exposed in order to become competent in the relevant occupation.

Learning programme design and development

This element focuses on the way an organisation plans and designs its occupational learning programmes. It entails the use of relevant unit standards and logbooks, the format of presentation, the assessment scheme to be used and the outcome of the learning process (SQA, 2009). The new OLS landscape in South Africa demands that during the development phase of occupational curriculum/qualifications, a curriculum/qualification development facilitator should be appointed to guide and direct various working groups, which are responsible for the development of an occupational profile, the development of learning process design and the development of assessment specifications (DHET, 2010b). The QCTO will have to ensure quality assurance of development and design task by applying nationally standardised processes and systems (DHET, 2010b). The design of a learning programme determines its outcomes.

As Kirkpatrick and Kirkpatrick (2006) indicate, if a learning package is of sound design, it should help the learners to bridge a performance gap. They suggest that if a programme is carefully designed, learning can be evaluated fairly and objectively while the training session is being conducted. Stoffelbeam and Shinkfield (2007), however, suggest that the evaluation of training programme inputs helps to determine the general programme strategy for planning and procedural design, and whether outside assistance is necessary. Bushnell (1990) suggests that evaluation should embrace the planning, design, development and delivery of training programmes. Occupational learning programmes should thus be carefully designed, taking into account the needs of all stakeholders, the industry and the national interests.

Phase III: Monitoring and evaluation

This phase is concerned with the systematic implementation and post-implementation monitoring and evaluation of the occupational learning programmes. The elements include observation and problem solving, monitoring and evaluation, and occupational competence (Tshilongamulenzhe, 2012).

Observation and problem solving

This element entails regular observation visits by SETA representatives or designated agents to sites of delivery (classroom, workshops, workplaces, etc.) in order to monitor the progress of learners for the duration of the occupational learning programme. In Singapore (Chee, 1992), on-the-job training of apprentices is structured and backed by a comprehensive documentation and monitoring system. From the point of placement of an apprentice in a company, the Institute of Technical Education (ITE) begins a programme of monitoring the particular apprentice's progress for the full duration of his or her training. ITE officers visit the company regularly, at intervals of about two to three months, to ensure

that the training is in accordance with the training structure and on schedule; to monitor the apprentice's progress and performance through direct observation and dialogue with his or her supervisor; and to attend to any matters pertaining to the performance and welfare of the apprentice. Based on the observations made, the officers initiate the necessary follow-up with the apprentice, company or ITE headquarter departments accordingly.

Monitoring and evaluation

This element focuses on the monitoring and evaluation of occupational learning programmes. The NQI emphasises the importance of monitoring and evaluation of the progress made towards meeting the goals of the organisation (NQI, 2007). In South Africa, the QCTO will conduct research to monitor the effectiveness of learning interventions in the context of the larger occupational learning system. Monitoring and evaluation revolves around the development and design processes, the implementation of occupational learning programmes and data analysis and impact assessment (qualitative and quantitative) (DHET, 2010b). SETAs will have to focus on monitoring and evaluation of the implementation of occupational learning programmes in line with the Department of Higher Education and Training (DHET) regulations.

A systematic appraisal should be made of on-the-job performance on a before-and-after basis. Stuffelbeam and Shinkfield (2007) also support the evaluation of the actual training programme activities because this provides feedback on managing the process, recording and judging the work effort. Furthermore, Bushnell (1990) emphasises the significance of gathering data resulting from the training interventions. However, Fitz-Enz (1994) believes that evaluating the difference between the pre- and post-training data is vital to establish the actual value of a training intervention. The experience in Singapore, as reported by Chee (1992), is such that on-the-job training of apprentices is strictly supervised and the supervisor certifies the completion of each task in the logbook, thus closely monitoring the progress of the apprentice in following the tasks list.

Occupational competence

This element entails an assessment of the learner's ability to function effectively and provide products or services relating to the relevant occupation. This may include working together with others in a team in order to achieve performance improvement in the relevant occupation in an organisation. An evaluation of the post-training occupational affiliation is necessary in this dimension (Taryn Florence & Braam Rust, 2012). The acquisition of new skills and knowledge is of no value to an organisation unless the participants actually use them in their work activities (Kirkpatrick & Kirkpatrick, 2006). Phillips (1997) also emphasises the importance of measuring change in behaviour on the job and

specific application of the training material. Successful occupational learning programmes should impart the relevant skills to learners so that they can competently and effectively function in their respective occupations. In the new OLS landscape in South Africa, occupational learning programmes are evaluated, *inter alia*, on the appropriateness and relevance of skills that learners acquired, learners' enhanced employability and enhanced productivity and quality of work (DHET, 2010b). Equally important, Kirkpatrick and Kirkpatrick (2006) indicate that it is necessary to measure learners' performance because the primary purpose of training is to improve results by having the learners acquire new skills and knowledge and then actually apply them to the learners' jobs.

RESEARCH METHOD

Phase I: Questionnaire development

The process followed in the development of the new Learning Programme Management and Evaluation Scale (LMPES) is outlined below.

Scale development procedure

The procedure of scale development suggested by Clark and Watson (1995) was followed and included the conceptualisation of the construct, item generation, item development and item evaluation and refinement.

Conceptualisation of the constructs

Learning programme management has been defined in this study as the process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human and physical) in order to achieve the objectives of an occupational learning programme (Trewatha & Newport, 1976); whereas, learning programme evaluation refers to a process of collecting descriptive and judgemental information on the programme's components (*e.g.* context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcomes (Stufflebeam, 2003).

Item generation

In item generation, the primary concern is content validity, which may be viewed as the minimum psychometric requirement for measurement adequacy and is the first step in construct validation of a new measure (Schriesheim, Powers, Scandura, Gardiner & Lankau, 1993). Content validity must be built into the measure through the development of items. As such, any measure must adequately capture the specific domain of interest yet contain no extraneous content. In this study, a clear link was established between items and their theoretical domain. This was accomplished by beginning

with a strong theoretical framework regarding skills development, occupational learning system, training management and evaluation models, and by employing a rigorous sorting process that matched items to construct definitions.

Item development

Once the scope and range of the content domain have been tentatively identified, the actual task of item writing can begin (Clark & Watson, 1995). Writing scale items is more challenging and time-consuming (Mayenga, 2009). In this study, a large pool of items were written and carefully reviewed by the researcher with the assistance of the research supervisor. The review process was aimed to determine whether the items were clearly stated; whether the items conformed to the selected response format; whether the response options for each item were plausible; and, whether the wording was familiar to the target population. An initial pool of 182 items was generated during this stage based on review of the literature.

Item evaluation and refinement

As Benson and Clark (1982) state, an instrument is considered to be content valid when the items adequately reflect the process and content dimensions of the specified aims of the instrument as determined by expert opinion. As part of the content validation, a sample comprising 27 skills development experts and apprentices/learners reviewed the pool of 182 items with instructions to assess the face and content validity, to evaluate the relevance of the items to the dimensions they proposed to measure, to assess the importance of the items, to assess the item difficulty level (easy, medium, difficult), and to judge items for clarity. The goal was to obtain a reasonable number of items that would constitute the final draft measure. Item quality and content relevance for the final draft of the scale were determined based on the strength of the literature and expert reviewers' comments. A decision to retain items for the final draft was made based on the results of expert review regarding item clarity, relevance and importance. The expert review results showed a clean ranking of each item in terms of relevance, importance and difficulty. All items were consistently ranked and the results ranged from an average of 84.1 to 100 percent in overall. However, in view of the fact that an average less than 100 percent demonstrates that not all reviewers agree on the relevance, clarity and importance of some items, the researcher decided that a cut-off point of 96 percent would be appropriate in order to eliminate some items that may not be clear, relevant and important in the draft research instrument.

Subsequent to this decision, the results of expert review on item relevance, clarity and importance showed that 33 items had an average of 100 percent agreement among experts; 24 items had an

average percentage range of between 98, 6 and 98, 7 percent; 43 items had an average percentage range of between 97, 2 and 97, 5; and only 9 items had an average percentage range of between 96.0 and 96.3. Consequently, all items below a 96 percent average were eliminated, except for four best-averaged items below this cut-off point in two dimensions that were included to ensure that each dimension had at least 5 items. Each pair of these four retained items had the highest average percentage below the cut-off point (93.3 and 94.7 respectively) in their respective theoretical dimensions. In the final analysis of the expert inputs, the revised instrument had 113 items in total which were measured on a 6-point Likert scale, ranging from (1) Strongly Agree to (6) Strongly Disagree. All items were classified into the appropriate dimension and each dimension had at least 5 items.

Phase II: Item evaluation with Exploratory Factor Analysis and Rasch analysis

Research approach

A quantitative, non-experimental, cross-sectional survey design was used in order to achieve the objective of this study.

Measuring instrument

The newly developed Learning Programme Management and Evaluation Scale (LPMES) consisted of 113 items, measuring the elemental aspects outlined in the theoretical framework proposed by Tshilongamulenzhe (2012). Construct validity and internal consistency reliabilities were examined by means of Exploratory Factor Analysis. Unidimensionality of the refined LPMES was assessed by means of Rasch analysis.

Research participants

In this study, a sample of 900 respondents was drawn from 6 organisations: 5 Sector Education and Training Authorities (SETAs) and the South African Board for People Practices (SABPP), using a probabilistic simple random sampling technique. The sample was drawn from the databases of these organisations and the target participants were learning managers/employers, mentors/supervisors of learners/apprentices, skills development officers/providers, learning assessors/moderators as well as learners/apprentices. The conjecture was that all sampled participants have adequate knowledge of the South African skills development system including occupational learning programmes. In full view of this, the sample drawn was deemed representative of the research population. Only 652 usable questionnaires resulted from the administration process, yielding a response rate of 72%.

The sample used in the present study was comprised mainly of young people in the early carer stage of their lives. About 78.8% were aged below 35 years with only 3, 3% older than 56 years. The sample was diverse in terms of gender, educational achievement, type of learning programme and occupational profile. The gender composition shows that about 52.8% of respondents were females. About 58.8% of the respondents achieved a senior certificate (Matric/N3) as their highest qualification, with only 4% who did not completed matric. The results also show that only 13.9% of the respondents achieved a professional (4 years) or honours, master's and doctorate degree. About 86.6% of the respondents were involved in learnerships compared to 13.4% who were involved in apprenticeships. Just over 65% of the respondents constituted learners/apprentices with 9% comprising employers/managers.

Research procedure

Permission to undertake this research was sought from all 21 SETAs and the SABPP. The researcher wrote official letters of request for permission to all Chief Executive Officers of 21 SETAs. Unfortunately, only five of the twenty one SETAs gave permission for the research to be undertaken within their jurisdictions. Permission was also obtained from the SABPP. Once permission to undertake the research was granted, the researcher started the process of planning for sampling and data collection with the respective organisations. Five fieldworkers and a project administrator were appointed to render the data collection service and project fieldwork management support. The project management support included assistance to the fieldworkers and the researcher, management and capturing of data. The fieldwork took place in three of the nine South Africa's provinces, that is, Mpumalanga, North West and Gauteng, over a period of 3 months.

The questionnaire distributed to respondents had a cover letter which informed respondents of the purpose and significance of the research, and that their participation is voluntary at their own consent. Also included in the letter was the time required to complete the questionnaire as well as the assurance that respondents can discontinue their voluntary participation at any time they wish. The cover letter also assured respondents of their anonymity and confidentiality of their responses, which would only be used for the current research purposes only.

In order to ensure a high degree of internal validity between the different fieldworkers a number of criteria had to be met when appointing fieldworkers (Leedy & Ormrod, 2001, p. 103). Fieldworkers were selected according to the following criteria:

- Tertiary qualification: Fieldworkers were required to at least have a Bachelor's Degree in Human Resource Management (HRM) and knowledge of research methodology. A qualification in HRM provides a broader understanding of training/learning/human resource development issues and this knowledge was important to address questions that respondents may raise.
- The project administrator was required to have some experience with the research process, including logistics management, project management, data management and data capturing.
- A briefing session in which fieldworkers and an administrator were trained on various aspects pertaining to this research was also arranged. In addition, several demonstrations of the data collection procedure and data management were performed with the fieldworkers and the administrator respectively to ensure that they understood the process and complied with the ethical principles. Both the fieldworkers and an administrator demonstrated high level of knowledge and competence, as observed during interactions with the researcher before data collection began.

The reason for conducting physical fieldwork was to try and mitigate the low response rate commonly known for web surveys. The researcher decided to exclude the other 6 provinces from the survey as they were already represented in a web survey. Each of the 6 organisations that participated in the study had members in all 9 provinces of South Africa. A web-version of the research measure was thereafter developed for wider reach of the population. Web respondents were informed by their organisations of the research and its purpose using online newsletters, email and the website. An active web link to the questionnaire was sent to respondents by their organisations along with a covering letter on the organisations' letterheads. A covering letter also stipulated the time frame for the survey, and informed the respondents of their rights to participate and provided assurance of anonymity and confidentiality.

Statistical analysis

In order to achieve the objective of this research, data was analysed using Statistical Package for Social Sciences (SPSS- Version 20) (IBM, 2011) and Winsteps (Version 3.70.0) (Linacre, 2010). SPSS was used for Exploratory Factor Analysis, while Winsteps was used for the Rasch analysis. Exploratory factor analysis included the diagnostics tests (Kaiser-Meyer-Okin and Bartlett's test of Sphericity) and principal component analysis (PCA). Rasch analysis included person/item separation indices, measure order and principal component analysis (PCA).

RESULTS

Exploratory Factor Analysis

Exploratory factor analysis is based on the correlation matrix of the variables involved. Tabachnick and Fidell (2001, p. 588) provide advice regarding the sample size for exploratory factor analysis: 50 is very poor, 100 is poor, 200 is fair, 300 is good, 500 is very good, and 1000 or more is excellent. In the present study, a sample size of about 652 (response rate of 72.4) cases was considered appropriate for factor analysis. Two initial tests (the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity) were performed to establish adequacy of the sample and the appropriateness of the correlation matrix for factoring, and the results are shown in Table 1.

Table 1
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.960
Bartlett's Test of Sphericity	Approx. Chi-Square		49316.106
	Df		6328
	Sig.		.000

The Kaiser-Meyer-Olkin (KMO) index of .96 in the present study indicates that the items in the new LPMES are very suitable for factor analysis (Kline, 1994), and therefore, the factorial structure to be obtained from the Principal Component Analysis (PCA) will be acceptable. KMO is a measure of how much the items have in common. A KMO value closer to 1 indicates that the variables have a lot in common. The Bartlett's test of sphericity was also conducted to test the null hypothesis that 'the correlation matrix is an identity matrix'. An identity matrix is a matrix in which all the diagonal elements are 1 and off diagonal elements are 0. The Bartlett's test of sphericity was statistically significant ($df = 6328$; $p \leq .000$) and rejects the null hypothesis that 'the correlation matrix is an identity matrix'. The determinant of the correlation matrix between the factors was set to zero due to orthogonal rotation restriction which imposes that the factors cannot be correlated. Taken together, the results of these tests meet a minimum standard which should be passed before a PCA is conducted.

Principal Component Analysis (PCA)

Nineteen strong factors with an eigenvalue greater than 1 were extracted from the PCA. These are shown in Table 2.

Table 2
Factor extraction using Principal Component Analysis

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings	
	Total	% of Variance	Total	% of Variance	Total	% of Variance
1	42.929	37.990	42.929	37.990	12.788	11.317
2	4.699	4.158	4.699	4.158	9.174	8.119
3	3.374	2.986	3.374	2.986	5.587	4.944
4	2.422	2.143	2.422	2.143	5.422	4.799
5	2.122	1.877	2.122	1.877	4.482	3.966
6	1.983	1.755	1.983	1.755	4.270	3.779
7	1.918	1.697	1.918	1.697	4.197	3.714
8	1.830	1.620	1.830	1.620	3.773	3.339
9	1.697	1.502	1.697	1.502	3.501	3.098
10	1.579	1.398	1.579	1.398	3.432	3.038
11	1.467	1.298	1.467	1.298	3.055	2.704
12	1.435	1.270	1.435	1.270	2.906	2.571
13	1.356	1.200	1.356	1.200	2.402	2.126
14	1.243	1.100	1.243	1.100	2.400	2.124
15	1.209	1.070	1.209	1.070	1.853	1.640
16	1.188	1.052	1.188	1.052	1.723	1.524
17	1.108	.981	1.108	.981	1.684	1.490
18	1.034	.915	1.034	.915	1.653	1.462
19	1.019	.901	1.019	.901	1.311	1.160

Extraction Method: Principal Component Analysis.

While an eigenvalue of 1 represents the norm in the literature (and often the default in most statistical software packages), a cut-off point of 1.45 eigenvalue units was used to extract the factors in the present study. Furthermore, an additional criterion used to extract the factors was the number of items loading at .4 and higher. The criterion applied during factor rotation is slightly higher than a .3 rule of thumb for the minimum loading of an item as cited by Tabachnick and Fidell (2001). Thus, all factors with a total eigenvalue above 1.45 and a minimum of 4 items loading at .4 and higher were considered for further analysis. As Costello and Osborne (2005) suggest, a factor with fewer than three items is generally weak and unstable, hence the researchers' decision to consider factors with a minimum of four items loading at .4 and higher. Consequently, only the first 11 factors extracted were considered useful for further statistical analysis in the present study. The determination on the number of factors for inclusion was guided by theory and informed by the research objective, and the need to extract only the factors that could yield the most interpretable results.

The PCA of standardised residuals has an advantage over fit statistics in detecting departures from unidimensionality when (1) the level of common variance between components in multidimensional data increases and (2) there are approximately an equal number of items contributing to each component (Smith, 2004). To judge whether a residual component adequately constitutes a separate dimension, the researchers looked at the size of the first eigenvalue (<2) of unexplained variance that is attributable to this residual contrast. According to Reckase (1979), the variance explained by the first factor should be greater than 20% to indicate dimensionality.

A range of variance explained by the sub-scales is depicted in Table 3. The variance explained by the 11 sub-scales ranged between 44.7% and 61.1%. The unexplained variance explained by the first contrast for all 11 dimensions had eigenvalue units ranging from 1.4 to 1.9, which were below the chance value of 2.0 (Smith, 2002). These findings show that all sub-scales were unidimensional as there was no noticeable evidence of a secondary dimension emerging in the items.

Table 3
 Summary of the Principal Component Analysis (PCA) Results for the Sub-scales of the LPME Scale

Sub-scale	Total variance in observation		Variance explained by measure		Total variance unexplained		Unexplained variance (1 st contrast)	
	Eigenvalue	%	Eigenvalue	%	Eigenvalue	%	Eigenvalue	%
Administrative Processes (AP)	9.1	100	4.1	45.2	5.0	54.8	1.9	20.5
Environmental Scanning (ES)	11.1	100	5.1	45.8	6.0	54.2	1.4	12.7
Monitoring and Evaluation (ME)	9.3	100	4.3	46.4	5.0	53.6	1.7	18.4
Observation and Problem Solving (OPS)	11.0	100	5.0	45.5	6.0	54.5	1.7	15.8
Policy Awareness (PA)	15.3	100	7.3	47.8	8.0	52.2	1.9	12.3
Quality Assurance (QA)	7.2	100	3.2	44.7	4.0	55.3	1.6	18.9
Stakeholder Inputs (SI)	35.3	100	18.3	51.8	17.0	48.2	1.7	4.8
Strategic Leadership (SL)	9.3	100	5.3	56.9	4.0	43.1	1.6	13.8
Learning Programme Design and Development (LPDD)	24.9	100	11.9	47.9	13.0	52.1	1.8	7.4
Learning Programme Specifications (LPS)	7.7	100	4.7	61.1	3.0	38.9	1.6	21.4
Occupational Competence (OC)	20.0	100	9.0	45.1	11.0	54.9	1.6	8.0

As shown in Table 4, the final LPMES consisted of 81 items that were clustered into 11 sub-scales. These sub-scales were labelled as: Administrative Processes (AP), Learning Programme Design and Development (LPDD), Policy Awareness (PA), Observation and Problem Solving (OPS), Quality Assurance (QA), Stakeholder Inputs (SI), Monitoring and Evaluation (ME), Environmental Scanning (ES), Strategic Leadership (SL), Learning Programme Specifications (LPS) and Occupational Competence (OC).

Table 4
Summary of the Final Sub-scales and Items of the LPMES

Sub-scale	Sub-scale label	No. of Items	Item code
Administrative Processes	AP	5	B4.1; B4.2; B4.3; B4.4 and B4.5
Environmental Scanning	ES	6	B2.1; B2.2; B2.3; B2.4; B2.5 and B3.3
Observation and Problem Solving	OPS	6	B9.2; B9.3; B9.4; B9.5; B10.1 and B10.2
Policy Awareness	PA	8	B5.2; B5.3; B5.4; B5.5; B5.6; B5.7; B5.8 and B5.9
Quality Assurance	QA	4	B8.1; B8.2; B8.3 and B8.6
Stakeholder Inputs	SI	16	B3.9; B3.10; B3.11; B3.12; B3.13; B3.14; B3.15; B3.16; B3.17; B3.18; B3.19; B3.20; B3.21; B3.22; B3.23; and B3.24
Strategic Leadership	SL	4	B1.1; B1.2; B1.3 and B1.4
Learning Programme Design and Development	LPDD	13	B6.5; B6.6; B6.7; B6.8; B7.1; B7.2; B7.3; B7.4; B7.5; B7.6; B8.7; B8.8 and B8.9
Learning Programme Specifications	LPS	3	B6.2; B6.3 and B6.4
Monitoring and Evaluation	ME	5	B3.6; B3.7; B3.8; B9.1; B14.1
Occupational Competence	OC	11	B11.1; B11.5; B12.3; B13.1; B13.2; B13.6; B13.7; B13.9; B13.11; B13.13 and B13.14

Rasch analysis

Subsequent to the Principal Component Analysis (PCA) factor extraction process, a Rasch analysis was conducted on the 11 LPMES sub-scales to further examine the psychometric properties of the LPMES. A Rasch model is a probabilistic mathematical model which provides estimates of person ability and item difficulty along a common measurement continuum, expressed in log-odd units (logits). It focuses on constructing the measurement instrument with accurateness rather than fitting the data to suit a measurement model (Hamzah, Khoiry, Osman, Hamid, Jaafar & Arshad, 2009). This model was used in the present study to further examine the psychometric properties of the LPMES.

The Rasch Model results for all 11 sub-scales of the LPME scale are reported in Table 5. The results include a summary of person/item separation indices and reliability coefficients, measure order, and principal component analysis.

Table 5

Rasch: Person and Item Summary Statistics for the Sub-scales of the LPMES

Sub-scale	Average measure (SD)	Infit (SD)	Outfit (SD)	Separation	Reliability	α
Administrative Processes (AP)						
Person	-2.74 (1.52)	.97 (1.02)	.99 (1.06)	1.28	.62	.83
Item	.00 (.32)	1.00 (.22)	1.00 (.22)	3.59	.93	-
Environmental Scanning (ES)						
Person	-2.54 (1.24)	.99 (.87)	.98 (.86)	1.06	.53	.84
Item	.00 (.20)	.99 (.15)	.99 (.16)	2.02	.80	-
Monitoring and Evaluation (ME)						
Person	-2.02 (1.22)	.98 (.87)	.97 (.85)	.99	.49	.79
Item	.00 (.23)	.99 (.13)	.97 (.14)	3.01	.90	-
Observation and Problem Solving (OPS)						
Person	-2.72 (1.63)	.99 (1.15)	1.00 (1.16)	1.50	.69	.88
Item	.00 (.25)	.99 (.09)	1.01 (.15)	2.59	.87	-
Policy Awareness (PA)						
Person	-2.86 (1.51)	.98 (.86)	.99 (.88)	1.74	.75	.89
Item	.00 (.16)	1.00 (.18)	.99 (.15)	1.58	.71	-
Quality Assurance (QA)						
Person	-3.47 (1.67)	.96 (1.06)	.96 (1.09)	1.08	.54	.83
Item	.00 (.32)	.99 (.25)	.97 (.19)	2.69	.88	-
Stakeholder Inputs (SI)						
Person	-2.86 (1.34)	1.02 (.65)	1.01 (.66)	2.17	.83	.94
Item	.00 (.25)	1.00 (.11)	1.01 (.13)	2.98	.90	-
Strategic Leadership (SL)						
Person	-3.00 (1.63)	.95 (.87)	.95 (.88)	1.17	.58	.85
Item	.00 (.22)	.99 (.14)	.96 (.16)	2.27	.84	-
Learning Programme Design and Development (LPDD)						
Person	-2.69 (1.44)	1.04 (.90)	1.04 (.91)	2.05	.81	.93
Item	.00 (.23)	1.01 (.13)	1.04 (.12)	2.42	.85	-
Learning Programme Specifications (LPS)						
Person	-5.19 (3.31)	.73 (1.43)	.73 (1.42)	1.20	.59	.89
Item	.00 (.18)	.99 (.15)	.78 (.09)	.90	.45	-
Occupational Competence (OC)						
Person	-3.01 (1.47)	1.01 (.82)	1.01 (.83)	1.91	.79	.92
Item	.00 (.13)	1.00 (.16)	1.01 (.19)	1.08	.54	-

The person/item separation indices examine the extent to which the new measure distinguishes the different levels of responses and respondents abilities. The reliability coefficient assesses the internal consistency of the measure. Measure order assesses the goodness of item fit to the Rasch model as well as unidimensionality. It is evident in Table 5 that the person infit and outfit values for all 11 sub-scales range from .73 to 1.04 respectively. These findings show that respondents were less able to respond to the items of the sub-scales. The sub-scale Learning Programme Specifications (LPS) showed the lowest infit and outfit value (.73 respectively) relative to other sub-scales and this is attributable to the limited number of items ($n = 3$) constituting this sub-scale.

Further, the results in Table 5 show that the item infit values ranged from .99 to 1.01, while the outfit values ranged from .97 to 1.04 respectively. These findings show that the items for each of the 11 sub-scales were well designed and work together in defining each underlying construct. These findings support the unidimensionality of each sub-scale. The person separation indices ranged from .99 (one stratum distinction) to 2.17 (three strata distinction – low, medium and high ability). Overall, respondents' ability to answer the items fell below the average mean score on all 11 sub-scales. However, in view of the high item separation indices and good reliability coefficients for all the sub-scales, the chances that the difficulty ordering of the items will be repeated if the measure were given to another group of respondents are extremely high. The Cronbach's reliability coefficients for the 11 sub-scales as shown in Table 5 ranged from .79 to .94 and are acceptable. Overall, the Cronbach' alpha for the LPMES is .87.

Inter-correlations between the sub-scales of the LPMES

Correlations between the sub-scales of the LPMES were computed by means of Pearson Product-moment correlations. The results are shown in Table 6. It is clear from Table 6 that the inter-correlations among the variables were found to be within the acceptable range because none is $\geq .85$ (Almost, 2010) or $\geq .9$ (Maiyaki, 2012). Therefore, this is an indication of the absence of multicollinearity problems among the constructs under investigation.

As depicted in Table 6, all variables showed a positive and statistically significant correlation amongst each other. The strongest correlation was found between the variables learning programme design and development and policy awareness ($r = .73$; $p \leq .01$, larger practical effect size), learning programme design and development and stakeholder inputs ($r = .72$; $p \leq .01$, larger practical effect size), learning programme design and development and occupational competence ($r = .73$; $p \leq .01$, larger practical effect size), and stakeholder inputs and observation and problem solving ($r = .70$; $p \leq .01$, larger practical effect size).

Table 6
Correlations among the sub-scales of the LPMES

Sub-scale	1	2	3	4	5	6	7	8	9	10
1. Learning Programme Design and Development	1									
2. Policy Awareness	.732**	1								
3. Observation & Problem Solving	.688**	.657**	1							
4. Quality Assurance	.684**	.604**	.584**	1						
5. Administrative Processes	.650**	.661**	.642**	.521**	1					
6. Stakeholder Inputs	.728**	.676**	.704**	.635**	.693**	1				
7. Strategic Leadership	.408**	.413**	.427**	.361**	.450**	.484**	1			
8. Learning Programme Specifications	.684**	.675**	.586**	.526**	.551**	.593**	.342**	1		
9. Monitoring & Evaluation	.533**	.509**	.577**	.468**	.512**	.613**	.445**	.533**	1	
10. Occupational Competence	.734**	.640**	.690**	.605**	.581**	.667**	.444**	.565**	.534**	1
11. Environmental Scanning	.565**	.550**	.574**	.602**	.508**	.685**	.454**	.520**	.519**	.531**

** Correlation is significant at .01 level (2-tailed).

$r \geq .50$ (large practical effect size); $r \geq .30 \leq .50$ (moderate practical effect size); $r \geq .10 \leq .30$ (small practical effect size)

DISCUSSION

This study sought to operationalise the elements of learning programme management and evaluation theoretical framework, developed by Tshilongamulenzhe (2012), into a measurement scale and thereafter test the construct validity and reliability of the newly developed scale. The construct learning programme management was conceptualised in this study as a process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human and physical) in order to achieve the objectives of an occupational learning programme (Trewatha & Newport, 1976); while learning programme evaluation was conceptualised as a process of collecting descriptive and judgemental information on the programme's components (e.g. context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcomes (Stufflebeam, 2003).

The item generation stage was guided by the elements outlined in the theoretical framework developed by Tshilongamulenzhe (2012). The process of evaluating the items of the newly developed Learning Programme Management and Evaluation Scale (LPMES) was done using a pool of experts in the area of inquiry. The rationale to engage experts at this stage was to ensure that the scale is valid and all items were clear and unambiguous. As Benson and Clark (1982) state, an instrument is considered to be content valid when the items adequately reflect the process and content dimensions of the specified aims of the instrument as determined by expert opinion. Feedback from the experts was distilled and some items from the initial pool were deleted. The remaining items (113 items remained) were subjected to an exploratory factor analysis (EFA) in order to establish the factorial structure of the draft scale. The factorial structure was established through a varimax

rotation technique using a principal component analysis (PCA). The goal of rotation is to simplify and clarify the data structure (Costello & Osborne, 2005). A principal component analysis (PCA) revealed an initial total of 19 factors which were reduced to 11 factors. The eleven remaining factors were considered as sub-scales of the newly developed LPMES. A principal component analysis (PCA) of the residuals (observed minus expected scores) was also performed to assess sub-scale dimensionality (Linacre, 2009; Smith, 2002) and the findings of this study show that all sub-scales of the LPMES were unidimensional.

The Rasch analysis process was undertaken in order to test the unidimensionality, reliability and validity of the LPMES sub-scales and their associated items. The findings of this study show that the LPMES sub-scales and their associated items were valid and reliable and fit the Rasch model.

CONCLUSIONS

The conclusion drawn from the findings of this study is that the LPMES and its sub-scales are a valid and reliable measure that can be used in practice to monitor and evaluate the effectiveness of occupational learning programmes in the South African skills development context. Empirically, this study contributes by developing and testing a valid and reliable LPMES measure for the effective management and evaluation of occupational learning programmes. As a valid and reliable measure, the LPMES can be applied with confidence in South African workplaces. Practically, the findings of this study will enable skills development stakeholders involved in occupational learning programmes to identify gaps in the system and develop interventions for improvement by means of a reliable and valid measure. The LPMES will help SETAs, skills development practitioners and providers to manage and evaluate occupational learning programmes effectively.

LIMITATIONS

Irrespective of the contributions made by the study, several limitations need to be pointed out. Firstly, the literature review was constrained due to the limited amount of previous research regarding occupational learning programmes in South Africa. The concept of occupational learning programme is still new in South Africa and very limited research has been conducted.

Secondly, this study focused only on two types of learning programmes, that is, learnerships and apprenticeships. So, the interpretation or application of the findings of this study should be limited to these two learning programmes.

Thirdly, the sample was also not analysed in terms of racial composition and, therefore, the results are limited with regard to the diagnosis of racial differences.

Fourthly, this study took place during a period of transition from the old dispensation of the repealed SAQA Act 53 of 1995 into the new dispensation brought about by the NQF Act 67 of 2008. At the time this study was in progress, the Skills Development Amendment Act 37 of 2008 was being implemented including the new definition of a learning programme. A new vocabulary was being phased-in as part of the third NSDS (2011-2016). During the same period, the skills development unit migrated from the Department of Labour into the Department of Higher Education and Training. Consequently, the wording of the items in the new measure captured the new vocabulary which may have not been clearly understood by some of the respondents during the data collection phase. This limitation was prompted by a low person separation index and poor person-item targeting in most dimensions of the LPME measure as was observed when the researcher was conducting Rasch analysis during exploratory factor analysis phase of this research. The item separation index was consistently high and acceptable, and the other fit statistics (MNSQ infit/outfit values, point measure correlation) also confirmed that the items were well developed and measured the construct under enquiry. Therefore, the findings of this study may have to be interpreted with caution taking into cognisance this limitation.

The fifth and final limitation relates to the scope of application of the findings of this study. It must be noted that the LPMES developed in this study is not the sole panacea to the learning programme challenges currently being experienced by organisations, and therefore should not be interpreted as such. Although a valid and reliable tool, the LPMES should be seen as an outcome of a scientific enquiry which may require further scrutiny. There may be other factors not examined in this study such as the size of the organisation, the nature of its human resource development (HRD) policy framework, and the business imperatives, which may also require careful consideration to augment the successful application of this newly developed tool.

RECOMMENDATIONS

This study sought to contribute to the field of human resource development (HRD) and in particular to skills development in the South African workplace context. Given the seriousness of the skills shortage challenge facing South Africa, the present study provides a solid base upon which skills development practitioners could effectively manage and evaluate occupational learning programmes, and upon which HRD scholars could further seek a lasting solution to the skills shortage challenge. The LPMES is a valid and reliable

measure that can be applied in any workplace in South Africa, and its sub-scales can be applied autonomously depending on the needs of the users. The current study provides direction for future research. It is justifiable to suggest that the findings of this research point towards a need for action research whereby the newly developed LPMES could be applied and measured practically.

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APPENDICES

APPENDIX A: LPME - Draft scale (Version 1.0) and reviewer's report

Measure of the Effective Management and Evaluation of an Occupational Learning Programme: Dimensions and associated descriptive items

Dear expert reviewer.

I am developing an instrument to measure the effective management and evaluation of an occupational learning programme in South African workplaces. An occupational learning programme is defined as a programme which includes a structured work experience component. However, in the context of this research, only the legally regulated learning programmes were considered, that is, the apprenticeship and learnership. Therefore, you are requested to serve as a content expert to review this instrument because of your experience and/or expertise in Human Resource Development or related fields. Your participation and contribution in the instrument review process is valuable to this research, which is part of a Doctorate of Commerce in Human Resource Development in the College of Economic and Management Sciences at the University of South Africa. Your voluntary participation and time spent in this review process are highly appreciated in advance.

This instrument consists of items related to the different dimensions of the effective management and evaluation of an occupational learning programme, and each of these items will be assessed using a six point rating scale, with '1' representing 'Strongly Disagree' and '6' representing 'Strongly Agree'. In addition, some qualitative items were included in the instrument to solicit data that complements these different dimensions of the effective management and evaluation of an occupational learning programme and to provide answers to other specific questions pertaining to the empirical phase of this research. The different dimensions of the effective management and evaluation of an occupational learning programme that will be assessed using this instrument are as follows:

- A. *Leadership*
- B. *Environmental Scanning*
- C. *Stakeholder focus*
- D. *Processes*
- E. *Policy Awareness*
- F. *Learning Design*
- G. *Programme Structure*
- H. *Quality Assurance*
- I. *Observation*
- J. *Assessment and Progress Report*
- K. *Self-Evaluation*
- L. *Completion Rate and Qualification*
- M. *Work Readiness*
- N. *Occupational Competence*
- O. *Impact Assessment*

Please provide your biographic information on Section A of this instrument. Thereafter, as an expert in the field, please judge the relevance, clarity and importance of each item related to a specific dimension of the effective management and evaluation of an occupational learning programme. You are also requested to comment on the comprehensiveness of the instrument as well as addition or deletion of some items by completing the attached 'Reviewer's Report'. Please complete this review and send your inputs to me as soon as operationally possible. If there is any additional clarification you require about the instrument and the research project, please do not hesitate to contact me or Professor Melinde Coetzee using the contact information below.

Thank you very much for your contribution, time and effort.

Mr. MC Tshilongamulenzhe (DCom Candidate)
Department of Human Resource Management
Email: tshilmc@unisa.ac.za
Tel: 012 429 3724
Fax: 086 642 2062

Prof. Melinde Coetzee (Supervisor)
Department of Industrial and Organisational Psychology
Email: Coetzm1@unisa.ac.za
Tel: 012 429 8204
Fax: 012 429 8368

Relevance questionnaire on the Effective Management and Evaluation of Occupational Learning Programmes: Dimensions and associated descriptive items

SECTION A: DEMOGRAPHIC QUESTIONS

The following demographic questions require you to provide some background information about yourself. Please mark with an "X" where applicable.

Please mark with an 'X' in the box to provide consent for completing this review: Yes

1. Your age category:

Below 25 Years	25 – 35 Years	36 – 45 Years	46 – 55 Years	56 Years and older
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2. Your gender:

Male	Female
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3. Your highest educational qualification :

Below Matric/N1/N2
Senior Certificate/Grade 12 (Matric)/N3
Occupational Certificate/National Higher Certificate
3 Years National Diploma/First Degree
Honours Degree
Master's Degree
Doctorate

4. Type of learning programme in which you are involved currently.

Apprenticeship
Learnership
NONE

5. Type of occupation in which you are involved currently (e.g., Electrical, Carpentry):

6. Your current occupational position:

Skills Development Provider
Assessor/Facilitator
Mentor/Supervisor
Employer/Manager
Learner/Apprentice
Others

7. If your occupational position is **others**, please specify which one here:

8. In which sector (SETA) are you primarily involved currently?

SECTION B: EFFECTIVE MANAGEMENT AND EVALUATION OF OCCUPATIONAL LEARNING PROGRAMMES
OCCUPATIONAL LEARNING PROGRAMME MANAGEMENT

Occupational learning programme management refers to the process of planning, coordinating, controlling and activating organisational operations and processes to ensure effective and efficient use of resources (human, physical and financial) to ensure that the objectives of an occupational learning programme are achieved.

INITIATION: Initiation refers to how an organisation scans its environment (external and internal), use the inputs obtained to plan, and organise for the successful delivery of an occupational learning programme. The relevant inputs include legislative guidelines, needs analysis results, and the resources (human, physical and financial) needed in order to achieve the objectives of an occupational learning programme. The dimensions in this element include leadership, environmental scanning, stakeholder focus and processes.

ITEMS	<p align="center">DIMENSIONS</p>							
9. A clear understanding of organisational business strategy and goals is important for the successful implementation of an occupational learning programme.	<p>A. Leadership: This focuses on how organisational leaders (HRD Management) drive HRD policy and strategy in order to facilitate the achievement of the objectives of an occupational learning programme.</p>	<p>Mark the applicable boxes with an "X" to provide your perceptions on the relevance, clarity and importance of each item below. Please, do not omit any item. You have to mark 3 boxes per item.</p>	<p>Item is Relevant</p> <input type="checkbox"/>	<p>Item is Irrelevant</p> <input type="checkbox"/>	<p>Item is Clear</p> <input type="checkbox"/>	<p>Item is not clear</p> <input type="checkbox"/>	<p>Item is essential</p> <input type="checkbox"/>	<p>Item is not essential</p> <input type="checkbox"/>
10. A clear understanding of organisational human resource development strategy and goals is important for the successful implementation of an occupational learning programme.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. An organisation requires a clear human resource development vision and strategy in order to implement an occupational learning programme successfully.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. An organisation offering occupational learning programmes must have sound and effective leadership for its human resource development effort.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. An organisation offering occupational learning programmes must have the human capacity to deal with occurring problems during the learning process.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. There must be effective leadership to provide proper guidance to the learners before they enter an occupational learning			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. There must be effective leadership to provide mentorship to the learners before and during an occupational learning programme.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. The availability of suitable learners with basic skills required in the industry is important for the successful implementation of an occupational learning programme.	B. Environmental Scanning: This entails an analysis of an organisation's external and internal environments in order to draw inputs necessary to plan and organise for the successful delivery of an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
17. The availability of suitable learners with the necessary motivation is important for the successful implementation of an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. An organisation must have qualified professionals to train in a particular profession or occupation in which learners require training.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Occupational learning stakeholders must have adequate knowledge and understanding of the organisation's mission and values.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Occupational learning stakeholders must have the appropriate knowledge and understanding of the general climate of an organisation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Occupational learning stakeholders must have access to the necessary resources and equipment needed to perform the work required.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. The learning environment must encourage peer and superior assistance when challenges are encountered.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Adequate training material must be made available to stakeholders.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. The equipment for training must be in good working condition.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. The workplace conditions with regard to health and safety must promote effective learning.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Occupational learning stakeholders must have basic knowledge of health and safety operating procedures.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Formal training infrastructure and resources must be available and in good condition (these include sites, library, internet, office, classroom, computer and facilitators).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. The skills development provider must have adequate knowledge of training venue layout, technology and equipment.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Learners' logbooks or learners' files must be made available in order to keep record of daily activities.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Training materials such as articles, manuals, books, stationery must be available during an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. A suitable workplace must be available (A workplace is a place which provides an opportunity for learners to acquire practical training and work experience).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. Learners must have the ability to understand the theory taught in the classroom.	C. Stakeholder Focus: This dimension looks at how an organisation identifies and relates to its key stakeholders that are critical for the successful delivery of an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
33. A qualified skills development provider must be appointed (This is someone who is always available when learners need assistance with the theory).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. The employer must provide the learner with appropriate training in the work environment.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. The employer must advise the learner of the terms and conditions of his/her employment.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. The employer must advise the learner of workplace policies and procedures.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. The learner must be available for and participate in all learning and work experience.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. The learner must comply with workplace policies and procedures.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. The learner must attend all study periods and theoretical learning sessions.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. The learner must complete any timesheets and/or any written assessment tools supplied by the employer.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. The learner must work for the employer as part of the learning process.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. The employer must apply the same disciplinary, grievance and dispute resolution procedures to the learner as to other employees.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. The employer must provide appropriate facilities to train the learner.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. The employer must keep up-to-date records of learning.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. The employer must release the learner during normal working hours to attend off-the-job education and training.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. The employer must pay the learner the agreed learning allowance.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. The employer must conduct on-the-job assessment or cause it to be conducted.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. The skills development provider must record, monitor and retain details of the training provided.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

49. The skills development provider must conduct off-the-job assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. The skills development provider must provide the employer with reports on the learner's performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. The employer must comply with his/her duties in terms of the skills development legislation and all other related legislations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. The employer must provide the learner with adequate supervision at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. The skills development provider must provide education and training in terms of the occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. SETAs must keep a record of the registered occupational learning programme agreement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. SETAs must keep records of qualification or credit attainment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. SETAs must assist with an uninterrupted running of the occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. SETAs must oversee the implementation of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. SETAs must attempt to reconcile any dispute arising during the course of an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. SETAs or their designated agents must issue certificates to the successful learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. SETAs must monitor and enforce applicable labour legislation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. SETAs must monitor the performance quality of skills development providers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. The skills development provider must be able to assist learners with the theoretical component of the learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. The skills development provider must encourage learners' interaction and group discussions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. The skills development provider must always be well prepared for teaching and assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. The skills development provider must have a good understanding of the South African occupational learning system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

66. The skills development provider must have knowledge and understanding of the skills-based approach to training design and assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. A qualified workplace mentor must be available (A mentor is someone who is able to help learners, for example, showing them how to work with a difficult problem at work).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Qualified workplace mentors must be able to assist the learners with practical and workplace experience components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. The skills development provider, mentor and supervisor must be knowledgeable about an occupation for which the learner is training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. The skills development provider, mentor and supervisor must be available when learners need them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. A qualified learning assessor must be available (An assessor is someone who marks learners' assignments).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. The learning assessor must have relevant expertise and demonstrated competence in learning design and learning assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. A qualified workplace supervisor must be available (A supervisor is someone whom the learner reports to at the workplace and who manages the learner's performance).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. The skills development provider must have excellent knowledge of the subject content/occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. The skills development provider must use up-to-date equipment, facilities and learning material.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. The skills development provider must have a range of services to support the learner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Inputs from other key stakeholders (SETAs, Professional Bodies, etc) are necessary for the successful implementation of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. Occupational learning programme stakeholders must always be aware of their roles and responsibilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. It is important to explain the roles and responsibilities to each key stakeholder (learner, skills development provider, employer and SETA) involved in the occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Effective recruitment methods are necessary to identify potential learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. Proper selection methods must be used to ensure person-task fit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Processes: These focuses on the critical activities that are required to support the successful delivery of an occupational learning programme.																	

82. The appointment of qualified skills development provider must be handled rigorously and carefully in accordance with clear criteria.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. The nomination or selection of experienced workplace mentors and supervisors must be handled carefully with the objectives of the programme in mind.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. It is important to explain to stakeholders what an occupational learning programme entails before the programme commences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. It is important to explain to stakeholders how an occupational learning programme works.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. It is important to explain to stakeholders what Recognition of Prior Learning (RPL) is.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. The information pertaining to the occupational learning programme and its benefits must be made available to stakeholders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. A discussion of the occupational learning programme contract with stakeholders is significant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89. A discussion of the employment contract with stakeholders is significant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90. A discussion of the job description with stakeholders is significant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91. A job description relevant to the learner's occupation must be made available to stakeholders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS		DIMENSIONS					
		Mark the applicable boxes with an "X" to provide your perceptions on the relevance, importance and clarity of each item below. Please, do not omit any item. You have to mark 3 boxes per item.					
		Item is relevant	Item is irrelevant	Item is clear	Item is not clear	Item is essential	Item is not essential
		E. Policy awareness: This involves an organisation's analysis of relevant legislation that entrenches occupational learning programmes to inform and guide the design and implementation of occupational learning programmes.					
92. It is important to understand formal procedures in setting up and dealing with occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. Knowledge of skills development legislation is important when one is involved in occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94. Knowledge of the National Qualifications Framework Act is important when one is involved in occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95. Knowledge of the Recognition of Prior Learning (RPL) process is important when one is involved in occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
96. Skills development providers must be registered in terms of the applicable legislation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
97. Policies must be in place for learner entry, guidance and support system.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98. Quality management policies, procedures and review mechanism must be in place.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Policies must be in place with regard to managing assessment.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100. An understanding of the policy and processes of assessment and certification is significant when one is involved in occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101. Occupational learning programmes must be developed around unit standards that are registered by the Quality Council for Trades and Occupations.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
102. Learning programmes must be developed based on specified registered occupational standards or qualifications		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103. Learning programmes must be evaluated based on specifications on the registered occupational standards or qualifications		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		F. Learning Design: This relates to how an organisation plans and designs its occupational learning programmes.					

104. Occupational learning programmes must have a minimum credit value as defined by the occupational standards that may allow a candidate to perform a certain occupational task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
105. Occupational learning programmes must consist of National Qualifications Framework credits that contribute towards a registered occupational qualification.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
106. Learning programmes must be delivered based on specifications on the registered occupational standards or qualifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
107. The design of theoretical modules must be centred on general knowledge and theory required to produce the relevant occupational-related products and services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
108. The design of theoretical modules must be based on relevant general knowledge and theory occupational standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
109. The design of the practical modules must incorporate practical skills that will enable learners to fulfil relevant occupational responsibility.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
110. The design of practical modules must be based on relevant practical occupational standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
111. The design of the work experience modules must capture the work experience conditions required for effective and optimum performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
112. The design of work experience modules must be based on relevant work experience occupational standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
113. Occupational learning programmes must be based on specific occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114. Occupational learning programmes must provide the knowledge and theory components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
115. Occupational learning programmes must provide the practical skills component.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
116. Occupational learning programmes must provide the structured work experience component.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
117. The content of theoretical modules must focus on the products and services to be delivered when doing an occupational task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
118. The content of the theoretical modules must capture the general knowledge and theory required in the relevant occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
119. The content of practical modules must focus on occupational responsibilities needed to perform an occupational task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>G. Programme Structure: This focuses on how an occupational learning programme is structured</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

120. The content of work experience modules must focus on the relevant occupational context in which tasks are to be done.	<p>H. Quality Assurance: This relates to how an organisation promotes and assures quality in the design and implementation of occupational learning programmes.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
121. The formal training delivered by skills development providers must be of quality.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
122. SETAs must provide quality support to occupational learning programme stakeholders.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
123. The employer must provide quality support to learners, mentors, supervisors and the skills development provider.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
124. The workplace supervisor must provide quality support to the learner.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
125. The Quality Council for Trades and Occupations must ensure quality design of occupational qualifications.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
126. Quality research and data analysis must inform the design of occupational qualifications.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
127. The Quality Council for Trades and Occupations must collaborate with other relevant stakeholders to enhance the quality of occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
128. Quality research and data analysis must inform the assessment of occupational qualifications.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
129. The skills development provider must deliver quality theoretical training to the learners.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
130. The learning assessor must provide quality assessment during the learning process.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
131. The workplace must be suitable to provide quality practical training during an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
132. The workplace must be suitable to provide quality work experience during an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
133. The involvement of quality partners such as professional bodies, SAQA and SETAs enhances the quality of training during an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
134. The involvement of Communities of Expert Practitioners contributes to the quality assurance of occupational learning programmes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
135. SETAs must conduct a comprehensive evaluation of the quality of training received by learners during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

OCCUPATIONAL LEARNING PROGRAMME EVALUATION

Occupational learning programme evaluation is the systematic process of collecting descriptive and judgemental information on the programme's components (e.g. context, input factors, process activities and actual outcomes) to determine whether the programme has achieved its desired outcome.

MONITORING: This element is concerned with the systematic post-implementation monitoring and evaluation of the occupational learning programmes. The dimensions involved include observation as well as assessment and progress reporting.

ITEMS	DIMENSIONS					Mark the applicable boxes with an "X" to provide your perceptions on the relevance, importance and clarity of each item below. Please, do not omit any item. You have to mark 3 boxes per item.		
	Item is Relevant	Item is irrelevant	Item is Clear	Item is unclear	Item is essential	Item is not essential		
136. Regular contact by SETAs with employers and learners must occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
137. An employer must monitor the relationship between the skills development provider and learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
138. The focus of observation visits must be on the training and support received by learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
139. The focus of observation visits must be on the general conditions within which learning is taking place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
140. Identification and solving of problems related to learning programmes during site visits is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
141. SETAs have the responsibility to monitor occupational learning programmes from the beginning to the end.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
142. SETAs have to ensure the smooth running of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
143. An employer has to ensure that other stakeholders are satisfied with the processes involving an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
144. Employers, mentors/supervisors and learners must be interviewed regularly during observation visits to identify and address problems arising.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
145. It is important to explain to occupational learning stakeholders what learning assessment is all about.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
J. Assessment and Progress Report: This entails the assessment of learners and monitoring of their progress		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

146. It is important to explain to occupational learning stakeholders what formative assessment entails.																		
147. A valid and reliable measure for the effective management and evaluation of occupational learning programmes is important.																		
148. The assessment of occupational learning programmes must be standardised and nationally credible.																		
149. It is important to explain to occupational learning stakeholders what summative assessment entails.																		
150. Assessments during an occupational learning programme must be based on realistic activities.																		
151. The progress of learners who benefit from occupational learning programme grants is an important component in the review process.																		
152. The overall progress of learners participating in the occupational learning programme must be assessed constantly.																		
153. The assessment of learners during an occupational learning programme must be credible and in line with the applicable principles.																		
in the learning programme.																		

EVALUATION AND REVIEW: This element involves a systematic analysis of the entire occupational learning programme from inception as well as tracking down the achievement of its intended goals and objectives. The dimensions involved in this element include self-evaluation, completion rate and qualification, work readiness, occupational competence and impact assessment.

ITEMS	DIMENSIONS					
	Item is Relevant	Item is Irrelevant	Item is Clear	Item is Unclear	Item is essential	Item is not essential
154. Adequate learner support must be rendered during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
155. Learners must always be prepared to learn during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
156. Assessors must always be prepared to assess during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
157. Mentors and supervisors must always be prepared to guide learners during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
158. Employers must always provide a stimulating working environment during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
159. An employer must be able to provide information on the number of learners who left before completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
160. An employer must be able to provide information on the period learners stayed on the programme before leaving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
161. An employer must be able to provide information on the reasons why learners left before completing the occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
162. The Quality Council for Trades and Occupations must ensure credible learner achievements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
163. The occupational standards achieved during an occupational learning programme must bear National Qualifications Framework credits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
164. Learners must achieve an occupational qualification after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
165. Qualifications achieved after completing an occupational learning programme must be SAQA accredited.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

166. The overall impact of experience gained from working on the projects must increase learner's level of confidence to function effectively in an occupation.	<p>M. Work Readiness: This involves an evaluation of learner's ability to perform tasks or to apply the learned skills practically in the work context</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
167. Learners must be satisfactorily prepared for work when they finish an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
168. Occupational learning programmes are established to ensure the employability of learners.	<p>N. Occupational Competence: This entails an evaluation of learner's ability to function effectively and provide products or services related to the relevant occupation.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
169. It is important for learners to acquire professional knowledge and expertise relevant to an occupation after completing the programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
170. Learners' must develop the ability to practically apply the acquired knowledge in a particular occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
171. Learners' must develop the ability to interact socially in the work context because of their involvement in an occupational learning programme.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
172. Learners' must develop the ability to deal with occurring problems in a particular occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
173. The training offered during an occupational learning programme must focus on relevant occupational skills.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
174. An occupational learning programme must expose learners to a wide range of skills that they can use in the workplace.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
175. The training provided during an occupational learning programme must meet the skills needs relevant for an occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
176. The skills learnt during the occupational learning programme must be appropriate and relevant to an occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
177. The training offered during an occupational learning programme must prepare the learner for an occupational related work.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
178. Learners must have the ability to use the theory they have learnt from an occupational learning programme at the workplace.	<p>O. Impact Assessment: This entails an assessment of the impact of learning programmes</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
179. The work learners do in the workplace must be related to the theory taught in the classroom and relevant to the learner's occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
180. Occupational learning programme content must cover all aspects that are needed in the workplace and related to a specific occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
181. An occupational learning programme must prepare learners to relate their training to their relevant occupation.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
182. A generic framework for managing occupational learning programmes across SETAs is necessary.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

183. A generic framework for evaluating occupational learning programmes across SETAs is necessary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
184. SETAs have the overall responsibility to monitor and evaluate the impact of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
185. Further support should be provided to learners after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
186. Learners must be able to integrate all aspects of the learning process after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
187. Learners must be able to deliver occupationally relevant products or services after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
188. Learners must be able to perform occupational tasks after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
189. Occupational learning programmes are established to develop the competence levels required in organisations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
190. Occupational learning programmes are an important means to develop skills in South Africa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THANK YOU FOR YOUR TIME TO COMPLETE THIS QUESTIONNAIRE

REVIEWER'S REPORT

Relevance questionnaire on the Effective Management and Evaluation of Occupational Learning Programmes: Dimensions and associated descriptive items

1. Please provide your comments on the 'comprehensiveness' of the instrument in terms of measuring "Effective Management and Evaluation of Occupational Learning Programmes". You may use an additional sheet of paper if the space below is insufficient.

2. Which items/dimensions would you recommend must be included in this instrument? You may use an additional sheet of paper if the space below is insufficient.

3. Which items would you recommend must be deleted in this instrument? Please provide justification for this decision. You may use an additional sheet of paper if the space below is insufficient.

THANK YOU FOR COMPLETING THIS REPORT

APPENDIX B: LPME – Draft scale (Version 2.0)

Measure of the Effective Management and Evaluation of an Occupational Learning Programme and associated descriptive items

Dear participant.

I am developing an instrument to measure the effective management and evaluation of an occupational learning programme in South African workplaces. An occupational learning programme is defined as a programme which includes a structured work experience component. However, in the context of this research, only the legally regulated learning programmes were considered, that is, the apprenticeship and learnership. Therefore, you are requested to serve as a content expert to review this instrument because of your experience and/or expertise in Human Resource Development or related fields. Your participation and contribution in the instrument review process is valuable to this research, which is part of a Doctorate of Commerce in Human Resource Development in the College of Economic and Management Sciences at the University of South Africa. Your voluntary participation and time spent in this review process are highly appreciated in advance.

This instrument consists of items related to the different dimensions of the effective management and evaluation of an occupational learning programme, and each of these items will be assessed using a six point rating scale, with '1' representing 'Strongly Disagree' and '6' representing 'Strongly Agree'. In addition, some qualitative items were included in the instrument to solicit data that complements these different dimensions of the effective management and evaluation of an occupational learning programme and to provide answers to other specific questions pertaining to the empirical phase of this research. The different dimensions of the effective management and evaluation of an occupational learning programme that will be assessed using this instrument are as follows:

- (a) *Leadership*
- (b) *Environmental Scanning*
- (c) *Stakeholder focus*
- (d) *Processes*
- (e) *Policy Awareness*
- (f) *Learning Design*
- (g) *Programme Structure*
- (h) *Quality Assurance*
- (i) *Observation*
- (j) *Assessment and Progress Report*
- (k) *Self-Evaluation*
- (l) *Completion Rate and Qualification*
- (m) *Work Readiness and Occupational Competence*
- (n) *Impact Assessment*

Please provide your biographic information on Section A of this instrument. Thereafter, as an expert in the field, please judge the relevance, clarity and importance of each item related to a specific dimension of the effective management and evaluation of an occupational learning programme. You are also requested to comment on the comprehensiveness of the instrument as well as addition or deletion of some items by completing the attached 'Reviewer's Report'. Please complete this review and send your inputs to me as soon as operationally possible. If there is any additional clarification you require about the instrument and the research project, please do not hesitate to contact me or Professor Melinde Coetzee using the contact information below.

Thank you very much for your contribution, time and effort.

Mr. MC Tshilongamulenzhe (DCom candidate)
Department of Human Resource Management
Email: tshilmc@unisa.ac.za
Tel: 012 429 3724
Fax: 086 642 2062

Prof. Melinde Coetzee (Supervisor)
Department of Industrial and Organisational Psychology
Email: Coetzm1@unisa.ac.za
Tel: 012 429 8204
Fax: 012 429 8368

Measure of Effective Management and Evaluation of Occupational Learning Programmes and associated descriptive items

SECTION A: DEMOGRAPHIC QUESTIONS

The following demographic questions require you to provide some background information about yourself. Please mark with an "X" where applicable.

Please mark with an 'X' in the box to provide consent for completing this review: Yes

A. Your age category:

Below 25 Years	25 – 35 Years	36 – 45 Years	46 – 55 Years	56 years and older
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B. Your gender:

Male	Female
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C. Your highest educational qualification :

Below Matric/N1/N2
Senior Certificate/Grade 12 (Matric)/N3
Occupational Certificate/National Higher Certificate
3 Years National Diploma/First Degree
Honours Degree
Master's Degree
Doctorate

D. Type of learning programme in which you are involved currently.

Apprenticeship
Learnership
NONE

E. Type of occupation in which you are involved currently (e.g., Electrical, Carpentry):

F. Your current occupational position:

Skills Development Provider
Assessor/Facilitator
Mentor/Supervisor
Employer/Manager
Learner/Apprentice
Others

G. If your occupational position is **others**, please specify which one here:

H. In which sector (SETA) are you primarily involved currently?

SECTION B: EFFECTIVE MANAGEMENT AND EVALUATION OF OCCUPATIONAL LEARNING PROGRAMMES

ITEMS

	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.					
	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
1. A clear understanding of an organisation's business strategy and goals is important for the successful implementation of an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. A clear understanding of an organisation's human resource development strategy and goals is important for the successful implementation of an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. An organisation requires a clear human resource development vision and strategy in order to implement an occupational learning programme successfully.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. An organisation offering occupational learning programmes must have the human capacity to deal with occurring problems during the learning process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. There must be effective leadership to provide proper guidance to the learners before they enter an occupational learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. An organisation must have qualified professionals to train in a particular profession or occupation in which learners require training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The equipment for training must be in good working condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The workplace conditions with regard to health and safety must promote effective learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Formal training infrastructure and resources must be available and in good condition (these include sites, library, internet, office, classroom, computer and facilitators).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. A suitable workplace must be available (A workplace is a place which provides an opportunity for learners to acquire practical training and work experience).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Learners must have the ability to understand the theory taught in the classroom.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. The learner must complete any timesheets and/or any written assessment tools supplied by the employer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The employer must provide appropriate facilities to train the learner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The skills development provider must record, monitor and retain details of the training provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. The skills development provider must provide the employer with reports on the learner's performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. SETAs must keep records of the registered occupational learning programme agreement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. SETAs must oversee the implementation of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS

	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.						
	Strongly Agree	Agree	Somewhat Agree	Disagree	Somewhat Disagree	Disagree	Strongly Disagree
18. SETAs must monitor the performance quality of skills development providers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. The skills development provider must be able to assist learners with the theoretical component of the learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The skills development provider must encourage learners' interaction and group discussions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. The skills development provider must always be well prepared for teaching and assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. The skills development provider must have knowledge and understanding of the skills-based approach to training design and assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. A qualified workplace mentor must be available (A mentor is someone who is able to help learners by showing them how to solve difficult problems at work).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Qualified workplace mentors must be able to assist the learners with practical and workplace experience components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. The skills development provider, mentor and supervisor must be knowledgeable about an occupation for which the learner is training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. The skills development provider, mentor and supervisor must be available when learners need them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. A qualified learning assessor must be available (An assessor is someone who marks learners' assignments).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. The learning assessor must have relevant expertise and demonstrated competence in learning design and learning assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. A qualified workplace supervisor must be available (A supervisor is someone whom the learner reports to at the workplace and who manages the learner's performance).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. The skills development provider must have excellent knowledge of the subject content/occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. The skills development provider must use up-to-date equipment, facilities and learning material.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. The skills development provider must have a range of services to support the learner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Inputs from other key stakeholders (SETAs, Professional Bodies, etc) are necessary for the successful implementation of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Occupational learning programme stakeholders must always be aware of their roles and responsibilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. The nomination or selection of experienced workplace mentors and supervisors must be handled carefully with the objectives of the programme in mind.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS

	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.				
	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
36. It is important to explain to stakeholders what Recognition of Prior Learning (RPL) is.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. The information pertaining to the occupational learning programme and its benefits must be made available to stakeholders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. A discussion of the learner's job description with stakeholders is significant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. A job description relevant to the learner's occupation must be made available to stakeholders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. It is important to understand formal procedures in setting up and dealing with occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Knowledge of skills development legislation is important when one is involved in occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Knowledge of the National Qualifications Framework Act is important when one is involved in occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Knowledge of the Recognition of Prior Learning (RPL) process is important when one is involved in occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Skills development providers must be registered in terms of the applicable legislation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Policies must be in place for learner entry, guidance and support system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Quality management policies, procedures and review mechanism must be in place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Policies must be in place with regard to managing assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. An understanding of the policy and processes of assessment and certification is significant when one is involved in occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Occupational learning programmes must be developed around unit standards that are registered by the Quality Council for Trades and Occupations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Learning programmes must be developed based on specified registered occupational standards or qualifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Learning programmes must be evaluated based on specifications on the registered occupational standards or qualifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Learning programmes must be delivered based on specifications on the registered occupational standards or qualifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. The design of the practical modules must incorporate practical skills that will enable learners to fulfil relevant occupational responsibility.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS

	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.				
	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
54. The design of practical modules must be based on relevant practical occupational standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. The design of work experience modules must be based on relevant work experience occupational standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Occupational learning programmes must be based on specific occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Occupational learning programmes must provide the knowledge and theory components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Occupational learning programmes must provide the practical skills component.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Occupational learning programmes must provide the structured work experience component.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. The content of theoretical modules must focus on the products and services to be delivered when doing an occupational task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. The content of practical modules must focus on occupational responsibilities needed to perform an occupational task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. The content of work experience modules must focus on the relevant occupational context in which tasks are to be done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. The formal training delivered by skills development providers must be of quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. The employer must provide quality support to learners, mentors, supervisors and the skills development provider.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. The workplace supervisor must provide quality support to the learner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. The Quality Council for Trades and Occupations must collaborate with other relevant stakeholders to enhance the quality of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. Quality research and data analysis must inform the assessment of occupational qualifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. The skills development provider must deliver quality theoretical training to the learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. The learning assessor must provide quality assessment during the learning process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. The workplace must be suitable to provide quality practical training during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. The workplace must be suitable to provide quality work experience during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS

	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.					
	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
72. Regular contact by SETAs with employers and learners must occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. Employers, mentors/supervisors and learners must be interviewed regularly during observation visits to identify and address problems arising.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. The focus of observation visits must be on the training and support received by learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. Identification and solving of problems related to learning programmes during site visits is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. An employer has to ensure that other stakeholders are satisfied with the processes involving an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. It is important to explain to occupational learning stakeholders what learning assessment is all about.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. A valid and reliable measure for the effective management and evaluation of occupational learning programmes is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. The assessment of occupational learning programmes must be standardised and nationally credible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Assessments during an occupational learning programme must be based on realistic activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. The overall progress of learners participating in the occupational learning programme must be assessed constantly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82. The assessment of learners during an occupational learning programme must be credible and in line with the applicable principles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. Adequate learner support must be rendered during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. Learners must always be prepared to learn during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. Assessors must always be prepared to assess during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. Mentors and supervisors must always be prepared to guide learners during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. Employers must always provide a stimulating working environment during an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. An employer must be able to provide information on the period learners stayed on the programme before leaving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89. An employer must be able to provide information on the reasons why learners left before completing the occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS

	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.				
	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
90. The occupational standards achieved during an occupational learning programme must bear National Qualifications Framework credits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91. Learners must achieve an occupational qualification after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92. Qualifications achieved after completing an occupational learning programme must be SAQA accredited.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. The overall impact of experience gained from working on the projects must increase learner's level of confidence to function effectively in an occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94. Occupational learning programmes are established to ensure the employability of learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95. It is important for learners to acquire professional knowledge and expertise relevant to an occupation after completing the programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
96. Learners' must develop the ability to practically apply the acquired knowledge in a particular occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
97. Learners must be satisfactorily prepared for work when they finish an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98. Learners' must develop the ability to deal with occurring problems in a particular occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. The training offered during an occupational learning programme must focus on relevant occupational skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100. An occupational learning programme must expose learners to a wide range of skills that they can use in the workplace.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101. The training provided during an occupational learning programme must meet the skills needs relevant for an occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
102. The skills learnt during the occupational learning programme must be appropriate and relevant to an occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103. The training offered during an occupational learning programme must prepare the learner for an occupational related work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
104. Learners must have the ability to use the theory they have learnt from an occupational learning programme at the workplace.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
105. The work learners do in the workplace must be related to the theory taught in the classroom and relevant to the learner's occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
106. Occupational learning programme content must cover all aspects that are needed in the workplace and related to a specific occupation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
107. An occupational learning programme must prepare learners to relate their training to their relevant occupation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEMS

ITEMS	Mark the applicable box with an "X" to indicate your level of agreement or disagreement with each item below. Please provide only one answer per item.					
	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
108. SETAs have the overall responsibility to monitor and evaluate the impact of occupational learning programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
109. Learners must be able to integrate all aspects of the learning process after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
110. Learners must be able to deliver occupationally relevant products or services after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
111. Learners must be able to perform occupational tasks after completing an occupational learning programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
112. Occupational learning programmes are established to develop the competence levels required in organisations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
113. Occupational learning programmes are an important means to develop skills in South Africa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THANK YOU FOR YOUR TIME TO COMPLETE THIS QUESTIONNAIRE



**LEARNING PROGRAMME
MANAGEMENT AND EVALUATION
SCALE (LPME)**

Department of Industrial and Organisational Psychology

**COLLEGE OF ECONOMIC AND MANAGEMENT
SCIENCES**

UNIVERSITY OF SOUTH AFRICA

2012

LEARNING PROGRAMME MANAGEMENT AND EVALUATION SCALE

Factor extraction

Principal Component: Varimax Rotation

SUB-SCALE		CODE	Q#	ITEMS	SUB-SCALE
1				Factor 1	
		B11.1	Q83	Adequate learner support must be rendered during an occupational learning programme.	Occupational Competence
		B11.5	Q87	Employers must always provide a stimulating working environment during an occupational learning programme.	
		B12.3	Q90	The occupational standards achieved during an occupational learning programme must bear National Qualifications Framework credits.	
		B13.1	Q93	The overall impact of experience gained from working on the projects must increase learner's level of confidence to function effectively in an occupation.	
		B13.2	Q94	Occupational learning programmes are established to ensure the employability of learners.	
		B13.6	Q98	Learners' must develop the ability to deal with occurring problems in a particular occupation.	
		B13.7	Q99	The training offered during an occupational learning programme must focus on relevant occupational skills.	
		B13.9	Q101	The training provided during an occupational learning programme must meet the skills needs relevant for an occupation.	
		B13.11	Q103	The training offered during an occupational learning programme must prepare the learner for an occupational related work.	
		B13.13	Q105	The work learners do in the workplace must be related to the theory taught in the classroom and relevant to the learner's occupation.	
		B13.14	Q106	Occupational learning programme content must cover all aspects that are needed in the workplace and related to a specific occupation	

SUB-SCALE	CODE	Q#	Factor 2
2	B3.9	Q19	The skills development provider must be able to assist learners with the theoretical component of the learning programme.
	B3.10	Q20	The skills development provider must encourage learners' interaction and group discussions.
	B3.11	Q21	The skills development provider must always be well prepared for teaching and assessment.
	B3.12	Q22	The skills development provider must have knowledge and understanding of the skills-based approach to training design and assessment.
	B3.13	Q23	A qualified workplace mentor must be available (A mentor is someone who is able to help learners by showing them how to solve difficult problems at work).
	B3.14	Q24	Qualified workplace mentors must be able to assist the learners with practical and workplace experience components.
	B3.15	Q25	The skills development provider, mentor and supervisor must be knowledgeable about an occupation for which the learner is training.
	B3.16	Q26	The skills development provider, mentor and supervisor must be available when learners need them.
	B3.17	Q27	A qualified learning assessor must be available (An assessor is someone who marks learners' assignments).
	B3.18	Q28	The learning assessor must have relevant expertise and demonstrated competence in learning design and learning assessment.
	B3.19	Q29	A qualified workplace supervisor must be available (A supervisor is someone whom the learner reports to at the workplace and who manages the learner's performance).
	B3.20	Q30	The skills development provider must have excellent knowledge of the subject content/occupation.
	B3.21	Q31	The skills development provider must use up-to-date equipment, facilities and learning material.
	B3.22	Q32	The skills development provider must have a range of services to support the learner.
	B3.23	Q33	<i>Inputs from other key stakeholders (SETAs, Professional Bodies, etc) are necessary for the successful implementation of occupational learning programmes.</i>
	B3.24	Q34	Occupational learning programme stakeholders must always be aware of their roles and responsibilities.

Stakeholder Inputs

SUB-SCALE	CODE	Q#	Factor 3
3	B6.5	Q53	The design of the practical modules must incorporate practical skills that will enable learners to fulfil relevant occupational responsibility.
	B6.6	Q54	The design of practical modules must be based on relevant practical occupational standards.
	B6.7	Q55	The design of work experience modules must be based on relevant work experience occupational standards.
	B6.8	Q56	Occupational learning programmes must be based on specific occupation.
	B7.1	Q57	Occupational learning programmes must provide the knowledge and theory components.
	B7.2	Q58	Occupational learning programmes must provide the practical skills component.
	B7.3	Q59	Occupational learning programmes must provide the structured work experience component.
	B7.4	Q60	<i>The content of theoretical modules must focus on the products and services to be delivered when doing an occupational task.</i>
	B7.5	Q61	The content of practical modules must focus on occupational responsibilities needed to perform an occupational task.
	B7.6	Q62	The content of work experience modules must focus on the relevant occupational context in which tasks are to be done.
	B8.7	Q69	<i>The learning assessor must provide quality assessment during the learning process.</i>
	B8.8	Q70	The workplace must be suitable to provide quality practical training during an occupational learning programme.
	B8.9	Q71	The workplace must be suitable to provide quality work experience during an occupational learning programme.

Learning Programme design and development

SUB-SCALE	CODE	Q#	Factor 4
4	B5.2	Q41	Knowledge of skills development legislation is important when one is involved in occupational learning programmes.
	B5.3	Q42	Knowledge of the National Qualifications Framework Act is important when one is involved in occupational learning programmes.
	B5.4	Q43	Knowledge of the Recognition of Prior Learning (RPL) process is important when one is involved in occupational learning programmes.
	B5.5	Q44	Skills development providers must be registered in terms of the applicable legislation.

	B5.6	Q45	Policies must be in place for learner entry, guidance and support system.
	B5.7	Q46	Quality management policies, procedures and review mechanism must be in place.
	B5.8	Q47	Policies must be in place with regard to managing assessment.
	B5.9	Q48	An understanding of the policy and processes of assessment and certification is significant when one is involved in occupational learning programmes.

	SUB-SCALE	CODE	Q#	Factor 5	Learning Programme Specifications
	B6.2	Q50	Learning programmes must be developed based on specified registered occupational standards or qualifications		
	B6.3	Q51	Learning programmes must be evaluated based on specifications on the registered occupational standards or qualifications		
	B6.4	Q52	Learning programmes must be delivered based on specifications on the registered occupational standards or qualifications		

	SUB-SCALE	CODE	Q#	Factor 6	Observation and Problem Solving
6	B9.2	Q73	Employers, mentors/supervisors and learners must be interviewed regularly during observation visits to identify and address problems arising.		
	B9.3	Q74	The focus of observation visits must be on the training and support received by learners.		
	B9.4	Q75	Identification and solving of problems related to learning programmes during site visits is important.		
	B9.5	Q76	An employer has to ensure that other stakeholders are satisfied with the processes involving an occupational learning programme.		
	B10.1	Q77	It is important to explain to occupational learning stakeholders what learning assessment is all about.		
	B10.2	Q78	A valid and reliable measure for the effective management and evaluation of occupational learning programmes is important.		

SUB-SCALE	CODE	Q#	Factor 7
7	B1.1	Q1	A clear understanding of an organisation's business strategy and goals is important for the successful implementation of an occupational learning programme.
	B1.2	Q2	A clear understanding of an organisation's human resource development strategy and goals is important for the successful implementation of an occupational learning programme.
	B1.3	Q3	An organisation requires a clear human resource development vision and strategy in order to implement an occupational learning programme successfully.
	B1.4	Q4	An organisation offering occupational learning programmes must have the human capacity to deal with occurring problems during the learning process.

Strategic Leadership

SUB-SCALE	CODE	Q#	Factor 8
8	B8.1	Q63	The formal training delivered by skills development providers must be of quality.
	B8.2	Q64	The employer must provide quality support to learners, mentors, supervisors and the skills development provider.
	B8.3	Q65	The workplace supervisor must provide quality support to the learner.
	B8.6	Q68	The skills development provider must deliver quality theoretical training to the learners.

Quality Assurance

SUB-SCALE	CODE	Q#	Factor 9
9	B2.1	Q6	An organisation must have qualified professionals to train in a particular profession or occupation in which learners require training.
	B2.2	Q7	The equipment for training must be in good working condition.
	B2.3	Q8	The workplace conditions with regard to health and safety must promote effective learning.
	B2.4	Q9	Formal training infrastructure and resources must be available and in good condition (these include sites, library, internet, office, classroom, computer and facilitators).
	B2.5	Q10	A suitable workplace must be available (A workplace is a place which provides an opportunity for learners to acquire practical training and work experience).
	B3.3	Q13	The employer must provide appropriate facilities to train the learner.

Environmental Scanning

SUB-SCALE	CODE	Q#	Factor 10
10	B4.1	Q35	The nomination or selection of experienced workplace mentors and supervisors must be handled carefully with the objectives of the programme in mind.
	B4.2	Q36	It is important to explain to stakeholders what Recognition of Prior Learning (RPL) is.
	B4.3	Q37	The information pertaining to the occupational learning programme and its benefits must be made available to stakeholders.
	B4.4	Q38	A discussion of the learner's job description with stakeholders is significant.
	B4.5	Q39	A job description relevant to the learner's occupation must be made available to stakeholders.
Administrative Processes			

SUB-SCALE	CODE	Q#	Factor 11
11	B3.6	Q16	SETAs must keep records of the registered occupational learning programme agreement.
	B3.7	Q17	SETAs must oversee the implementation of occupational learning programmes.
	B3.8	Q18	SETAs must monitor the performance quality of skills development providers.
	B9.1	Q72	Regular contact by SETAs with employers and learners must occur.
	B14.1	Q108	SETAs have the overall responsibility to monitor and evaluate the impact of occupational learning programmes.
Monitoring and evaluation			

TOTAL LPME SCALE ITEMS BEFORE EXPLORATORY FACTOR ANALYSIS

1. A clear understanding of an organisation's business strategy and goals is important for the successful implementation of an occupational learning programme.
2. A clear understanding of an organisation's human resource development strategy and goals is important for the successful implementation of an occupational learning programme.
3. An organisation requires a clear human resource development vision and strategy in order to implement an occupational learning programme successfully.
4. An organisation offering occupational learning programmes must have the human capacity to deal with occurring problems during the learning process.
5. There must be effective leadership to provide proper guidance to the learners before they enter an occupational learning.
6. An organisation must have qualified professionals to train in a particular profession or occupation in which learners require training.
7. The equipment for training must be in good working condition.
8. The workplace conditions with regard to health and safety must promote effective learning.

9. Formal training infrastructure and resources must be available and in good condition (these include sites, library, internet, office, classroom, computer and facilitators).
10. A suitable workplace must be available (A workplace is a place which provides an opportunity for learners to acquire practical training and work experience).
11. Learners must have the ability to understand the theory taught in the classroom.
12. The learner must complete any timesheets and/or any written assessment tools supplied by the employer.
13. The employer must provide appropriate facilities to train the learner.
14. The skills development provider must record, monitor and retain details of the training provided.
15. The skills development provider must provide the employer with reports on the learner's performance.
16. SETAs must keep records of the registered occupational learning programme agreement.
17. SETAs must oversee the implementation of occupational learning programmes.
18. SETAs must monitor the performance quality of skills development providers.
19. The skills development provider must be able to assist learners with the theoretical component of the learning programme.
20. The skills development provider must encourage learners' interaction and group discussions.
21. The skills development provider must always be well prepared for teaching and assessment.
22. The skills development provider must have knowledge and understanding of the skills-based approach to training design and assessment.
23. A qualified workplace mentor must be available (A mentor is someone who is able to help learners by showing them how to solve difficult problems at work).
24. Qualified workplace mentors must be able to assist the learners with practical and workplace experience components.
25. The skills development provider, mentor and supervisor must be knowledgeable about an occupation for which the learner is training.
26. The skills development provider, mentor and supervisor must be available when learners need them.
27. A qualified learning assessor must be available (An assessor is someone who marks learners' assignments).
28. The learning assessor must have relevant expertise and demonstrated competence in learning design and learning assessment.
29. A qualified workplace supervisor must be available (A supervisor is someone whom the learner reports to at the workplace and who manages the learner's performance).
30. The skills development provider must have excellent knowledge of the subject content/occupation.
31. The skills development provider must use up-to-date equipment, facilities and learning material.
32. The skills development provider must have a range of services to support the learner.
33. Inputs from other key stakeholders (SETAs, Professional Bodies, etc) are necessary for the successful implementation of occupational learning programmes.
34. Occupational learning programme stakeholders must always be aware of their roles and responsibilities.
35. The nomination or selection of experienced workplace mentors and supervisors must be handled carefully with the objectives of the programme in mind.
36. It is important to explain to stakeholders what Recognition of Prior Learning (RPL) is.
37. The information pertaining to the occupational learning programme and its benefits must be made available to stakeholders.

38. A discussion of the learner's job description with stakeholders is significant.
39. A job description relevant to the learner's occupation must be made available to stakeholders.
40. It is important to understand formal procedures in setting up and dealing with occupational learning programmes.
41. Knowledge of skills development legislation is important when one is involved in occupational learning programmes.
42. Knowledge of the National Qualifications Framework Act is important when one is involved in occupational learning programmes.
43. Knowledge of the Recognition of Prior Learning (RPL) process is important when one is involved in occupational learning programmes.
44. Skills development providers must be registered in terms of the applicable legislation.
45. Policies must be in place for learner entry, guidance and support system.
46. Quality management policies, procedures and review mechanism must be in place.
47. Policies must be in place with regard to managing assessment.
48. An understanding of the policy and processes of assessment and certification is significant when one is involved in occupational learning programmes.
49. Occupational learning programmes must be developed around unit standards that are registered by the Quality Council for Trades and Occupations.
50. Learning programmes must be developed based on specified registered occupational standards or qualifications
51. Learning programmes must be evaluated based on specifications on the registered occupational standards or qualifications
52. Learning programmes must be delivered based on specifications on the registered occupational standards or qualifications
53. The design of the practical modules must incorporate practical skills that will enable learners to fulfil relevant occupational responsibility.
54. The design of practical modules must be based on relevant practical occupational standards.
55. The design of work experience modules must be based on relevant work experience occupational standards.
56. Occupational learning programmes must be based on specific occupation.
57. Occupational learning programmes must provide the knowledge and theory components.
58. Occupational learning programmes must provide the practical skills component.
59. Occupational learning programmes must provide the structured work experience component.
60. The content of theoretical modules must focus on the products and services to be delivered when doing an occupational task.
61. The content of practical modules must focus on occupational responsibilities needed to perform an occupational task.
62. The content of work experience modules must focus on the relevant occupational context in which tasks are to be done.
63. The formal training delivered by skills development providers must be of quality.
64. The employer must provide quality support to learners, mentors, supervisors and the skills development provider.
65. The workplace supervisor must provide quality support to the learner.
66. The Quality Council for Trades and Occupations must collaborate with other relevant stakeholders to enhance the quality of occupational learning programmes.
67. Quality research and data analysis must inform the assessment of occupational qualifications.
68. The skills development provider must deliver quality theoretical training to the learners.
69. The learning assessor must provide quality assessment during the learning process.
70. The workplace must be suitable to provide quality practical training during an occupational learning programme.
71. The workplace must be suitable to provide quality work experience during an occupational learning programme.

72. Regular contact by SETAs with employers and learners must occur.
73. Employers, mentors/supervisors and learners must be interviewed regularly during observation visits to identify and address problems arising.
74. The focus of observation visits must be on the training and support received by learners.
75. Identification and solving of problems related to learning programmes during site visits is important.
76. An employer has to ensure that other stakeholders are satisfied with the processes involving an occupational learning programme.
77. It is important to explain to occupational learning stakeholders what learning assessment is all about.
78. A valid and reliable measure for the effective management and evaluation of occupational learning programmes is important.
79. The assessment of occupational learning programmes must be standardised and nationally credible.
80. Assessments during an occupational learning programme must be based on realistic activities.
81. The overall progress of learners participating in the occupational learning programme must be assessed constantly.
82. The assessment of learners during an occupational learning programme must be credible and in line with the applicable principles.
83. Adequate learner support must be rendered during an occupational learning programme.
84. Learners must always be prepared to learn during an occupational learning programme.
85. Assessors must always be prepared to assess during an occupational learning programme.
86. Mentors and supervisors must always be prepared to guide learners during an occupational learning programme.
87. Employers must always provide a stimulating working environment during an occupational learning programme.
88. An employer must be able to provide information on the period learners stayed on the programme before leaving.
89. An employer must be able to provide information on the reasons why learners left before completing the occupational learning programme.
90. The occupational standards achieved during an occupational learning programme must bear National Qualifications Framework credits.
91. Learners must achieve an occupational qualification after completing an occupational learning programme.
92. Qualifications achieved after completing an occupational learning programme must be SAQA accredited.
93. The overall impact of experience gained from working on the projects must increase learner's level of confidence to function effectively in an occupation.
94. Occupational learning programmes are established to ensure the employability of learners.
95. It is important for learners to acquire professional knowledge and expertise relevant to an occupation after completing the programme.
96. Learners' must develop the ability to practically apply the acquired knowledge in a particular occupation.
97. Learners must be satisfactorily prepared for work when they finish an occupational learning programme.
98. Learners' must develop the ability to deal with occurring problems in a particular occupation.
99. The training offered during an occupational learning programme must focus on relevant occupational skills.
100. An occupational learning programme must expose learners to a wide range of skills that they can use in the workplace.
101. The training provided during an occupational learning programme must meet the skills needs relevant for an occupation.
102. The skills learnt during the occupational learning programme must be appropriate and relevant to an occupation.
103. The training offered during an occupational learning programme must prepare the learner for an occupational related work.
104. Learners must have the ability to use the theory they have learnt from an occupational learning programme at the workplace.
105. The work learners do in the workplace must be related to the theory taught in the classroom and relevant to the learner's occupation.

106. Occupational learning programme content must cover all aspects that are needed in the workplace and related to a specific occupation
107. An occupational learning programme must prepare learners to relate their training to their relevant occupation.
108. SETAs have the overall responsibility to monitor and evaluate the impact of occupational learning programmes.
109. Learners must be able to integrate all aspects of the learning process after completing an occupational learning programme.
110. Learners must be able to deliver occupationally relevant products or services after completing an occupational learning programme.
111. Learners must be able to perform occupational tasks after completing an occupational learning programme.
112. Occupational learning programmes are established to develop the competence levels required in organisations.
113. Occupational learning programmes are an important means to develop skills in South Africa.

APPENDIX D: Permission request letter

To: **The Chief Executive Officer**
 SETA
 P. O. Box
 Johannesburg
 2118

Subject: **PERMISSION TO UNDERTAKE A SKILLS DEVELOPMENT RESEARCH**
 PROJECT IN YOUR SECTOR (2011/12)

Date: 09 February 2011

Dear Sir/Madam

The above subject refers.

The launch of the NSDS III on 13 January 2011 by the Minister of Higher Education and Training marks a new era for South Africa to achieve the skills revolution the country needs. The commencement of the implementation of this strategy by SETAs over a five-year period (01 April 2011 – 31 March 2016) is highly anticipated, particularly due to the fundamental changes that are focused on the leadership, governance and strategy of the SETAs in order to meet the objectives of NSDS III and to improve their functioning and performance. The Department of Higher Education and Training intends to set up a comprehensive performance monitoring, evaluation and support system for all education, training and skills development institutions in South Africa, with a particular focus on the SETAs and public FET colleges.

In view of the above, I am currently undertaking a National Research Foundation (NRF) funded research project titled "*Effective Management and Evaluation of Occupational Learning Programmes in South African workplaces: Towards a Valid and Reliable Measure, and an Integrated Theoretical Model*". This project is part of a Doctor of Commerce degree in Human Resource Development in the College of Economic and Management Sciences at the University of South Africa. The purpose of this research project is "*To develop a valid and reliable measure for the effective management and evaluation of occupational learning programmes (apprenticeships and learnerships) in South Africa, and to contribute to the development of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes*".

The project aims are as follows:

- To determine how the elements of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African workplace context could be empirically operationalised into a valid and reliable measure.
- To examine the current perceptions of stakeholders regarding the importance of the elements of a holistic and integrated theoretical model for the effective management and evaluation of occupational learning programmes in the South African workplace context.
 - To examine the perceptions of stakeholders regarding the importance of a valid and reliable measure for the effective management and evaluation of occupational learning programmes.
 - To examine the perceptions of stakeholders regarding the mechanisms used to manage and evaluate occupational learning programmes.
 - To examine the perceptions of stakeholders regarding their roles and responsibilities for occupational learning programmes as bestowed on them through relevant policies and regulations.

- To examine the perceptions of stakeholders regarding the key challenges and opportunities facing occupational learning programmes in South Africa.
- To investigate the implications for the development and implementation of an integrated and effective management and evaluation system for occupational learning programmes and to provide recommendations for future research.

Participants to this research project are the Skills Development Providers, Learners/Apprentices, SETAS Learning Managers, Mentors/Workplace Supervisors and Employers. Data will be collected through a self-administered questionnaire and semi-structured interviews during the period April to July 2011 and 2012. The questionnaire should take about ten to twenty minutes to complete, and interviews will be scheduled for a maximum of 30 minutes. Only the research staff will have access to participants' responses, which will remain confidential and private. Names, addresses and other personal/organisational details will not be identified, or divulged to any third party. This project complies with the ethical guidelines of conducting social science research and conforms to the ethical parameters set by the University of South Africa.

However, the kind of assistance that is being sought from your organisation includes the following:

1. Permission to undertake this important research project in your sector.
2. Access to the databases in which information of Learners/Apprentices, Skills Development Providers and Employers is stored. The purpose is to allow the researchers to draw samples of research participants. This process will be conducted within strict confidentiality parameters.

Once your permission to conduct this research project and access to the database is allowed, sampled individuals and organisations/companies will be contacted for further permission and consent to participate in the research project.

How will your organisation benefit by participating?

1. Your organisation will be provided with an Executive Summary of the findings of this important research project.
2. You will receive a copy of the "Ministerial Policy Brief" which will be handed over to the Minister of Higher Education and Training based on the findings of this research project.
3. You will receive a copy of the "Full Report" based on the findings of this project.
4. We are prepared to forge collaborative partnership with your organisation in areas of strategic importance such as research and capacity building, etc.

Should you need further information regarding this request, please do not hesitate to contact us using the information provided below.

Looking forward to your positive response.

Kind regards

Mr. MC Tshilongamulenzhe (Doctoral candidate)
 Senior Lecturer: Human Resource Development
 Department of Human Resource Management
 Email: tshilmc@unisa.ac.za
 Tel: 012 429 3724
 Fax: 086 642 2062
 P. O. Box 392, UNISA, 0003

Prof. Melinde Coetzee (Supervisor)
 Professor: Industrial and Organisational Psychology
 Department of Industrial and Organisational Psychology
 Email: Coetzm1@unisa.ac.za
 Tel: 012 429 8204
 Fax: 012 429 8368