

**The information needs and information-seeking patterns of secondary level
geography teachers in Lesotho: implications for information service**

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ABSTRACT

This thesis reports on a study that investigated the information needs and the information-seeking patterns of secondary level geography teachers in Lesotho with the aim of guiding the design and the implementation of information service for these teachers. It was instigated by variations in content acquired by geography teachers graduating from the National University of Lesotho. The study followed a survey method using focus group discussions with the in-service teachers who were the core participants, questionnaire with the prospective teachers and individual interviews with officials in institutions that work closely with secondary level geography teachers in order to triangulate and validate the survey results. The school libraries as part of information service provided to these teachers were also partially observed through site visits to note existing services. From the visits to school libraries the status quo and key problems in this regard were identified. The data collected through the questionnaire were mainly quantitative and were analysed using the Statistical Package for Social Sciences (SPSS), while the qualitative data from the focus group discussions and individual interviews were analysed by examining themes in such a way that common trends were established. Narratives were compared with each other throughout the entire data-processing stage. There were 82 in-service geography teachers from 28 out of 51 schools offering geography at both junior and senior secondary level in seven out of ten districts of Lesotho who participated in the study. Furthermore, 46 out of 62 prospective geography teachers and nine officials from institutions involved in secondary level geography education participated in this study.

The study used the Leckie, Pettigrew and Sylvain's (1996) information-seeking of professionals' model as its theoretical framework but overlaid it with other models such as Savolainen's (1995) everyday life information-seeking model and Wilson's (1999) nested model of information behaviour where necessary. The Leckie, Pettigrew and Sylvain's (1996) model helped to reveal the work environment of the in-service teachers, including their work roles, associated tasks, information needs and information-seeking patterns. The secondary level geography teachers (including in-service and prospective teachers) in Lesotho have a variety of information needs. The **nature** of the information needed is current and accurate for the content that they have to deliver in class. The **format** of information

needed is mostly audio-visual for teaching aids and materials for use in class to concretise abstract foreign geographical features and principles of geography to the learners, and print format for teachers' personal use. The study found that the participants all have the main educator role of teaching geography. Consequently the **scope** of information needed covers geography content with more emphasis on physical geography sphere. The scope of information needs also covers pedagogy or teaching methods, classroom management, learners' academic assessment and specific information pertaining to their social background, including information concerning youth and adolescence issues generally. It transpired that the participants also have administrative roles and tasks that require institution-specific information such as education policies, syllabus and curriculum documents, teaching regulations, national examinations and education legal frameworks. The results of the study also reveal that teachers have a social responsibility and caregiving role in respect of orphans whose numbers are increasing owing to the high prevalence of HIV and AIDS in Lesotho. Fulfilling this role requires information on social assistance for orphans and vulnerable children.

Findings on the teachers' information-seeking patterns include preferences for information sources and the order of consulting such sources. In this study, teachers' preferred order of information sources is the syllabus, then the learners' prescribed textbooks, their own collection of books and then colleagues who are also **geography** teachers in their schools and professional associations, **science**, **agriculture** and **development studies** teachers. Teachers' age and the geographic location of schools seem to have an influence on information-seeking patterns, given that younger novice teachers always start with the syllabus, while older teachers with longer teaching experience indicated that they do not consult the syllabus that much. Other marginal differences between the participants are that while younger teachers in urban schools reported occasional use of the internet, older teachers mostly consult their colleagues in other schools, as they seem to have well-established social networks. Teachers in the rural schools use the people in their communities, such as farmers and miners, as information sources. Libraries are hardly used because they are reported to be stocked with outdated books that bear no relevance to a current understanding of geography. The school libraries were reported to be staffed by incompetent people who are unable to assist with addressing the teachers' information needs. It was evident that journals are lacking in schools

and the teachers have limited means of keeping abreast with the latest developments in geography education other than through media such as television, radio and newspapers.

In terms of preferences for information sources and order of use, it is evident that teachers begin with the syllabus, which is a national framework guiding teaching and learning, moving on to internal and external information sources such as book collections, with a preference for colleagues specialising in disciplines such as geography, agriculture and natural sciences and development studies. This is followed by selective use of the internet as a global information source by younger teachers in urban areas. In satisfying information needs, teachers in rural schools also reach out to community members, such as farmers and miners. Popular media such as television, radio and newspapers compensate for lack of journals and other current literature possibly existing in well-functioning libraries.

In seeking information, communication channels used to access information are also important and had to be considered in this study. The study found that secondary level geography teachers in Lesotho use face-to-face communication as well as telephone/cell-phone calls, including Short Message System (SMS), for communication. The internet was recommended by 100% of the participants as one of the ways that could improve information service to these teachers. The internet is regarded as the key source to provide current and varied information, even though at the time of the study it was mostly used only by younger teachers in the urban areas. Communication channels preferred by secondary level geography teachers need to be noted, as they can shed light on how to communicate information to these teachers.

Based on the findings, the study proposes an information service model for secondary level geography teachers in Lesotho. The model is based on the information needs and information-seeking patterns of these teachers, including their preferred information sources and order of use, as well as communication channels. The model also considers, in its design, the prevailing poverty and limited resources in Lesotho to ensure that it is realistic and achievable. The model outlines its implementation strategies, as well as strategies to evaluate the proposed information service.

The study concludes by making recommendations concerning the modalities for addressing the information needs of secondary level geography teachers in Lesotho, the most important being that the teachers have access to information that is current and relevant to their teaching, disseminated in their preferred format and communicated through their preferred channels. Following the findings on information needs and information-seeking patterns, including the expressed need for internet, the study also recommends strategies on how these teachers may access the internet.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACL - Anglican Church of Lesotho

AIDS - Acquired Immune Deficiency Syndrome

ARV - Anti-retroviral

BA - Bachelor of Arts

B Ed. - Bachelor of Education

BA Ed. - Bachelor of Arts Education

BBGTA - Butha-Buthe Geography Teachers' Association

BGTA - Berea Geography Teachers' Association

BSc Ed. - Bachelor of Science Education

CDS-ISIS - Computerised Documentation System-Integrated Set of Information Systems

COM - Community

COSC - Cambridge Overseas School Certificate

CSIR - Council for Scientific and Industrial Research (in South Africa)

EBIT - Engineering Built Environment and Information Technology

ECCD - Early Childhood Care and Development

ECOL - Examinations Council of Lesotho

FPE - Free Primary Education

GOV- Government

HIV - Human Immunodeficiency Virus

ICT - Information and Communication Technology

IE - Institute of Education, National University of Lesotho

IDC - Information and Documentation Centre

IFLA - International Federation of Library Association and Institutions

FAIFE - Free Access to Information and Freedom of Expression

JC - Junior Certificate

LCE - Lesotho College of Education

LEC - Lesotho Evangelical Church

LGTA - Leribe Geography Teachers' Association

LIS - Library and Information Science

M Ed. - Master of Education

MA Ed. - Master of Arts Education

MOET- Ministry of Education and Training

NCDC - National Curriculum Development Centre

NEPAD - New Partnership for African Development

NUL - National University of Lesotho

OPAC - Online Public Access Catalogue

OVC - Orphans and Vulnerable Children

RCC - Roman Catholic Church

RUSA- Reference and User Services Association

SGTA - Southern Districts Geography Teachers' Association

SMS - Short Message System

SPSS - Statistical Package for Social Science

TV- Television

UK - United Kingdom

UN - United Nations

UNESCO - United Nations Education, Scientific and Cultural Organisation

USA - United States of America

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

It is generally accepted that education is fundamental to socio-economic development. The United Nations Education, Scientific and Cultural Organisation (UNESCO) World Conference on Education for Sustainable Development declaration recognises education as a significant factor in improving human wellbeing. The declaration mentions that through education, lifestyles based on economic and social justice, food security and sustainable livelihoods can be achieved (UNESCO, 2009). Education is ‘one of the most powerful instruments known for reducing poverty and inequality and for laying the foundation for sustained economic growth, sound governance, and effective institutions’ (Bruns *et al*, 2003:1). Education is perceived as a major contribution to improving people’s livelihoods and their socio-economic status. Teachers are considered to be fundamental agents of formal education.

Lesotho also acknowledges the importance of education, given that the Constitution of Lesotho, section 28 (a), stipulates that “education is directed to the full development of the human personality and sense of dignity and strengthening the respect for human rights and fundamental freedoms.” Even the Education Act of 1995, Education Act of 2010 and the Lesotho Vision 2020 highlight the importance of education and the significance of education in improving people’s lives. In addition, the Lesotho Government Education Sector Strategic Plan 2005-2015 also indicates, among others, that the government has to focus on ensuring that the quality of secondary education is at acceptable level to meet local and international experiences and expectations. This shows that in principle education is among the top priorities of the Lesotho leadership and civil society.

The delivery of education in Lesotho is largely carried out by the government through the Ministry of Education and Training (MOET), churches and the community. Formal education includes the early childhood care and development level, which usually lasts three years, then the primary education level, which is seven years of basic education ending with a national primary school-leaving examination. The learners proceed to secondary education level,

which takes five years. Secondary education is divided into three years of junior secondary and two years of senior secondary schooling. The junior secondary phase is often called junior certificate (JC), as the learners write JC examinations, which are an entry requirement for senior secondary education. The senior secondary education ends with Cambridge Overseas School Certificate (COSC) examinations that determine entry to the tertiary education level. In this study, the junior secondary and senior secondary levels are referred to as JC and COSC respectively.

The role of secondary education in least developed countries such as Lesotho, is centred on the need of learners to acquire functional knowledge skills to be employed or self-employed, because most of them drop out at this level, while a few proceed to tertiary education. ‘Secondary education builds upon basic education and continues to prepare learners for further education and training and the world of work’ (MOET, 2008:19). As a result, the secondary education curriculum aims to develop learners’ advanced entrepreneurial, technological and vocational skills for the world of work and further studies (MOET, 2008:21). According to MOET (2008:35), this curriculum is organised to address five major learning areas. Each learning area has a cluster of subjects to enable its achievement. These learning areas are:

- Linguistic and literary area.
- Numerical and mathematical area.
- Personal, spiritual and social area.
- Scientific and technological area.
- Creativity and entrepreneurial area.

The MOET is responsible for secondary education curriculum development, delivery strategies and standardised assessment. This includes addressing the learning areas mentioned above, as well as identifying various subjects, including their syllabi outlines, that are clustered under each learning area. Clusters of subjects help to provide the learners and schools with a wider choice. The choice of subjects for each cluster varies from school to school. Nonetheless, the compulsory subjects are English, life skills, mathematics, sciences (biology, chemistry, and physics) and Sesotho. The elective subjects are agricultural science, business education (accounting and commerce), development studies, drama, geography,

history, Information and Communication Technology (ICT), home economics (food and nutrition and home management), music, physical education, religious education, technical subjects and other international languages such as French and Spanish. Although the curriculum and assessment policy document has put geography, sciences and technical subjects under the scientific and technological learning area, the schools have put geography under the social sciences. In Lesotho schools, geography, history and development studies teachers are in the department of social sciences. Seemingly, the policy document considers geography as a scientific subject, while the schools regard it as a social science.

Lesotho secondary education faces constraints such as lack of finances, teaching materials and facilities such as laboratories and libraries. This is coupled with the problem of overcrowding in classrooms. Oversize classes and the scarcity of resources, coupled with the lack of trained teachers, has been an unresolved problem in Lesotho for a long time (Moloi *et al*, 2008:613). Veenam (1984:143) acknowledges that inadequate and/or insufficient teaching materials and supplies hinder effective teaching and learning. However, the Lesotho government has embarked on some initiatives to address these constraints. Some of these initiatives are building more secondary schools and the introduction of part-time and distance-education programmes for teacher training both at the National University of Lesotho (NUL) and the Lesotho College of Education (LCE) to increase the production of qualified teachers.

Lesotho teachers are working in a peculiar environment complicated by a number of factors that may affect their information needs and information-seeking patterns and that warrant research. Firstly, their schools operate in a bureaucratic system overseen by three governing institutions: government, churches and the community. These institutions are driven by different ideologies, which may be conflicting and may not always be in agreement with matters affecting teachers. For instance, while the government may find sex education vital in a school curriculum, churches and the community may view it as a taboo from religious and cultural perspectives. These conflicting views ultimately affect teachers and may trigger some information needs, thus impinging upon information-seeking.

Secondly, the Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) impinge on the teachers because they are exposed to orphans and vulnerable children, with no learning support at home concerning school work and other life matters. For some orphans, the only adult figure with whom they interact is their teacher. Hence the teachers may have to assume additional roles of being counsellors, parents and guardians, among others. This is affirmed by Mnubi-Mchombu *et al's* (2009) study of the information needs and information-seeking behaviour of orphans and vulnerable children (OVC) and their caregivers in Namibia which found teachers as the main source of information for OVC. Teachers also emerged as a primary source of information for learners in political upheavals in Stilwell and Bell (2003) study. The teachers are also not immune to HIV and AIDS; they might not only be infected but also affected as they have families and friends suffering from this pandemic. The HIV and AIDS pandemic, as well as other emerging societal and technological challenges, require the teachers to be capable and ready to equip their learners with the relevant information and necessary skills to combat the pandemic and the emerging challenges. This may require the teachers to seek more information regarding HIV and AIDS, including emerging societal challenges posed by this pandemic. Furthermore, the secondary teachers' mandate is to develop learners who are mostly adolescents. Adolescents' age ranges between 10 and 19 years and represents, in many societies, a transition to physical, psychological and social maturity (Mturi & Hennink, 2005:129). Adolescents may sometimes commence having unprotected sex, which may mean exposure to HIV and may also result in unwanted pregnancies.

Thirdly, the high influx of learners into high schools as a result of free primary education (FPE) is a factor that adds peculiarity to the teachers' environment. When FPE started in 2000, many children who could not afford tuition were registered in schools. This increased primary schools' enrolment enormously. In turn, the number of learners entering secondary education also increased remarkably in 2007, as it was the beginning of this phase for the first cohort of FPE learners. FPE has not only contributed to large class sizes at both primary and high schools, but has also exacerbated overcrowding in high schools, as the number of high schools has always been far lower than the number of primary schools in Lesotho. The 2008 statistics from the MOET indicate that there are 318 secondary and high schools while there are 1481 primary schools in Lesotho. These large class sizes pose challenges to teaching, resources, facilities and the provision of information in schools. At this point, one realises the

role that information could play in helping the teachers and learners in the process of teaching and learning in these difficult circumstances.

The Lesotho junior secondary geography syllabus aims to increase learners' knowledge and understanding of the earth as the home of humans, including the interaction of humans with their environment. It develops a positive attitude to caring for one's environment. It supports learners in gaining basic geographic skills and techniques that will enable them to address environmental problems. It also aims at improving their social lives within their living environment, as well as arousing their interest and curiosity to analyse the relationships between the bio-physical processes and human activities, including knowing about their country in relation to other countries (MOET, 2004).

The syllabus further recommends a learner-centred approach involving all the senses in the learning process. It also encourages a combination of more than one method. According to the MOET (2004:2), these methods are:

- Close observations of the environment by the learners.
- Use of audio-visual aids for abstract topics.
- Discussions and debates on topics which generate a lot of questions and arguments.
- Group work and peer-teaching.
- Use of guest speakers, research, fieldwork and excursions, as well as lecturing.

The junior secondary geography syllabus is formulated in Lesotho with textbooks both for the learners and teachers to aid the teaching and learning process in order to accomplish the objectives of the syllabus. These books are provided by the government under the book rental scheme for junior secondary education. Nevertheless, there is still a need for more information to supplement the textbooks so that various teaching and learning methods are used and also for developing the learners' information literacy skills; this can be addressed if the teachers are also information literate. Studies related to teachers' information literacy include those of Asselin and Lee (2002), Branch (2003), Crouse and Kasbohm (2004), Earp (2009), Herron and Haglund (2009), Immroth *et al*, 2007, Johnson and O'English (2004), Jones (2008), Kimsey and Cameron (2005), Lipu (2003), Merchant and Hepworth (2002),

Miller (2005), Miller *et al.*, (2005), Probert (2009), Stephens (2007), Todd (1997), Usluel (2007), Wen and Shih (2008), Williams and Coles (2007b) and Williams and Wavell (2007). Although they address the important issue of information literacy, the above studies provide little reflection on the information behaviour of teachers and their information needs.

The senior secondary Geography syllabus covers physical geography and human geography aspects. Physical geography includes scientific topics such as geology and geomorphology, weather and climate, mining, marine erosion and drainage systems. Human geography includes topics related to humankind such as population and settlements, tourism and migration. Most secondary level geography teachers in Lesotho graduated from the NUL with a BSc Ed, BA Ed, or B Ed degree.

The BSc Ed. teachers study Geography from the scientific perspective, which is mostly physical geography, while the rest study geography from the humanity perspective and mostly study human geography. This creates a disparity in knowledge content regarding these two spheres of geography. Yet, the teachers are expected to teach the subject fully covering these two major areas irrespective of their degree.

The senior secondary geography syllabus is developed by the University of Cambridge, which is the examinations body for senior secondary education in Lesotho, but no designed textbooks are provided. There is no single textbook that addresses all the topics in the syllabus adequately and this calls for several books for the subject of geography. Moreover, teaching geography requires comprehensive books with colourful illustrations to aid understanding, and often these are expensive and most of the learners may be unable to afford them. At senior secondary level, there is no government book-rental scheme. The need for information to meet the demands of the senior secondary syllabus, and also to address the NUL graduate teachers' content gaps emanating from their degree structure, cannot be overemphasised.

It is evident from the junior and senior secondary education geography syllabi that the teachers need to know their environment for geography teaching and learning. They might also have to source external people with expertise to talk on some topics and identify areas

for field work and excursions, both in Lesotho and possibly outside the country. The teachers have to identify topics suitable for research, group work, lecturing, discussions and debates, including the appropriate audio-visual aids for each topic. The environment changes over time and the field work excursions may not be the same every year; even the learners differ from year to year. The geography teachers need up-to-date, relevant information most of the time. Such information may be delivered to the teachers in their preferred format to address their information needs and could use their preferred information sources if all these are known. This can be determined through a proper investigation of the teachers' information needs and information-seeking patterns and preferences for communication channels that involve them directly. In this study information-seeking includes a preference for information sources, order of information sources used and preferred information communication channels; these components will be addressed through separate research questions.

Access to information remains a problem for teachers in Lesotho. Few schools in Lesotho have school libraries. Where school libraries exist, they are not adequately equipped and there is no evidence that these libraries are treated as an important component of the school curriculum, as they are often manned by unqualified library assistants or professional teachers with no librarianship qualification (Kakoma, 1999:121). Mafube (2005) still indicates lack of school libraries and information resources in secondary education, while Kakoma and Mariti (2008) emphasise lack of information resources in tertiary education.

School libraries are invaluable facilities that contribute to positive learning outcomes (Chartered Institute of Library and Information Professionals, 2004; Crossley & Murby, 1994; National Literacy Trust, 2010). They are 'indispensable adjuncts to education as well as a base for generating innovative thinking, a stimulus to culture, and an aid to individual self-development' (Önal, 2009:45). The school library, therefore, is one of the important sources of information to teachers and learners in achieving learning outcomes. The library has ample potential to improve the quality of educational processes in the school (De la Vega & Puente, 2010:311).

Although teachers are described as ‘the population group that is active, experienced and critical users of information’ (Taylor, 1991:219) and teaching and learning are associated with handling of information (Karunarathna, 2008), the secondary level teachers in Lesotho may still have limitations in accessing information. This is mainly due to lack of diverse modern ICTs in many schools, including library facilities, as indicated earlier. Yet, pedagogy and content require information. The teachers have to deal with the national curricula requirements and syllabi outlines, as well as emerging social, economic, political and natural issues, which are dependent upon the accessibility of up-to-date information. Failure to obtain relevant and authentic information may hamper the learning process and ultimately have negative effects on the learners’ performance.

The need for information cuts across all spheres of life, but the relevance of information in the education of young minds and their teachers cannot be overemphasised. Consequently, ‘information-seeking is a primary activity of life and people seek information to deepen and broaden their understanding of the world around them’ (Karunarathna, 2008:13). Rogers (1995) acknowledges that obtaining information is one of the primary ways of reducing uncertainty. Teachers and learners are constantly in dire need of information to build up or develop relevant knowledge. There are learners who drop out of secondary education before completing it, while others complete it but do not proceed to higher education. Most of these learners have to seek employment. As a result, in Lesotho, secondary education also serves to prepare learners for employment. There is a need to equip learners with information relevant for different workplaces, including proper career guidance and good conduct in the midst of HIV and AIDS.

‘The field of education demonstrates a substantial amount of literature written by, for and about the teachers. However, the field of information science has yet to publish much with regards to teachers and information behaviour’ (Mundt *et al*, 2006:1). In education, teachers have been studied extensively in relation to information, often in respect of the use of the internet and other information and communication technologies in teaching (e.g. Barker, 2009; Becker & Ravitz, 1999; Chai *et al*, 2009; Chigona & Chigona, 2010; Haydn & Barton, 2008, 2007; Irvine & Williams, 2002; Madden *et al*, 2005; Noh *et al*, 2004; Passey, 2006; Tahee *et al*, 2004; Twidle *et al*, 2006). In the field of information science, literature on teachers’ information needs, information-seeking and preferences for communication

channels is still limited and mostly emanates from other continents such as Australia (e.g. Dillon, 1997), North and South America (e.g. Mundt *et al*, 2006; Patuelli, 2008; Perrault, 2007), Europe (e.g. Conroy *et al*, 2000; Henley, 1995; Williams & Coles, 2007b) and Asia (e.g. Hsu, 2005; Lan & Chang, 2002, Lundh, 2005; Wu *et al*, 2005). Some pertinent studies from Asia and South America are inaccessible because of language barriers (e.g. Chang, 2004; Chien & Chang, 2005; Kolozs, 1992). Other pertinent studies are on teachers (i.e. lecturers) at universities, not at secondary/high school level (e.g. Asunka *et al*, 2009; Tahir *et al*, 2008; Tahira & Ameen, 2009). Studies on teachers' information needs and information-seeking patterns are still limited in Africa, with exceptions including Nwokedi and Adah (2009), Oosthuizen (1997), and Snyman and Heyns (2004). At the time of writing this thesis, there was no study on the information needs and information-seeking patterns of teachers in Lesotho.

Secondary level teachers occupy an important role in education in any country. In Lesotho, they have the chief responsibility for producing a capable workforce that will be able to contend with the prevailing problem of high unemployment (Boaduo, 2005:12). It is often argued that both secondary education drop-outs and graduates contribute to unemployment. The importance of these teachers, in particular their information needs and information-seeking patterns, including the implications for providing them with a satisfactory information service, underpin this study.

The development of appropriate information service depends largely on understanding fully the target users' information needs and information-seeking patterns. This may be achieved through appropriate research. According to Hepworth (2007), information practitioners are faced with challenges pertaining to information products and services. Hepworth (2007:33) adds that understanding the consumer (user in this study) of information is becoming increasingly important in relation to the design and development of information products and services, because this understanding enables information services to be tailored to individuals and the community they serve. In affirmation, Wilson (2006a:667) argues that 'an information science firmly founded upon an understanding of information users in the context of their work or social life is likely to be of more use to the information practitioner, by pointing the way to practical innovations in information services.' Consequently, Oladokun and Aina (2009) studied the library and information needs, including the use of information

sources, of continuing education students at the University of Botswana (UB) and made recommendations for service delivery for the distance learners at UB. White *et al* (2009) studied the information needs and information behaviour of students studying abroad and developed library and information services for them. Similarly, in the context of the current study, there is a need to investigate the information needs of secondary level geography teachers in Lesotho, the way these teachers seek information, including the sources that they use and their preferences for communication channels, in order to guide the design and implementation of their information service. ‘We need to understand the user’s perspective to design more effective library and information services’ (Kuhlthau, 2004:13).

The following are some of the factors that led to a need to study secondary level geography teachers in Lesotho:

- Most secondary level geography teachers in Lesotho graduated from the NUL with a BSc Ed, BA Ed, or B Ed. The BSc Ed teachers study mostly physical geography, while the rest study mostly human geography. This creates a disparity in knowledge content regarding these two major geographical spheres that may be addressed through delivery of an appropriate information service.
- In the past five years, little attention has been paid to the secondary level geography teachers’ in-service training in terms of regular workshops, particularly by the MOET. It is worth investing how these teachers obtain information to meet their needs.
- In most of the newly opened government schools, geography is offered at JC level. Previously, some of the schools were phasing out geography by offering subjects such as development studies, business education, etc. It was felt that geography as a subject could be threatened by the new subjects, including the introduction of environmental education in schools. It is envisaged that the provision of more information on geography may increase appreciation of this subject.
- The researcher used to be a secondary level geography teacher in Lesotho. Given her experience and knowledge of teaching geography in Lesotho, it may be easier to study secondary level geography teachers compared to teachers of other subjects.
- The researcher is now an information practitioner at the Institute of Education (IE) Information and Documentation Centre (IDC) at the NUL. In her current designation, she has to initiate and provide information services for various users in the field of

education. Most of these users are pre-service and in-service teachers. Therefore, investigating the information needs and information-seeking patterns of secondary level geography teachers would enable the researcher not only to understand them, but also to provide them with an appropriate information service.

It is against this background that there was a need for an investigation into the information needs and information-seeking patterns of secondary level geography teachers in Lesotho, in order to guide the design and implementation of an information service for them.

1.2 STATEMENT OF THE PROBLEM

An understanding of human information behaviour is fundamental to the provision of high quality library and information services. Once librarians and other designers of information services understand people's information-seeking behaviour and preferences, they might mould their services and resources to conform to these patterns, thereby better serving the users' needs (Agosto & Hughes-Hasell, 2005:141-163). They might also note opportunities for intervention that may shape and have an impact on information behaviour. Consequently, the central focus of this study is the information needs and information-seeking patterns (part of information behaviour) of secondary level geography teachers in Lesotho. These teachers' information needs and information-seeking patterns, including preferences for information sources and information communication channels, are regarded as fundamental to the design and implementation of an appropriate information service. The study poses the following principal research question:

What are the information needs and information-seeking patterns of secondary level geography teachers in Lesotho with regard to their teaching roles and how can these guide the design and implementation of an information service for these teachers?

1.2.1 Research questions

The principal research question is broad and was therefore divided into the following sub-questions:

1. What are the information needs of secondary level geography teachers in Lesotho?
2. What are the information-seeking patterns of secondary level geography teachers in Lesotho?
3. Which information sources do these teachers mostly use?
4. Which information communication channels are preferred by these teachers to access and exchange information?
5. Which information sources are available and accessible to these teachers at schools?
6. What kind of an information service can be recommended for secondary level geography teachers in Lesotho?

1.3 THEORETICAL FRAMEWORK

Studying the information needs and information-seeking patterns of human beings as part of their information behaviour is not new. Many studies have been undertaken resulting in models that reveal human behaviour in seeking information. Some of these models explain how the information needs arise, how these needs are addressed and how the information is used. While some models could be termed broad and general, others are specific and concise. For instance, Wilson (1999) and Wilson and Walsh (1996) offer a general information behaviour models that encapsulates the cycle of information activities, from the origin of an information need to the stage when information is used. Taylor (1991) specifically offers an information use model outlining the uses of information. Kuhlthau (1993) offers an information search process model and Ingwersen (1996) an information retrieval model. A few examples of other information behaviour related models are suggested by Choo *et al* (1999, 2000), Dervin (1983), Ellis (1989, 1993), Johnson (1997), Krikelas (1983), Leckie *et al* (1996) and Savolainen (1995) on everyday life information-seeking focusing on non-work information-seeking and tested on teachers and textile industry workers. Although the current study focuses on teachers' information-seeking for work purposes, considering that the current study involves teachers in a developing country, who have to prepare learners for

employment, while also facing peculiarities such as HIV and AIDS, bureaucratic systems under which their schools operate and high influx of learners in schools, models focusing on everyday life information-seeking, such as Savolainen's (1995) might be of value in this study.

Ikoja-Odongo and Mostert (2006:154) explain that each model has its own strengths and weaknesses and not all of them are based on empirical tests. Wilson (1999:250-251) asserts that models can be presented theoretically or conceptually, aiming to provide a thinking framework about a problem; in this case, using a model enables specific research questions to be tested and researched. However, all available information-seeking models do not test the same things, therefore researchers need to acquaint themselves with what each model has set out to test, then choose a model after determining whether the model will present the information required accurately, reliably and systematically, and whether it can explain or predict the desired phenomena, specifically enabling validation of representations and findings (Wilson, 1999). After familiarising oneself with several models in the literature, and bearing in mind the principal research question outlined above, it was found that Leckie *et al*'s (1996) information-seeking of professionals model would be the most appropriate to adopt as the theoretical framework of this study. This model is explored in more detail in Chapter Two (section 2.2.1). Nonetheless, it is important to explain briefly why this model was chosen as the study's theoretical framework.

As mentioned earlier, teachers are important agents of formal education. Therefore, their information needs and information-seeking patterns underpin this study. As a result, this study aims to establish the information needs and information-seeking patterns of teachers with respect to their work, in order to guide the design and implementation of information service for these teachers. The teachers are professionals, and it is therefore imperative that a study of their information-seeking behaviour be guided by the information-seeking model that specifically applies to professionals at work. As a result, the study employs the Leckie *et al* (1996) model because it is an information-seeking model for professionals. It was derived from studies of professionals such as engineers, lawyers and those in health care. Moreover, Leckie *et al* (1996:161) maintain that their model is applicable to all professionals and it focuses on the professionals' tasks and work roles (Case, 2007:139). Where necessary the model can be supplemented with insights from other models.

1.4 RESEARCH DESIGN AND METHOD

This section briefly introduces the research design and method that were followed in this study. The comprehensive explanation of the entire research procedure is presented as Chapter Three. This study employs a survey research method both quantitatively and qualitatively to investigate the research problem. However, the overall methodology was a qualitative one. The objective was to use the two methodologies so that they complement each other and assist in gaining insight into the research problem. It was envisaged that the use of both quantitative and qualitative methodologies would help to increase the validity and reliability of the data collected. Section 1.4.2 below shows how the quantitative and the qualitative methods were used.

1.4.1 Study population

The rationale and elaborate description of the study population are outlined in Chapter Three (section 3.4). The following were the groups that formed the study's population:

- In-service secondary level geography teachers.
- Prospective secondary level geography teachers.
- Institutions directly involved in secondary level geography education in Lesotho.

1.4.2 Data collection methods

While quantitative methodology was found suitable to collect data from the prospective geography teachers, a qualitative methodology was found appropriate for collecting data from the in-service secondary level geography teachers, and institutions involved in secondary level geography education in Lesotho, as well as site visits for observation of school libraries. Specifically, data were collected using the following methods that are described further in Table 1.1:

- Literature review to establish the theoretical framework and to guide the empirical component of the study.
- Questionnaire for the prospective secondary level geography teachers.
- Focus group discussions with the in-service secondary level geography teachers.

- Interviews with officials in the institutions involved in secondary level geography education in Lesotho.
- Partial observation through site visits to school libraries.

Table 1.1: Research techniques used for the study of secondary level geography teachers

Research techniques	Descriptions of the research techniques
Literature review	The review covers the information needs and information-seeking patterns of teachers, their information communication channels and information sources, including information service in relation to the wider field of information behaviour. The extensive literature review is provided as Chapter Two.
Prospective secondary level geography teachers' structured questionnaire	The questionnaire for the prospective secondary level geography teachers addressed the information needs, information-seeking patterns and information communication channels of these teachers during their teaching practice. It sought suggestions on the improvement of information service for secondary level geography teachers in Lesotho. (Appendix D)
Focus group schedule for the in-service secondary level geography teachers	The schedule for the focus groups involving the secondary level in-service geography teachers aimed to establish their information needs, information-seeking patterns and information communication channels, as well as their opinion on the availability of information in their schools, including their suggestions on the improvement of such information service. (Appendix A)
Semi-structured interview schedule for individuals in institutions involved in secondary level geography education in Lesotho	The interview schedule was aimed at the institutions involved in secondary level geography education in Lesotho. It was meant to investigate their perceptions of teachers' information needs as well as their preferred modes of information communication. The schedule aims to establish the existing information service for the teachers and methods of disseminating information to the teachers. (Appendix B)
Observation schedule for libraries	This was used to explore the school libraries as part of information service in place to support the information needs and information-seeking of the teachers. (Appendix C)

It is common for information needs and information-seeking studies to combine research methods, therefore the current study is no exception. The table below provides examples of some related studies that utilised more than one research technique.

Table 1.2: Examples of multiple research methods in related information behaviour studies

Author(s)	Focus	Research techniques
Williams and Coles (2007a)	Teachers' use of research information in teaching	Questionnaire, interviews, focus groups
Stokes and Lewin (2004)	Information-seeking behaviour of nursing teachers	Questionnaire, interviews and observations
Dias Gasque and De Souza Costa (2003)	Teachers information-seeking behaviour in continuing education	Questionnaire and interviews
Mnubi-Mchombu <i>et al</i> (2009)	Information needs and information-seeking behaviour of OVC and their caregivers (included because of teachers' involvement with orphans owing to HIV and AIDS)	Interviews, focus group discussions and questionnaire

1.4.3 Data analysis

Since this study applied both qualitative and quantitative methodologies, it is inevitable that the data collected are qualitative and quantitative. Therefore, data had to be analysed accordingly. Qualitative data were collected from focus group discussions, individual semi-structured interviews and observations, while quantitative data were collected from the structured questionnaire. Content analysis was used to analyse the qualitative data while the quantitative data from questionnaire were analysed using Statistical Package for Social Science (SPSS). An explanation of the qualitative data analysis for this study is provided in Chapter Three (section 3.9.2). The general aim of the data analysis was to establish the information needs and seeking patterns of secondary level geography teachers, as well as to establish the existing information services, including their preferred channels of communication. The ultimate purpose was to guide the design and implementation of information service for these teachers.

1.5 SIGNIFICANCE OF THE STUDY

This study is investigative in nature. It examines the information needs and information-seeking patterns, including the use of information sources and preferences for means of communication, in order to improve information service delivery for the secondary level geography teachers in Lesotho. Specifically, the study aimed to:

- Understand the secondary level geography teachers' information needs, information-seeking patterns and preferred information sources;
- Identify the information communication channels and information gaps for the secondary level geography teachers;
- Look for effective ways of information service delivery to the secondary level geography teachers in Lesotho that could even be applicable to the entire teaching sector; and
- Contribute important knowledge in the field of information behaviour in the area of the teachers' information needs, information-seeking patterns and information service delivery. Such knowledge is still limited, particularly in Africa, and lacking in Lesotho.

1.6 LIMITATIONS

- The study focuses only on secondary level geography teachers in Lesotho in the schools that offer geography both at JC and COSC levels.
- The study did not consider prospective teachers at the LCE because they are engaged in teacher training for JC level only.
- Geography is an elective subject as opposed to a core subject and therefore it is not offered in all the schools. The schools that offer geography may have certain unique features, unknown to the researcher, which may introduce some peculiarity that shapes the findings of this study. Therefore, this may have an impact on generalising the findings to all schools and all subjects.
- Studying the teachers' information needs and information-seeking patterns and formulating an appropriate information service strategy do not necessarily solve the many other problems that teachers face in facilitating the teaching and learning of geography in Lesotho, such as overcrowded classrooms and an increasing number of orphans in schools.

1.7 CLARIFICATION OF TERMS

This section outlines the working definitions of terms used in this thesis. The study is on information needs and information-seeking patterns and the term information is crucial. From the research questions (section 1.2) it is evident that terms such as information need, information-seeking, information source, information communication channel, information service and secondary level geography teacher also have to be clarified. The terms are presented in a systematic manner that is logical for easy understanding. Although these terms are briefly clarified in this introductory chapter, they are further discussed in Chapter Two for literature review.

1.7.1 Information

Despite a lot of efforts to define information in the field of information science, there is still no generally accepted and agreed explicit understanding of the concept of information (Bawden, 2007:2). Somehow there seem to be problems and complexities when dealing with the term ‘information’. The following are some of the reasons for the complexities pertaining to the term ‘information’ found in the literature:

- Information is too vast a concept to define and examine, given that it is intangible and multifaceted (Weller, 2007:438-439).
- The term ‘information’ has many underpinning meanings and perspectives, depending on the field in which it is being studied and the context in which it is being used (Zhang & Benjamin, 2007:1935).
- Information has been studied in many different disciplines, such as Computer Science, Communication, Information Science, Information Systems and Informatics, and each of these disciplines has a different focus (Mutsheva, 2006:34).
- Information does not have a single definition and there is also some failure to make distinctions among information, facts, advice and opinion (Wilson, 2006a:659).

Nonetheless, Ikoja-Odongo and Mostert (2006:149) argue that information can be seen as any stimulus that reduces uncertainty. According to Zhang and Benjamin (2007:1935), information is related to concepts such as fact, data, knowledge, intelligence, news, communication, instruction, representation, mental experience or stimulus, among others. To

corroborate this view, Wilson (2000a:6) indicates that information can be understood as a *physical entity* or phenomenon, such as books, journals, etc., as well as the *channel of communication* through which data are transferred, whether written or oral, or as *subject data* contained in a document or transmitted orally, or *factual data* objectively transferred, or *advice* or *opinions*, into which value judgements enter.

Because of the complexities pertaining to the term ‘information’ outlined earlier, this study does not attempt to define information, but rather opts to be guided by the understanding outlined by Wilson (2000a) above. This is because in many instances ‘we ordinarily use and hear the word “information” without much concern for its definition; but we know what we mean when we use the word information’ (Case, 2007:42). In the same vein, it is deemed that the research participants will know what is meant by information, especially when it is pertinent to their teaching.

1.7.2 Information need

According to Kuhlthau (2004:26), ‘information need is an actual, but unexpressed need for information, or an ill-defined area of indecision which may be expressed in an ambiguous, rambling statement. Information need may start as a vague sort of dissatisfaction which is characterised by confusion and perplexing reaction to a vague new idea. This confusion increases and mounts until the person may be threatened by his/her lack of understanding.’ On the one hand, Ingwersen and Järvelin (2005:20) state that ‘information need signifies a consciously identified gap in the knowledge available to an actor. Information needs may lead to information-seeking and formulation of requests for information’. On the other hand, Ikoja-Odongo and Mostert (2006:149) observe information need as the recognition of the existence of uncertainty in the personal or work-related life of the individual. In addition, Ikoja-Odongo and Mostert (2006:147) note that information needs may be expressed, unexpressed or dormant, where dormant needs are those that the individual is unaware of, but may be potentially activated by an information service provider. Furthermore, there are unconscious needs which do not necessarily lead to action.

Based on the discussions above, in this study information need is regarded as an absence or lack of information that creates deficiency in the knowledge of the teachers. While this study

acknowledges that information needs may be expressed or unexpressed, or may be derived from the environment within which users operate, it considers only the expressed information needs.

1.7.3 Information-seeking

Information-seeking is described as the purposive acquisition of information from selected information carriers; these include information sources and channels for communicating information (Johnson, 2003:737). It includes examining the ways in which people find information they require, such as how and where people look for solutions to information problems (Burke, 2007:679). However, Spink and Cole (2006:27) argue that it is not in every case that human beings seek information for a specific purpose, because there is the everyday life information-seeking that includes more consideration of human sense-making behaviour of the environment and more non-academic and less formal information-seeking behaviour. This may happen when browsing or reading for leisure, but finding something that was not originally sought (Foster & Ford, 2003:324). Nonetheless, McKenzie (2003:27) indicates that there are also occasions when people make contact or interact with information sources through the initiative of another agent, either the information source or some other gatekeeper or intermediary. It is also important to note that Fourie (2006:101), in line with the suggestions by Wilson (1999), indicates that “information-seeking can be active or passive”. On the one hand passive information-seeking occurs when people decide that they do not want to seek information, or they may be unaware of the fact that they might need information. On the other hand, active information-seeking occurs when people do everything in their power to seek information.

From the arguments above, one deduces that information-seeking may occur with a specific purpose in mind in order to address the information need. It may also happen when one is regularly interacting with sources of information without necessarily looking for something specific. This study regards information-seeking as the process which the secondary level geography teachers engage in to find information, either with a specific purpose in mind, or through regular interaction with information sources such as browsing or through other agencies. The study also considers that information-seeking can be an individual endeavour or a group exercise.

1.7.4 Information behaviour

Ingwersen and Järvelin (2005:21) define information behaviour as the human behaviour dealing with generation, communication and use of information and other activities concerned with information, such as information-seeking behaviour and interactive information retrieval. Case (2007:5) maintains that ‘information behaviour encompasses information-seeking as well as the totality of other unintentional or passive behaviours (such as glimpsing or encountering information), as well as purposive behaviours that do not involve seeking, such as actively avoiding information.’ To corroborate this view, Wilson (2000b:49) describes information behaviour ‘as the totality of human behaviour in relation to sources and channels of information, including both active and passive information-seeking and use.’ In the same vein, Fisher and Julien (2009:317) explain that information behaviour focuses on people’s information needs; particularly how they seek, manage, give and use information, purposefully and/or passively, in their varied roles in their everyday lives. In this study, information behaviour is considered as any activities in which teachers engage in relation to information phenomena. This includes awareness of their information needs, their active information-seeking, their use of information in creation and presentation, their communication of information, their preferences and use of information sources, and how they interact with such sources.

1.7.5 Information use

According to Byström and Hansen, (2005:1055) as a result of information-seeking, certain information is retrieved, collected and may be used in various ways. It may be used as a whole, in part or in combination with other information already existing. Nahl (2007:xix) indicates that information use is related to the feeling of wanting to do something with the information that has been received, such as telling someone else, or buying it, or selling it, or using it to achieve something more effectively. In the same vein, Choo *et al* (2008:794) note that an important form of information use is instrumental utilisation, which is more related to outcomes. Therefore, one may deduce that a person realises the information gap, acts on it to seek information and does something with the information as discussed by Savolainen (2006a). Information use occurs when something is actually done with information to utilise it to address information needs, share information or communicate, and generate other information.

1.7.6 Information source

Generally speaking, ‘anything human beings interact with or observe can be a source of information’ (Bates, 2006:1035). The information source is a medium in which knowledge and/or information is stored (Nikalanta & Scamell, 1990:25). In the workplace, Byström and Järvelin (1995:193) mention that from the workers’ point of view an information source contains (or is expected to contain) relevant information. Fisher and Julien (2009:332) indicate that there are two types of information sources that dominate the literature in studies on information behaviour: the interpersonal and the internet. Other related terms found include information carriers (Johnson, 2003) and information resources (Fidel & Pejtersen, 2004). In this study, an information source is understood as something that contains and/or stores information. This is affirmed by Tucker and Napier (2002:299) when they indicate that the information source provides content or expertise of interest to the information seeker.

1.7.7 Information communication channel

According to Huang *et al* (2004:148) a communication channel refers to a transmission system or medium, including the whole process of sending messages from the source to the receiver. This is a mechanism through which information is transferred from an information source to an information seeker. Nikalanta and Scamell (1990:25) indicate that a communication channel is a means by which information is moved from one point to another. Tucker and Napier (2002:299) point out that the information communication channel refers to the methods or vehicles by which information is transferred or received. This study considers an information communication channel as a conduit, transmitter or passage for information transfer from source to receiver.

1.7.8 Information service

According to Woodsworth and Williams II (1993:3), an information service can be described as a combination of information, technology and people, including a set of activities that provides individuals with relatively easy access to data or information. Ju (2006:354) mentions that the core benefit of information services is their capacity to help the users to get the right information, thereby enhancing their academic understanding and efficiency. Moreover, Ju (2006:355) indicates that to meet users’ needs, information services should focus on identifying, analysing and coordinating the needs of various potential user groups.

In this study, information service refers to those services involving a combination of information, technology, people and activities that aim to provide specific information to teachers in order to carry out work-related tasks and activities in a relatively easy and convenient way. It may involve current awareness services, social networking of teachers, document delivery and guidance on how to use the internet and other electronic resources.

1.7.9 Secondary level geography teacher

For the purposes of this study, the teacher concerned is a person who is teaching geography at the secondary education level in Lesotho and typically associated with high schools. The teacher prepares learners for tertiary education and therefore is an intermediary in education between primary education and tertiary education. However, owing to a high dropout rate at secondary education level in Lesotho, teachers are also mandated to prepare learners for employment and to deal with social issues such as HIV and AIDS.

1.8 THESIS STRUCTURE

The thesis has been structured according to the following chapters:

Chapter 1 – Introduction

This chapter offers the introduction and overview of the study. It covers the background to the study; the statement of the problem, which includes the principal question and its sub-questions; the methodology; significance and limitations of the study; the clarification of key concepts and the thesis structure.

Chapter 2 – Literature review

Chapter two presents the review of the relevant literature based on the research questions outlined under the statement of the problem. It also covers literature on information-seeking models, including the model that was selected for the theoretical framework for this study. The literature on the information needs and the information-seeking patterns of the teachers, as well as the information sources and information communication channels that are used by teachers is also reviewed. Since this study ultimately aims to guide the design and

implementation of an information service for secondary level geography teachers in Lesotho, literature on information services is also outlined.

Chapter 3 – Research design and method

This chapter describes the research design of the study and this includes the study population, sampling techniques, survey methods of data collection and the procedures and steps taken to increase the validity and reliability of data.

Chapter 4 – Data analysis

This chapter is mainly an analysis of both the qualitative and quantitative data collected. It portrays the analytic presentation of the information obtained from the literature, focus group discussions, semi-structured interviews, questionnaire and observations through site visits.

Chapter 5 – Interpretation of the data

The chapter offers an interpretation of the data and informed discussions of the data that were analysed and presented in Chapter Four. The data are compared and contrasted with the results of other studies reviewed. Data are further interpreted based on the theoretical framework guiding this study, which is the Leckie *et al* (1996) model of information-seeking of professionals.

Chapter 6 – Proposed information service model for secondary level geography teachers in Lesotho

An information service model for secondary level geography teachers in Lesotho is proposed in this chapter. The chapter also suggests strategies for the design and implementation of the information service for these teachers.

Chapter 7 – Findings and recommendations

This chapter presents the summary of findings and recommendations of the study in relation to the principal research question and its sub-questions. It reaches a general conclusion based on these findings and formulates recommendations, including suggestions for further research.

1.9 CONCLUSION

Chapter One served as the thesis introduction and provided the background to the study, in particular the factors that underpinned the research problem. It outlined the statement of the problem and posed the principal question and its sub-questions for this study. It briefly discussed the research design and method that were followed. This includes a survey research method using both qualitative and quantitative approaches. The chapter outlined the study population and how data were collected and analysed. The study's significance, limitations and working definitions were also presented. It ended by articulating how the thesis is structured. Chapter Two offers a review of the related literature. This review will be guided by the research questions posed for the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

While the previous chapter formed the introduction and provided the background to the study, the statement of the problem, research questions and introductory research design and method, this chapter offers the literature review for the study. The aim of the literature review is to develop fundamental insights into research on information needs and information-seeking patterns of teachers. The literature review should not only help to provide the research perspective for the current study, but also forms a basis for the empirical study on the teachers' information needs and information-seeking patterns, which will assist to guide the design and implementation of an information service.

Another objective of the literature review is to address the principal research question: **What are the information needs and information-seeking patterns of secondary level geography teachers in Lesotho with regard to their teaching role and how can these guide the design and implementation of an information service for these teachers?** This principal question, along with its sub-questions outlined in Chapter One (section 1.2), not only guided the literature review process, but also established the subtopics for this chapter. The chapter's subtopics are:

- Information-seeking models.
- Information needs of teachers.
- Information-seeking patterns of teachers.
- Information sources used by teachers.
- Information sources available and accessible in schools.
- Information communication channels preferred by teachers.
- Information service delivery for teachers.

This chapter also alludes to information-seeking models because the current study uses the Leckie *et al* (1996) information-seeking of professionals' model for its theoretical framework. The theoretical framework model cannot be discussed without recognising other information-seeking models.

2.2 INFORMATION-SEEKING MODELS

In order to theorise information needs and information-seeking, some models were reviewed to establish their relevance to the current study in order to develop an appropriate theoretical framework to guide the study. The review of the models is based on the principal research question. There are many information needs and information-seeking related models in the literature, as noted by Case (2006, 2007), Courtright (2007) and Fisher and Julien (2009). While it is important to recognise their existence, one does not necessarily have to discuss these models, as they may not bear direct relevance to the current study. Some of the popular models found in the literature include:

- (a) General information behaviour models
 - Dervin (1983, 1996) sense-making theory.
 - Wilson (1981, 1999) and Wilson and Walsh (1996) information behaviour models.
- (b) Workplace and task-related information behaviour models
 - Byström and Järvelin (1995) task complexity and information-seeking and use.
 - Leckie *et al* (1996) information-seeking of professionals' models.
- (c) Digital environments models
 - Choo *et al* (1999, 2000) information-seeking on the web.
- (d) Information-seeking, search and retrieval models
 - Ellis (1989) model of information-seeking behaviour.
 - Ingwersen (1996) information retrieval process model.
 - Kuhlthau (1991, 1993) information search process model.

As explained in Chapter One (section 1.3), this study employs the Leckie *et al* (1996) information-seeking of professionals' model as its theoretical framework. Therefore, it is befitting to review literature related to this model. The actual model is explained along with other scholars' perceptions of it, and evidence of the model's application in information-seeking related studies. Although other models and their implications are noted, the focus of this study will be on models that allow for workplace tasks and roles of professionals, including the environment in which workplace tasks are completed. The Leckie *et al* (1996) model will guide data collection, since it is deemed to be the most appropriate model, and it will also add value for data analysis and findings to be mapped against other task-related models.

2.2.1 Leckie *et al's* (1996) information-seeking of professionals' model

This study uses the Leckie *et al's* (1996) model as the framework for the investigation of the information needs and information-seeking patterns of secondary level geography teachers in Lesotho. The graphical presentation of the information-seeking model of professionals is presented in Figure 2.1.

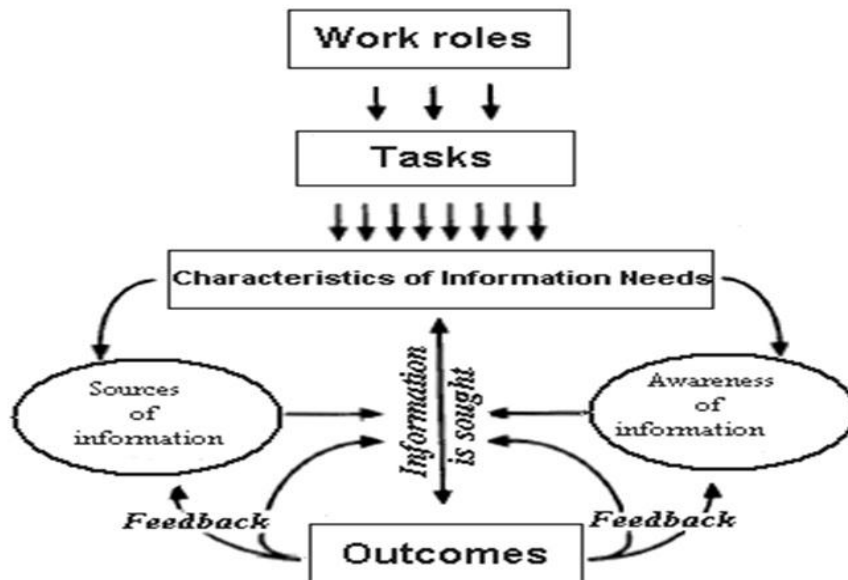


Figure 2.1: The Information-seeking of Professionals model (Leckie *et al*, 1996:180)

From Figure 2.1, it is evident that the Leckie *et al* (1996) model has six components: work roles, tasks, characteristics of information needs, awareness of information, sources of information and outcomes. From the model, one can see that work roles lead to certain tasks that trigger information needs and depending on the nature of the information need, information-seeking may occur. The information needs determine the information sources to be used and also influence awareness of information. The information-seeking process results in outcomes. These outcomes provide feedback about the information-seeking process, including the information need, the sources of information and the awareness of information. In addition, these outcomes may lead to other information needs. It is evident from the model that information needs emanate from tasks that emanate from the work roles of the professionals.

According to Leckie *et al* (1996:181), professionals may have work roles such as service provider, administrator/manager, researcher, educator and student. The secondary level geography teachers being studied here are educators. Leckie *et al* (1996:181) indicate that within the professionals' roles, there are embedded tasks such as assessment, supervising, counselling, report writing, etc. To corroborate this view, Niedźwiedzka (2003:9) indicates that certain roles indicate specific information needs and the environment within which the life and work of the information user take place. This would apply to secondary level geography teachers in Lesotho, as depicted in Chapter One (section 1.1). In addition, Vakkari (1998, 1999, 2001, 2003) and Byström and Hansen (2005) discuss tasks in relation to information-seeking, information retrieval and searching. Vakkari (1999:824-5) affirms that a worker's job consists of tasks that are well identified by the workers, as they are primary actors. According to Vakkari (1999:825), the complexity of a task determines its performance and consequent information needs. The geography teachers being studied here, in addition to being educators, are likely to have the tasks of assessing, supervising their learners and writing the learners' progress reports. Moreover, since many schools in Lesotho do not have professional counsellors, some of the teachers have the task of counselling learners when the need arises. Considering the earlier reference to the role of the teachers in Lesotho regarding subject teaching, preparing for employment and their care-giving role in the prevailing HIV and AIDS situation, counselling tasks might be important to note in this study. Other authors reporting tasks and information-seeking behaviour are Järvelin and Ingwersen (2004); Kallehauge (2010); Landry (2006); Morehead and Rouse (1982); Vakkari (2003) and Xu, *et al* (2006).

Leckie *et al* (1996:181) point out that information-seeking is strongly related to the enactment of a particular role and its associated tasks. Most importantly, an ongoing aspect of a professional's work is keeping up with the advancements in one's field and upgrading one's education and skills (Leckie *et al*, 1996:182). This implies that the geography teachers as educators not only have certain tasks and roles that may require information-seeking, but that they may also seek information just to be up to date with the latest developments in their field. This is affirmed by Noh *et al* (2004:1296) who argue that the teachers need opportunities for their professional development in order to maintain and enhance their abilities to teach, and because the subject contents as well as instructional methods are evolving and expanding. Therefore, it is imperative also to find out how the teachers generally interact with information to keep abreast with the latest developments.

According to Leckie *et al* (1996:182) information needs arise from situations pertaining to specific tasks that are associated with one or more of the professionals' work roles. This is also supported by Järvelin and Ingwersen (2004), Kallehauge (2010); Landry (2006), Morehead and Rouse (1982), Vakkari (1999, 2003) and Xu, *et al* (2006). The information needs are not constant and can be influenced by intervening variables such as:

- Individual demographics such as age, profession, specialisation, career stage and geographic location. Some of these demographics are also noted by Hargittai and Hinnant (2006), Johnson (1997) and Taylor (1991).
- Context (need arising from a specific situation). This is also affirmed by Courtright (2007) and Wilson (1999).
- Frequency of the need (recurring or new).
- Predictability (anticipated need or unexpected need).
- Importance of the need (degree of urgency).
- Complexity of the need (easily resolved or difficult).

The nature of the information need, particularly its importance, has been indicated by Krikelas (1983) when discussing immediate needs and deferred needs. Moreover, the 'information need analysis' component of the Byström and Järvelin (1995) model is related to the information need issues outlined by Leckie *et al* (1996) above.

The above intervening variables indicate that it is important to establish the age of these teachers, their teaching experience and the geographic location of their schools. This is because the teachers in the urban schools may have different information needs from teachers in the rural schools. It is also important, in this study, to establish the specialisation of the geography teachers, given that some of these teachers graduate from NUL with a BSc Ed, BA Ed, or B Ed, as explained in Chapter One (section 1.1), which may affect the type of geography training they receive. Furthermore, it is of importance to determine the frequency of the information needs experienced by the teachers, given that the ultimate aim of the study is to formulate an appropriate information service for these teachers. Therefore, one would like to focus first on delivery of information that is needed frequently.

According to Leckie *et al* (1996:183-187) the sources of information and awareness of information are factors that affect information-seeking. This is also evident in the models of Byström and Järvelin (1995), Krikelas (1983) and Wilson (1999). Firstly, professionals seek

information from various sources such as colleagues, librarians, handbooks, journals and their own personal knowledge and experience. Personal knowledge and experience are important to professionals because they have to master an advanced body of specialised knowledge before practising. In addition, personal knowledge and experience also entail the different ways in which work is conducted or practice is carried out within a profession. As a result, it is also necessary to identify the information sources consulted by the geography teachers, including their use of personal knowledge and experience. According to Meyers *et al* (2007:5), various information sources may be used, depending on the nature of the information need. It is therefore crucial to consider all possible sources used and preferred by the teachers, given that the ultimate aim of this study is to guide the design and implementation of an information service. Studies related to information sources of teachers include those undertaken by Kirby and Bogotch (1996), De la Vega and Puente (2010), Henley (1995), Landrum *et al* (2007), Mowen *et al* (2007), and Weiss (1995). Literature that deals with teachers' use of information sources is reviewed later in section 2.5.

Secondly, Leckie *et al* (1996:185) point out that knowledge of various information sources and the perceptions formed about the information retrieved play a crucial role in the overall process of information-seeking. These scholars argue that knowledge and awareness of information, in particular content, can determine the course of information-seeking. It is mentioned that professionals will consult sources that they are familiar with and with which they have had prior success in satisfying an earlier information need. Professionals consult sources that they trust will provide accurate information in a preferred format. Furthermore, professionals use sources that they know will deliver the information on time and are accessible in terms of distance and costs. In the same vein, Case (2007:97) mentions that it is widely believed that humans tend to seek information that is congruent with their prior knowledge, beliefs and opinions, and to avoid exposure to information that conflicts with these internal convictions. To corroborate this view, Kuhlthau (1991:362) argues that people actively and constantly construct their view of the world by assimilating and accommodating new information with what they already know or have experienced. Furthermore, Kuhlthau (1991:362) affirms that as people have a limited capacity for assimilating new information, they purposely construct meaning by selectively attending to information that connects with what they already know.

Although information source preferences are not static, the information source preferences of the geography teachers in this study need to be established for appropriate information service delivery (Hepworth, 2007; Wilson, 2006a). However, an appropriate information service will require constant evaluation and close monitoring because change in life is inevitable (Chattopadhyay *et al*, 2006; Chiware, 2008). In various information behaviour models (e.g. Byström & Järvelin, 1995; Johnson, 1997; Krikelas, 1983; Taylor, 1991; Wilson, 1981, 1999) there are variables, such as demographics, context, information need and prior knowledge, that influence users' choice of information sources.

Thirdly, outcomes are the results of the information-seeking process. It may be considered as the end result of the work related requirements of specified work roles and tasks (Leckie *et al*, 1996:187). In the Leckie *et al* (1996) model, the optimal outcome is when the information need is met and the professional has accomplished his/her task. However, it is possible that the outcome does not meet the information need such that the task is not accomplished and therefore further information-seeking is pursued. This has been outlined as the feedback loop in the model (Leckie *et al*, 1996:187). According to Prabha *et al* (2007:74), the current abundance of information makes it crucial for information seekers to decide what information is sufficient to meet their objectives. Prabha *et al* (2007:77) discuss information-seeking behaviour models regarding decisions on when to stop searching for more information. From their article, one gathers that there are several factors that lead to decision-making. These factors may be incorporated in the feedback process of the outcomes component of the Leckie *et al* (1996) model. These factors, according to Prabha *et al* (2007:77-79) are users' feelings that they have enough to write; time and money; knowledge of trusted authors; nature of the problem and task at hand; context, situation or setting that the user is in; search system; motivation level of the user; task-domain knowledge and information-seeking ability. It is important to find what the geography teachers usually do when they find that their information needs have not been met after seeking information.

When choosing the Leckie *et al* (1996) model as the theoretical framework for this study, it was believed that it had attributes that could help to address the principal research question and ultimately help to guide the design and implementation of an appropriate information service for secondary level geography teachers in Lesotho. Moreover, the model was chosen because it incorporates both information needs and information-seeking, which are the core aspects of the current study. In addition, the model was derived from studying professionals

(lawyers, engineers and health professionals) in the workplace. Leckie *et al* (1996:161) maintain that their model is applicable to all professionals. This is important in this study because it focuses on teachers' information needs and information-seeking patterns pertaining to their work as professionals. Furthermore, in comparison to other models that were reviewed, this model was found to be simple to understand and follow.

Since the Leckie *et al* (1996) model forms the theoretical framework for the current study, it is worth observing how other scholars view it and therefore, some literature regarding this model is reviewed in the next section.

2.2.2 Literature review of the Leckie *et al* (1996) model

Case (2007:127) asserts that the Leckie *et al* model is restricted to professionals, and it is not surprising that work roles and tasks are considered as the prime motivators for information-seeking. In addition, some important factors in this model, according to Case (2007:128), are familiarity and prior success with the source (or the search strategy employed), along with the trustworthiness, packaging, timeliness, cost, quality and accessibility of the sources. According to Case (2007:128), in the Leckie *et al* (1996) model needs create an awareness of information sources and/or content, and thus motivate a person to examine those needs. Furthermore, information-seeking behaviour is viewed as a two-way process between the characteristics and outcomes of the information need. Case (2007) criticises the model for restricting itself to professionals in the workplace and indicates that it does not consider other non-work contexts that may affect a professional. In a certain sense this model is well suited to this study that investigates teachers' information needs and information-seeking patterns for work purposes. The limitation highlighted by Case (2007) further justifies the appropriateness of this model in this particular study. However, the model may be expanded to consider non-subject teaching ideas for teachers.

According to Courtright (2007:279), the Leckie *et al* (1996) model was derived from an analysis of influences on information practices of users' roles at work, and stemming from these roles, the tasks they are charged with. The tasks give rise to information needs and the strategies deployed to meet those needs differ in various corporate cultures, individual habits, availability of information sources and systems, as well as commitment to professional development of staff. This implies that the teachers' unique work settings have to be taken

into consideration. These settings could be the fact that they teach in different schools, located in different places, with different information resources and school governance. Secondary level geography teachers may also be teaching other, different subjects and may have differing teaching loads. One also gathers from Courtright (2007) that it is important to establish the information sources and systems that are available to teachers. This may include the institutions and the infrastructure that is in place to help the teachers with information.

According to Pettigrew *et al* (2001:62) the Leckie *et al* (1996) model is holistic and based on the assumption that studies in information-seeking of professionals should understand the broader working context and examine, in depth, the details of individuals' work, including all the roles a professional has to play. This is done bearing in mind the complexity and unpredictability of the process of information-seeking. This means that this study has to understand the context of geography teaching in Lesotho. For instance, context may be interpreted in terms of the information resources that are available in the schools, their accessibility to the teachers and the perception that the teachers have regarding the information content of these resources. Furthermore, one has to examine the duties of the geography teachers, including the roles and different tasks that these teachers have in the schools where they are teaching, in order to ascertain their information needs and the ways in which they obtain the information that they need.

The Leckie *et al* (1996) information-seeking of professionals' model emanates from lawyers, engineers and health professionals. This is mostly a scientific cadre of professionals (except the lawyers). This study, however, intends to use the model in relation to geography teachers who are professionals in education. Baker (2004:11) observes that because the Leckie *et al* (1996) model evolved from the literature of healthcare professionals, engineers and lawyers, it may be too formal, applying rather to the traditional type of work in an institutional setting where information in various formats can be accessed easily. In Lesotho secondary education, geography is sometimes clustered with science subjects and sometimes with social sciences. However, as mentioned in Chapter One (section 1.1), secondary level geography teachers in Lesotho operate in an institutional setting characterised by limited information sources. The teachers in this study are in a least developing country, while the model evolved from literature is found mostly in the developed world. According to Baker (2004:11), the Leckie *et al* (1996) model does not address information-giving (i.e. information-sharing) in the information-seeking process of professionals, and yet some professionals, such as teachers,

nurses, doctors, librarians, etc. have the task of sharing and giving information. Consequently, this model is applied recognising the issues outlined above, with some expectation of disparities in the model and the findings of this study.

Wilkinson (2001) studied the information-seeking behaviour of lawyers and maintains that the five roles that the Leckie *et al* (1996) model describes did not apply to the information-seeking activities of the lawyers who were studied. According to Wilkinson (2001:270), only two roles, viz those of service provider and administrator/manager, were identified and the other three roles of researcher, educator and student were not identified. Wilkinson (2001:274) adds that the five roles described by Leckie *et al* (1996) may not be the only roles that the professionals have; the professionals may have fewer roles or totally different roles to those described in the Leckie *et al* (1996) model. Therefore, one learns some important facts about the Leckie *et al* (1996) model from the critique of the model and the studies testing the model, such as the need to use it flexibly, knowing that not all its components and variables are applicable in every situation.

The literature reviewed above about the Leckie *et al* (1996) model highlights the importance of considering the following:

- The broader work context of professionals, such as the socio-political and economic conditions of their countries, their institutional settings and the availability of infrastructure for information service and information resources.
- The nature of the work, which might be scientific and/or non-scientific.
- The type of profession, its discipline and the diversity of its roles, associated tasks and requirements.
- Possibilities of giving and sharing information among professionals at the workplace and in non-work contexts.

2.2.3 Other studies based on the Leckie *et al* (1996) model

In addition to the studies noted in the preceding section, it was established from the literature that the model had been used as the research framework in more empirical studies. For instance, Du Preez (2007, 2008) and Du Preez and Fourie (2009) report on a study on the information behaviour of consulting engineers in South Africa using the model as a theoretical framework. Landry (2006) used the model as a conceptual framework to study the

work roles, tasks and information behaviour of dentists. Mundt *et al* (2006) utilised this model to study the information behaviour of teachers by employing it to frame questions on the characteristics of the information needs of their participants and also incorporated the ‘work roles’ component of this model into their new model. Baker (2004) used it as the framework for studying the information needs of female police officers involved in undercover operations with sex workers. Kerins *et al* (2004) used the model when studying the information-seeking behaviour of engineering and law students in selected universities in Ireland. Kostianen *et al* (2003) used the model to examine information-seeking in pre-trial police investigation. Wilkinson (2001) developed the information-seeking behaviour model of practising lawyers and tested it against the Leckie *et al* (1996) model. These examples are evidence that the model chosen for the theoretical framework guiding this study has been used before in studies related to information needs and information-seeking. This is crucial because this model is used knowing that it has been successfully applied in other empirical studies related to the current study and how it was applied, and most importantly, with awareness of its limitations and the criticism of other authors.

After outlining the theoretical framework used in this study, it is imperative to review the literature related to the research questions. The first research question is about the information needs of teachers, which are considered in relation to the characteristics of the information needs component of the Leckie *et al* (1996) model. Therefore, the next section presents the literature review on information needs and builds on the interpretation of the concepts of information and information needs that were discussed in Chapter One (sections 1.7.1 -1.7.2). It outlines the concept of information, clarifies information needs in the context of the reported study and then reviews literature on teachers’ information needs. This section starts with information needs because the focus of this study is on information needs and information-seeking patterns of teachers based on the principal research question as outlined in Chapter One (section 1.2). At a later stage it will be aligned with the Leckie *et al* (1996) model and its focus on work roles and associated tasks components.

2.3 INFORMATION NEEDS OF TEACHERS

It is not easy to study information needs without discussing the term ‘information’. This is because information needs are intertwined with information. Therefore, the term ‘information’ is discussed before the term ‘information needs’.

2.3.1 Information

While Chapter One (section 1.7.1) defined the term ‘information’, this section reviews the literature related to the concept of information in more detail. Scientists/researchers have been reflecting on the meaning of information for many years. Nonetheless, the term still proves problematic. Case (2007:42) asserts that the central difficulty is that the word ‘information’ has been used to denote several different concepts. Wilson (2000a:6) acknowledges that defining the concept ‘information’ is problematic because there is no single definition of the concept and moreover, explanations fail to distinguish among alternative, common-sense meanings of the word ‘information’. Moreover, Mutsheva (2006:34) opines that the problem is compounded by the fact that information has been studied in many different disciplines, such as Computer Science, Communication, Information Science, Information Systems and Informatics, each with a different focus. Another complexity is brought about by the fact that distinctions may or may not be made among information, facts, advice and opinion (Wilson, 2006a:659).

In 1981, Wilson (as cited by Bawden, 2006:672) described information as a ‘troublesome concept’ and showed that it was difficult to believe that the situation would improve in subsequent years. It might worsen, as the term ‘information’ is used even more widely as a central concept in other sciences. According to Bawden (2006:673), researchers had better distinguish the best sense of the meaning of the word for their purpose. However problematic the concept of information may be, information is acknowledged as a crucial phenomenon in people’s undertakings. Wilson (2006a:659) maintains that information does not have a single definition and that researchers fail to use a definition appropriate to the level and purpose of their investigation.

Zhang and Benjamin (2007:1935) argue that the concept of information has many underpinning meanings and perspectives, depending on the fields in which it is being studied and the context in which it is being used. But in general, information is related to concepts such as fact, data, knowledge, intelligence, news, communication, instruction, representation,

mental experience or stimulus, among others. Buckland's (1991) argument is affirmed by Wilson (2000a:06) who asserts that information can be understood in the context of user-studies research, as a **physical entity** or **phenomenon**, such as books, journals, etc.; as the **channel of communication** through which data are transferred, whether written or oral; or as **subject data** contained in a document or transmitted orally; factual data objectively transferred, or as **advice or opinions** into which value judgements enter.

As mentioned in Chapter One (section 1.7.1), the study being reported here adopts Wilson's (2000a) view outlined above and postulates that the concept of information may be viewed using the following categories:

- Information as physical phenomenon such as books, journals, discs, pictures, etc. that could be perceived as informative.
- Information as messages that are being transferred or communicated in various formats and/or media, e.g. electronic or print media.
- Information as subject matter found in data, messages, physical documents, advice, opinions, etc.

One notes that 'human beings can potentially act on or be influenced by virtually any imaginable information in the universe' (Bates, 2006:1033). According to Buckland (1991:356), 'we are unable to say confidently of anything that it could not be information'. As mentioned in Chapter One (section 1.7.1), despite all the confusion clouding the definition of the term 'information', in principle, 'we ordinarily use and hear the word "information" without much concern for its definition; but we know what we mean when we use the word information' (Case, 2007:42). Once again, it is assumed that the teachers in this study are likely to know what is meant by information, and what is meant when they are questioned about their information needs for work purposes.

2.3.2 Information needs

In Chapter One (section 1.7.2) the term 'information needs' was defined for the purposes of this study and this section builds on the definition outlined in section 1.7.2 by reviewing literature about this concept. The trouble with defining 'information' also makes it difficult to explain 'information needs'. This is corroborated by Wilson (2006a:659) who asserts that part of the difficulty with explaining 'information needs' lies with the troublesome concept of

‘information’, as has been explained in the previous paragraphs. If there had been no information there would not be any information needs.

Information need may be understood in the context of Belkin’s “anomalous state of knowledge”, as that knowledge gap or uncertainty existing within the individual that triggers information-seeking, either immediately or at a later stage in an attempt to address uncertainty (Belkin *et al.*, 1982:62). Uncertainty is a concept that has been addressed by many researchers of information needs, such as Anderson (2006) and Yoon (2007). Although it is not the purpose of this study to discuss uncertainty, one gathers from the literature that uncertainty is closely linked to information needs, such that uncertainty leads to information need, which may lead to information-seeking. For instance, Ikoja-Odongo and Mostert (2006:149) observe an information need as the recognition of the existence of uncertainty in the personal or work-related life of the individual (Ingwersen & Järvelin, 2005; Kuhlthau, 2004). Therefore, once teachers recognise the existence of uncertainty in their work life that might turn into an information need.

According to Ingwersen (1999:19), an individual’s information need is a function of the current knowledge state of that individual. Moreover, information needs may be stable and well defined, such as is often the case in selective dissemination of information, or they may be vaguely stated or ill-defined, such as during exploratory search sessions. This is affirmed by Kuhlthau (2004:26) as quoted in Chapter One (section 1.7.2). Furthermore, Ingwersen and Järvelin (2005:20) state that ‘an information need signifies a consciously identified gap in the knowledge available to an actor. Information needs may lead to information-seeking and formulation of requests for information.’ However, Ikoja-Odongo and Mostert (2006:147) cite Devadason and Lingam (1997) and Krikelas (1983) who state that information needs may be expressed, unexpressed or dormant; dormant needs are those that the individual is unaware of, but which may be potentially activated by an information service provider. These include unconscious needs which do not necessarily lead to action. This also fits in with Wilson’s (1996) viewpoint of passive information needs.

The above paragraph reveals that the teachers being studied here may have uncertainties that may develop into information needs. The teachers’ information needs may be expressed, unexpressed, dormant or unconscious. It is envisaged that it will not be easy to investigate the information needs that are unexpressed, dormant or unconscious. Consequently, the study

will focus only on the expressed information needs, but in order not to miss the unexpressed, dormant and unconscious information needs, the study also considers the prospective geography teachers and the institutions involved in secondary level geography education in Lesotho to help reveal the complexity of these teachers' information needs. Prospective teachers will be questioned on their information needs during their teaching practice, while the officials from institutions involved in secondary level geography education will be questioned on their perceptions of secondary geography teachers' information needs.

Case (2007:76-77) discusses information needs from both the objective and subjective viewpoints. An objective viewpoint is adopted when an information need is considered as reflecting an objective reality, and an information need is well-defined in order to retrieve a specific fact to make a decision or solve a problem to reduce existing uncertainty. From this objective viewpoint, information needs are relatively fixed. A subjective viewpoint represents the idea that many searches of information are prompted by a vague feeling of unease, a sense of a gap in knowledge, or simply by anxiety about a current situation. From a subjective viewpoint, the emphasis is that humans often strive to make sense of their situations, and their information needs might be highly dynamic. Sense-making posits information as sense-made that stands as a bridge over gaps (Dervin, 1999:739). Sense-making is succinctly discussed by Dervin over years as a model and constructivist approach (Dervin, 1983, 1998), as a *communitarian* (Dervin, 1994), as a verbing approach (Dervin, 1998) and as research method, methodology and meta-theory (Dervin, 1999, 2003).

As indicated in Chapter One (section 1.7.2), this study regards an information need as an absence or lack of adequate information that creates a deficiency in the knowledge of people, in this study secondary level geography teachers. The knowledge deficiency makes it difficult for the teachers to deal with their situation. As mentioned earlier, it is deemed that it will be difficult to establish unexpressed information needs. Therefore, the study will focus only on information needs expressed by the teachers. It was imperative to determine from the literature what had been reported on the information needs of teachers before carrying out the empirical component of the current study by focusing on information needs that had been reported, including the factors that may trigger these needs. These are discussed in the next section.

2.3.3 Teachers' information needs

This section discusses teachers' information needs and the factors that trigger these needs, as reported in the subject literature. While the previous section 2.3.2 explained the expanded concept of an information need, this section focuses on the information needs specific to teachers as reported in the literature.

Mardis (2009:1) mentions that the 'literature surrounding teachers' development suggests that teachers have very specific information needs relating to mastering the curriculum content and the behavioural structure of their classrooms for a diverse range of learners'. De la Vega and Puente (2010:317) indicate that teachers not only require sources of information on the curricular areas they teach, on pedagogy, didactics and information technology, but also on issues students face.

Lan and Chang (2002) studied the information behaviour of biology teachers in junior high schools in Taiwan, where they found that the biology teachers' pedagogical knowledge played an important role in their processing of information. Furthermore, those biology teachers' information needs included information pertaining to students, subject matter and pedagogical content, among others. These scholars reveal an important issue about knowing more about the students one teaches. This requires information, as one needs to establish the different learners' capabilities, interests and social behaviour, including their problems, because these are some of the things that may affect their learning and development (Lang & Chang, 2002). Passey (2006) analyses the use of information and communication technologies by primary and secondary pupils. Passey (2006:146) indicates that within the overall arena of knowledge handling, teachers are fundamentally concerned with subject knowledge and the curriculum, which could be factors associated with teachers' information needs.

Shulman (1987:7) asserts that the teachers transform understanding, skills and desired dispositions into pedagogical representations and actions. Therefore, at a minimum, a knowledge base required for teaching includes:

- Content knowledge;
- General pedagogical knowledge, including its content;
- Curriculum knowledge;

- Knowledge of the learners and their characteristics;
- Knowledge of educational contexts; and
- Knowledge of educational ends, purposes, and values, including their philosophical and historical backgrounds.

The above points are considered to be pertinent to the information needs of teachers. One may interpret these points thus: content knowledge pertains to the subject matter to be taught, which is geography in this study. The general pedagogical knowledge relates to teaching methods and approaches that may be used to deliver the geographical content to the learners for better teaching and learning. The curriculum knowledge is related to the national geography curriculum requirements, syllabus outlines and geography examinations. The educational contexts may be related to, among others, the goals of education, the aims of secondary education, the environment within which teaching and learning take place and the situation of the schools, including other subjects offered in the schools. The educational ends are related to the objectives and outcomes of education, the principles of education and the historical development of education bearing the culture of the nation.

Although the study focuses on the European Union Education Policy dimension, Conroy *et al* (2000) reveal some of the information needs that could be affecting the teachers that will be studied here. Conroy *et al* (2000) indicate that the European information needs of secondary school teachers include:

- Current information, because things change a lot in modern times;
- Social and cultural information; and
- Information resources that are tailored for teachers and learners.

Similarly, Perrault (2007) refers to the following issues on which teachers seek online information and resources:

- Curriculum content.
- Presentation materials.
- Personal knowledge.
- Individualised learning materials (for the learners).

Mundt *et al* (2006:9) mention that teachers have three major roles for which they often need information for, namely:

- Lesson planning and content;
- Teaching methods; and
- Student evaluation.

Snyman and Heyns (2004:212) investigated information needs of Afrikaans language teachers in South Africa and identified that the information needs pertained to:

- Classroom activities;
- Curricula; and
- Supportive study material.

In addition, Snyman and Heyns (2004:212) found that factors that have an impact on the information needs of these teachers are, among others:

- A changing curriculum;
- The nature of languages as a subject;
- A high workload;
- Extramural activities; and
- Pressure regarding examination results.

Pattuelli (2008) alluded to three dimensions of context pertaining to the teachers, which may trigger their information needs. These are pedagogical, institutional and personal aspects of contexts. According to Pattuelli (2008), the pedagogical aspects relate to the way teaching and learning take place, such as inquiry-based learning, stimulating learners' interests and engaging them in creative analytical activities. Institutional aspects are associated with national curriculum standards, including national examination for testing whether standards have been met. Personal aspects of context pertain to individuals' characteristics such as their attitude to technology, ability to manage time and their knowledge of and experience of the subject matter to be taught. From Patuelli (2008) one notes that teachers' information needs are related to pedagogy, national curriculum standards and the syllabus, including examinations as well as knowledge of the subject matter to be taught. One further observes that it is possible that the geography teachers in Lesotho might need information related to their subject curriculum and full syllabus, including its examination. They might also need to

know the subject of geography in order to offer the right content. Moreover, the content has to be offered using appropriate teaching methods and therefore, this may require pedagogical information.

As indicated earlier (section 2.2.1), certain roles and the environment within which the life and work of the information user take place may indicate specific information needs (Niedźwiedzka, 2003:9). Similarly, Leckie *et al* (1996) explain that professionals have certain roles (service provider, administrator, manager, researcher, educator and student) incorporating certain tasks that trigger information needs. Given that this study is guided by the Leckie *et al* (1996) model, it is imperative to contextualise secondary level geography teachers in Lesotho into the work roles mentioned in the literature that applies to them, and this is done in subsequent chapters.

In summary, the literature indicates that the teachers' information needs are related to the subject matter they teach and the teaching and learning methods that will help to achieve the curriculum aims. The information needs are also related to the curriculum, the syllabus, and the assessment of the subject and the learners. Moreover, the information needs pertain to the learners being taught, that is, their capabilities, interests, social backgrounds and their intellectual growth and development. Furthermore, information needs may be related to other work roles and tasks that the teachers have within their schools. In essence, there are many issues pertaining to the information needs of teachers in their work as professionals. It is appreciated that these information needs may differ from time to time and from individual to individual, depending on the situation.

2.4 INFORMATION-SEEKING PATTERNS OF TEACHERS

When information is insufficient, such as an anomalous state of knowledge (Belkin *et al*, 1982) and information gap (Dervin, 1999), this results in information needs, which may lead to information-seeking. However, there are also times when information is sought on an ad hoc basis without any explicit realisable information needs owing to the need to monitor and master information on an on-going basis, as explained in Chapter One (section 1.7.3). This section reviews literature on information-seeking, including the different ways of information-seeking, the factors that influence information-seeking and the information-

seeking behaviour of teachers. It expands in more detail on the information-seeking concept outlined in Chapter One (section 1.7.3).

2.4.1 Information-seeking

As shown in Chapter One (section 1.7.4), information-seeking is part of information behaviour and as mentioned in Chapter One (section 1.7.3), “information-seeking can be active or passive” (Fourie, 2006:101). On the one hand, passive information-seeking occurs when part of people’s information behaviour is to decide that they do not want to seek information, or they may be unaware of the fact that they might need information. On the other hand, active information-seeking takes place when people do everything in their power to seek information. As mentioned earlier (section 2.3.2), it is envisaged that it will be difficult to establish unexpressed information needs. Similarly, it is deemed that it will not be easy to establish passive information-seeking, given the available resources, such as time and money, for the current study. Therefore, this study focuses on active information-seeking because it is informed by the teachers’ perceptions and views on their information-seeking.

Literature points out that active information-seeking can be done purposefully, serendipitously, through proxy and collaboratively. This is evident in the subsequent discussions.

2.4.1.1 Purposeful information-seeking

Johnson (2003:737) describes information-seeking as the purposive acquisition of information from selected information carriers. It includes examining the ways in which people find information they require, such as how and where people look for solutions to information problems (Burke, 2007:679). According to Foster (2004:228), information-seeking has been conceived as being a process in which information needs are pursued, or in which problem-solving takes place within a context. Moreover, the information-seeking process is initiated by a recognised need for information and a decision to act on it (Byström & Hansen, 2005:1055) and most importantly, information-seeking would reflect the experiences of the information seeker (Foster, 2004:234). Seeking information for lesson planning and use in class for learners is purposive information-seeking by teachers and it is discussed in studies by Kahlert (2001), Lundh (2005) and Sánchez and Valcàrcel (1999). Moreover, Asunka *et al* (2009:43) note purposeful visits to the library website to seek

scholarly material by teachers in the same way they physically visit the library. There are instances when information-seeking is not necessarily initiated by information needs, but rather through incidental encounters with information or through everyday life interactions with information to keep up with the advancements in one's field. This is often referred to as serendipitous information-seeking and it is discussed below.

2.4.1.2 Serendipitous information-seeking

Foster and Ford (2003) allude to information-seeking that occurs not necessarily to achieve a specific task, solve a problem, pursue information needs or for immediate use. This process they term serendipitous information-seeking, which may happen when browsing or reading for leisure, and finding some information that was not originally sought (Foster & Ford, 2003:324). In the same vein, Spink and Cole (2006:27) argue that it is not in every case that human beings seek information for a specific purpose, because there is everyday life information-seeking that includes more consideration of human sense-making of the environments and more non-academic and less formal information-seeking behaviours. It was also learnt from Fisher *et al* (2004), Hyldegård (2006) and McKenzie (2003) that the person seeking information actually not always goes out personally to search for information. Sometimes people use others to seek information on their behalf and this is explained below.

2.4.1.3 Proxy information-seeking

Fisher *et al* (2004:757) mention that there are occasions when information is sought not only incidentally, in a serendipitous manner without anyone expressing the need for that information, but also in proxy information-seeking when someone seeks information on behalf of someone else. Taking the issue of proxy further, McKenzie (2003:27) refers to proxy as occasions when people make contact with or interact with information sources through the initiative of another agent, either the information source or some other gatekeeper or intermediary. Hyldegård (2006:280) cites Allen's (1977) description of the gatekeeper phenomenon, by indicating that the gatekeeper takes the responsibility to look for information and forward it to colleagues in his/her team, and in this way, the information recipient and the gatekeeper collaborate to find information. White *et al* (2009:190) argue that the gatekeeper may restrict and permit access to information, and advocate a facilitator who eliminates the restrictive nature of the gatekeeper and permits access to information, and who also actively helps in finding needed information. Kirby and Bogotch (1996) and Uibu

and Kikas (2008) indicate that teachers have the role of information provider and knowledge/information disseminator respectively involving acquisition and distribution of information. This means that when teachers assume this role they become proxies for information-seeking.

At this point information-seeking is considered as any process in which the teachers engage to find information, whether purposely, incidentally or through proxy. For the research design it is important to bear in mind that information-seeking may also happen through proxies. There are times when people at work have tasks that they have to perform as a team, for which they may require certain information. As a result, teams instead of individuals engage in information-seeking. This is explained in the next subsection.

2.4.1.4 Collaborative information-seeking

Fourie (2006:101) maintains that collaborative information-seeking occurs when one is not alone in the process of seeking information, but rather works through interaction with colleagues and peers. This appears to be common in situations of joint projects, authorship, team work, etc. According to Foster (2006:330) ‘collaborative information-seeking and retrieval is the study of the systems and practices that enable individuals to collaborate during the seeking, searching and retrieval of information.’ Although Foster’s review is mainly on studies on collaborative information-seeking in academia, industry, medicine and military settings, he alludes to the concept of information-sharing as ‘an umbrella concept that covers a wide range of collaboration behaviours, from sharing accidentally encountered information to collaborative query formulation and retrieval’ (Foster, 2006:331).

There is general contention that most models of information behaviour focus on the individual information seeker (Madhu & Jansen, 2008:256), even though much information behaviour takes place in collaborative settings (Hyldegård, 2006:276). Consequently, studies on collaborative information-seeking have emerged in the literature. For instance, recognising that people in most organisations conduct much of their work in collaborative settings and the general perception of information behaviour at the individual level, Madhu and Jansen (2008) studied the collaborative information behaviour of healthcare teams in context and came up with a model on collaborative information behaviour. In the field of education, Hyldegård (2006) studied collaborative information behaviour of students using Kuhlthau’s (1993)

information search process model. In addition, Lazonder (2005) studied the effects of students' collaboration on web search behaviour. Hertzum (2008:957) argues that collaborative information-seeking should be a combined activity of information-seeking and collaborative grounding, mainly because collaborative grounding is necessary to share information among collaborating actors, and thereby establish and maintain the common ground necessary for their collaborative work.

Chen and Lee (2009) discuss collaboration of teachers and teacher-librarians in designing information literacy instruction and indicate that collaboration may be improved through joint research projects, collaborative planning and co-teaching. Goldman *et al* (1993) note joint decision-making and teachers' collaboration in developing and fulfilling schools' mission and vision statements and point out that as teachers become more collaborative, their desire for information increases. Deaney and Hennessy (2007:68) indicate that teachers in the UK do not work alone, since the subject departments act as a *community of practice* (Lave & Wenger, 1991; Wenger, 1998) that shares resources and approaches to teaching and learning and collaboratively develops schemes of work, where these are perceived as collaborative work of teachers involving collaborative information-seeking. In addition, Snyder (2007:428) indicates that school faculties work as a team to describe their programmes and practices, accessing information from a variety of sources to support their descriptions and notes that schools that are most successful are those that rise above individual effort and see professional development and collaboration as central to developing effective schools (Snyder, 2007:433). This means that teachers not only collaborate in practice, but also work more effectively through collaborations.

The above literature reveals an important aspect of information-sharing that needs to be borne in mind in this study. It may be worth investigating the different ways in which teachers share information as a means of establishing collaborative information-seeking. This literature further informs researchers that information-seeking is not always a process undertaken by individuals; it might involve teamwork. This might also be the case for teachers in Lesotho and must therefore be considered in the research design. For the purpose of the research instruments, collaborative information-seeking could be simplified to information-sharing.

2.4.2 Factors that affect information-seeking

Heinström (2005:229) indicates that information-seeking is a dynamic and changeable process that depends on the situation, but also to a large extent on the individual performing it. This is because the attitude, motivation and mood come into play when the information seeker is confronted with a complex task (Hyldegård, 2006:288). Heinström (2005:229) adds that information-seeking may be influenced by different factors such as the personality of the information seeker, the urgency of the information need, the context or situation of the information seeker and the availability of information sources, among others.

From the information behaviour related models outlined earlier, in particular Johnson (1997), Leckie *et al* (1996), Taylor (1991) and Wilson (1996), it is evident that demographics influence information needs and information-seeking and information-seeking is affected mainly by the sources of information and awareness of information (Leckie *et al*, 1996). In addition, Hargittai and Hinnant (2006:58) maintain that when studying human information behaviour, variables that should not be ignored are socio-economic background, gender, age, ethnicity and education, because these things may well influence an individual's information-seeking behaviour. Since this study is guided by the Leckie *et al* (1996) information-seeking model, it will consider age and career stage, which are linked to teaching experience, geographic location of the schools where the teachers work and the teachers' qualifications.

As mentioned earlier (section 2.2.1), Case (2007), Kuhlthau (1991) and Leckie *et al* (1996) reveal that people tend to seek information that is congruent with their prior knowledge, beliefs and opinions and may avoid exposure to information that conflicts with their state of mind. Moreover, people may also assimilate and accommodate new information with what they already know or have experienced and tend to connect what is new with what they already know. Consequently, users' prior knowledge is perceived as another factor that affects information-seeking, since people tend to seek information that fits in with what they already know. Relevance and timeliness of information sources were also found to have an impact on information-seeking and utilisation for school improvement (Cousins & Leithwood, 1993).

Affections are also a factor that might influence information behaviour. For instance, Preece (2007:xvi) asserts that instinctively there is an inherent emotional and affective quality to information, such that when people process information they may avoid information that

provokes strong negative emotions (Choo *et al*, 2000:17). This means that people avoid hurting others' feelings, causing embarrassment, conflict or regret, thus avoiding tarnishing their self-images; they would rather work towards enhancing their status or reputation. Another psychological factor is the perceived value of the information given: 'whenever information is sought, issues of relevance, pertinence, and salience arise' (Case, 2007:115). Power dynamics could also influence information-seeking behaviour. For example, Mutshewa (2007:249) expounds on power as a possible avenue to understanding the information-seeking behaviour of people at work. He asserts that people who want to gain power from information would portray information-seeking behaviour that enables them to come into possession of information and subsequently use it (Mutshewa, 2007:250). Moreover, Mutshewa (2007:250) posits that the power one anticipates to either gain or lose influences the kind of information behaviour one exhibits when in need of information.

Inskip *et al* (2008:648) explain that when studying information behaviour, one may also consider the following factors pertaining to information: subject, function, nature, intellectual level, viewpoint, quantity, quality/authority, date/currency, speed of delivery, place and the processing of such information. Another important factor that may affect information-seeking is when one decides to stop the information-seeking process. Prabha *et al* (2007:80) mention that in the Ellis (1989) model the decision on whether the information found is sufficient to meet the users' needs depends upon chasing and evaluating references, as well as systematically identifying content that is of interest to the users. In the Dervin and Frenette (2003) model, the ending requires making sense of the situation or resolving the problem with the information gathered. In essence, the process of information-seeking, its extent and intensity may depend on how quickly the information seeker decides that the information gathered is sufficient to address the information need. According to Prabha *et al* (2007:77-79), information-seeking stops because of the following factors that may also be considered to be influencing information-seeking:

- The users' feeling that they have enough to write and that they have consulted the authors they trust.
- Time and money.
- Nature of the problem and task at hand and task-domain knowledge.
- Context, situation or setting that the user is in.
- Search system.

- Motivation level of the user and his/her information-seeking ability.

Information must be accessible in order to be sought, found and used. In essence, ‘people tend to look for the information that is most accessible, sometimes referred to as the Zipf’s principle of least effort’ (Savolainen, 2008:276). Zipf’s principle of least effort is also discussed by Case (2005) and Hertzum (2002). Madhu and Jansen (2008:258) view physical distance as a factor that either facilitates or inhibits information-seeking. In addition, Gardiner *et al* (2006:356-357) indicate that some common problems affecting the usability of a currently available electronic information service are:

- Payment - users are not prepared to pay for information sources.
- Poor readability of electronic information.
- Accessibility and retrieval of information due to complexities of interfaces.
- Information overload – too much information scattered all over.
- Reliability and authenticity of web information where anyone can publish anything.
- Amount of time required for accessing information owing to information overload.

More literature on the accessibility of information is reviewed in section 2.5.3, which addresses the availability and accessibility of information sources.

Gardiner *et al* (2006) and Prabha *et al* (2007) mention time as a factor that influences information-seeking. It is also noted that Savolainen (2006b) discusses different ways in which time influences information-seeking. He shows how time is a fundamental element of a situation or context of information-seeking; how time is a qualifier of access to information and how time is an indicator of the information-seeking process.

The above subsection can help in deciding on pertinent variables to consider for the research design. Such variables include gender, age and educational background; as some teachers may have bachelors or masters degrees or diplomas, it may be worth finding out if these qualifications affect their information-seeking, as well as social networks and the availability of resources, to name a few. The next section outlines the literature on the information-seeking patterns of teachers.

2.4.3 Information-seeking patterns of teachers

Lundh (2005) researched high school teachers' information-seeking during their transition from educational to occupational practice. Part of the current study explores the information needs and information-seeking patterns of final-year education students, who are at the point of transition from training to practising. Lundh (2005) found that during training, the teachers mostly used scientific material through their academic libraries. As they started practising, the teachers' information-seeking became more related to their pupils and colleagues were mostly used as information sources. This study indicated that it is considered more important to find material that is useful in classroom situations rather than scientific. In essence, the most important criterion for material selection is its applicability in the classrooms; this notion was also observed by Kahlert (2001) and Tanni *et al* (2008). It is therefore worth investigating the criteria for material selection used by secondary level geography teachers in Lesotho.

Shanmugam (1999) completed a study on the information-seeking behaviour of trainee teachers in selected teachers training colleges. The study attempted to establish the trainee teachers' motives for seeking information, the resources they explored, the channels they preferred, the attributes of information that they valued and the problems they encountered in the information-seeking process. From Shanmugam (1999), it is evident that the teachers prefer informal and interpersonal sources of information. Accessibility of an information source was the most important attribute affecting its use. Information currency and relevance were very important considerations in information-seeking. In addition, the teachers preferred to use sources written in their vernacular to sources written in English.

Wu *et al* (2005) studied elementary school teachers' searching behaviour for instructional resources on the internet, and how they integrate those resources into classroom teaching. The study found that the teachers' choice of resources on the internet was determined by the accuracy and currency of information, as well as the attractiveness of a web site. From this, one gathers that teachers opt for information that is not only accurate, but also current and attractive. Therefore, alerting the teachers to new information released may be a vital information service.

Tanni *et al*'s (2008) study found that teachers' information behaviour, in particular the seeking process, was influenced by subject knowledge. This knowledge would determine

what specifically to search for, what to deliver during the lesson and where to search for more information. Their study reveals that often teachers start by reading textbooks to familiarise themselves with the topic and to compare different views from the books. Depending on the outcome, they search for more information using Google on the web. The internet is mainly used if the information from the textbooks is inadequate or conflicting. The information found is used in the lesson plans to complement textbooks, exemplify, illustrate, maintain interest or raise discussions among the learners. Moreover, the study found that when processing information, the teachers choose only the parts of a document that will be understood by their learners, simplifying the vocabulary and reducing and synthesising information. Furthermore, it was important to find appropriate ways of presenting the information to learners in a limited time, still maintaining their interest in the topic. It is evident that the teachers bear the learners in mind when they are seeking information for teaching purposes. Therefore, they prefer information that will help the teaching and learning process. This is affirmed by Sánchez and Valcàrcel (1999:509) when stating that all teachers claim to take students into account when preparing for lessons; they consider the level of the learners, age and general knowledge of the subject in question.

Perrault (2007) explored biology teachers' online information-seeking practices. She found evidence of a recursive process in which teachers engage in online information-seeking practices. The researcher interprets and presents this recursive process as illustrated in Figure 2.2 below:

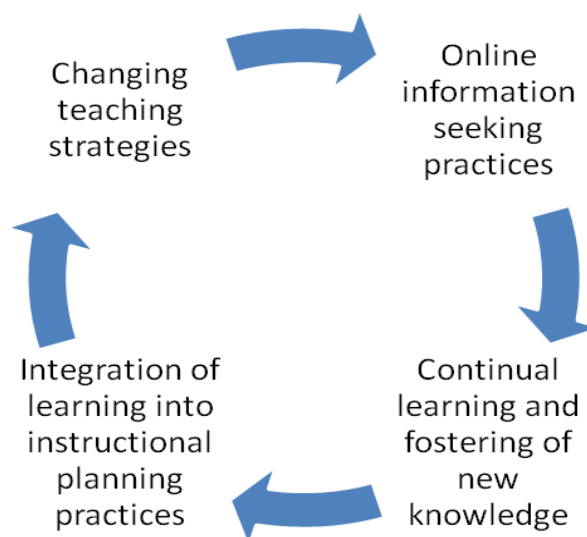


Figure 2.2: Teachers' recursive online information-seeking practices based on Perrault (2007)

From Perrault (2007) one deduces that teachers' information-seeking practices are influenced by currency of information, need to generate new ideas, gaining of personal knowledge and availability of time.

Mundt *et al* (2006:11) mention that teachers tend to ask the following questions when selecting/seeking information:

- Is it easy to use?
- Does it keep me aware of new developments?
- Is it complete and comprehensive?
- Does it respond to my problem?
- Is it likely to have the information that I need?
- Is it free or inexpensive to use?
- Is it authoritative, accurate and objective?
- Is it close at hand and easily available?
- Does it offer a variety of viewpoints or discussions?
- Can I access it on my own without involving other people?
- Does it lead to other sources?

Borgman *et al* (2005:651) found that geography educators seek new literature through the following means:

- Browsing familiar sections of the library.
- Making bookmarks for favourite websites.
- Following citation links.
- Attending professional conferences.
- Receiving sources and references from the scholarly peers.

A principle drawn from this is that work roles bear certain tasks that trigger information needs, resulting in information-seeking. The information is sought from various information sources. One of the sub-research questions of this study aims to determine the information sources used by the teachers. It becomes imperative, therefore, to review literature related to information sources and this is done in the next section.

2.5 INFORMATION SOURCES USED BY TEACHERS

This study's stance is that there are information needs, which may result in information-seeking using information sources. This is evident in many information related models such as those of Byström and Järvelin (1995), Ellis (1989), Krikelas (1983), Kuhlthau (1991), Leckie *et al* (1996) and Wilson (1999). This section reviews the literature on information sources used by the teachers. It builds the conceptual framework for the focus on information sources. Then it outlines the information sources used by the teachers. This is followed by a discussion on the availability and accessibility of information sources. The intention is to address one of the sub-questions in Chapter One (section 1.2) that is concerned with the availability and accessibility of information in schools.

2.5.1 Information sources

According to Bates (2006:1035), generally speaking, 'anything human beings interact with or observe can be a source of information'. In addition, Bates (2006:1033) indicates that the only thing in the universe that does not contain information is total entropy. The two statements by Bates above suggest that everything in the world can be a source of information. In the workplace, Byström and Jarvelin (1995:193) mention that from the worker's point of view an information source contains (or is expected to contain) relevant information. Byström and Jarvelin (1995:196) categorise information sources as the people concerned with something; experts who are knowledgeable people in the area; literature in mainly formal publications and official documents, which are mainly office papers such as minutes, letters, memoranda, etc. It was also mentioned earlier that Leckie *et al* (1996:183-187) maintain that the sources of information used by professionals are colleagues, librarians, handbooks, journals and their own personal knowledge and experience.

2.5.2 Information sources preferred by teachers

Williams and Coles (2007a) address teachers' information behaviour in relation to their own professional development. In their study, the teachers were asked to reflect on scenarios which were likely to provoke a need for additional information, and this provided the opportunity to explore how the teachers went about information-seeking and differences in information behaviour related to the type of information need in terms of content and nature of information sources preferred (Williams & Coles, 2007a:816).

According to Williams and Coles (2007a:816) the teachers were asked what they would advise a colleague or student teacher to do in looking for and using information. This helped elicit their own preferences in a non-threatening way, and this strategy was also designed to partly overcome the danger of respondents telling the researchers what they thought they ought to do rather than what they actually do. The scholars found that the teachers tend to rely on readily available resources, particularly those available in the school. Their frequently used information sources were mostly colleagues, in-service events, newspapers and reports available in the schools. The main barrier in information-seeking and use was limited time. It is therefore imperative for the current study to identify the information sources mostly used by the teachers and to determine if these information sources can be found in their schools. The limitations or challenges that they encounter in using the available information sources also need to be determined. Kirby and Bogotch (1996:14) and Williams and Coles (2007b:201) indicated that sources of information available in the school environment are among the most popular. Therefore, it seems that to increase information use, teachers need a well-organised access point to information located within the school that would allow them to find the information that they want as quickly as possible.

Dias Gasque and de Souza Costa (2003) studied elementary and secondary school teachers' information-seeking behaviour in the context of continuing education in Brazil. This involved identifying teachers' information channels and sources, as well as the factors that influence their behaviour when they seek information in continuing education. The results showed that print sources were still predominant and new information technologies had not yet been used by teachers. It is worth establishing the information format preferred by secondary level geography teachers in Lesotho.

Martin (2008) studied undergraduate students majoring in education to investigate their information-seeking behaviour in order to understand where they find their research information and to determine if library instruction had any impact on the types of sources they use. The study by Martin (2008) reveals that the majority of students find their research information on the freely available web. Therefore, the internet was the major source of information. In addition, Tanni *et al* (2008) reveal that information sources used by trainee teachers comprised both print and electronic documents such as textbooks, books, magazines, newspapers, compact discs, web sites and videos. Moreover, the teachers often used Google to search the internet and Wikipedia was another source that was often used by the teachers

instead of a printed encyclopaedia. The paper reveals that today's college students are using freely available internet sites much more than library resources. One would therefore want to determine the extent of internet use among the prospective teachers currently being studied compared to other sources.

Landrum *et al* (2002) studied teachers' perceptions of the trustworthiness, usability and accessibility of information from different sources. They found that teachers generally rated colleagues, workshops and in-service presentations as accessible, trustworthy and usable sources of information. In essence, professional journals were found to be less trustworthy, less usable, and less accessible when compared with information from colleagues. Sánchez and Valcàrcel (1999) found that in general teachers used the textbooks prescribed for learners as the principal source of reference although they also consulted magazines and other textbooks if the prescribed textbooks were considered to provide insufficient information or if the teachers did not agree with the information provided in the textbooks. In addition, the teachers also used their subject knowledge and experience to make modifications or additions to the information found in the textbooks. Perrault (2007) stipulates that sources that teachers consult for planning purposes include personal notes and handouts, audio-visual materials and tests from previous years. Nwokedi and Adah (2009) found that teachers preferred textbook information to any other source of information. In addition, Nwokedi and Adah (2009) report that most of the teachers prefer to have information sources in their own specific subject areas.

Conroy *et al* (2000) mention the following sources of information as being preferred by the teachers they studied:

- The internet, mainly because it provides current information and is also popular among learners. However, not all schools have access to the internet.
- CD-ROMs are also popularly used by teachers as an information source, mainly in the form of encyclopaedias.
- Videos are also used and are generally preferred to textbooks prescribed for learners because videos capture the learners' attention more.
- The press and television are used because they cover current affairs.

Mundt *et al* (2006:9) mention that teachers use information sources as follows:

- Curriculum materials, followed by colleagues and personal files, are used mainly for lesson planning.
- For improving teaching methods, teachers often use their colleagues as well as workshops, seminars and meeting notes.
- For assessing students, teachers confer with students and consult their personal notes and files.
- For keeping up to date with local and international affairs, mainly in the form of everyday life information-seeking, teachers use newspapers, magazines, television, educational journals and the internet.

Borgman *et al* (2005:651) allude to the following sources of information for geography educators:

- Primary sources, including raw, unprocessed data or images such as maps, photographs, census data.
- Secondary sources, including conference papers, journal articles, books which come from the processing of primary sources.
- Physical geographers, who are concerned with sources that deal with climate and geomorphology and human geographers, who are concerned with social activities associated with places.

Merchant and Hepworth (2002:82) indicate that teachers use different sources to satisfy different information needs. Print sources, with the exception of newspapers and magazines, were viewed as sources of information with which to build a framework for the topic, the theory behind what was to be taught, or for factual information. Alternatively, the internet in particular, and also television, subject journals, newspapers and magazines were considered to provide current, supplementary information, both to fill in gaps in the material available through textbooks and to add the ‘interest factor’, which would engage pupils in the subject matter.

2.5.3 Availability and accessibility of information sources

The study reported here focuses on the information needs and information-seeking patterns of secondary level geography teachers in Lesotho. It was depicted in the Leckie *et al* (1996) model that information is sought from sources of information with some awareness of the information. As mentioned earlier in section 2.4.3, it is imperative for information sources to be available and accessible for information-seeking to occur. Hence this section attempts to review literature reporting findings on the availability and accessibility of information sources and how it impinges on information-seeking. The remark by Johnson (2003:737) that information-seeking is the purposive acquisition of information from selected information carriers is noted. In addition, according to Hargittai and Hinnant (2006:59), information-seeking does not occur in isolation from one's surroundings, as these surroundings encompass, among a wide range of factors, the availability of sources. Moreover, Hargittai and Hinnant (2006:59) argue that the autonomy of information resources, meaning the extent to which the user or person seeking information has the flexibility to consult the necessary information resources at his/her leisure and convenience, can influence information-seeking.

Vancouver and Morrison (1995) discuss accessibility by restricting it to the availability of information sources. This means that information can be accessed if the information sources are available. The Oxford dictionary (2005) defines availability as 'how easily you can find something' whereas accessibility is defined as 'how easy it is to reach or approach something'. From this, it can be deduced that availability of an information source means that the source is there in place, meaning that it exists. The accessibility of an information source is related to the user being able to reach the information source that exists. Pinelli *et al* (1993) perceive accessibility strictly in terms of the physical distance between the information seeker and the information source, while Meyers *et al* (2007:5) opine that information should be physically, psychologically and intellectually accessible in order to be used. Some of the issues related to accessibility of information were outlined earlier under factors that affect information-seeking in section 2.4.2. From Meyers *et al* (2007), it is interpreted that information sources have to be available and then accessible in order to be used, and that the availability and the accessibility of information sources affect information-seeking. Furthermore, during the information-seeking process, various information sources may be used, depending on the nature of the information need. Sometimes the information source may even be at a distance from the information seeker and may therefore be accessed through

an information communication channel, such as a knowledgeable teacher (information source) in another school who may be consulted by telephone (communication channel). Nwokedi and Adah (2009) report lack of transportation as a problem hindering the provision of information sources to teachers. In Nwokedi and Adah's (2009) study it is revealed that information resource centres are available for teachers; however, these centres are in towns and the teachers in rural areas need transport to get to these information centres.

In the literature reviewed not much was reported on information sources' availability and accessibility for teachers. One notes De la Vega and Puente's (2010) study on availability and use of information sources by high school teachers in Peru, which found that availability of information to teachers both privately and at the workplace is very limited. One of this study's research questions aims to determine the information communication channels that are used by teachers to access and exchange information. Consequently, the literature related to information communication channels is reviewed. Similarly, efforts were made to find literature on information communication channels preferred and used by teachers; nothing was found. Hence the literature reviewed in the next section is general and it only aims to clarify further the concept of an information communication channel and its impact on information-seeking and information behaviour in the context of the current study.

2.6 USE OF INFORMATION COMMUNICATION CHANNELS WITH POSSIBLE IMPLICATIONS FOR TEACHERS

This section reviews literature on information-seeking and information communication channels in general to identify possible implications for the teachers being investigated. Although in Chapter One (section 1.7) the terms 'information source' and 'information communication channel' were defined in order to avoid confusion between these concepts, it is significant to explain them further to clarify their meanings in the context of this study.

Rogers (1995) mentions that researchers often use the terms information 'sources' and 'channels' interchangeably. It is significant to clarify the difference between information sources and information communication channels to avoid confusion. This study embraces that 'an information source is a medium in which knowledge/information is stored while a communication channel is a means by which information is moved from one point to another' (Nikalanta & Scamell, 1990:25). This is affirmed by Tucker and Napier (2002:299) when

they indicate that sources provide the content or expertise of interest to the information seeker, while channels refer to the methods or vehicles by which information is transferred or received. Therefore, in this study the information source is viewed as anything that contains information and might inform a person about something or provide knowledge to somebody, while an information communication channel is just a conduit for information transfer. This interpretation is reflected in the discussions in sections 1.7.6 - 1.7.7.

Huang *et al* (2004:148) indicate that a communication channel refers to a transmission system or medium, including the whole process of sending messages from the source to the receiver. Bondarenko *et al* (2010:468) maintain that communication channels nowadays include email and instant messaging tools, forums, blogs, chat rooms, social networking tools, web conferencing and voice-over-IP. Pauleen and Yoong (2001:190) explain electronic communication channels as technologies supporting email, bulletin boards, audio/video/data conferencing, automated workflow, electronic voting and collaborative writing. According to Pauleen and Yoong (2001:194) communication channels fall into three groups, namely face-to-face, conventional and internet-based. Face-to-face meetings are regarded as highly effective in building relationships in the sense that they allow a deeper kind of rapport or trust to develop. A telephone is a conventional channel. When people cannot meet face-to-face, they converse over the telephone. The telephone has been around for very long; people are familiar with it and its use is generally second nature to people (Pauleen & Yoong, 2001:195). Phone calls can initiate meetings as well as business relationships (Pauleen & Yoong, 2001:196). According to Pauleen and Yoong (2001:197-198), internet-based communication channels include emails, chatting and instant messages and desktop video conferencing.

According to Dawson (2008:208), internet and email communication are some of the information communication technologies teachers are prepared and willing to use. Hsu (2005:309) indicates that email has been used to increase communication between student teachers, supervising teachers and peer student teachers. Moreover, multimedia portfolios and case discussions on the World Wide Web have been tried to harness peer-group support for student teachers during their teaching practice. Hsu (2005:308) further indicates that face-to-face communication must still be supported because despite tremendous advances in communication technologies, most communication among student teachers in their study took the form of face-to-face interaction.

The ultimate aim of the current study is to guide the design and implementation of an information service for secondary level geography teachers in Lesotho. It is imperative to review literature related to the design and implementation of information service. The next section discusses information service, its design, implementation and evaluation.

2.7 DESIGN AND IMPLEMENTATION OF INFORMATION SERVICE

In the wake of an exponential increase in volumes of information due to advancements in information and communication technologies, teachers, like many other professionals, face a huge challenge in keeping up to date with the latest developments in their field. In order to be up to date, teachers need an appropriate information service. One of the aims of this study is to guide the design and implementation of an information service for secondary level geography teachers in Lesotho. Such a service may raise awareness of collections and tools that will meet the diverse range of information needs of these teachers. As a result, literature on information service, in particular the design, implementation and evaluation of information service, is reviewed in this section.

Arising from the literature on teachers and information that was outlined earlier, issues were noted that could be related to an information service for teachers. For instance, Nwokedi and Adah (2009) found that teachers prefer to use textbooks rather than other information sources. As a result, their study recommends that teachers should be supplied with current textbooks in their areas of specialisation. Moreover, the Nwokedi and Adah (2009) study recommends that government should install computers in school libraries with full internet service for teachers to access information. In addition, it is recommended that the teachers should be trained in using the internet for teaching.

In Lesotho, Kakoma (1999), Kakoma and Mariti (2008) and Mafube (2005) observe problems of information for teachers originating from lack of school libraries and information resources in educational institutions. These scholars recommend proper training of school librarians, provision and supply of information resources such as books and up-to-date information material by government to schools, as well as promotion of information literacy among teachers and learners alike. In addition, Kakoma (1999) recommends the formulation of an information policy and an information act to provide a legal framework that could guide the institutions dealing with information.

Mundt *et al* (2006) have found that teachers prefer interpersonal information sources, and they state that librarians need to establish personal contact with teachers so that teachers view them as interpersonal resources and feel comfortable coming to them for information. In addition, these scholars indicate that school librarians should have knowledge of the various roles and skills involved in teaching in order to serve the teachers better with the information that they need.

2.7.1 Information service

According to Woodsworth and Williams II (1993:3), an information service can be described as a combination of information, technology and people, including a set of activities that provides individuals with relatively easy access to data or information. Ju (2006:354) mentions that the core benefit of an information service is its ability to help users to source the right information, thus enhancing their academic understanding and efficiency. To corroborate this view, Brophy (2000:168) cites Bernal (1945) who says that the modern information service should aim to ensure that the right information, in the right form, is sent to the right people. Moreover, Ju (2006:355) asserts that to meet users' needs, information services should focus on identifying, analysing and coordinating the needs of various potential user groups. While information services might formerly have relied on their own collections, it has become necessary to consider the vast range of networked information services, including the web and other internet sources and commercial databases (Brophy, 2000:169).

Cloutier (2005:333) reveals two types of information services, namely research services and document delivery services. The former is defined as the mediated use of electronic databases, the internet or any research collection by the library staff in order to respond to the information requested by the clients. These services include the delivery of articles, books, reports, theses/dissertations or any publicly available materials (regardless of availability to the local collection or not) to the clients. Document delivery also appears in the hospital-based patient information service model by Tarby and Hogan (1997). Tarby and Hogan's (1997:163) information service model for patients comprises an information specialist, who maintains two-way interaction with the users of information, who are patients and various healthcare professionals, in a hospital setting. The role of the information specialist is to provide information to these users using an in-house resource centre/library collection,

electronic databases, document delivery and community resource centres/libraries. Tarby and Hogan's (1997) model provides an important framework to consider for Chapter Six that proposes suggestions for an information service for secondary level geography teachers in Lesotho.

Kaur and Rani (2008) outline some aspects of library information services in the university setting; these are presented in Table 2.1 below.

Table 2.1: University libraries' information services and facilities (Kaur & Rani, 2008:530-532)

Services		Facilities	
Basic services	Advanced services	Basic facilities	Advanced facilities
Photocopy	Current awareness service	TV	Desktop publishing
Bibliography	Selective dissemination of information	VCR	UNIX
Press clipping	Content pages of journals	Telex	Barcode
Inter-library loan	Indexing service	Microfiche	Scanner
Library membership	Abstracting service	Microfilming	Full automation
New arrivals	Translation services	Fax	Local area network
Reference service	Online searches including CD-Rom		Video satellite
	Email		Intranet
	Internet surfing		

Many of these services may be adopted for teachers in Lesotho. However, after reviewing the literature on the information service, it is envisaged that it will be worthwhile to establish, empirically, the information service that the teachers being studied would prefer in order to guide the design and implementation of their appropriate information service. This is because such an information service has to be relevant to the teachers, taking cognisance of their prevailing conditions. Nonetheless, it is beneficial to learn more about the different information services' models, particularly the design of the information service. The next subsection aims to provide insights from the literature.

2.7.2 Design of information service

Design is perceived as a planning process (Underwood, 1990). It has been gathered from the literature that information services are often initiated after extensive planning processes, which may comprise a survey of users' needs. For instance, Kaur and Rani (2008:535) advocate the involvement of users in the designing of processes concerning new services and products targeted at them. In the same vein, Madden (2008:563) maintains that before developing an information service model, the information needs must be ascertained through both formal surveys and on-going dialogue. One recognises Hepworth (2004) who provides an important conceptual framework for collecting and understanding the information needs of a target community for information service. Hepworth (2004) synthesises most of the popular information behaviour models, some of which were recognised earlier in section 2.2 (e.g. Ellis, 1989; Kuhlthau, 1991; Wilson, 1999), into a comprehensive framework and then applies it to informal carers.

A paper by Chattopadhyay *et al* (2006) on the design and implementation of a library-based information service at the University of Pittsburgh explains that the design and implementation of the information service in this project comprises the following:

- Survey of targeted user needs.
- Hiring of an information specialist to lead the design and implementation process.
- Hands-on workshops on the use of databases and software to train the targeted users in the technologies that are going to be used for the information service.
- Individualised consultations with targeted users on the tools to be used.
- Licensing of commercial products such as programs and software to be used.
- Web portal, comprising information about services, workshops and available information resources and tools.
- Promotion of the information service to the targeted users by the information specialist.

From Chattopadhyay *et al* (2006) one deduces that the design and the implementation of the information service should begin with a proper needs assessment. This should be followed by appointing an information specialist who will spearhead the process. Such a specialist should not only lead the design and implementation of the information service, but also train the targeted users. In addition, the specialist should have consultations with the users to seek the

best ways of service delivery. Furthermore, the specialist should consider legislation and ethical issues related to the products and tools that the service will utilise. According to Chattopadhyay *et al* (2006), when all legal and ethical matters have been addressed, the information service has to be publicised so that the targeted people will know about it.

In the same vein, Underwood (1990) indicates that in the design stage of an information service, the main focus is on the users of the service. The salient issues to consider during the design stage would entail:

- Operational issues such as a specific outline of the products, what the actual service entails and how such a service will be delivered and developed over time;
- A marketing programme that entails a plan of action on how the intended users will know about the service;
- Human resource requirements, which are important because there have to be an adequate number of competent people who will provide the service; and
- Technology requirements that articulate the specific outline of the technology (tools and equipment) that will be required to deliver and manage the service.

Chattopadhyay *et al* (2006) and Underwood (1990) address issues related to the human resources and technologies required for information service. Similarly, Woodsworth and Williams II (1993:3) affirm that information professionals, information resources and delivery systems are some of the common components of the information service. In addition, Chattopadhyay *et al* (2006) and Underwood (1990) reveal the issue of marketing the information service. This is supported by Madden (2008:563) who argues that after the information service has been developed, it needs to be marketed and promoted so that it will be fully used. In affirmation, Kaur and Rani (2008:536) argue that libraries must grasp that marketing and business plans are essential for survival in the face of rising competition and a fast-changing environment. This is clear emphasis on the importance of widely publicising information service to create awareness of their existence.

Although it is in the context of digital libraries, Borgman *et al* (2005:653-654) draw the following implications for the functionality and architecture of geographical digital libraries that could be noted in this study:

- Searching by concept is essential, although it is difficult because people have different interpretations of concepts.
- Personal digital libraries are important mainly because people have different approaches to selecting, collecting and organising teaching resources, implying that each teacher needs his or her own space in which to manage digital resources.

This implies that when designing an information service, one should bear in mind that it is going to serve individuals who not only have different needs and ways of searching information, but also different ways of collecting and storing information. Therefore, a linear model for an information service may not work well, given the versatility and instability of users' information needs and information-seeking patterns that have been noted in preceding sections.

Chen *et al* (2009:224) maintain that while providing a proactive information service, a digital library needs to address the following three issues:

- How to determine that a user needs information.
- How to collect the information needed by the user comprehensively.
- Which mechanisms to adopt in order to direct the information to the user.

Chen *et al* (2009:225) add that once a library determines the users' information needs, it may comprehensively collect pertinent information and provide users with personalised services.

The Reference and User Services Association (RUSA) is a division of the American Library Association responsible for stimulating and supporting excellence in the delivery of library services and the provision of reference and information services (American Library Association, 2011). RUSA guidelines for information service (2000) indicate that information services should take into account the information-seeking behaviour, the information needs, and the service expectations of the members of the community they intend to serve. The issues in the RUSA guidelines pertaining to information service are presented in Figure 2.3 and elaborated on in Table 2.2 below.



Figure 2.3: RUSA guidelines’ model of an information service (2000)

Based on Figure 2.3 and RUSA (2000) guidelines, the researcher formulated Table 2.2 below.

Table 2.2: Expansion of RUSA guidelines for an information service

Information service	
Services	<ul style="list-style-type: none"> • Provision of required information. • Provision of complete accurate information in appropriate formats. • Instruction in how to use the services’ resources effectively. • Publicity of what is available. • Continual needs assessment. • Proactive information delivery. • Information repackaging to suit users’ needs.
Ethics	<ul style="list-style-type: none"> • Maintenance of high ethics at all times.
Personnel	<ul style="list-style-type: none"> • Sufficient qualified staff that meet the users’ needs and communicate effectively. • Staff having knowledge of information needs of the users. • High competency levels and need for continuing education.
Resources	<ul style="list-style-type: none"> • Resources aimed at serving the full spectrum of the intended users. • Accurate and current resources that are adequate for a variety of users.
Access	<ul style="list-style-type: none"> • Ready accessibility to users. • Highly visible services accommodating users with disabilities. • State of the art communication methods for access to resources. • Appropriate equipment, in adequate quantities for users to access information. • Convenient opening hours for the services.
Evaluation	<ul style="list-style-type: none"> • Information service evaluation. • Integration of staff and clients in the evaluation process. • Process that emphasises factors important to clients. • Collection of relevant statistics. • Evaluation of resources.

Madden (2008) studied the professional associations' library and information service in the United Kingdom and came up with an ideal library and information service model presented as Figure 2.4 below.



Figure 2.4: A model of library and information service for a professional association (Madden, 2008:563)

Madden (2008:562-3) explains the model thus:

- Online library and information resources refer to the web site.
- The in-house library services refer to the physical collection.
- The enquiries service is likely to be a reference service providing answers to factual, technical or professional questions, and it can be run in-house, online and by telephone.
- Research services involve library and information staff helping with the research topics of users.
- Information summaries could take the form of new product displays.

The Madden (2008) and RUSA (2000) guidelines have shed some light on information service models. Such models may be used in the design and implementation of an information service for the teachers being studied here. Nonetheless, 'choice of a model in the design stage of information service depends, to a large extent, on the specific conditions prevailing in a particular country' (Chiwere, 2008:60). Therefore, the existing information services need to be determined in order to know the prevailing conditions. The teachers' information needs and their prevailing conditions have to be considered when designing and implementing their information service. It is perceived that the Fidel and Pejtersen (2004)

framework, outlined below, might help to determine the specific prevailing conditions for secondary level geography teachers with regard to information.

Fidel and Pejtersen (2004) articulated a cognitive work analysis conceptual framework using the example of a project to study the information behaviour of teachers in a public elementary school with the aim of developing design recommendations for an information system. Fidel and Pejtersen (2004:5) present seven components of the framework thus:

- **The work environment** investigates the environment in which the school operates, for instance the national or district regulations governing the school, curriculum policies and standards, student population, testing, etc.
- **Work-domain analysis** studies the work that is done at the school and the school library, the goals of each organisation and its activities, resources and constraints.
- **Task analysis** looks at specific tasks and analyses them through the same questions, for instance, teachers' goals for lessons, sources they consult and their constraints when searching information for lessons.
- **Organisational analysis** examines the management style and the rationale for the allocation of roles and responsibilities.
- **Decision analysis** provides a more specific analysis of individual decisions, such as what information sources one uses and finds desirable and appropriate for one's task.
- **Strategies analysis** examines possible strategies for each task and decision.
- **User's resources and value analysis** identifies the characteristics of each group of users. These include the teachers' experience, knowledge, values, etc.

The above framework sets out some important issues that concern the information needs and information-seeking of teachers relevant in the design and implementation of their information service. For instance, the work environment is basically related to the curriculum, syllabus and examination. Work domain analysis is related to the resources available at schools; task analysis may be related to lesson plans, and all these need information. Organisational analysis is related to other roles and responsibilities that the teachers may have. As mentioned earlier, teachers have other roles in addition to teaching. These roles include sports master/mistress or serving in committees such as disciplinary, debate and cultural ones, to name a few. It is evident that these roles may require information,

as indicated by Leckie *et al* (1996). Decision, strategy and value analysis is related to individual teachers' knowledge, experience and preference in carrying out tasks, delivering content and using information sources. The Fidel and Pejtersen (2004) framework highlights the factors that can be used to develop a clear picture of the prevailing conditions for secondary level geography teachers in Lesotho. It is envisaged that these factors have the potential to help this study to yield the data that will help to guide the design and implementation of the teachers' information service because the prevailing conditions of these teachers would be known.

2.7.3 Implementation of information service

While the design is the planning stage, the implementation puts the designed plans into action. The plans that are drawn up during the design stage are then put into effect. The intended schedules are adhered to and the activities that constitute the information service are embarked upon (Wilson, 2000a). This includes the delivery of the information service.

McMenemy (2010:7) asserts that the delivery of reliable information to users is one of the most vital aspects of a librarian's role. In addition, McMenemy (2010:7) argues that the ethics inherent in decision-making are fundamental to librarians' professional ethos and their role in supporting people's use of information for enhancing their lives. Moreover, McMenemy (2010:7) maintains that wrong delivery of information may well be professionally unethical, but it could also be potentially dangerous for the individual librarians and their organisation. As mentioned in Chapter One (section 1.1), failure to deliver relevant and authentic information to teachers may hamper the teaching and learning process and may ultimately have negative effects on the learners' performance.

2.7.4 Evaluation of information service

After designing and implementing the information service, the impact, value, relevance, etc. of such services need to be established. This is normally done by evaluating the information service. Wilson (2000a) mentions that evaluation involves assessment of all the data collected during the monitoring process with the objective of determining the success, usefulness or value of the innovation, and in this study the innovation is the information service. Therefore, at the evaluation stage, one will be assessing whether the users find the information service useful, valuable and successful.

Botha *et al* (2009) studied the impact of the special library service at the Council for Scientific and Industrial Research (CSIR) on research scientists. Botha *et al* (2009:112) assert that as their special library (CSIR Information Service) understands the researchers' information needs well, it can evaluate the service and products on offer in order to select those information products that best serve the researchers' needs. These products include external information suppliers procured by the CSIR Information Service (e.g. outsourcing online journals) for researchers' use.

For the evaluation of the information service, Kaur and Rani (2008:535) suggest regular user surveys to determine whether a service should be continued/modified or withdrawn. Immediate feedback on the quality of services is essential for making the necessary adjustments to meet the requirements. Moreover, Kaur and Rani (2008:536) indicate that libraries should constantly maintain and improve the quality and range of their services/products and match these to the changing requirements of users. Assessing the quality of information services is nothing new. There are instruments, such as SERVQUAL, that developed into SERVPERF, which have been developed, tested and used in various settings to determine the quality of services as well as the performance of services (Parasuraman *et al*, 1988). Brophy (2005) sets out means for comparing the different effects of a service on individuals in a particular community over time. Brophy's (2005) model aims to assess the level of impact of information and library services. It is beyond the scope of this study to intensively review literature on the evaluation of information services, including the instruments and techniques that are used. It is envisaged that the evaluation will be done after the information service for teachers has been designed and implemented. Therefore, an extensive literature review on the evaluation of the information service will be more relevant at that point.

In this section it is gathered that it is crucial to involve users when designing the information service. The information service's design requires needs assessment and understanding information-seeking. The design stage is the planning phase, the implementation stage is the execution of the plans, and the evaluation stage marks the identification of outcomes after the delivery and could be interpreted as the reality check on the impact of the information service. It should be noted that after designing and implementing the information service for the secondary level geography teachers in Lesotho, evaluations will need to be carried out. As mentioned earlier, it is only then that more evaluation techniques, models and instruments

will be reviewed. For the purpose of this study, it suffices to be aware that the delivery of an information service needs to be evaluated constantly in order to enhance efficiency.

2.8 CONCLUSION

This chapter has been the literature review for the current study. The literature addressed most of the research sub-questions except the information service aspect specifically for teachers. The Leckie *et al* (1996) information-seeking of professionals' model that forms the theoretical framework for this study was reviewed with recognition of other information behaviour related models. The review of the Leckie *et al* (1996) model also included soliciting other scholars' views and studies that applied the model.

The literature review helped to conceptualise some of the key terms related to this study that were briefly clarified in Chapter One (section 1.7). These terms are information, information need, information-seeking, information source, information communication channel and information service. Furthermore, a distinction was made between an information source and an information communication channel in the context of this study.

The literature revealed the categories of information needs of teachers. It was evident that the teachers' information needs pertain to pedagogy, the curriculum and syllabus, including examinations, as well as knowledge of the subjects they teach. In addition, the teachers need information related to their students, such as their talents, capabilities, interests and social behaviour.

It emerged that information may be sought for a specific purpose, while it may also be found incidentally as one interacts with information sources. Sometimes people seek information through other people (agents/proxies) and also collaborate to find information. The literature also pointed out that teachers generally seek information from sources that are readily available in their schools. The teachers prefer to seek information that is not only current, but also relevant and applicable to teaching. The textbooks are the first point of information-seeking for the teachers. In addition, the teachers tend to seek information that will be easily understood by their learners and go to the extent of simplifying the language and finding different means of presenting the information to the learners to enhance understanding and interest.

The information sources used by teachers are mostly colleagues, books, magazines and newspapers, with a preference for mostly formal publications. In one study it was specifically noted that the teachers preferred print sources to electronic sources. In another study, it was observed that the teachers preferred sources that were written in their vernacular to those written in English. In this respect it is worth determining the situation with the secondary level geography teachers in Lesotho.

It was established that the information communication channels can be personal, such as face-to-face talking, conversing over the telephone/cell phones, using SMS through cell phones, or more internet-based such as email, web chatting, web sites, instant messaging, and Facebook, twitter, wikis, blogs, etc. As a result, the empirical component of the current study needs to establish the teachers' preferred communication channel, given that this study also aims to guide the design and implementation of these teachers' information service. Therefore, it is important to find the channels that are appropriate to use in the delivery of such an information service.

Provision of an information service often begins with a needs assessment of the targeted users, including establishing essential facilities and services, as this has a bearing on the delivery of the information service. The design of the information service involves specifying the services to be offered and their mode of delivery. Other factors to consider include prevailing conditions in the country, the necessary staff, equipment and marketing plans for the information services, as well as implementation strategies. It is important to note that the information service needs to be evaluated from time to time in order to establish its impact, whether it is still needed, or should be modified or discontinued. The information service related models and frameworks noted in this chapter that may be used in subsequent chapters are the studies by Brophy (2005, 2000), Hepworth (2004), Kaur and Rani (2008), Madden (2008) and the RUSA guidelines (2000), as well as Tarby and Hogan (1997).

The next chapter addresses the research design and methods that were used to carry out the investigation of the information needs and information-seeking patterns of secondary level geography teachers in Lesotho. It considers the empirical components of the studies reviewed in this chapter to justify the decisions made on the choice of research methods.

CHAPTER THREE: RESEARCH DESIGN AND METHOD

3.1 INTRODUCTION

The previous chapter was the literature review for this study. It provided fundamental insights into research on the information needs and information-seeking patterns of teachers. Most importantly, the literature review confirmed the theoretical framework to guide this research. This was fundamental in the decisions that were made for the empirical component of this study, particularly the items that should constitute the research instruments. The aim of this study, as mentioned in Chapter One, was to answer the principal question: **What are the information needs and information-seeking patterns of geography teachers in Lesotho with regard to their teaching role and how can these guide the design and implementation of an information service for these teachers?** This principal question has subsidiary research questions outlined in Chapter One (section 1.2). Data had to be collected to answer the principal question for this research. This chapter outlines the overall procedure that was followed in data collection and processing. The chapter, therefore, presents the overall description of the methodology, research method, population, sampling, data collection techniques, pilot study and data analysis. In addition, the chapter explains ways of addressing concerns about reliability and validity, as well as the ethical considerations in this study.

3.2 RESEARCH METHODOLOGY

Most research studies are informed by and based on certain theoretical stances called methodologies. Methodology concerns the general theoretical perspective of the research, that is, the overall nature of the research activity. It concerns the perspective or the angle that the researcher wishes to take on the question being asked. There are two fundamental methodologies, namely, qualitative and quantitative (Pickard, 2007: xvi). The Sage *Dictionary of Social Research Methods* (2006:175) defines methodology as ‘the philosophical stance or worldview that underlies and informs the style of research. It could be termed the philosophy of methods.’

Richards and Morse (2007:93) assert that when the research problem is complex or if the researcher suspects that one method or strategy may not comprehensively address the research problem, multiple research methods or approaches are used. Mixed methodology is a research design that focuses on collecting, analysing and mixing both quantitative and qualitative strategies in different phases of the research process in a single study or series of studies. The reason for using both qualitative and quantitative methodologies in combination is that it provides a better understanding of a research problem than either approach alone (Creswell & Clark, 2007:5).

It was realised, in the research planning stage, that in order to ascertain the teachers' information needs and information-seeking patterns that will guide the design and implementation of the information service, several approaches needed to be employed. Consequently, this study employed both quantitative and qualitative methodologies. The aim was to gain some advantages of both methodologies, so that the weaknesses of one would be compensated for by the strengths of the other.

It is of paramount importance for this study to gain insights into the information needs and information-seeking patterns of secondary level geography teachers, as well as their preferences for communication channels, in order to guide the design and implementation of an appropriate information service for them. To gain these insights, qualitative methodology was deemed to be appropriate. In order to turn the information service into reality, it should be supported by the authorities governing and administering the teaching service in Lesotho. Some of these authorities are politicians and policy makers who tend to have a strong faith in numbers. Therefore, quantitative methodology is employed in order to convince the potential policy makers. Combining research methodologies has been done in information behaviour related research, such as that of Perault (2007), Rowley and Urquhart (2007), Twidle *et al* (2006) and Williams and Coles (2007a).

3.2.1 Qualitative methodology

Although both the quantitative and qualitative methodologies are used in this study, the study primarily applied a qualitative methodology. According to Leedy and Ormrod (2005:133), qualitative research focuses on phenomena that occur in natural settings, in the "real world". Qualitative research also involves studying those phenomena in all their complexity.

Therefore, qualitative research is rarely simple because it recognises that the issue being studied has many dimensions and layers, hence it tries to portray the issue in its multifaceted form.

Leedy and Ormrod (2005:134) add that qualitative research serves one or more of the following purposes:

- Description - revealing the nature of certain situations, settings, processes, relationships, systems or people.
- Interpretation - gaining insights into a particular phenomenon, developing new concepts or theoretical perspectives about the phenomenon and/or discovering problems that exist within the phenomenon.
- Verification - allowing the researcher to test the validity of certain assumptions, claims, theories, or generalisations in real-world contexts.
- Evaluation - providing a means through which a researcher can judge the effectiveness of particular policies, practices or innovations.

Based on Leedy and Ormrod's (2005) discussion above, this study is descriptive because it aims to reveal the secondary level geography teachers' information needs. It seeks to establish these teachers' information-seeking patterns and their use of information sources, including their preferred information format and channels of communication for exchanging information. The study is interpretive, given that it aims to gain insights into the information needs and information-seeking patterns of the secondary level geography teachers in order to guide the design and implementation of an appropriate information service for these teachers. Therefore, in this study, qualitative research serves both descriptive and interpretative purposes.

The literature, such as the publications of Bell (2010), Pickard (2007) and Yin (2011), implies that qualitative data has the advantage of rich descriptions of the things being studied in their natural environment as opposed to a laboratory setting. This is because qualitative data focuses on issues that are not just complex, but also evolving. As a result qualitative data is less amenable to precise measurement or numerical interpretation (Gorman & Clayton, 2005:3). Qualitative data do not involve just numbers and statistics, but full descriptions of things that occurred, including the real experiences. In addition, qualitative research emphasises the human element, uses close first-hand knowledge of the research setting and

avoids distancing the researcher from the people or event/situation being studied (Neuman, 2003).

3.2.2 Quantitative methodology

Quantitative research is described as research that involves numbers and measurement, thus emphasising frequencies and statistics. For instance, Struwig and Stead (2001:7) assert that quantitative research requires that data be collected and expressed in numbers. Leedy and Ormrod (2005:179) describe it as the approach that yields quantitative information that can be summarised through statistical analysis. Gorman and Clayton (2005:3) opine that quantitative researchers view the world as a collection of observable events and facts that can be measured.

Pickard (2007:18) asserts that quantitative research begins with a theoretical framework established from the literature review; from this framework a hypothesis can emerge and variables within the hypothesis can be identified. A hypothesis notion can be translated into research aims and objectives. However, if a true experimental research method is chosen, hypothesis is not compulsory. In this instance, one selects the most appropriate research method, calculates the sample and designs the data collection instruments within that method, and finally collects data, processes and analyses it. Once data analysis is complete, there is usually enough evidence to either negate or support the hypothesis. Generalisations are then made based on the findings, or in the case of experimental research, general laws are formulated (Pickard, 2007; Struwig & Stead, 2001).

After identifying the broader research approach for this study, herein called methodology, the next step was to decide on an appropriate research method or combination of methods. There are many research methods in the literature even though they are called by different names. For instance, what Pickard (2007) explains as a research method, Leedy and Ormrod (2005) discuss as a research design. For the purposes of this thesis, it will be accepted that a ‘research method is the bounded system the researcher wants to use to engage in empirical investigation, it is the overall approach that is often referred to as strategy’ (Pickard, 2007: xvi). Pickard (2007) outlines eight research methods as case study, survey, experimental research, ethnography, delphi study, action research, historical research and grounded theory.

According to Leedy and Ormrod (2005:135-142), qualitative research methods include case studies, ethnography, phenomenology, grounded theory and content analysis.

A decision was made on the research methods that would be appropriate for this study after a careful investigation of the various alternative research methods in the literature, constantly bearing in mind the principal research question and the resources available for this study, as well as the need to collect both qualitative and quantitative data. Although Leedy and Ormrod (2005:183) and Wang (2001:60) classify a survey as a standard quantitative research method, Aldridge and Levine (2001:29) assert that to characterise surveys as pre-eminently quantitative research is a misconception. On the contrary, surveys have the prime advantage of allowing simultaneous collection of both qualitative and quantitative data (Aldridge & Levine, 2001:29). Consequently, it was decided that a survey research method would be the most appropriate for this study. Many other studies on information needs and information-seeking behaviour report the use of surveys, as can be seen in Case (2006), Courtright (2007) and Wang (2001). Section 3.3.4 provides examples of some information behaviour related studies that used the survey research method.

3.3 SURVEY RESEARCH

Because of the large number of teachers and the diversity of their locations, it was not possible to reach all of them. It was also clear from the onset that reaching all the secondary level geography teachers in Lesotho would not be possible, given the time and resources available for the current study.

Survey research involves acquiring information about one or more groups of people, perhaps about their opinions, characteristics, attitudes, or previous experiences, by asking questions and tabulating the answers. The ultimate goal is to learn about a large population by surveying a sample of it (Leedy & Ormrod, 2005:183). In other instances, a survey is viewed as the research method used to structure the collection and analysis of standardised information from a defined population using a representative sample of that population. In addition, the term ‘survey’ refers to a study that has used a representative sample (Creswell, 2009), otherwise, if the entire population has been involved in the study, it is a census (Pickard, 2007:95). Questions must be asked using a standardised questioning procedure applied equally and consistently to all research participants. It should aim to study

relationships between specific variables, which are identified at the outset of the research and stated either as a hypothesis or research question (Pickard, 2007:95).

Salant and Dillman (1994:10) mention three types of surveys, namely:

- A needs assessment survey that is used to solicit people's opinion about a problem and possible solutions;
- A marketing survey that is used to evaluate the nature and level of demand for particular products or services; and
- An evaluation survey that is used to learn about the impact of programmes and policies.

The current study used survey research methods to investigate the information needs and information-seeking patterns of secondary level geography teachers in Lesotho and based on the views of Salant and Dillman (1994), can therefore be classified as a needs assessment survey. It further wanted to guide the design and implementation of an information service for these teachers.

In a survey, a series of questions are posed to participants. Their responses are summarised through percentages and frequency counts and inferences are drawn (Leedy & Ormrod, 2005:183-184). In this study, a set of questions were posed to participants using different methods to yield both quantitative and qualitative data in order to solicit descriptions and interpretations. Only the responses for the quantitative data were summarised as percentages and frequency counts, presented in Chapter Four. The responses for the qualitative data are presented as narratives in Chapter Four. Like most other research methods, survey research has its benefits and limitations and these are discussed in the next subsection.

3.3.1 Benefits of survey research

It was important to understand clearly the benefits of survey research as the chosen research method, particularly what it entails. This is because the researcher constantly had to make well-informed decisions to determine if the chosen method was indeed the most suitable method for the current research. Various scholars have identified the main benefits of survey research (Aldridge & Levine, 2001; Babbie, 1990; Leedy & Ormrod, 2005; Pickard, 2007; Salant & Dillman, 1994). These benefits have been encapsulated and linked to the current study in Table 3.1 below.

Table 3.1: Benefits of survey research method

Benefits of survey research	Specific link to this study
Surveys can fit into a highly naturalistic strategy such as participant observation, as well as in a controlled artificial laboratory (Aldridge & Levine, 2001:28).	Partial observation of school libraries is considered to be a naturalistic strategy, while the questionnaires for prospective teachers might qualify as a controlled setting.
Surveys are capable of gathering comparable information from various respondents across a wide range of different social groups (Aldridge & Levine, 2001:29).	A survey has been used for in-service teachers, prospective teachers and officials from institutions directly involved in secondary geography education in Lesotho, thus representing different social groups.
Surveys use a standardised questioning procedure applied equally and consistently to all participants (Pickard, 2007:95), thus making them reliable because the same questions are posed in the same manner to all respondents.	Preparation of research instruments (attached as schedules and questionnaire in Appendices A, B and D) and the pilot study enabled consistent and standard questioning of different categories of participants.
Surveys are versatile because they can be used to investigate almost any problem or question (McMillan & Schumacher, 2001:305).	A survey is used to investigate the information needs and information-seeking behaviour of secondary level geography teachers in Lesotho.
Surveys are popular because credible information can be collected timeously at a relatively low cost, especially when compared to other research methods such as ethnography (McMillan & Schumacher, 2001:305).	A wider in-service teachers' population was reached over a short period of time with limited funds.
Surveys allow data to be collected from small samples to use it to study the entire population in ways that permit generalisations (McMillan & Schumacher, 2001:305).	Considering the different locations and number of schools that have employed in-service teachers, sampling was essential, as the resources for the study would not permit the entire target group to participate in the study. The findings are generalised to other geography teachers.
It is useful for discovering new phenomena as well as pointing out typical responses that can be generalised to many people (McMillan & Schumacher, 2001:305).	Phenomena related to the principal research question are discovered through a small sample and help to guide the design and implementation of an information service for secondary level geography teachers in Lesotho. The findings can also be generalised for other geography teachers in Lesotho and the information service model may possibly be extended to other teachers.
It can be applied to many people in various contexts or settings (Aldridge & Levine, 2001:29).	The participants (in-service teachers and prospective teachers during their teaching practice) are located in schools that are in the rural areas, urban areas, lowlands and highlands of Lesotho, which are different settings.
It allows the researcher to enter the research field with fixed frameworks and prepared questions, so that data collection and analysis are less overwhelming (Aldridge & Levine, 2001:29).	The Leckie <i>et al</i> (1996) model (used as the study's theoretical framework) and the research instruments (attached as Appendices A-D) are fixed frameworks and prepared questions that made data collection and analysis less overwhelming.

3.3.2 Limitations of survey research

From Babbie (2004), one deduces that pre-defined questions make it impossible to probe insights relating to the causes or processes relevant to the issue being studied. Moreover, pre-defined questions appear to be superficial in covering complex topics. This limitation was addressed by using various methods of data collection, such as interviews, focus group discussions and partial observations of school libraries, as well as different sets of

participants, such as in-service and prospective teachers and officials from institutions directly involved in secondary geography education in Lesotho.

3.3.3 Survey research in information needs and information-seeking studies

According to Wang (2001:61), surveys remain the main method to study the information needs of various user populations. As a result, survey research methods have been used in information needs and information-seeking studies. For instance, Chiware and Dick (2008) report a survey of the information needs and information-seeking patterns of small, medium and micro-enterprises in Namibia. Yi (2007) used an email survey to examine international students' information needs and whether their education level, age and gender affect their information use. Kim and Sin (2007) used a survey method to study the perception and selection of information sources by undergraduate students.

In the teaching context, a survey was used by Conroy *et al* (2000) to study the information needs of secondary school teachers in Europe. The survey was based on two sets of semi-structured interviews. Mundt *et al* (2006) studied the information behaviour of teachers using a quantitative survey in the form of a questionnaire and followed it up by multiple qualitative interviews. Madden *et al* (2005) surveyed practising teachers' views of the internet as an educational resource. Nwokedi and Adah (2009) used a survey research method to study the information needs of post-primary teachers in Nigeria while Tahee *et al* (2004) investigated the perceived professional needs of science teachers by means of a survey.

After deciding on a research method, it was imperative to establish the research population that would be used, including the sampling strategies. Therefore, the next two sections discuss the research population and the sampling procedures used in this study.

3.4 RESEARCH POPULATION

This section describes the population that participated in this study. Section 3.6 will discuss how data were collected. Population means all the people or subjects about whom the study is meant to generalise (Jackson, 2008:97). The reasons for studying in-service geography teachers were mentioned in Chapter One (section 1.1). The potential population comprises three sets, namely:

- In-service secondary level geography teachers in Lesotho;
- Prospective secondary level geography teachers who are final-year students in the Faculty of Education at the NUL majoring in geography and therefore studying to be geography teachers; and
- Institutions that are involved in secondary level geography education in Lesotho with regard to teacher training, professional development, curriculum design and development, teaching and learning geography inspection, as well as geography examinations.

The prospective secondary level geography teachers are included in this study because it is envisaged that they can provide salient information regarding beginning novice teachers' information needs and information-seeking patterns. This may lead the design and implementation of the teachers' information service to incorporate the needs of the young novice teachers, who might also reflect information behaviour related to the Net Generation, as noted by Leung (2004), Oblinger and Oblinger (2005) and Tapscott (2009). Given that this study also aims to guide the design and implementation of an information service for secondary level geography teachers in Lesotho, it was imperative to learn from the institutions involved in secondary level geography education in Lesotho some of the issues pertaining to the information needs, communication channels and information service for the secondary level geography teachers.

3.4.1 In-service secondary level geography teachers in Lesotho

The in-service secondary level geography teachers in Lesotho are the primary participants in this study because the study is about their information needs and information-seeking patterns. They are currently teaching geography in Lesotho high schools. This cadre includes graduates from the LCE and the NUL. There are also teachers that graduated from other institutions outside Lesotho. The teachers' qualifications range from diplomas to masters' degrees. These teachers are also at different career stages; some may be experienced, while others may still be inexperienced. However, they are considered as professionals, according to Leckie *et al* (1996:184), because they had to master advanced knowledge to practise teaching and were therefore considered suitable to participate in this study that was guided by the Leckie *et al* (1996) information-seeking model of professionals.

It was decided that these teachers would be accessed in their respective schools. It was also decided that partial observations of school libraries (explained later in section 3.6.3) as facilities for a teachers' information service would be done while accessing in-service teachers in their schools. This is because the study also intends to guide the design and implementation of an information service for secondary level geography teachers in Lesotho. A list of schools offering geography was obtained from the Examinations Council of Lesotho (ECOL) to guide the selection of schools and the teachers that would be included for participation in this study. This is because, as mentioned in Chapter One (section 1.2), not all the schools in Lesotho offer geography. It was expected that the schools that are already offering geography and writing its examinations would be well established and have been in existence for a longer period. Therefore, there was a probability of including both experienced and inexperienced teachers from such schools for rich data. The subsequent section 3.6.1 explains how data were collected from the in-service teachers.

Two lists were obtained from the ECOL, one for the schools that offer geography at JC level and the other for the schools that offer geography at COSC level. A third list of schools offering geography both at the JC and COSC levels was compiled from these two lists. It is this list that informed part of the population of this study. It was crucial to work with teachers in the schools offering geography at both the JC and COSC levels because the JC geography syllabus is formulated and developed in Lesotho, while the COSC geography syllabus is formulated by the University of Cambridge (as mentioned in Chapter One, section 1.1). These two syllabi may trigger different information needs. It was envisaged that schools offering geography at both JC and COSC level would yield rich data. Table 3.2 below shows the distribution of schools offering geography in the ten districts of Lesotho. Tables 3.2, 3.3 and 3.4 are based on the data obtained from the ECOL lists in 2008.

Table 3.2: Distribution of schools offering geography in Lesotho

District	JC Level Only	COSC Level only	Both JC and COSC	Totals	%
Berea	7	1	4	12	11.01
Butha-Buthe	1	2	8	11	10.09
Leribe	8	2	12	22	20.18
Mafeteng	2	1	6	9	8.26
Maseru	10	6	14	30	27.52
Mohale's Hoek	3	1	5	9	8.26
Mokhotlong	2	1	1	4	3.67
Qacha's Nek	1	3	0	4	3.67
Quthing	2	1	1	4	3.67
ThabaTseka	4	0	0	4	3.67
Total	40	18	51	109	100.00

3.4.2 Prospective secondary level geography teachers

Prospective secondary level geography teachers are final-year education students, majoring in geography in the Faculty of Education at the NUL. As explained in section 3.4, it was envisaged that these teachers would provide some insights into the research question. These are mostly novice teachers just about to become qualified professionals, who are still at the university completing their teacher training. Sometimes they are called pre-service teachers or teacher trainees (Cheong, 2010; Sharpe *et al*, 2003; Sirmaci, 2010). This group was chosen to provide information to shed light on the information needs and information-seeking patterns of beginning novice teachers based on their experiences during their teaching practice. Teaching practice takes place when teacher trainees are posted to different schools away from the university site for internship (Sharpe *et al*, 2003). The purpose of teaching practice is to give trainees an opportunity to learn and practise, in a natural school setting, the theories taught at the university (Cheong, 2010). According to Sirmaci (2010:649), to be able to be a good teacher, besides having theoretical information from the university, it is essential to gain teaching experience before beginning a teaching career. For years NUL has been engaging its students in teaching practice; and it also involves teacher trainers (i.e. Faculty of Education, lecturers) to visit schools to observe their trainees in practice. Section 3.6.4 explains how data were collected from the prospective teachers.

3.4.3 Institutions involved in secondary level geography education in Lesotho

The secondary level geography teachers might be working with and receiving information from various institutions involved in secondary level education in Lesotho regarding their work as professionals. These institutions may be related to geography education in terms of teacher training and professional development, curriculum design and development, teaching regulations, geography teaching/learning inspection and examinations and include the LCE, NUL, National Curriculum Development Centre (NCDC) and the ECOL. The institutions that participated in this study and how they were identified are explained in section 3.5.3 and section 3.6.2 explains how data were collected from these institutions.

After deciding on the population and establishing that the researcher could not reach all the participants, particularly the in-service secondary level geography teachers, it was decided to use a sampling procedure. The next section explains the sampling procedure for the current study.

3.5 SAMPLING PROCEDURES

According to Jackson (2008:97), in most cases it is not feasible or necessary to survey the entire population relevant to a study. As a result, one selects a sample that is a representative or a subset of the entire population. However, to draw meaningful, reliable and valid conclusions, the sample should closely reflect the study population, that is, it should be a representative sample. Pickard (2007:59) asserts that the method of sampling used plays a major role in any research investigation, as very often it is the characteristics, composition and scale of the sample that gives weight to any findings that emerge from the study. Hence various sampling techniques are followed in empirical research, depending on the research problem and objectives. For instance, McKenzie (2003) and Savolainen (2008) adopted convenience sampling, while Foster and Ford (2003) and Musoke (2007) applied purposive sampling and Foster (2004) and Marcella *et al* (2007) used snowball sampling.

It was vital to collect data from all the districts of Lesotho in order for this study to qualify as a Lesotho study. It was also important to establish the information needs and the information-seeking patterns of the secondary level geography teachers with different qualifications, at schools located in urban and rural settings, as well as the lowlands and highlands as geographical regions of Lesotho. It was also significant to include schools from different

proprietors in one district. The fact that only schools offering geography at both JC and COSC level participated in this study, might mean stratified sampling as explained by Creswell (2009:148), Czaja and Blair (2005:187-188) and Strydom (2005:200). This is because a specific category of schools was selected. Given that the number of prospective geography teachers and institutions that are involved in secondary level geography education was small, it was felt that sampling them was not necessary. However, sampling was applied to in-service geography teachers as explained below.

3.5.1 In-service secondary level geography teachers in Lesotho

The in-service secondary level geography teachers were accessed in their respective schools and were all given an equal opportunity to participate in the study. However, these teachers are employed in many different schools throughout Lesotho. As a result, sampling of these schools was essential, given the limited resources, such as time and money, for this study. As explained earlier, it was decided that in order to ascertain rich qualitative data, it would be best to use teachers in schools that offer geography at both JC and COSC levels. Moreover, such schools should have participated in the examinations administered by the ECOL at least by 2007. Therefore, a purposive sampling strategy, which is a selection of a sample on the basis of its contribution of information-rich cases for in-depth study (Patton, 1990), was used for this group's schools, bearing in mind the following:

- Schools' proprietorship, such that schools with different proprietors within one district were included.
- Location per district, such that each district should be fairly represented in the study. In addition, the selection of schools had to be done with care to include schools in rural and urban settings, as well as lowlands and highlands regions within one district.

The sample of the schools that participated in the study is shown in Table 3.3 below, while Table 3.4 reflects different categories of schools, school libraries and the number of geography teachers.

Table 3.3: Sample of schools that participated in the study

School	Prop.	District	Loc.	Streams	Av. Class	Geo teachers	Part.	Code
Bereng High School	LEC	Mafeteng	Town	15	55	5	4	521
Butha-Buthe Community	COM	BB	Rural	13	50	5	5	111
Butha-Buthe High School	LEC	BB	Town	21	55	6	3	122
Hlotse High School	GOV	Leribe	Town	20	45	5	2	201
Holy Cross High School	RCC	M'Hoek	Rural	12	45	4	1	631
Khethisa High School	LEC	Leribe	Rural	14	60	4	2	222
Leribe English Medium High	COM	Leribe	Town	13	40	3	2	213
Lesotho High School	GOV	Maseru	Town	28	45	6	3	401
Likuena High School	LEC	M'Hoek	Town	18	65	1	1	622
Mamathe High School	COM	Berea	Town	13	45	4	4	311
Mapoteng High School	LEC	Berea	Rural	14	50	3	2	322
Maseru High School	COM	Maseru	Town	23	55	5	4	412
Masianokeng High School	LEC	Maseru	Urban	21	60	5	5	423
Masitise High School	LEC	Quthing	Rural	18	55	5	2	721
Methodist High School	METH.	Berea	Urban	18	70	5	3	353
Mohale's Hoek High School	GOV	M'Hoek	Town	24	55	4	2	603
Molapo High School	LEC	Leribe	Town	15	55	5	3	224
Mount Royal High School	RCC	Leribe	Town	15	40	5	2	235
Paul VI High School	RCC	M'Hoek	Rural	13	60	4	4	634
Peka High School	LEC	Leribe	Rural	15	40	2	1	226
Sechaba High School	GOV	Leribe	Rural	14	40	4	3	207
Sefika High School	LEC	Maseru	Town	24	55	6	4	424
St Agnes High School	ACL	Berea	Town	15	45	4	3	344
St Catherine's High School	ACL	Maseru	Town	13	45	4	4	445
St Cyprian's High School	ACL	BB	Town	13	40	4	4	143
St John's High School	ACL	Mafeteng	Town	18	65	5	3	542
St Mary's High School	RCC	Maseru	Urban	16	45	6	4	436
St Patrick's High School	RCC	M'Hoek	Town	14	50	3	2	635

Key: Prop. - Proprietor
 Loc. - Location
 Av. Class – Average number of learners in a class.
 BB- ButhaButhe
 M'Hoek – Mohale's Hoek
 Meth.- Methodist
 Part. Number of participants in a focus group discussion

Table 3.4: Categories of schools and number of geography teachers

Category	Schools	Libraries	Geography teachers	Participants
Schools offering geography at JC level only	40	29	124	-
Schools offering geography at COSC level only	18	6	72	-
Schools offering geography at both JC and COSC levels	51	47	138	-
Schools that participated in this study	28	22	122	82
School libraries observed	-	17	-	-
Study sample percentage	28/51 (54.90%)	17/47 (36.17%)	82/138 (59.42%)	

(ECOL, 2008; Ministry of Education and Training, Planning Unit, 2008)

3.5.2 Prospective geography teachers

Since the prospective geography teachers were accessed through one institution, the NUL, it was not necessary to sample them. The NUL academic year starts in July and ends in June the next year. There were 62 prospective secondary geography teachers enrolled in the academic year 2009/2010, who were all given the questionnaire and therefore had an equal opportunity to participate in the study. They were approached to participate in the study when they were in their teaching practice schools, with the assistance of the geography educator lecturer, as he was visiting the schools to observe the prospective geography teachers, as mentioned in section 3.4.2. This is the NUL lecturer for the geography curriculum studies, which are undertaken by all the students in the Faculty of Education at NUL studying to be geography teachers. A total of 46 prospective secondary geography teachers responded to the questionnaire resulting in a response rate of 74.2% (46/62).

3.5.3 Institutions involved in secondary level geography education in Lesotho

There may be many institutions in Lesotho that work with secondary level geography teachers in Lesotho. A list of these institutions could not be ascertained. While some institutions may be working with the teachers on a regular basis, others may be working with them on an *ad hoc* basis. In addition, some have information such as syllabus documents, relevant policy documents, past examination question papers and reports, etc. that the teachers often request. The list of institutions to interview was informed mainly by the in-service secondary level geography teachers during the focus group discussions. It was based on asking the in-service teachers which institutions they usually consult for information, as well as the criteria outlined earlier in section 3.4.3 and it was also supplemented by the researcher's own knowledge and experiences as a former secondary level geography teacher in Lesotho. The sample of the institutions that participated in the study is reflected in Table 3.5 below.

Table 3.5: Sample of institutions that participated in the study

Institution	Official Interviewed
Berea Geography Teachers' Association	General Secretary and Chairperson
Butha-Buthe Geography Teachers' Association	General Secretary
Examinations Council of Lesotho	Geography Specialist
Lesotho College of Education	Geography Educator Lecturer
Leribe Geography Teachers' Association	General Secretary
National Curriculum Development Centre	Geography Curriculum Specialist
National University of Lesotho	Geography Educator Lecturer
Southern Districts Geography Teachers' Association	Deputy General Secretary

After the methodology, research method, research population and sampling procedures had been determined, techniques that were going to be used to collect the data had to be selected. It was significant to choose data collection techniques that would not only help to address the principal research question, but would also fit well into the survey research method and the resources available to the researcher. Since the study is both qualitative and quantitative, the researcher also had to consider various techniques in order to ultimately yield both qualitative and quantitative data. The next section explains the data collection process for the current study.

3.6 DATA COLLECTION

In studies of information behaviour, Case (2006:312-313) reveals the use of observation as the “root” method. Case (2006) maintains that interviews, content or document analysis, diaries, transaction logs, focus groups, think-aloud protocols, experiments, tests, bibliometric analysis and discourse analysis are other common methods used. In the same vein, Sonnewald *et al* (2001) mention psychometric measures, surveys, interviews, think-aloud protocols and direct observation as research methods in information-seeking studies. In addition, Wang (2001:60) explains that data may be obtained and analysed by surveying users (implying use of questionnaires), interviewing users, observing users through experiments or in their natural settings and by using multiple phases and emerging methods. To corroborate this view, Hargittai and Hinnant, (2006:63) argue that ‘for an in-depth understanding of people’s information-seeking behaviour, in-person observations and interviews can be especially insightful.’

It was established that ‘surveys can be fruitfully combined in all sorts of imaginative ways with interviews, observations, document analysis, focus groups, etc.’ (Aldridge & Levine, 2001:14). It was also specifically found that surveys employ methods such as questionnaires, face-to-face interviews and observation (Aldridge & Levine, 2001:6). In addition, surveys based on structured questionnaires and interviews have been the most frequent data collection method in information-seeking research (Byström & Järvelin, 1995:197).

From the literature and the arguments presented above, it was decided that this study would employ the following techniques to collect data:

- Focus group discussions with the in-service secondary level geography teachers. (Appendix A)
- Individual interviews with representatives of the institutions involved in secondary level geography education in Lesotho. (Appendix B)
- Partial observations of the school libraries. (Appendix C)
- Questionnaires for the prospective secondary level geography teachers (these are teachers at pre-service stage and therefore still in training). (Appendix D)

The rationale for the decisions regarding the data collection techniques are explained in subsections 3.6.2 - 3.6.5, where each technique is succinctly discussed. Furthermore, examples of related studies that combined research techniques were provided in Chapter One (Table 1.2.).

It is crucial to mention that all qualitative data collection was done solely by the researcher, that is, all the interviews, focus group discussions and partial observations of the school libraries. This is mentioned because in some large surveys, data collection is sometimes done by a team of people or through agencies. For instance, Saracevic and Kantor (1997) recruited, paid and trained interviewers to collect data. White *et al's* (2008) study involved three researchers for data collection and Chiware (2008) used research assistants to distribute and collect questionnaires. Aldridge and Levine (2001:84-85) share the advantages of doing survey research personally. Some of these advantages are:

- Doing it gives a far better 'feel' for the data than if a hired interviewer had delivered the data.
- There is an advantage in knowing what was said and how it was said.
- One gains insight into the areas which the respondents found sensitive, and probably even why they felt so.
- Based on the responses, one may be able to judge which items were most salient to respondents.
- Some hired interviewers may not necessarily be interested in the research and may not do their best to solicit as much data as possible. This factor is crucial, given that this research is for study and work purposes.

Collecting the data personally helped to standardise all the instruments, including the researcher as the human instrument. It also provided more insights about the respondents. This yielded field notes that were informative and that would otherwise have been missed if the research had been done by someone else. It made the transcription of tapes easier because when listening to the voices, the picture of the interview and discussions came back to mind, such that one was taken back to the situation, thus enabling supplementation of field notes and deeper involvement in the data. Remembering the situations of the focus group discussions and interviews was further helped by embarking on a strategy to transcribe the tapes immediately. The decision for this procedure was based on experiences from the pilot study (discussed in section 3.8), as well as arguments from the literature. For instance, Bell (2010:168) indicates that one must write up as much as one remembers as soon as the interview is over. Barbour (2007:78-79) mentions that it is best for novice focus group researchers to do their own transcription because this has the advantage of familiarising one with the data. In addition, McLellan-Lemal (2008:108) indicates that transcribing the interviews gives an opportunity to assess the strengths and weaknesses of interviewing skills and may also help to determine how well the interview guide works.

The questionnaires were administered by the NUL geography educator lecturer. He distributed them to the prospective geography teachers during their teaching practice in the various schools where these teachers were posted. The questionnaires were distributed in March 2010 and were handed in to the geography educator lecturer in April 2010 when the prospective teachers were submitting their teaching practice reports. The said lecturer was very helpful because he not only teaches and knows all the final-year students who are majoring in geography, but also had to visit all of them in their respective teaching practice schools for observation and assessment. It was important to ensure that only the final-year geography education students participated in this study. Mabawonku (2006:78) mentions using the researcher and an assistant to distribute questionnaires and indicates that friends and colleagues also assisted with ensuring that the questionnaires were completed, which resulted in a high response rate.

The next subsections discuss in more detail the research techniques that were used in this study.

3.6.1 Focus group discussions

The in-service secondary level geography teachers, who are the primary participants in this study, participated in this study through focus group discussions guided by the schedule that is attached as Appendix A. Marshall and Rossman (2011:149) explain focus groups as a method of interviewing that originates from marketing research. The groups are composed of seven to ten people who are unfamiliar with one another and have been selected because they share certain characteristics relevant to the study questions. Babbie (2007:308) asserts that in focus groups, typically 12 to 15 people are brought together in a room to engage in a guided discussion on some topic. The people are selected on the basis of their relevance to the topic under study. Pattuelli (2008:637) reports using 15 to 20 participants in focus groups and Williams and Coles (2007b) report using focus group of three to five participants.

In this study, the number of participants in the focus groups was determined by:

- The number of teachers that were teaching geography, during data collection, in each school that constituted the study's sample; and
- The number of geography teachers who were willing to participate in the study.

As a result, in some cases only one teacher was available to be interviewed, hence it became an individual interview. There are also instances where two teachers were interviewed together. The largest schools had six geography teachers participating (see Table 3.2).

Marshall and Rossman (2011:149) state that in a focus group the interviewer creates a supportive environment, asking focused questions to encourage discussion and the expression of differing opinions and viewpoints. Moreover, Marshall and Rossman (2011:149) argue that these interviews may be conducted several times with different individuals so that the researcher can identify trends in the perceptions and opinions expressed, which are revealed through careful, systematic analysis. In affirmation, Babbie (2007:308) notes that more than one focus group is convened in a given study because of the serious danger that a single group might be too atypical to offer conclusive insights. Consequently, different focus groups were held in various schools, even though they were all guided by the same schedule.

Marshall and Rossman (2011:149) further reveal that focus groups have the advantage of being socially oriented, studying participants in an atmosphere more natural than artificial experimental circumstances and more relaxed than one-to-one interviews. In addition, these

scholars opine that when combined with participant observation, focus groups are especially useful for gaining access, focusing site, selection and sampling. In the same vein, Babbie (2007:308) maintains that focus groups help in exploratory studies, and they allow socially-oriented research that captures real-life data in a social environment. Furthermore, Babbie (2007) indicates that this method offers flexibility, high face value and speedy results at low cost.

However, focus groups, according to Marshall and Rossman (2011:150), have the disadvantage of power dynamics that need to be controlled, as some people in the group may dominate discussions, thus foregrounding individual's viewpoints instead of the groups'. In addition, time can easily be lost while dead-end or irrelevant issues are discussed and data are difficult to analyse because context is essential to understanding the participants' comments. To corroborate this view, Babbie (2007:308) points out that the researcher has less control over group discussions compared to individual interviews. Moreover, the focus groups may yield data that can be difficult to analyse, and often require a skilled moderator to manage the discussions. In addition, the differences between groups may be troublesome; groups may be difficult to assemble, and the groups' discussions may derail. Another issue raised about focus groups to bear in mind is that 'recordings in which people are simultaneously talking or carrying on side conversations, may create audio confusion even when the quality of the sound of the tape recorder is good' (McLellan-Lemal, 2008:103).

When discussing focus groups Locke *et al* (2007:106-107) describe them as a method that has increasingly been applied to social and behavioural research. It allows insights into participants' feelings, attitudes and perceptions about a selected topic. It presents a more natural environment because participants appear to be influencing others and being influenced by others just as in life and this sense of authenticity can lend a useful degree of authority to the data. Considering the disadvantages of focus groups outlined above, it is evident that focus groups require the skill to control the group, as failure to do so might lead to erroneous conclusions due to confusing data which might even be irrelevant. Bearing these issues in mind, the researcher had to do a pilot study not only to test the data collection instruments, but also to acquire interviewing skills as well as skills to moderate group discussions. A lot of effort was made during data collection to control people in order to prevent them from talking at the same time, side talking and dominance in the discussions. Probing each individual was done if they were observed to be withdrawn. Probing was done

based on Greeff (2005:306) pointing out that the researcher may be the facilitator, which was the case in this study. Greeff (2005:307) indicates that in a focus group the facilitator must direct discussions, encourage participation and probe participants. In addition, Bell (2010:166) points out that researchers should devise their own techniques of keeping strong personalities in line and of drawing silent members into the group discussions. Pickard (2007:222) suggests that one can invite each person to speak on a particular point in turn, because this ensures that everyone has an opportunity to speak.

The decision to use focus groups among one set of participants in this study was based on the argument that ‘the focus groups method also allows the facilitator the flexibility to explore unanticipated issues that arise during the discussion. The cost of focus groups is relatively low, and they can increase the sample size of the qualitative studies by permitting more people to be interviewed at one time’ (Marshall & Rossman, 2011:150). It was envisaged that focus groups would help more data to be gathered that could perhaps not be obtained through questionnaires. Moreover, focus groups seemed appropriate for in-service secondary level geography teachers because there are too many of them to conduct individual interviews, yet they may be found at one location (their schools), that made it easier to assemble the groups. The school is the natural environment for these teachers and this is important, given the arguments from the literature outlined earlier. Furthermore, Fink (2003:119) asserts that one should use focus groups if one is looking for a range of ideas and perspectives and if one wants these to emerge from the focus group. In addition, Evjen and Aundunson (2009) maintain that the use of focus group interviews in LIS research is common internationally, and that it is a qualitative method that enables the researcher to talk with several people in a shorter time span. Moreover, in a focus group interview, where participants interact with one another, the interviewer can also trigger thoughts and ideas, simply because it allows the introduction of new ways of thinking. Since this study investigates teachers’ information needs and also requires their recommendations on an information service, focus groups were deemed appropriate to elicit ideas from in-service teachers.

The focus group discussions were held from January to March 2010 in schools that offer geography at both JC and COSC level, as indicated earlier. The intention was to ensure that the right people participated in the study and did so comfortably in their natural setting. The discussions were audio-taped in order to capture all the data and this was coupled with the researcher’s observations of respondents being jotted down as field notes. Based on the

experiences gained during the pilot study (outlined in section 3.7) it was decided that only one focus group would be held per day. McLellan-Lemal (2008:108) confirms that taking time to transcribe tapes during data collection makes the process occur at a slower pace. Visiting one school per day made the data collection process longer and expensive. This was done intentionally, not only to enable more time in one school for the partial observation of school libraries, but also to allow time for immediate transcription of the tapes and field notes, while everything was still fresh in mind. This is because the focus groups yielded a lot of data that could easily overwhelm the researcher and needed to be carefully processed for meticulous data analysis.

Aldridge and Levine (2001), Fink (2003) and Salant and Dilman (1994) opine that in a survey, focus groups are mainly used to help develop salient questions for the questionnaire. These scholars imply that focus groups, in survey research, are used as a first step to help develop the content and the format of the questionnaire. In this study, focus groups were used as a stand-alone technique and not necessarily to formulate the questions for the questionnaire. However, in this study, the focus groups helped to identify more institutions that were involved in secondary level geography education, which otherwise might have been missed by the researcher. For instance, the researcher was not aware of any geography teachers' associations; their existence and activities were only discovered during the focus group discussions and their members were added to the list of the interviewees.

3.6.2 Interviews

Individual interviews were used to collect data through pertinent individuals from the institutions that are directly involved in secondary level geography education in Lesotho. Section 3.5.3 explained how these institutions were selected. The interviews were found to be appropriate in this instance because they would help to elicit more information compared to questionnaires. In addition, it would have been difficult to assemble all these institutions together for a focus group. Dias Gasque and De Souza Costa (2003) used interviews to study teachers' information-seeking behaviour and Makri *et al* (2008) and Meyers *et al* (2007) also combined interviews with observation.

According to Tharenou *et al* (2007:103), interviews are of two extreme types: structured and unstructured; midway between these is the semi-structured type of interview. Tharenou *et al*

(2007:103) explain that structured interviews comprise completely pre-set standardised questions, normally closed-ended and following each other sequentially. It is often argued that these types of interviews are actually questionnaires that are administered to respondents verbally but yield immutable response options. However, Tharenou *et al* (2007:103) also explain that unstructured interviews are open-ended and the interview is conducted in a manner similar to a friendly conversation, with no pre-determined order of questions or specified wording to the questions. Semi-structured interviews have an overall topic, general themes, targeted issues and specific questions; they are more flexible than structured interviews, but more focused than unstructured interviews because the interviewer is still free to pursue matters as the situation dictates, just as in unstructured interviews. Tharenou *et al* (2007:104) cite Crabtree (1992) to explain that semi-structured interviews are guided, concentrated, focused and open-ended communication of events that are co-created by both the interviewer and the interviewee and occur outside the stream of everyday life. In addition, Tharenou *et al* (2007:106) mention that unstructured interviews are typically used in interpretive and inductive (deriving theory from data) research. However, if a researcher is testing a theory, then a questionnaire or structured interview is a good choice.

The study being reported is investigative and descriptive, neither deriving theory from data, nor testing a hypothesis/theory. As a result, it employed semi-structured interviews since it followed a predetermined set of questions (the interview schedule is attached as Appendix B) and asked them in the same order to all the respondents. However, the interviewer allowed interviewees to discuss other factors deemed relevant to the questions, bearing in mind that the intention of employing interviews in this study was to yield qualitative data. This is because interviews allow the interviewer to follow up ideas, probe responses and investigate motive and feelings, which a questionnaire cannot do (Bell, 2010:161). Probing was important because it helped to clarify issues where things were not clear during the interviews. Furthermore, semi-structured interviewing was found to be appropriate because it enabled the repetition of the interview process with various respondents, which standardised the questioning. As earlier indicated in section 3.3, standardisation is fundamental in survey research.

Interviews have been criticised by authors such as Bell (2010:161) and Bennett (2003:58) who indicated that:

- Interviews are time-consuming and expensive in terms of both time and money;

- Interviews are highly subjective and run the danger of bias; and
- While interviews can yield rich information material, they can also be too cumbersome, making them difficult to analyse.

These criticisms are some of the factors that led to the decision to use semi-structured interviews to guide responses in order to make them manageable for analysis. That is why interviews were considered for the institutions that are involved in secondary level geography education, since these institutions are fewer in number. Nonetheless, it was envisaged that semi-structured interviews would help to gather data that could probably not be obtained through questionnaires, thus aiding the objective of addressing the principal research question more adequately. In addition, the interviews helped to gather information that could be termed useful, reliable and valid data.

On average two interviews were conducted per day in April 2010, and even in this case a voice recorder was used with the permission of the participant. The recording was done along with the interviewee observations that were jotted down as field notes. On average the interviews took about 15 minutes.

3.6.3 Observation

Only partial observation of school libraries, as explained by Gay *et al* (2006:447), was done owing to time limitations. This involved limited engagement in the school libraries in order to see what was going on. School libraries were observed because they were perceived as part of resources that might support the information needs and the information-seeking patterns of secondary level geography teachers and as structures already in place to render an information service of teachers. This is important, as the study intends to draw implications for the design and implementation of an information service for secondary level geography teachers.

Gorman and Clayton (2005:39) maintain that ‘observation typically involves the systematic recording of observable phenomena or behaviour in a natural setting. While observation may not tell the researcher very much about the stated attitudes or self-perceptions of subjects, it does provide useful insights into unconscious behaviour and how this might relate to the self-perceptions of those involved in an event.’

‘Observation in a strict sense of simply watching people is little used in social research (except as an unobtrusive method) both because human behaviour is too complex to record in this way, and because it isolates researchers from what is being studied, thus preventing participation or deeper exploration of understandings through conversation or interview. Hence participants’ observation is more common whereby the researcher takes on an active role within the social setting that is being studied’ (Payne & Payne, 2004:157).

According to Gay *et al* (2006:447) observations are done to varying degrees. The degree of observation mainly depends on the research problem and the opportunities available to the researcher. Gay *et al* (2006:447) outline the degrees of observation thus:

- Active participant observer – this refers to active engagement in the field.
- Privileged, active observer – this refers to being engaged in more active, privileged manners such as teaching a lesson or leading a workshop session.
- Passive observer – refers to little engagement in order just to see what is going on in the environment, as was the case with partial observation of school libraries in this study.

The relevance of identifying existing information service in the schools, particularly the school libraries, has been explained earlier. Initially, it was envisaged that the school library service would be revealed during the focus group discussions with secondary level geography teachers. However, problems could be foreseen if these teachers were not regular library users. The study would run the risk of depending solely on the teachers’ perceptions instead of the actual library service. In Lesotho schools, the libraries are perceived as a responsibility of the English language teachers (Mafube, 2005:5) which might make geography teachers less knowledgeable about the entire school library service.

The partial observations of school libraries were done either before or after the focus group discussions because specific times were allocated to focus group discussions with the teachers. In this study, the researcher was a passive observer of the school library service mainly because the core objective of the research was not school libraries; rather it was investigating the information needs and information-seeking patterns of teachers. This was done by visiting the school libraries for about an hour when going to various schools for focus group discussions. The partial observations were done along with the focus group

discussions from January to March 2010, as mentioned earlier (section 3.6.1). The partial observation included:

- Perusing the materials in the libraries to establish the information collection and the subjects it covers;
- Noting the location of the library in relation to other school buildings such as classrooms, offices and the staff room; and
- Ascertaining the facilities available in the library, including the number of staff members, and the service that the school library offers.

The passive observation was supplemented with chatting to the school librarians, in order to address all the issues that were outlined in the observation schedule (see Appendix C) in a limited time.

The data collected in this manner was purely in the form of field notes. It is worth noting that while ‘observation has the advantage of providing a picture of the context in which something is being studied or takes place, its major disadvantage is that it requires a lot of time both for data collection and analysis’ (Bennett, 2003:59). It is also argued that data collected through observations is often difficult to categorise systematically, thus making it difficult for a researcher to reach conclusions (Bennett, 2003:59). As a result, an observation schedule (Appendix C) was developed to guide the researcher in order to make the data manageable. Information behaviour related studies reporting the use of observations include those of Nwokedi and Adah (2009) and Stokes and Lewin (2004).

3.6.4 Questionnaires

Singh (2007:69) maintains that a questionnaire is almost always self-administered, allowing respondents to fill them out themselves. All the researcher has to do is to arrange for their delivery and collection. In affirmation, Pickard (2007:64) indicates that questionnaires are instruments completed by respondents themselves; they are relatively easy to use, inexpensive and are often the most plausible option for measuring unobservable constructs such as attitudes, values and preferences, intentions and personalities. They have a highly structured format, often used where the aim is to generate quantitative data from a large sample to test research questions and/or hypotheses. To corroborate this view, Nardi (2006:68) mentions that questionnaires are efficient tools for surveying large samples of respondents in a shorter period of time than interviews or other research methods, with less

expense. As mentioned earlier, the questionnaire (attached as Appendix D) was used among the NUL Faculty of Education final year students studying to be geography teachers (herein called prospective secondary level geography teachers). The questionnaires were distributed in March 2010 and were handed in to the geography educator lecturer at NUL in April 2010 when the prospective teachers were submitting their teaching practice reports. The Faculty of Education at NUL is one of the faculties with the highest number of students at the NUL. It was envisaged that a questionnaire would be appropriate for this group.

Salant and Dillman (1994:101) indicate that researchers should bear in mind the following factors when designing questionnaires:

- A well-designed questionnaire takes time to put together, but it is fruitful in the end, as it will help to yield the desired data.
- People are willing to respond to attractive questionnaires.
- Good questionnaires make the task of responding easier, since they tend to minimise the burden on the respondent.

Singh (2007:69) explains that often questionnaires have three basic types of questions:

- Open-ended questions that do not have pre-coded options.
- Dichotomous questions that have two possible answers, such as yes/no; true/false or agree/disagree.
- Multiple response questions that may have many probable answers.

The study developed a questionnaire that mainly contained multiple response questions with probable answers. In addition, the questionnaire contained a few dichotomous questions and only one open-ended question at the end. The questionnaire is highly structured mainly because it intends to yield quantitative data (see Appendix D).

There are disadvantages associated with questionnaires, which have been outlined in the literature. For instance, Bennett (2003:59), Bryman (2001:127) and Gray (2004:187) explain that some of the disadvantages of questionnaires are that:

- Questionnaires are associated with low response rates;
- It is impossible to probe respondents, as personal contact is lost because they fill them in on their own; and

- With questionnaires there is no allowance for respondents to ask questions where there is lack of clarity and there is a greater risk of missing data, as some respondents may not fill in all the questions.

Bearing the above arguments from the scholars in mind, the researcher decided to:

- Ensure that the questions were as clear and unambiguous as possible and ran a pilot study;
- Outline the title and purpose of the study on the front page to provide information about this study as a way of encouraging more prospective teachers to participate in the study; and
- Distribute the questionnaires in the teaching practice schools so that the prospective teachers had an extended time to fill them in.

Distributing the questionnaires in the schools during teaching practice was done after establishing that ‘a self-administered questionnaire can be completed in a specifically designated area, such as a clinic, waiting room, a classroom, or a personnel office’ (Fink, 2003:16). In addition, this was done after seeking permission from the NUL authorities, including the teaching practice coordinator at the NUL. The teaching practice coordinator and the geography educator lecturer felt that the study’s findings could help to develop the teaching practice programme in the sense that in the future students might know what to expect in schools with regard to information.

Questionnaires have been used in quantitative information behaviour studies, mostly in surveys. For instance, Choo *et al* (2008) used them to study information culture and information use, Heinström (2005) used questionnaires to study the influence of personality on information-seeking behaviour, Nazim (2008) used them to study information-searching behaviour on the internet and Patitungkho and Deshpande (2005) used them in a survey on information-seeking behaviour. Information behaviour studies about teachers who used the questionnaires include those of Nwokedi and Adah (2009), Perrault (2007), Snyman and Heyns (2004) and Williams and Coles (2007b).

As indicated earlier, the study being reported collected data from multiple sources (in-service secondary level geography teachers, prospective geography teachers, school libraries and institutions involved in secondary level geography education), using different data collection

techniques. In research, this is called triangulation, and therefore, the next section gives an account of triangulation and how it was employed in this study.

3.7 TRIANGULATION

Davies (2007:34-35) maintains that in social science research triangulation is based on the idea of using two or three different methods to explore the same subject. In addition, Fox and Bayat (2007:107) affirm that triangulation involves finding a convergence among sources of information, different investigators or different methods of data collection. In this case, a researcher could establish an “audit trail” of key decisions and/or conclusions that had been made during the research process and validate the quality of those decisions and/or conclusions.

Willis *et al* (2007:219) discuss triangulation as a technique that involves confirmation across different data collection methods, the rationale being that the flaws of one method are often the strengths of another, and by combining different methods, researchers can achieve the best of each, while overcoming their individual deficiencies. Moreover, triangulation can also be done across different sources of information, such as interviewing three different respondents in different settings. Furthermore, scholars opine that triangulation is a conservative way of preventing the researcher from drawing unsupported conclusions from data, thus increasing the validity of the findings.

The current study used triangulation in various forms as follows:

- Employing both qualitative and quantitative methodologies.
- Using secondary level geography teachers, prospective teachers and institutions that disseminate information to secondary level geography teachers to constitute the study population.
- Collecting data using different techniques: questionnaires, interviews, focus group discussions and partial observations.

Although Table 1.2 (in Chapter One) outlined information behaviour studies that use more than one research technique (which is still considered as triangulation), this paragraph highlights more examples of triangulation in research relevant to the current study. For

instance, van Aalst *et al* (2007) combined interviews, questionnaires, search logs and diaries to triangulate. Limberg and Sundin (2006) and Meyers *et al* (2007) also used triangulation by engaging students, teachers and teacher librarians as participants in their respective studies. In the context of information needs and information-seeking, Dent (2006) used focus groups, questionnaires and interviews with students, teachers and library staff to explore the impact of school libraries in Ugandan schools. Snyman and Heyns (2004) used focus groups, a questionnaire and unstructured interviews to investigate the information needs of Afrikaans L1 language teachers in South Africa. Williams and Coles (2007b) examined the use of research information among teachers in the UK using a questionnaire, interviews and group discussions. Perrault (2007) investigated biology teachers' online information-seeking practices through a questionnaire and in-depth interviews. Nwokedi and Adah (2009) used questionnaires, interviews, direct observation and document analysis to study the information needs of post-primary teachers in Nigeria.

To summarise, the study being reported here used a questionnaire, interview schedule, focus groups schedule, observation schedule and the researcher as a human instrument in data collection. It was imperative to pre-test all these instruments to ensure that they would capture the required information and this was done through a pilot study. The pilot study enabled the researcher to review the questions that were in the questionnaire and the schedules. Pilot studies have been done in information needs related studies. For example, Twidle *et al* (2006) piloted their questionnaire on 15 participants; it was finally administered to 128 participants.

3.8 PILOT STUDY

As explained, research instruments such as the human instrument (researcher), questionnaire, and schedules for interviews, focus group discussions and observations were used to collect data. In order to increase and test the reliability of these instruments, a pilot study was done from August to October 2009.

Gorman and Clayton (2005:98) mention that 'a pilot study means taking the draft research plan and applying it in a neutral location that will not be used in the actual fieldwork, or collection of preliminary data in the actual location(s) from which data are to be collected. Either way, a pilot study allows one to test several variables and to iron out any initial

problems before preparing the broad plan that will direct the entire research project. The idea is not to get data *per se*, but to learn about the research process, interview schedule, observation techniques and the researcher as the instrument. The variables being tested include data collection methods, the time frames of the investigation, and the researcher as the instrument'. Pickard (2007:115-116) discusses the researcher as the instrument in ethnography research. The research being reported used a survey research method and not ethnography. However, this study interpreted the researcher's ability to interview people, control group dynamics in focus groups and observe participants and school libraries for data-worthy field notes as issues related to the researcher.

Gorman and Clayton (2005:98) continue arguing that a pilot study could also be used to test the language and the content of the questions, as well as the length and approach of the interviews and focus groups. Moreover, a pilot study could test observation techniques such as the non-verbal responses of those being interviewed. Furthermore, a human instrument might test the dress code, behaviour and appropriate manner of presentation, as well as how one relates to others, including matters of establishing rapport. Revisions are made accordingly from the pilot study so that the actual study is of better quality.

For the pilot study, the researcher used some secondary level geography teachers in the Maseru and Leribe districts to test the focus group instrument. These districts have the highest number of schools offering geography in Lesotho. The prospective teachers' questionnaire was tested on the prospective teachers studying at the LCE who were doing their teaching practice in the schools that were chosen for the pilot study in these two districts. Table 3.6 below provides information about the sample of the participants in the pilot study.

Table 3.6: Sample of participants in the pilot study

School	District	Number in a focus group	Questionnaires filled in	School library observations
Adventville High School	Maseru	4	2	YES
Christ the King High School	Maseru	3	1	YES
Khubetsoana High School	Maseru	5	2	NO
Leribe High School	Leribe	4	2	YES
Lithabaneng High School	Maseru	3	2	NO
Life High School	Maseru	3	1	NO
Likhakeng High School	Leribe	3	1	NO
Makhethisa High School	Leribe	3	3	NO
Manonyane High School	Maseru	3	0	NO
Thabeng High School	Maseru	5	3	YES
Joy to the World High School	Leribe	4	2	YES
Total		36	19	5

The pilot study provided useful insights, such that the scale of the empirical component of this study was established. In particular, it was established that the focus group discussions were long and might yield overwhelming data that could easily confuse the researcher. Therefore, care had to be taken to moderate the discussions, such that participants do not talk at the same time, to allow good recording. In addition, the pilot study showed the need to observe participants who are dominating discussions as well as those who seem to be withdrawn and the need for the interviewer to try constantly to balance the discussions. Moreover, the researcher not only learnt the importance of distinguishing all the individual responses in the focus groups, but also that of capturing them accurately. It was found that immediate transcription of field notes and records would help to minimise data confusion and enable meticulous analysis of data. Bell (2010:168) indicates that one must write up as much as one remembers as soon as the interview is over. It was established that meticulous data analysis should include identification of respondents and their responses, immediate transcription of tapes, incorporation of field notes and coding of responses. It is the pilot study that led to the decision to hold one focus group per day in order to take things step by step, allowing data processing while things were still fresh in the mind. Based on the pilot study, it was also decided that it would be best to start with the focus group discussions together with the school library observations, then administer the questionnaires and finally conduct the interviews. It was found that the data from the focus groups and the questionnaire would help to further inform the list of institutions involved in secondary level geography education in Lesotho.

The pilot study was done not only to ensure that the study's instruments would yield the needed information, but also as an additional way of increasing the quality of the data for this study. Gray (2004) mentions reliability and validity as the main criteria that can be used to determine data quality. Hence issues of reliability and validity in research are discussed next.

3.9 RELIABILITY AND VALIDITY IN RESEARCH

According to Gay *et al* (2009:154), if the researchers' interpretations of the data collected are to be valuable, then the measuring instruments used to collect the data must be both valid and reliable. In principle, the value of any kind of research depends on the credibility of its research findings. This seems to be the case in all the disciplines and all the research methods used for data collection and analysis. Powell and Connaway (2004:43) affirm this by explaining that as one develops and conducts a research study, one should always be concerned with its validity and reliability. Some studies that were reviewed for this study indicated how the issues of reliability and validity were incorporated in their research. Two examples are the work of Chiware (2008) and Mutshewa (2006). Therefore, the validity and reliability of the survey research are discussed below.

3.9.1 Reliability

Reliability refers to consistency of measurement (Creswell, 2009:149; Delport, 2005:162; Kumar, 2011:181), that is, the extent to which results are similar over different forms of the same instrument or occasions of data collection (McMillan & Schumacher, 2001:245). This means that if another person carrying out the research follows the same procedure of measurement and then gets the same result, over a certain period, the instrument is reliable. According to Bell (2010:119), reliability is the extent to which a test or procedure produces similar results under constant conditions on all occasions. There are ways of ensuring that the reliability of an instrument is increased. According to McMillan and Schumacher (2001:245), these are:

- **Stability** – This is consistency of stable characteristics over time. It involves administering the same test to the same people over time. Then if the result is the same, the test is stable.

- **Equivalence** – This is a comparison of two measures of the same trait given at about the same time. It involves administering different forms to the same people at about the same time.
- **Equivalence and stability** – This is also a comparison of two measures of the same trait given over time. This is done by administering different forms of questions to the same people over time.
- **Agreement** – This is consistency of ratings or observations. This involves two or more persons carrying out observations and the extent to which they agree on what they have seen, heard or rated.

Delport (2005:163) suggests four possible ways of increasing the reliability of instruments, namely:

- Clear conceptualisation of constructs by developing an unambiguous, clear theoretical definition for each construct and by making sure that each measure indicates only one specific concept;
- Increasing the level of measurement indicators to a higher or more precise level of measurement;
- Using multiple indicators of a variable, such as two or more indicators to measure each aspect of a variable; and
- Using pre-tests, pilot studies and replications.

Kumar (2011:182) indicates that reliability may be affected by factors such as ambiguous wording of questions, changes in physical setting, particularly in interviews and laboratory testing, respondents and interviewer's moods, the nature of interaction among the respondents and also with the interviewer and the regression effect of the instrument.

3.9.2 Validity

Validity is the degree to which qualitative data can accurately gauge what the researcher is trying to measure (Gay *et al*, 2009:375). In affirmation, Gray (2004:219) opines that an instrument is valid if it measures what it was intended to measure. In addition, the instrument should cover all the research issues pertaining to both content and detail. To corroborate this view, Nardi (2006:58) indicates that validity is about accuracy and whether the items are correctly indicating what they are supposed to indicate. Nardi (2006:58-60) discusses several

ways of determining if the measures one uses are valid. According to Creswell (2011:149), Delport (2005:160-162), Kumar (2011:179-180) and Nardi (2006:58-60), some of the ways of determining validity are:

- Face validity – this assesses validity by seeing if the measure is getting the desired result. It is a “face value” check for an instrument. Although it is legitimate, it is not very scientific. It is usually based on consensus among researchers as to whether a measure is doing what it is supposed to be doing.
- Content validity – it is a subjective way of understanding how well a set of items measures the complexity of a variable being studied. It also depends on consensus among researchers evaluating the measures to determine if its content is valid.
- Construct validity – this is based on actual results and is often achieved after data have been collected and analysed. It is an abstract way of measuring validity because it requires constructing numerous ways of measuring an item.
- Criterion validity – this assesses validity for constructs that are not easily measured. It checks if the results from one item or instrument are similar to some external criteria that have been established.

Similarly, Creswell (2011:149) and Kumar (2011:179-180) discuss four ways of determining validity as:

- Face and content validity – the judgement of an instrument measuring what it is supposed to measure.
- Predictive validity – this is judged by the degree to which an instrument can forecast an outcome.
- Concurrent validity – it is judged by how well an instrument compares with a second assessment being done concurrently.
- Construct validity – this is determined by ascertaining the contribution of each construct to the total variance observed in a phenomenon.

In this study, the value of the research findings is ensured by addressing the issues of both reliability and validity in the following manner:

- Triangulation was applied by using different sources of data as well as different methods of data collection. The findings from various sources of data were compared. The objective was to boost confidence in the research findings.

- The questions asked in the questionnaire and the focus group discussions were drawn up after studying the Leckie *et al* (1996) model, which forms the theoretical framework for the current study, as well as other information-seeking related models outlined in Chapter Two (section 2.2). As a result, the concepts used in the instruments were drawn from the literature.
- The research instruments were pilot-tested with the aim of increasing validity. The instruments were pilot-tested on a sample similar to the intended study population. The comments from the pilot study were used to refine the final instruments.
- The questions were constructed in a concise manner in order to avoid ambiguity. In addition, an explanation of the research aims was provided to the respondents to give them some information about the study. The intention was to show the relevance and usefulness the study may have.
- All the respondents who participated in the study were assured of confidentiality. The respondents were not asked for their names, so that they could freely respond to the questions without any fear of being identified. This was done to ensure that they did not hold back some information. This is believed to contribute to the true picture of the situation as seen and experienced by the respondents.

Once the data had been collected, it had to be analysed in order to understand the information needs and information-seeking patterns of the secondary level geography teachers in Lesotho. Therefore, the next section explains how data were analysed in this study.

3.10 DATA ANALYSIS

It is only through analysis and interpretation of data that one can deduce meaningful insights from the data collected. Both qualitative and quantitative data were gathered for this study. Therefore, data had to be analysed qualitatively and quantitatively.

3.10.1 Analysis of quantitative data

Quantitative data were mainly sourced from the questionnaire that was administered to the prospective geography teachers, as discussed in section 3.6.1. The SPSS was used to capture and analyse these data. Firstly, each questionnaire that had been filled in was studied closely by checking all the questions and responses for errors. All the questions were assigned

numerical codes; it was therefore easier to work on the closed questions. The last open-ended question was also studied closely and content analysis was done.

3.10.2 Analysis of qualitative data

Qualitative data were mainly generated through interviews, focus group discussions and partial observations of school libraries. While the interviews and focus group discussions were audio-recorded and yielded the voices of the respondents with some field notes; the observations yielded field notes only. The records had to be transcribed before data could be analysed. McLellan-Lemal (2008:101) argues that some researchers opt to transcribe verbatim, some decide to paraphrase and summarise responses, while others transcribe only speech passages they think are relevant to the interview guide questions. In addition, McLellan-Lemal (2008:102) asserts that newcomers to qualitative research often make the mistake of characterising transcription as a technical, mundane clerical task and fail to consider how transcription may influence their ability to analyse and interpret the textual data. In this study, data were transcribed verbatim; it was only in cases where responses were either irrelevant to the questions or were in Sesotho that the responses were paraphrased and summarised. As mentioned earlier, it was important to transcribe data immediately while everything was still fresh and remembered clearly. This not only enabled comprehensive collection of data, but also proper coding of the data.

Richards (2005:85) maintains that most qualitative researchers code data mainly because coding generates new ideas and gathers material by topic; in particular purposive coding enables use of the results to develop new ideas and take the enquiry further. In this study, the voices of the participants in the focus groups are presented in boxes with some code such as 401T1. This will be seen clearly in the next chapter and subsequent chapters where data are presented, analysed and interpreted. This code identifies each teacher, his/her school district, proprietor and whether his/her school was the first, second or third from which the researcher collected data in that district. The codes were assigned to make the data analysis not only manageable, but also elaborative because they allowed some identification of individual responses. This was done without compromising the confidentiality and anonymity of the participants and they still felt comfortable to participate in the focus group discussions. The codes were assigned in the following manner:

- The first digit stands for the district, in this case 4 is Maseru.
- The second digit stands for the proprietor of the school, (0) is government.
- The third digit (1) means this is the first school for data collection in a district. In this case it is the first school that the researcher collected data from in Maseru district.
- The last part of the code, T1, symbolises teacher 1 in the focus group discussions. In all the focus groups we were sitting in a circle, so T1 is the teacher sitting next to me on my right.

The first question in the focus group schedule (see Appendix A) solicited the demographics of all the individual teachers who participated in the focus groups. Their responses were recorded on a form. This form bears the codes for all the teachers, including their teaching experience, gender, teaching load, their designation, committees, qualification and teaching subjects. This was done to enable detailed analysis of data. When a response was identified, the code was assigned and the form would be checked to establish the demographics of the respondent in order to study the data more deeply. The data analysis was not only about what was being said, but also who was saying it.

Similarly, the records for the interviews were transcribed immediately and were also coded. The coding here takes the form of INT1 or INT2 and this merely stands for interview 1 or interview 2, based on the sequence in which the interviews were conducted. A separate form was used to record all the codes and match them to the details of the interviewees, in particular their institution, their current designation and the period of their employment in the institution. This also enabled deeper analysis of the data.

According to Namey *et al* (2008:138), data analysis in qualitative research typically falls into two categories, namely content and theme. In content analysis, the researcher evaluates the frequency and salience of particular words or phrases from the data text in order to identify keywords or repeated ideas. In simpler terms, ‘content analysis refers to the gathering and analysis of textual content’ (Struwig & Stead, 2001:14). According to Gray (2009:500), content analysis involves making inferences about textual data by systematically and objectively identifying special classes or categories within them in order to reduce the volume of textual material into meaningful information. In addition, Bell (2010:132) explains content analysis as:

- A systematic, replicable technique for compressing many words of text into fewer content categories.
- A technique for making inferences by identifying specified characteristics of messages objectively and systematically.
- A research tool with which to analyse the frequency and use of words, terms or concepts in a document with the aim of extracting the meaning.

According to Kumar (2011:278-279), content analysis is an analysis of the contents of interviews or observational notes in order to identify the main themes that emerge from the responses given by respondents or the observation notes made by the researcher and the process involves the following steps:

- Identify the main themes.
- Assign codes to the main themes.
- Classify responses under the main themes.
- Integrate themes and responses into the text of the report.

This study used the content analysis strategy to analyse the responses from the last open-ended question on the questionnaire as well as all the qualitative data collected from focus group discussions, interviews and partial observations of school libraries.

Phelps *et al* (2007:209) argue that if one is carrying out descriptive/interpretive research where the aim is to seek insights into the human phenomenon or situation under study and to provide an enlightening description of the problem, without explicitly creating theory, then one can analyse data by examining topics/themes. This may be followed by breaking up texts into segments that represent instances of that theme and attaching codes or keywords and lastly bringing together segments of text that deal with the same theme. Consequently, the data from the focus group discussions and interviews were analysed by examining themes so that common trends were established and further constructed into narrative statements to represent responses. These themes were guided by the principal research question and its sub-questions outlined in Chapter One (section 1.2). If these themes were not guided by the research sub-questions, the qualitative data analysis would have been an overwhelming and never-ending process.

Chung and Neuman (2007) analysed their data by finding issues, patterns and themes in the data by beginning immediately after their first observation and continuing during the entire period of fieldwork by constantly comparing themes. Therefore, data analysis for the interviews and focus groups started and continued throughout the fieldwork, during data analysis, interpretation and report writing. Even after this thesis has been submitted, the data will still be reconsidered to learn more by scrutinising all the information collected further. In addition, Twidle *et al* (2006) analysed their data using content analysis by reading through their interview transcripts and identifying categories. Similarly, Qu and Furnas (2008) also categorised and summarised their observation notes and interview transcripts. Savolainen (2008) used content analysis by constantly comparing the articulations of respondents. Therefore, the researcher not only identified themes and content, but also constantly compared them throughout the entire data-processing stage.

In conducting this study, using a survey method, the researcher worked with different people as respondents. These people were in-service secondary level geography teachers, prospective secondary level geography teachers, school librarians and people working in the institutions that are involved in secondary level geography education in Lesotho. Therefore, it was imperative to consider ethical issues seriously in the survey research, and this is outlined below.

3.11 ETHICS IN SURVEY RESEARCH

Survey research, like any other research method, carries with it an obligation to follow certain ethical norms. The current study involves people as respondents. ‘A study that involves human and animal subjects needs to take into account ethical implications. It is essential that the research is not carried out at the sacrifice of the subjects in terms of exploitation. One has to remember that the subjects are real people and by agreeing to take part in the study they are doing one a huge favour. It is vital to respect people, in particular their rights, as well as details of their lives’ (Pickard, 2007:123).

According to Salant and Dillman (1994:9), any time a researcher asks people to participate in a survey, it is his/her responsibility to respect both their privacy and their voluntary participation. These scholars mention the following ethical issues in survey research:

- Practically, researchers politely encourage participants to respond but do not put pressure on them in an offensive manner. This requires one to make good judgements based on the situation pertaining to one's survey.
- Researchers have to do their absolute best to ensure confidentiality. This means releasing the results of the survey in such a way that an individual's responses may not be identified.
- Researchers have to obtain permission to enter sites where research will be conducted.

Brydon (2006:26) contends that informed consent means that researchers should carry out research, ask questions, organise focus groups, etc. after they have explained to people why they are doing this and what the extended outcomes are, both for the researcher and for them.

Bearing all the arguments above in mind, ethical issues were addressed in the following manner in this study:

- Permission to carry out the research was obtained from the Research Ethics Committee in the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria. The said committee scrutinised the instruments to ensure that all the questions adhered to ethical issues for scientific research and were not offensive.
- Permission to carry out the research was obtained from the Ministry of Education and Training in Lesotho to undertake the study in Lesotho schools.
- Permission to carry out the research involving the final-year education students majoring in Geography, who are prospective secondary geography teachers, as explained in section 3.4.2, was obtained from the registrar of the NUL.
- Consent forms were developed for the respondents in the interviews, focus groups and observations, explaining the intentions and ultimate aims of the research. Signed permission to record the proceedings of the discussions and interviews was requested.
- Confidentiality and anonymity were ensured by coding responses.
- An introductory cover letter for the questionnaire was written to explain all the aims of the study.

3.12 CONCLUSION

This chapter has described the broader research methodologies and the specific research method that was used in this study, namely a survey. The study followed qualitative and quantitative methodologies, both of which were explained in this chapter. Qualitative research serves description and interpretation purposes. It was also important to have a clear method of research for the current study, and in this case it was a survey research method. As a result, the chapter discussed survey research methods, their characteristics, benefits and limitations, including the application of survey research in information needs and information-seeking studies.

It was significant to explain the population for this study, including the sampling procedures that were used. It was noted that the study used in-service secondary level geography teachers, prospective secondary level geography teachers and the relevant people in the institutions that are involved in secondary level geography education in Lesotho. It was also explained that the study used stratified random sampling only for in-service teachers and did not sample the other two sets of participants, as they did not require sampling owing to small numbers. All potential participants were approached to participate.

The chapter further explained how data were collected, how triangulation was applied, how the pilot study was conducted and the issues of reliability and validity. The chapter went further to discuss the data analysis process, which was conducted both qualitatively and quantitatively. Since this study involved people as respondents, it was essential to take into account ethical issues in the survey type of study. This was done to ensure that the findings of the study were not harmful to the teachers and people in the various institutions that were interviewed and that the findings were presented as accurately and reliably as possible while maintaining anonymity. The following chapter contains the data analysis and the presentation. The data presented in that chapter are interpreted in Chapter Five.

CHAPTER FOUR: DATA ANALYSIS

4.1 INTRODUCTION

The previous chapter outlined the research methodology used to conduct the current study. The main purpose was to give a comprehensive explanation of the research procedures that were followed. These included the research methodology, research method, population, sampling, methods that were used to collect and analyse the data, the pilot study and the ethical considerations in studies of this nature. This chapter presents the data that were collected to investigate the information needs and information-seeking patterns of secondary level geography teachers in Lesotho. The data are presented according to their source. The first section is data collected from in-service secondary level geography teachers. This is followed by data from prospective secondary level geography teachers and lastly by data from representatives of the institutions involved in secondary level geography education in Lesotho. In each section the data presentation is based on the research questions of the study as outlined in Chapter One (section 1.2). The data presented in this chapter will be interpreted in Chapter Five.

The data were collected as follows:

- Focus group discussions with in-service secondary level geography teachers in Lesotho.
- Questionnaires for the prospective secondary level geography teachers studying at the NUL.
- Interviews with some officials from the institutions involved in secondary level geography education in Lesotho. The institutions are listed in Chapter Three (section 3.5.3).
- Partial observations of the school libraries in schools where focus group discussions were held.

The questionnaires and all the schedules for the focus group discussions, interviews and observations are attached as Appendices A-D at the end of the thesis.

This study was conducted solely by the researcher. She collected the qualitative data from all the focus group discussions and interviews and also undertook partial observations. The benefits of collecting the data solely without employing assistants were outlined in Chapter Three (section 3.6). In some other qualitative studies, research participants are given a chance to voice their views and perceptions. This study used audio recording, with the permission of the respondents, to allow the participants' voices to be captured and be presented anonymously as narratives for evidence in this study. Quantitative data and data describing the demographics of the participants are presented in tables using frequencies and percentages and charts using percentages to break the monotony of using one style of data presentation. Details of techniques on data collection were provided in Chapter Three (section 3.6).

Data are presented based on the categories of participants as follows:

- In-service secondary level geography teachers' data.
- Prospective geography teachers' data.
- Data from officials of institutions directly involved in secondary geography education in Lesotho.

4.2 IN-SERVICE SECONDARY LEVEL GEOGRAPHY TEACHERS' DATA

As explained in Chapter Three (section 3.4.1), the primary participants in this study were in-service secondary level geography teachers. These teachers are working in the schools that offer geography both at JC and COSC levels, which are the junior and senior secondary education levels respectively. The list of schools that offer geography was obtained from ECOL and guided the researcher during the data collection process. This section presents data collected from the in-service secondary level geography teachers in Lesotho using focus group discussions as explained in Chapter Three (section 3.6.1). 28 focus group discussions were held and a total of 82 teachers participated in this study through these discussions, to which Table 3.4 bears testimony. The data presentation offers information on all the questions asked, using the schedule attached as Appendix A.

In-service secondary level geography teachers were accessed in their respective schools and were all given an equal opportunity to participate. However, considering the resources for

this study, purposive sampling of schools was done, as explained in Chapter Three (section 3.5.1). The data are presented according to in-service teachers’ demographic details, context, information needs, information-seeking patterns, preferred information sources and communication channels, as well as their recommendations on an information service.

4.2.1 Demographic details of in-service teachers who participated in the study

The data presented in this sub-section provide a brief outline of the main demographic details of the secondary level geography teachers who participated in the study. This information was collected with regard to their teaching experience, position, subjects, qualifications and the committees on which they served.

Most of the in-service secondary level geography teachers who participated in this study had more than five years of teaching experience, with only 21.9% (18 out of 82) of the teachers having five or fewer years of teaching experience; 28% (23 out of 82) of the participants had 11-15 years of teaching experience and 19.5% (16 out of 82) had 6-10 years of experience. This is evident in Chart 4.1. As was to be expected, it was noted that the more experienced teachers were also older. None of the teachers reported leaving teaching for another job and rejoining it later. Only a few teachers reported that at some point in their teaching career they took study leave for advanced training and came back to teaching.

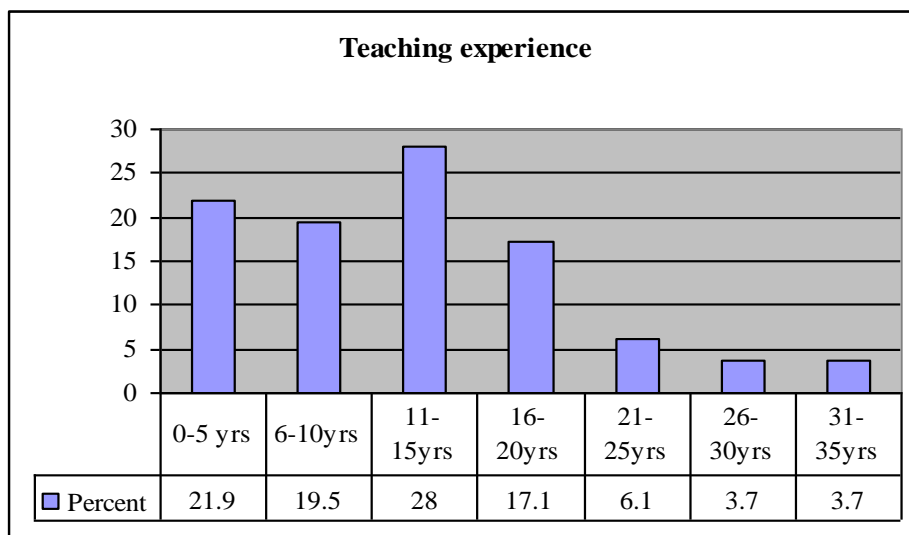


Chart 4.1: Teaching experience of the teachers in the survey

The participants' positions were heads of department (24.4%; 20 out of 82), deputy principals (3.7%; 3 out of 82), principals (1.2%; 1 out of 82), teachers (21.9%; 18 out of 82) and class teachers (48.8%; 40 out of 82). The class teacher has an administrative responsibility for his/her class in addition to his/her regular teaching load. These positions are explained in more detail in section 4.2.1.4 and depicted in Chart 4.2 below.

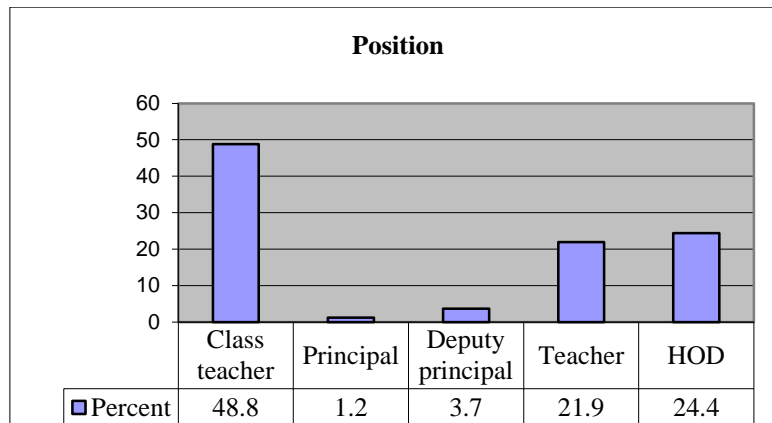


Chart 4.2: Positions of the teachers who participated in the survey

Most (75.61%; 62 out of 82) of these teachers have bachelors degrees and all of them have teaching qualifications. There were few teachers with postgraduate qualifications, and only one diploma holder. These are depicted in Table 4.1.

Table 4.1: Qualifications of in-service teachers that participated in the survey

Qualification	Frequency (n=82)	%
Bachelors' degree in Arts and Education	62	75.61
Bachelors' degree in Science Education	10	12.19
Masters' degree in Arts and Education	7	8.54
Diploma in Education	1	1.22
Postgraduate diploma in Education	2	2.44
Total	82	100.00

The largest group of in-service geography teachers in the survey was teaching geography only (39.02%; 32 out of 82); the other teachers were teaching geography and some other subjects, as shown in Table 4.2.

Table 4.2: Subjects taught by in-service teachers in the survey

Subjects	Frequency (n=82)	%
Geography only	32	39.02
Geography & Natural sciences	13	15.85
Geography & Business Education	1	1.22
Geography & Languages (English /Sesotho)	30	36.59
Geography & History/Religion/Development studies	6	7.32
Total	82	100.00

The in-service teachers' involvement in committees is depicted in Table 4.3. While some teachers were involved in one committee, others were active in either two or three committees. This is the reason for the total number exceeding 82. The names of the committees were mentioned by the participants, and they are the same in all the schools and have been the same even during the years the researcher was a teacher, except for the orphans' committee, which is new to the researcher because it did not exist during the years the researcher was a teacher. The only noticeable difference is that the Charismatic committee is only found in Catholic schools. Another difference is that in a few schools a cleaning committee as well as an environment committee exists. In most schools the environment committee is responsible for cleanliness as well.

Table 4.3: In-service teachers' involvement in committees

Committee	Frequency	%
Administration	4	3.42
Anti-smoking and drugs	1	0.85
Budget and planning	3	2.56
Charismatic	1	0.85
Cleaning	2	1.71
Culture	7	5.98
Debates	9	7.69
Disciplinary	15	12.82
Entertainment	3	2.56
Environment	26	22.22
Excursions	2	1.71
Obituaries	5	4.27
Orphans	9	7.69
Science club	4	3.42
Social welfare	5	4.27
Sports	19	16.24
School uniform	2	1.71
Total	117	100.00

4.2.2 The context of in-service secondary level geography teachers

As explained in Chapter One (section 1.3) and Chapter Two (section 2.2), this study is guided by the Leckie *et al* (1996) model as its theoretical framework. As a result, the context of the in-service secondary level geography teachers, which is considered as the work environment of these teachers, has to be highlighted. This is because ‘when analysing information behaviour studies, one has to consider the socio-political and the economical environment of the country of the information seeker, including the information user’s local community environment as well as his/her organisational environment, as the features in all these environments may either stimulate or hinder information needs and determine behaviour’ (Niedźwiedzka, 2003:9). According to Johnson (2003:736), context is equivalent to the situation in which an individual is immersed; it is a specific situation in which communication occurs; it is an elaborate specification of the environment within which information-seeking is embedded (Johnson, 2003:739).

In this study the context of the in-service secondary level geography teachers focuses on the school environment, including its location in terms of different administrative districts of Lesotho, and whether it is in a rural or urban setting, or in the highlands or lowlands region. The context of these teachers is outlined in the following sub-section and comprises the following:

- Description of the schools that participated in this study as the organisational environment of the in-service secondary level geography teachers.
- The school libraries as part of the teachers’ work environment, as well as facilities in place for information services.
- The teachers’ work roles and associated tasks.

4.2.2.1 Data describing schools that participated in this study

The sample of schools according to their districts is presented as Table 4.4. The distribution of schools in Lesotho is not equal in all the districts. Some districts have more schools than others, depending on population density. The districts with more schools have a relatively higher number of schools offering geography. As shown in Chapter Three (Table 3.2), the Maseru and Leribe districts have the largest number of schools offering geography and therefore more schools from these districts participated in the study. Most of the schools in Maseru and Leribe were already used for the pilot study and could not be requested to

participate in the main study again. Information regarding participation of schools in the pilot study is presented in Chapter Three (Table 3.6). Leckie *et al* (1996) and Taylor (1991) indicate that geographical location might have a bearing on information needs and information-seeking; hence there was interest in establishing the location of schools that participated in the study in terms of the district, development area (rural vs. urban) and geographical region (lowlands vs. highlands). While Table 4.4 presents data of the schools' distribution according to the districts, Table 4.5 presents the data of the schools according to development area. Frequency refers to the number of schools.

Table 4.4: Distribution of schools selected for the survey

District	Frequency (n=28)	%
Berea	3	10.71
Butha- Buthe	3	10.71
Leribe	7	25.00
Mafeteng	2	7.14
Maseru	7	25.00
Mohale's Hoek	5	17.87
Quthing	1	3.57
Total	28	100.00

Table 4.5: The location of the schools selected for the survey

Location	Frequency (n=28)	%
Rural	8	28.58
Urban	17	60.71
Semi-urban	3	10.71
Total	28	100.00

The urban areas are more densely populated compared with the rural areas. Densely populated areas therefore have more schools compared with less populated areas. Densely populated areas are in towns and usually have better services compared with sparsely populated rural areas. In most towns, there are internet cafés that enhance access to ICT.

According to Lefoka and Sebatane (2003), most secondary schools in Lesotho are church-owned (more than 90%) and provision for formal education is understood to be shared between the government with its MOET, churches and the community. Hence, very often the Lesotho education system is presented as a three-legged pot, the legs being government, churches and the community. Government pays teachers' salaries, formulates educational

policies, and reviews legislation and regulations for schools. It is also involved in infrastructure and national curriculum development, supervision and inspection of teaching. Churches own schools, appoint teachers and are responsible for the daily operations of the schools. As a result, this study investigated who the schools' proprietors were to determine if schools' proprietorship could have any bearing on teachers' information needs and information-seeking patterns. The proprietorship distribution of the schools that participated in the study is presented as Table 4.6 below.

Table 4.6: Proprietorship of schools selected for the survey

Proprietor	Frequency (n=28)	%
ACL	4	14.29
Community	4	14.29
Government	4	14.29
LEC	10	35.71
Methodist	1	3.57
RCC	5	17.85
Total	28	100.00

4.2.2.2 Descriptive data on the teachers' workload in participating schools

Gardiner *et al* (2006) pointed out that limited time is one of the factors that impinge on information-seeking. Consequently, this study endeavoured to establish the teaching load of in-service secondary level geography teachers. It is presumed that a heavy teaching load will not give the teachers enough time to seek the information that they need exhaustively. Therefore, teaching load could be perceived as one the factors that have an impact on the information-seeking process. In this study, teaching load was determined through the number of streams in the school, the average number of learners per class and the number of teaching periods that each teacher has per week. In the secondary education of Lesotho, a period is a 40-minute lesson. These three components of the teaching load data are presented in the subsequent paragraphs and tables.

In Lesotho, secondary education covers a five-year period. These five years are divided into what is often called forms, hence there are Form A to Form E. Because of an increasing number of learners joining secondary education, many schools have several classes for Form A to Form E. For instance, some schools have five classes in each form from A to E. These classes that constitute each form are often referred to as streams in Lesotho. If a school has many streams, it means that it has many learners. Too many learners in a school have a heavy

impact on school resources and facilities. They also impinge on teachers' responsibilities because the teachers and principals have more learners under their care. Table 4.7 shows the number of streams that the schools that participated in this study have.

Table 4.7: Number of classes/streams in schools selected for the survey

Streams	Frequency (n=28)	%
10s – 15s	16	57.14
16s - 20s	6	21.43
21s - 25s	5	17.86
26s - 30s	1	3.57
Total	28	100.00

The in-service secondary level geography teachers were asked about the average number of learners per class. They admitted that some classes, especially at the junior secondary level, have large numbers of learners while the senior secondary level classes have lower numbers of learners. Nevertheless, the teachers mentioned the average class sizes outlined in Table 4.8 below.

Table 4.8: Average class size in schools selected for the survey

Average class size	Frequency (n=28)	%
40	5	17.87
45	7	25.00
50	3	10.71
55	7	25.00
60	3	10.71
65	2	7.14
70	1	3.57
Total	28	100.00

The number of teaching periods is indicated in Table 4.9 below. The teachers were also asked about their teaching load, that is, the number of periods they have per week. Their responses have been presented in Table 4.9 below.

Table 4.9: Number of teaching periods per week for the participants

Number of periods per week	Frequency (n=82)	%
Less than 15	2	2.44
15-20	7	8.54
21-25	14	17.07
26-30	57	69.51
More than 30	2	2.44
Total	82	100.00

It is significant to indicate that more than 30 periods per week was mentioned as 32 and 33 periods. For those teachers with fewer than 15 periods per week, one was the principal and the other one was the head of department who mentioned that it was because she had a candidate for internship from the LCE doing teaching practice in her department. LCE candidates take one year in the schools doing their teaching practice. Therefore, the intern had taken her 10 periods per week. In most schools, principals have a smaller teaching load because they have to dedicate more of their time to administrative duties.

4.2.2.3 Data from partial observations of school libraries participating in the survey

Of the 28 schools that participated in this study, 22 had school libraries and only six did not have school libraries (see Chapter Three, Table 3.4). Four of the six schools that did not have school libraries were located in the rural areas, while two were located in the urban setting. Of the 22 schools that had school libraries, only four had purpose-built libraries. The rest had libraries in rooms that were meant to be either classrooms, store rooms or offices. A schedule included in Appendix C was used to guide the observation process. In some cases, the researcher supplemented the observations by asking the librarians or teachers for such information. Owing to time limitations, the researcher spent only one day in each school to hold the focus group sessions and to observe libraries. The observations were made after the focus group discussions, using the observation schedule attached as Appendix C. 17 school libraries were observed for the study reported here. This is because even though the other schools had libraries, these libraries were closed and no one seemed to know who could help to open the libraries. Seemingly these libraries are not being used. The observations for the available school libraries are noted below.

(a) Collection

- More than 95% of the collection is mainly printed books. This is a rough estimation based on checking the shelves and asking the librarians some questions related to the medium of information sources in the library.
- In some libraries the remaining percentage is mainly magazines, newspapers and a few videos. Some libraries had no non-book material such as videos or newspapers.
- None of these school libraries observed had any school library policy or library collection development policy. Acquisition of books is mainly driven by donations, even though there are some schools that still buy books in response to recommendations of teachers, particularly English language teachers.

(b) Subject coverage

- Most of the books are fiction, which could be helpful for English language and literature subjects.
- There is marginal coverage of subjects related to the sciences such as biology, chemistry, physics and agriculture.
- In some libraries there were also a few books on geography, history and development studies. In most libraries there was none.

(c) Currency of the information sources

- Most of the collection (mainly books) was very old and published years ago. It was gathered that some of the books came from the starting of the libraries, which in some cases dates back to colonial times prior to Lesotho's independence in 1966, and sometimes the 1970s. This observation is based on examining some book shelves and also asking questions to school librarians (when available) regarding the collection.

(d) Services

- There is no inter-library loan service for school libraries in Lesotho and although the idea of inter-lending is appreciated, several problems are foreseen. For instance, an unreliable system of delivery of books from one school library to another was pointed out as a problem that could lead to loss of books and delays in book delivery. Overall there seemed to be reluctance to consider inter-lending for school libraries.

- There are two types of services in schools, namely open book shelves and reference collections, which consist of mainly dictionaries and encyclopaedias. Books from the open book shelves may be borrowed from the library. In most schools the lending period is one week. Books from the reference collections must be used in the library.

(e) Staffing

- Most of the school libraries are manned by only one person with COSC as their highest level of education. In a few schools, the libraries are manned by a teacher from the English department while in other schools the office clerks help with the library work. The subsequent bullets provide more details.
- Ten out of 17 school libraries observed have full-time personnel and therefore their libraries are open during school hours. Two of the 17 school libraries observed are manned by office clerks who spend most of their time in the office performing other duties not related to the library. This affects the opening hours of the libraries because most of the time the library is closed because it cannot be left unattended. However, they were kind enough to open the libraries for observation by the researcher. The researcher also had the opportunity to talk to them.
- Five of the 17 school libraries observed were the responsibility of English language teachers. Similarly, these teachers opened the libraries and allocated the researcher some time to answer the questions in the observation schedule.

(f) Facilities, budgets and location

- Only one library had an electronic database for its catalogue using the CDS ISIS system.
- Some school libraries have a circulation desk and a card catalogue system.
- There are tables and chairs for reading.
- Bookshelves are available with books stored properly and classified according to the Dewey Decimal Classification. Fiction books bear the capital letter F and some number, e.g. F058. F stands for fiction and the numbers were reported to be an accession number.
- Most of the library buildings and rooms are too small to accommodate the large classes. (The average class sizes were indicated in Table 4.8).

- Often library budgets are non-existing or not known to the staff responsible for the library.
- The libraries were located around the other school buildings and were perceived to be accessible by the researcher.

4.2.2.4 In-service teachers' work roles and associated tasks in the survey

The data presented here were gathered from the focus group discussions and were analysed using content analysis as explained in Chapter Three (section 3.10.2). This study is guided by the Leckie *et al* (1996) model and therefore it is imperative to identify the work roles and associated tasks of the participants in order to know more about their information needs. Three key work roles were identified among the in-service secondary level geography teachers in Lesotho, namely:

Educator role: this is the core academic role of the teacher; it is related to pedagogy and development of learning skills for the learners. It involves daily interaction with the learners. This role has the following tasks identified from the participants' responses:

- Acquiring the content to be taught.
- Deriving the appropriate teaching methods for delivering the content.
- Finding the teaching aids that will be used to enhance understanding.
- Managing the classroom so that all that is planned to be done is achieved in reasonable time.
- Assessing the teaching and learning process.
- Keeping up to date with the syllabus and curriculum demands.

Administrator role: There are five administrative roles that teachers in Lesotho may assume, namely with regard to being an ordinary teacher, class teacher, head of department, principal or deputy principal, as shown in Chart 4.2. These roles were based on the researcher's background knowledge as a former teacher and were also confirmed by the teachers who participated in this study. In addition to the educator role discussed in the preceding paragraph, the teachers may have one of the following administrative roles, depending on their position. Each position and its associated tasks are outlined below:

1. Ordinary teacher – Such a teacher is only responsible for the subjects that s/he teaches and has no responsibility other than teaching, testing and marking, and report writing for his/her subject only. Although these tasks are similar to those of the educator role, they are being mentioned here for the administrative dimensions involved in teaching.
2. Class teacher – In addition to the roles and responsibilities of an ordinary teacher's job, s/he is also assigned one class that s/he manages. S/he is responsible for the cleanliness of the classroom, supervision of the learners in the class and comprehensive report writing on the overall performance of the learners in the class, including the welfare of the learners in the assigned class. S/he is expected to be more connected to the learners in the assigned class.
3. Head of department – in addition to the educator role, s/he has the tasks of supervision of teachers, management of the resources of the department, welfare of the teachers in his/her department and allocation of classes to the teachers. S/he is more connected to the teachers in his/her department.
4. Principal – in addition to the educator role, s/he supervises both academic and non-academic staff, manages all the schools' resources, administers the school policies and regulations, writes reports and attempts to maintain the welfare of students and staff. S/he has to be aware of national examinations, curriculum development issues and legislation governing education and schools and has to bring all these to the attention of the teachers.
5. Deputy principal – assists the principal in his/her tasks.

Committee role: this is a non-academic role that teachers have that may be related to extra-mural activities and the social, spiritual and emotional development of the learners. The different committees in which the teachers are involved are indicated in Table 4.3. Depending on the committee and issues that arise in the schools, this role may involve investigating issues, organising meetings, writing minutes, researching some information, coaching, counselling, managing resources, making decisions and developing policy and regulations.

In developed countries, schools have professionals such as counsellors, administrators and coaches to address some of these issues. In developing countries such as Lesotho, schools do not have such professionals hence teachers have more roles, performed through various committees, whose information needs and information-seeking might be revealed by everyday life information-seeking models such as Savolainen (1995).

4.2.3 In-service secondary level geography teachers' information needs in the survey

In order to solicit the teachers' information needs, a literature review was done of teachers' information needs. Then a list of common information needs was drawn up. The teachers were asked how often they needed information on the issues listed. They were also asked if there were other things on which they needed information that were not mentioned in the list. In addition, the teachers were asked if the information they found satisfied their needs. This section presents the views, opinions and perceptions of the in-service secondary teachers regarding their information needs as reported during the focus group discussions. As mentioned in Chapter Three (section 3.10.2), content analysis was used to analyse data from the focus group discussions. Based on the Leckie *et al* (1996) model, it was important to find the information needs pertaining to the key work roles identified in section 4.2.2.4. The information needs have been presented based on the issues that transpired frequently and with more emphasis from the participants.

4.2.3.1 Information needs related to key work roles in the survey

Firstly, the role of being an educator is associated with teaching tasks. These tasks trigger information needs related to content, teaching methods, teaching aids, assessment and classroom management. This is evident in the statements below. Some of the statements were transcribed verbatim, while others were translated from Sesotho to English and the rest were edited. In a few cases, marginal translation and editing were necessary in order to present the responses in correct English for academic purposes. The following is an example of a statement.

Content – Every day I go to class, I do preparation, I have a preparation book where I have to gather information, I have to outline the content, the teaching methods, the way I will motivate them, even planning active engagement of the learners, including how I will assess the class. Every day I go to class I have to prepare for each and every class, and gather all the information and outline it appropriately. 226T1

The statement by 226T1 above reflects that information is needed not only for the content to be delivered in class, but also for the teaching methods (pedagogy) that will be used to deliver the content. Teachers also need to know how they will actively involve the learners to keep them motivated. The need for pedagogical information as well as the nature of the topic and the type of learners is clear from the statement by 224T3 below.

We also have to get information about the appropriate teaching method that you are going to use, bearing in mind the topic and the type of students one has. Because some methods work well with bright students, still on the same topic, and you find that you try the same method with the same topic in another class and it's disaster. 224T3

Content has to be accurate, current and also adequate according to the standards set by the national curriculum and syllabus.

I need information every day, because I have to deliver information every time I go to class; I have to equip the learners with the necessary information. When I go to class, I have to give these kids the correct content and also enough content as required by the government. 143T1

Secondly, it was evident that the administrative role demands information. This is affirmed by this statement from one head of department. This statement also expresses the need for information in problem-solving situations that trigger the need for information about learners' parents, friends and how learners behave at home.

Yes, there is a need for information in order to perform my role as the HOD. There are times, when the teachers under my department may come with problems that require me to go and find more information in order to solve them. For instance, there could be a troublesome boy who frustrates a young inexperienced teacher, and obviously such a teacher will report the matter to me first, and I have to find more information about the problem, find more about the boy from his friends and even other teachers. Sometimes, I have to find more information about his parents as well and find out how the boy is generally behaving at home. 721T2

Thirdly, it transpired that the committee role requires its own information in view of the issues that the committee faces, such as disciplinary cases that require the right procedures to be followed, including possible conflict resolution and rehabilitation measures because the aim is to instill discipline constructively without any humiliation and human rights

infringements against the parties concerned. These may need policy documents, school regulations and legislation to be consulted. The following three statements bear testimony to this:

You know being in the disciplinary committee requires information outside the school; this is because one sometimes has to refer to policies on how to discipline the learners and the teachers alike in order to avoid breaking the law. It is also important to adhere to the right procedure when taking disciplinary action against people. This is one area which needs information in particular policy documents, teaching regulations, legislation such as Labour Code and many others. 111T4

Disciplinary committee requires us to gather information from different sources, those who are complaining and those who are ‘perpetrators’. It is important to establish the facts, so that you do not wrongly punish somebody. It is also important to find out if such an incident has ever happened before and how the student was punished. What are the school regulations saying about such a case? What is the fair punishment to give in that case? We have to try to find information so that at the end we give a fair punishment that will make students refrain from such actions. We should also try to avoid humiliating students. 222T2

Lesotho has one of the highest HIV and AIDS prevalence rates in the world (World Bank, 2005). As a result, the number of orphans in schools is increasing and it is evident that the teachers are making an effort to support these orphans through their committees for orphans, which also need information, as reflected in the statement below.

For me being in the committee that is concerned with the orphans, I need information about how they can be helped. We need to know more about the bursaries available for orphans, feeding schemes, sponsors, orphanage homes and many other societies that are out there to help out orphans. 111T5

Learners are the fundamental responsibility of teachers such that most of the time the teachers are concerned about their learners’ intellectual, social, emotional and spiritual development, as well as their welfare. Therefore, teachers also have specific information needs related to their learners, as shown in the next sub-section.

4.2.3.2 Information needs related to learners

The teachers’ core role of being educators, administrators and/or committee members includes working with learners most of the time. Therefore, it is not surprising that they may have information needs pertaining to their learners. This requires information, as one needs to establish the different learners’ capabilities, interests and their social behaviour, including

their problems, because these are some of the things that may affect their learning, including moral and social development. It was found that there are times when the secondary level geography teachers in Lesotho need to know more about their learners. Usually, it is due to social problems that emanate from the learners. This is supported by the statement:

Social problems – children differ from year to year. Some years you may find that they consume a lot of alcohol, other years drugs such as marijuana. Lately I heard that they use ARV³s, something like a high dosage of ARVs makes them high. As for how they get them I don't know. But as for pregnancy, every year it is a problem; a lot of students fall pregnant. Recently I see it happening in the junior classes. A lot of Form A students fell pregnant this year, and all these things as they happen, you need to know more about them, what to do. 201T1

You know as a teacher, I find myself wondering whether I really know my students, and how best should I know them so that I can help them whenever there is a need. It is not just about the academic side, you know the classroom activities; it is also about their social being and things that happen to them even outside the class because those things may affect their class work. Things such as these pregnancies are a big problem. Although we offer life skills and all the important facts in biology, we still find it happening. 222T2

It also transpired that the teachers are constantly observing and assessing the learners. As a result if the learners' academic performance drops, it is of great concern to the teachers. This concern requires the teachers to determine the reason for the declining performance, thus triggering the information need. The following statement bears testimony to this:

Background of the students - It is easier to handle the students and be able to cope with their demands when you know their background, such as whether they still have and live with both parents, they are day scholars or stay in the boarding. Their siblings at home, are they first born or last born in their families. This is because these students sometimes behave in a drastic manner and when you dig deeper into this behaviour you begin to realise the root of the problem and can thus give a fair punishment that will rehabilitate instead of destroy. 721T1

In short, if we could assess the learners very well both for academic and non-academic purposes it will help. After all this is a boarding school and these girls are here with us for weeks, some of us do not even have any children, so we need information about girl child development and issues that are common amongst them. 436T2

The teachers also need to know the different talents of the learners so that they are channeled appropriately.

³ATVs – Anti-retrovirals

You know in sports, we have to know about the tournaments at local level, district level and national levels. We also have to know about the rules and regulations of different sports. Which schools are we going to play with and when? You also have to know your students, their interests and capabilities in different sports. You know as a new teacher I still don't know a lot of these students and their conduct. Some students may be talented but lack discipline. I have to know all those things so that I may know how to help them to participate better in sports. Others may like to participate in soccer only to find that they are better in volleyball; just because soccer is a popular sport all the boys want to play it even if they are more talented in other things. 222T1

4.2.3.3 The need for current information

It was evident that the teachers need current information, as shown in the statement below.

Information material, we really need the latest information. There are times when the volcanoes are termed to be dormant and yet suddenly they erupt. We need details of varied information that is really current. 634T4

4.2.3.4 The need for audio-visual teaching aids

Information that is applicable in class is most needed. They need examples that they can use to help the learners to understand things better. There was a clear indication from the teachers that they need audio-visual material to show to learners in class in order to enhance their understanding and to concretise abstract concepts.

We lack audio-visual aids, geography has very abstract components, you know some of these things, they have never seen. In such cases videos would come in handy, but we don't have any. 207T1

Some topics are abstract, plate tectonics, marine erosion are too abstract for our learners and require audio-visual teaching aids. They need to see these things. 111T5

We want audio-visual things for topics that deal with geomorphology, you know landforms, plate tectonics and even for topics that deal with climatic issues, marine aspects, solar system. You know mainly DVDs. 322T1

4.2.3.5 Information needs satisfaction

The teachers were asked if the information they find satisfies their information needs. Some of the teachers expressed dissatisfaction thus:

- The information that they have is mostly outdated since it is mostly books that were published some years previously. It does not satisfy them because they need current information.

- There is a shortage of information generally to compare authors' views, clarify some topics and supplement the textbooks' information where necessary.
- Teachers expressed a dire need for teaching materials and technologies (audio-visual aids) that will help them to teach geography better.

You see these textbooks and some of the books that we have, even though they are meant to address the syllabus, I find them to be shallow; they provide very basic limited information. So in a way we have a shortage of information. This is the case even in other subjects, such as Sesotho. So with my knowledge of the syllabus and teaching experience I am able to recognise that certain topics in the textbooks are not adequately treated or discussed, so I immediately refer to the departmental books, and other personal copies. 401T2

The books do not provide enough information; we need to supplement them with other information for other books, sources. Some of the books we have are outdated and we need the latest editions, publications. 423T4

4.2.4 In-service teachers' information-seeking patterns reflected in the survey

This study aims to determine the information-seeking patterns of in-service secondary level geography teachers, including the factors that impinge on their information-seeking. Several questions were posed to ascertain the information-seeking patterns of these teachers. The questions were related to how they find information that they intend using for teaching when starting a new topic, including the challenges they encounter and possible solutions. The teachers were also asked whether they had had any training or formal guidance on using electronic information sources, since this might affect their information-seeking. In addition, they were also asked if they still needed to seek information as they gained teaching experience. The other aspect concerned with information-seeking which was envisaged would help to guide the design and implementation of information service, was the factors that the teachers would consider in selecting books/documents for teaching geography.

The teachers were asked how they find information when they start a new topic. The pattern of information-seeking processes differs; some teachers (mostly inexperienced ones) indicated that they start with the syllabus to establish all the details that need to be covered for the new topic, then move on to the learners' textbooks and some other books. Others start with the books (learners' textbooks first), then colleagues within the department, then teachers of subjects such as science, agriculture and development studies if the topic is

related to any of these subjects. The personal knowledge and experience of the teachers seem to be one of the major factors that influence their information-seeking pattern.

When starting a new topic - I look at the syllabus first if I have to start a new topic. We look at the topic from the syllabus. Then we get to the students' textbooks and see what the books say, then we go to our teachers' books, until we get what we want and build a clear picture. Sometimes we go to the internet to get more information and more examples and activities until I feel somehow happy. 143T1

I start with the textbook and check whether it gives me what I need according to the syllabus. If it is not enough, I gather information from other books, magazines and if it is not enough I consult colleagues. Often I find myself consulting colleagues for teaching methods. 201T1

We also consult each other, but generally we start by investigating how much they (students) already know, and we do this by asking the students and other subjects' teachers in the sciences, agriculture, then we prepare notes and integrate things. 634T4

We use various styles, depending on the confidence level, I may start with colleagues first, the books and other things such as the internet. 122T1

There was some indication of using the internet, which shows that the teachers are taking advantage of information and communication technologies. The use of the internet was reported mostly in urban schools, particularly by younger teachers. In addition, depending on the complexity of the topic and existing networks, the teachers may go to other neighbouring schools and/or their associations.

Mostly, we begin with the syllabus, then the books; we then use the magazines and nowadays we pop onto the internet to get more examples, depending on the topic, like I said earlier it depends on the topic, we may even consult one another. The internet is useful for teaching aids, downloading diagrams and examples, even activities for the learners. Diagrams, maps, many illustrations for geographical concepts. 213T1

How do other people teach certain topics that I find problematic, mainly after realising that I might not be teaching the topic in the best way, or because I need variations in teaching methods. In most cases I approach other schools, especially best performing schools, and ask their teachers for information on teaching methods. 423T2

We go out to some schools only if we have problems. We have an association here, we hold workshops, we share and exchange information, some experienced teachers present certain topics. What I found is that presentations are made on those topics that are challenging to most of us. 603T1

4.2.4.1 In-service geography teachers' information-seeking styles reflected in the survey

In chapter two (section 2.4.1), it was established that information can be sought with a specific purpose in mind, serendipitously, through proxies and/or collaboratively. It was found that the teachers who participated in this study engage in the following types of information-seeking:

(a) Purposeful information-seeking

This is the time when the teachers need specific information to solve a problem. It was found that there is regular purposeful information-seeking resulting from the teachers' role of being educators. Lesson planning is a regular activity in teaching and it constantly requires information. The teachers attempt to find information for the topic that they are going to teach in class. However, there are times when problems arise from learners, such that they require information in order for a need to be met immediately. It was found that if the learner is suspected to be pregnant, there is a need to establish the facts and take a decision immediately. This implies purposeful information-seeking for education (in a school situation) and for problems arising from the learners' life context.

(b) Serendipitous information-seeking

There are times when the teachers encounter information that they find useful when interacting with information sources incidentally. It was established that the participants regularly use the media, mainly the radio, TV and newspapers. The participants indicated that they often come across information on the TV and radio that would be useful to their learners, to the extent that they advise their learners to watch and/or listen to certain programmes such as news, and various geography related channels and programmes.

Media – I mainly use the TV and watch certain programmes and geographic channel. You know programmes like 50/50 are so good that I would wish my students would watch them as well. 201T2

(c) Proxy information-seeking

This is when information is sought through someone or some intermediary. In most cases, it transpired that the teachers use proxies thus:

- It was mentioned that the learners are given assignments to seek information from government departments for research purposes. Sometimes the learners are assigned to seek information from their parents and/or relatives who work in the mines for

topics related to mining such as labour migration, minerals, mine shafts, etc. as part of inquiry-based learning.

- The older teachers use their children and/or younger relatives, even other, younger teachers, as proxies to search information from the internet on their behalf.

We usually get assistance from younger teachers or those knowledgeable teachers like Mr K. You know we ask them to find things for us on the internet. 401T3

We often ask our children, nephews, nieces, etc. they are helpful in finding this information and good stuff from the internet. 423T1

Farmers and miners – not me to go and get the information. I ask my students to go and get the information from them. For instance, I recently asked them to go and find the advantages and disadvantages of deep shaft mining, and they came with quite good information and I only went to the internet to verify it, but it was really authentic. 622T1

(d) Collaborative information-seeking

From the teachers' responses, it was established that they work closely together; as a result they collaborate to find information. The teachers indicated that they practise team teaching. Other teachers go out to seek information and come back to share and compare their notes, to the extent of compiling departmental files. Collaboration in information-seeking also manifested in the teachers' associations. Collaborative information-seeking in the associations is done in the following manner:

- Seminar and workshop presentations.
- Preparing schemes and teaching work plans.
- Finding information when preparing common examination questions and marking schemes.
- Excursions.

We do go out to find more information about the topic and come back to share notes. We really depend on that method; I think it is because we are all young and still inexperienced in our department, so unless we collaborate we will not progress.

We were initially meeting a lot of challenges with physical geography especially at COSC level. So we felt that reading more on the topic and comparing notes was helpful. 542T2

Anything that we come across, even if it is a paper, from our friends at NUL or at other schools, or from a newspaper we bring it here and put it in our file. We are compiling a departmental file on various topics that are in the syllabus. 542T3

Workshops that were organised by the association only.

Topic sharing – we do it often; we plan our work together and try to do as much as we can jointly. We prepare our work together; in essence we share notes and store our information in our departmental information box. Well, owing to different circumstances we may not be at the same stage with our students, but we try our best to complete what we had planned for the term and set one question paper and use the same marking scheme. 635T2

No presentations and researching like that; we work individually in that aspect. We only scheme together and plan our work together, and in our departmental meetings people will indicate the topics that are challenging for them to teach, so we guide them and discuss other possible ways of delivering the topics. But we don't share information in that manner here in our school. You know that is the approach that we practise at the association. 226T1

Collaboration with primary school teachers, JC teachers and COSC teachers. I recently found that the primary school atlas showed the river deltas more clearly than the COSC prescribed atlas. We should not only confine ourselves, we should have links and networks with the other teachers in the primary school. 622T1

4.2.4.2 Challenges in-service secondary level geography teachers encounter when seeking information

The teachers were asked to narrate the challenges that they encounter while searching for information. They indicated the following challenges:

- Lack of resources such as time and money because some of the information needs to be purchased or accessed in a distant place, thus requiring money for transport.
- No access to school's resources such as telephones and the internet.
- Heavy teaching loads due to many learners in a class and many teaching periods. This takes a lot of their day time. Sometimes, evenings and weekends are spent marking the assignments and tests for these many learners.
- Lack of various sources of information.

Challenges here at school are time; we never have enough time. Funds also are a restriction; lately it has become a great problem to go out and find information, or even to take the learners to go out on an excursion to find information. It is also difficult to bring guests speakers as they usually mention that they do not have time. 423T2

We don't have reliable sources of varied information. If we had various books, old and new books, it would help because we would at least compare more books, old and new publications. We would consider the information from new books. 224T2

The loads of the classes and also all these other responsibilities make us fall for the resources that are readily available and fail to seek more resources out there that we know and are aware of. You find that you are quite limited in exploring other areas. 213T2

4.2.4.3 Factors that in-service secondary level geography teachers consider when selecting books/documents for teaching geography

In order to guide the design and implementation of the teachers' information service, the in-service geography teachers were asked to mention the factors that they consider when selecting books/documents for teaching geography. The teachers were asked to mention the factors that they would consider when selecting a book/document for teaching geography.

They mentioned the following factors:

- The contents of the book should address the syllabus.
- The language should be appropriate for the level of the learners.
- Colourful illustrations in the form of diagrams, photos and maps are important.
- Learners' activities are considered because the publications enhance understanding of the concepts and principles.
- The date of publication; current information is vital in geography.

Pictures, maps, photos and illustrations for both lower and higher levels are vital. These are important because often, the learners have to interpret maps, photos and other diagrams in the examinations. 401T1

Language used in the book. Some books have good information but use complex language that is not easily understood by our learners. 111T5

The date of publication, so that I know that I will get current information. 143T2

It is important to know the syllabus very well and its topics, and then look into the contents of the book and find if it covers the topics outlined in the syllabus. To me that is the most important thing, relevance to the syllabus. 721T1

Physical geography needs colourful diagrams because some earth features are easily identified through colours. It is known that blue symbolises water, green vegetation and brown land. So, colours really help more than black and white. 603T1

First of all, I would look at the language, simple and straightforward language. Diagrams, photographs are important in geography to illustrate things. Activities for the students at the end of every chapter are very important, as they will enhance the learners' understanding. 226T1

4.2.4.4 Guidance/training on how to seek information in electronic environments

The teachers were asked if they had ever had any training or formal guidance on how to find information from various electronic sources. Most of the younger teachers mentioned that they had some guidance on how to use electronic information sources while they were studying at the university and this is evident in the following statement:

Not really; the last time was when I was at the university during information literacy instruction by the library as part of the orientation. Other than that we struggle and learn how to look for information as we interact with it. We often ask our children, nephews, nieces, etc.; they are helpful in guiding us about the internet and generally how to use the computers to acquire computer literacy. 423T1

There are some teachers from the NEPAD e-schools that had training on electronic resources such as the internet and other electronic databases.

We had training on using the internet and the CD-ROMs when we were studying at the university. We also got training because we are one of the NEPAD e-schools. 521T1

There are some teachers that never had any training or formal guidance on using electronic resources, but they use the internet.

No training on the internet. We really use it as we get along. But we really have limited access to the internet. I can't even say whether I really know how to use it effectively. 224T2

There were also teachers that never had any training and never used the internet and electronic resources.

No training at all and I have never used the internet, not even a computer to find information. 322T2

4.2.4.5 Teaching experience and information-seeking

The participants were asked if they still felt the need to find information as they gained more teaching experience. This question particularly targeted the experienced teachers. It was found that even if the teachers gained experience, they still needed to find information and this is evident in the responses below.

Yes, information changes; things change. More experience still means more information for me. The learners differ every year; some ask very demanding questions that require the teacher to be on top of things. 401T3

One has to have up-to-date information. Moreover, when I gained experience, I gained more confidence, and became aware that I did not cover enough information for certain topics. Actually I should have gone deeper. And that requires more intensive reading. 445T1

4.2.5 In-service secondary level geography teachers' information sources

The teachers were asked about the availability and accessibility of information sources in their schools, the information sources that they use and the information format they prefer. The questions regarding information sources pertained to libraries, internet, books, reference books, journals, media, institutions, personal knowledge and experience. They were asked to mention the information sources that they would like to use and that were not available. This section deals with the teachers' responses to the information sources available and accessible in their schools, the information sources that they used and their preference for a particular format of information sources.

4.2.5.1 Availability and accessibility of information sources in schools

The availability and accessibility of information sources differ from school to school. Some schools have more resources while others have limited resources. Their accessibility to teachers also differs depending on the number of resources and the number of teachers and the learners that have to share the resource. Given the study's intention to guide the design and implementation of these teachers' information services, there was interest in determining the availability and accessibility of information sources in schools to avoid duplication of existing sources and to include essential information sources that are not available to these teachers. The following main resources in schools are considered:

- **The internet** – generally internet penetration in Lesotho is still very low. The situation is worse in schools owing to limited available funds. Where the internet is available, it is shared by many teachers and learners. Internet access is in the computer laboratories and in some school offices, which in most schools accommodate the principal, deputy principal and secretary, and none in the staff room where the teachers have accommodation for their work stations. One out of the three NEPAD e-schools⁴ that participated in the study had one computer in the staff room with internet access, but it had to be used by 26 teachers. In the other two NEPAD e-schools, the internet is in the school offices and computer laboratories and there is none in the staff room. Lesotho IFLA World Report (2010) indicates that Lesotho has low internet penetration, with only 3.4% of the population as internet users.
- **Books** such as teachers’ personal copies and departmental collections, as well as school library copies, textbooks and teachers’ guides, as well as dictionaries and encyclopaedias, are available in schools. However, most of the teachers criticised the encyclopaedias for being outdated.
- **Libraries** – some schools have libraries, while others don’t have libraries. The participants mentioned that their libraries have outdated books, are not functioning owing to staff shortages and generally lack geography books. These are some of the factors that keep them from using their school libraries where these are available.
- **Human information sources** – teachers and learners are the human information sources that are available and easily accessible to teachers in the schools. Occasionally, farmers, miners and teachers’ younger family members and relatives are consulted. These are, however, available outside the schools’ premises.
- **Infrastructure** such as telephones, photocopiers, printers, fax machines and computers are some of the ICT resources available in the schools that affect the availability of information sources. However, teachers have limited access to them or no access at all to some of these resources; but this differs from school to school.

⁴NEPAD e-schools aim to provide, among others, ICT skills and knowledge to primary and secondary school students that will enable them to function in the emerging Information Society and Knowledge Economy. It also aims to provide teachers with ICT skills to enable them to use ICT as tools to enhance teaching and learning (NEPAD, 2004).

It transpired that the following were some of the sources that are needed, but are neither available nor accessible to some teachers: the internet, maps, charts, models and videos.

Information sources that are lacking and we would like to have things such as videos like I mentioned earlier, and journals, books, maps and charts. You know we also should consult the relevant departments for information or invite them over; for now it is still wishful thinking and we have never done it. 201T1

4.2.5.2 Information sources used by in-service teachers participating in the survey

(a) Library

IFLA/FAIFE World Report (2007) report indicates that in Lesotho levels of access to the country's libraries are very low. This is also noted in the Lesotho IFLA World Report (2010) even though it shows growth in the number of public libraries (from six to twelve) and government funded libraries (from four to nine) since 2007. Generally few teachers were satisfied with their libraries and reported that they were using them. Otherwise most of the teachers indicated that they never or hardly ever used the libraries. The reasons given by the teachers for their low library use are:

- Lack of access to the library due to lack of personnel to render the library service.
- No school library nor public library in the vicinity.
- Other schools have libraries that are no longer functional after being converted to computer laboratories and/or the librarian post has been abolished owing to a shortage of funds.
- Libraries are manned by unqualified people who are not helpful in satisfying the teachers' information needs.
- The libraries have very old books, which are not even related to their subjects.

School library – the school has a library, but it is not functioning, there is no librarian and no one is manning it. Most of the books are old and their information is obviously outdated. 201T1

There is a school library here, but like most libraries in the developing countries the books are outdated and mostly donations that offer content totally related to those far countries and often of no relevance to our needs here. That is why he calls it a white elephant. 213T1

Our library has someone helping out in there full-time. She is not qualified at all in library services; she is not really helping in terms of finding information either for us or for students. She is just guarding the material in there basically so that students do not steal things such as previous examination papers. So we really are in a bad situation. She is not even a person who would know where to search for information. 721T1

(b) The internet

A significant number of teachers mentioned that they use the internet. It was established that the internet is still a new source in most schools and where it is available its accessibility to these teachers is either non-existent or very limited. This differs from school to school. In addition, most of the teachers that reported using the internet were in the town schools and often younger in age. They indicated that they often go to internet cafés.

Yes we have internet; I cannot say it is adequate especially for the learners, because they have to share one computer. And also we really need the second or even the third computer lab given the number of our learners and classes. Because if one class is in the lab, it means no access for us as well as for other learners. This is not fair because the learners also take computer studies. 401T1

However, there were teachers who reported that they do not have access to the internet and had never used it.

There is no internet here at this school and I have not used the internet. 201T2

(c) Books

Books are the information sources used by all the teachers and the most frequently used source. These books include the learners' textbooks, teachers' guides, the books bought by the schools on teachers' recommendations, and teachers' personal books that they purchased during teacher training at the university. There was an indication that the books that they purchased while training are very important and they supplement the information from the textbooks. The in-service teachers regret not buying books and depending on library books while at university. It was pointed out that the schools cannot afford to buy books that are expensive, and these expensive books are the ones that they really need and actually find useful. The teachers strongly recommend that university students should buy books while they still have the opportunity.

When the in-service teachers were asked if the books that they use are adequate in terms of number of copies available and in providing information, they indicated that:

- The books do not provide adequate information. There is a need to supplement them. At COSC level the learners require a textbook for each section of the geography syllabus. The learners need at least five books and since they are poor, they cannot afford to buy all the books required. Unfortunately, only a few chapters in each of the prescribed textbooks are required for each section of the COSC syllabus. There is a dire need for a book that comprehensively addresses all the sections of the syllabus adequately.
- The reference books are outdated.
- There are enough copies of the books for the teachers. However, at JC where there is a government book rental scheme, there are insufficient copies for all the learners.
- While some teachers assert that JC books have typographical errors as well as information conflicting with or contradicting the teachers' knowledge and other renowned books, other teachers perceive them as good products. In addition, some of the teachers complained that the JC books are shallow and do not adequately address the syllabus requirements.

The following statements bear testimony to the issues outlined above.

The reference books are also old, they have outdated information. They still discuss nine planets in the solar system, but now we talk about ten planets. We wish we could have the latest information. 445T3

Book contents – yes I am happy with the JC books. They have tried their best, although there are some weaknesses. It is as if they were done in a hurry. You know it is as if they did not edit the books, there are some mistakes here and there, and we do not want that in teaching. After writing the books they should have moderated them. 143T1

The (JC) books are not comprehensive enough, they do not address the syllabus demands. We use a lot of books; we have a good collection of books here. We go to Bloemfontein to buy books regularly. This is because there is no single book that adequately addresses the syllabus topics. At COSC level the students need, I think about five books, they are expensive and students cannot afford to buy all of them and all the other books for the other subjects. So we have to build the teachers' collection of books and also use the internet to prepare notes for the learners. There is no single book that really satisfies us. 521T1

You know what at JC level, the textbooks are shallow, they have conflicting information to what we know and to the other books that we have. They are also failing to address the information that is required by the syllabus. At COSC level, there is no single book that addresses the entire syllabus. A learner needs more than two or even three books; they are very expensive and we live in poverty-stricken areas. So it is a big challenge to be teaching geography. 111T4

In-service teachers strongly recommended that prospective teachers, during their teacher training at the university, buy books and computers instead of music systems and other entertainment gadgets with their book allowances from their sponsors, because when they get to the field of practice they really need books and computers. The following statements bear testimony to this:

We have to use our personal copies of the books that we bought while at university. We share our personal copies to supplement the books that are prescribed. The school also occasionally buys certain copies that we request in order to build our departmental book collection. But buying books while at NUL is very helpful. 111T1

We refer to our personal books that we bought while at university. For instance that Strala book I mentioned earlier, was one of the recommended books at the university. But I did not buy it then, you know very often we do not buy books with Manpower money and unfortunately when we get here we encounter challenges of information shortage and become frustrated. 603T2

While we were at the university we depended on the library copies, the journals and the internet, which are all not here now. So I strongly recommend that people should buy books, laptops with their Manpower money, instead of music systems. Strala is good for COSC, I did not buy it, because it was expensive, when I had the opportunity to buy it then and now my school also cannot buy it and I really need it. 603T2

Manpower mentioned in the above statement refers to the National Manpower Development Secretariat (NMDS), which is the unit of the Lesotho Government Ministry of Finance and Development Planning responsible for among other things, awarding and administering loan bursaries to Lesotho students in higher education. The loan bursary scheme covers tuition and a book and personal allowance including accommodation expenses. The book allowance is given to students directly and often students tend to use the money on other things instead of books or learning materials. This is based on the researcher's knowledge of the system, as she has been on the NMDS scheme.

(d) Journals

Most of the teachers indicated that they do not use journals because there are none in their schools. Only in two schools was there an indication that there were journals. Otherwise the teachers use journals that are freely available on the internet. So, generally teachers mentioned that they last used journals while they were studying at the university. The following statements bear testimony to this:

I mostly use journals from the internet. Otherwise the library does not have journals.401T1

We would like to use the journals; but they are not available here. 436T1

We have some few journals, they were sent to us as a donation from America and they are useful for physical geography. 213T1

We do not really use journals; we don't have them. 635T1,T2

(e) Media

The teachers were specifically asked about their use of media such as radio, TV and newspapers. It is evident from the teachers' opinions that they use the radio and TV more often. A few teachers also mentioned the use of newspapers. The TV is most predominant, to the extent that the teachers mention that they encourage their learners to watch some channels and programmes. On the one hand, the teachers state that the learners are only interested in entertainment aspects as opposed to the informing and educating aspects of the media. On the other hand, the teachers in disadvantaged rural communities indicated that they wished that their schools could provide TV with multiple channels for the learners to view. They strongly expressed that some channels and programmes could help the learners to understand geography better.

Of course we get more information from interacting with the media. There are programmes that are really helpful on the TV, the National Geographic channels as well as newspapers. We do not really listen to the radio that much due to TV. 423T4

Weather forecasts for the weather and climate. They view the symbols used on the TV and we try to interpret them in class.
We recommend National Geographic channel.401T1

(f) Human information sources

The teachers were asked about the people that they consult for information. This was meant to probe further into their sources of information, thus building a clear picture of their information-seeking processes.

It was found that various colleagues were consulted:

- All the teachers confirmed consulting each other for information, thus in-service geography teachers are constantly sharing and exchanging information.

- Some of the teachers also consult teachers from other schools, mostly through associations. But there are a few who indicated that they never consulted teachers from other schools.
- It transpired over and over again that teachers in the sciences, agriculture and development studies are regularly consulted for information regarding geography topics related to these subjects.
- Farmers are consulted by some teachers, particularly those teaching in schools that do not have agriculture in their curriculum.
- While some teachers consult miners directly as resource persons in their classrooms, others consult them informally, or through learners. They ask learners to go and find more information about mining from the miners around. However, there are teachers who do not consult miners at all.

Consulting miners, farmers – yes, we do, I work with one prospective farmer here. Every year I take my students to that farm so that they see the practical side of these things. We actually do research on his farm. I always use the miners and I invite the gentlemen from the village to present about the different methods of mining and their experiences in the South African mines. You know how it feels like being a miner. I do that when I start the mining topic. 226T1

Miners and farmers, we don't really consult formally, well casually through open discussions. I remember one time asking my brother who works in the mine about his experiences and how it is there, and one time he came with a piece of stone that he said they extract gold from that he took from underground. But I have never asked any farmer for information, probably it is because we have agric teachers here that we consult. 603T1

We consult each other here; we also consult other geography teachers that do not teach geography. We also consult science teachers. Very often we consult science teachers, agric and development studies teachers. 635T1

(g) Institutions

The institutions that are consulted are departments of the Ministry of Natural Resources, in particular:

- Water and Sewage Authority
- Department of Energy
- Department of Meteorology.

Other institutions that are consulted are:

- Land Survey and Physical Planning
- Central Bank of Lesotho
- Examinations Council of Lesotho
- MOET - Central Inspectorate
 - National Curriculum Development Centre
- NUL.

The following are the geography teachers' associations that are consulted.

- Butha-Buthe Geography Teachers' Association
- Leribe Geography Teachers' Association
- Berea Geography Teachers' Association
- Southern Districts Geography Teachers' Association.

It was noted that the geography teachers' associations are active in trying to provide information to their members. They hold workshops, meetings, seminars and take excursions. However, the associations do not document these events to produce reports. The only documentation that they produce is minutes of the meetings and annual reports from the treasurers and presidents. Reports on the workshops, seminars and excursions would be information sources that could be referred to whenever they are needed. If reports are not produced, this could lead to repetition of topics. Reports are sources of information that could help beginning teachers.

(h) Personal knowledge and experience

All the teachers indicated that they used their personal knowledge and experience:

- As their source of information;
- To guide the process of teaching; and
- To guide the information-seeking process.

4.2.5.3 Information format preference

Considering the intention to guide the design and implementation of information services for secondary level geography teachers, and the fact that information is available in various media such as print or electronic format, it was important to find the teachers' preferred format. Most of the teachers, particularly those teaching in rural schools and the older ones, indicated that they preferred print format. The younger teachers, especially in urban schools, tend to prefer electronic format. There was an indication that print format is preferred because of lack of information and communication technologies essential in using electronic information. It was evident that the teachers are aware of digital media and the fact that these need technology such as computers to access; unfortunately the availability of computers in most schools in Lesotho is still limited.

We would prefer printed information as opposed to electronic information because of the limited resources here; we still lack computers, the internet, and those technologies that would help us to access the electronic information. 423T3
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The need for audio-visual teaching material discussed in section 4.2.3.4 is considered as a clear indication of preference for audio-visual format for teaching, particularly abstract geography features that are mostly foreign to learners. For the purpose of information consumption these teachers prefer print format because of lack of computers, otherwise they would like to have audio-visual formats such as video for teaching.

4.2.6 In-service secondary level geography teachers' information communication channels

The teachers were asked about the information communication channels that they use to obtain and exchange information, including the channels and ICTs that they wished they had and that would provide a better information service to them. The teachers indicated that they mostly use word of mouth, telephones and SMS. However, they would like to have various modes of communication such as email and the internet for better information delivery even though they still realise the lack of facilities such as computers in their schools. They emphasised that the use of a communication mode depends on the following:

- The amount of information being exchanged, if one wants a full document or just a brief explanation of a concept.
- The distance from the person one would like to communicate with, whether somebody in their school, neighbouring schools or in the teachers' professional association, which may be far distant from the teacher.
- The information being communicated; some information may be sensitive and confidential.
- The urgency of the information required.

It depends; to communicate with whom? You know all those methods and means of communication are very important and I would like to have all of them if possible. It actually depends on the situation. If I need to communicate with my colleague in Uganda I need email; if I need to communicate with someone at Hlotse High school a phone will be useful and my colleague here, we just talk. I think all of them are important to have and just use them depending on the situation. 226T1

To me it depends on the information I want to obtain; how sensitive the information is, how big the information is and its contents. So I need various modes. Sometimes I feel I have to go and talk to the person. Sometimes, talking over the phone is OK. Sometimes SMS is enough, sometimes I need email, so it really depends. 401T2

To save time, it would be ideal to have more channels in order to save time. 353T2

Websites could be helpful. Internet can be helpful. But we need various channels, particularly for communicating as teachers within our association.344T1

I would prefer email, but we are poor and still do not have access to such facilities. At the moment we use cell-phones and mostly SMS to communicate with other teachers elsewhere, but here at school we talk to one another. 322T2

It seems as if the context of teachers in their schools or as part of a professional association is also important in determining their need and preference for information communication channels. There was an indication of preference for email, as much as the need for internet access was emphasised under information sources needed. It is evident that the teachers might be aware of the potential of the internet and email in teaching and learning and for improving their communication.

4.2.7 In-service teachers' recommendations on information service

In addition to the preceding issues, participants also specifically commented on their needs for an information service. These will be further interpreted as findings together with those noted from the prospective teachers and officials involved in secondary geography education in Lesotho in Chapter Five. A synthesis of these findings will be used in Chapter Six to guide the suggestions on the design and implementation of an information service for secondary level geography teachers in Lesotho. There is a need to solicit the recommendations and suggestions of these teachers on how to improve their information service, but one should bear in mind the kind of information they need and how the information should be delivered to them, that is, the information communication channels they prefer. The following is a synthesis of what transpired:

- The teachers need audio-visual information in their schools so that they can use it as a teaching aid. They mentioned that geography is a very abstract subject that covers geographical features that are not even found in Lesotho and they require models, charts, maps and videos to enhance understanding.
- It was emphasised that the establishment of geography rooms would help to serve both the teachers and the learners with information. Such geography rooms would be laboratories for geography teaching and learning.
- A central resource centre was also suggested by some teachers, as they felt that the Lesotho government could not afford to provide every school with all the information sources it needs.
- Resource centre persons offering information in the schools should be competent information professionals capable of providing the teachers with accurate and current information.

We need information officers (government officials) to come to our schools and talk to learners so that the learners can ask all their questions and see that the things that are in the syllabus do apply in real life. They need to realise the jobs that are out there related to the subject geography. 423T1

A resource centre would be helpful, because really the government cannot afford to provide every school with its resources. But such a resource centre should have good, well-trained staff that can even assist us with searching for information, if possible. We don't have well-trained information people to help us the way we want. We need accurate and current information. 401T1

We want audio-visual things for topics that deal with landforms, climatic issues, marine aspects, solar system, mainly DVDs. It would be ideal to have all these things that we need here in our school, because if it is in Teyateyaneng it is not accessible. Movement, that is transport, requires money; there are times when there would be no money for moving to places such as the resource centre. 322T1

The above statements have implications for including information officers and resource centre establishments and building a collection of audio-visual information for especially abstract physical geography topics in the proposed information service model for secondary level geography teachers in Lesotho.

One of the things that I have considered, would be to have a geography room, where all the teaching aids, charts, and all the material needed in geography would be displayed. We would take the students to that room and show them these things. A well-equipped geography room would be ideal. 213T1

After analysing the data collected through the focus group discussions with the in-service secondary level geography teachers, the data collected from the prospective secondary level geography teachers through the questionnaires were analysed. It should be highlighted that the in-service teachers are the primary participants in this study. The other participants were only used to gain more insight, to increase the validity of this study and to triangulate. The data collected from the prospective teachers are presented in the next section.

4.3 PROSPECTIVE SECONDARY LEVEL GEOGRAPHY TEACHERS'

DATA

The second category of participants is prospective secondary level geography teachers. This section presents data collected from the prospective teachers. These are final-year education students at the NUL Faculty of Education studying to be geography teachers. The data were collected from these teachers through a questionnaire (see Appendix D). The questionnaires were distributed by the geography educator lecturer to the prospective teachers in the schools during the teaching practice, which lasts for three months. This lecturer goes around to schools where the prospective teachers are posted for teaching practice for observation. Without his involvement, it might have been difficult to ensure that the appropriate students majoring in geography participated in this study, that the participants understood the rationale of the study and that the questionnaires were distributed and collected. The prospective teachers were asked to fill in the questionnaire and submit it together with their teaching practice reports to their geography educator lecturer. There were 46 out of 62 prospective teachers who filled in and returned the questionnaire.

This section presents the analysis of the data collected from the questionnaire that is attached as Appendix D. Demographic details are included to offer a profile of the prospective geography teachers as participants and not so much to draw correlations. Data also include the prospective teachers' perception of the accessibility and availability of information in their teaching practice schools, their information needs, information-seeking patterns, preference for information sources and communication channels, and recommendations for information service. Data are presented in charts and tables to break the monotony of using one format.

4.3.1 Prospective geography teachers' demographic details

The data presented in this section provide a summary of the demographic details of prospective secondary level geography teachers who participated in the survey. The demographic details are included to offer a profile of the prospective secondary level geography teachers who participated in this study and not to draw correlations. The demographic details are age, the degree being studied, teaching experience, subjects that were taught as well as their highest qualification when they entered the university. The prospective teachers' age is shown in the Chart 4.3 below.

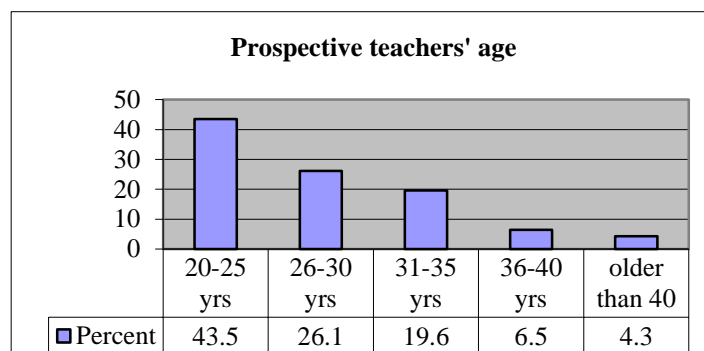


Chart 4.3: Age of prospective teachers participating in the survey

Most of these teachers (43.5%; 20 out of 46) are in the age group 20-25 years, followed by the 26-30 years group, which is 26.1% (12 out of 46) and 31-35 years age group at 19.6% (9 out of 46), 36-40 years at 6.5% (3 out of 46); they become fewer as their age increases, with only 4.3% (2 out of 46) prospective teachers older than 40.

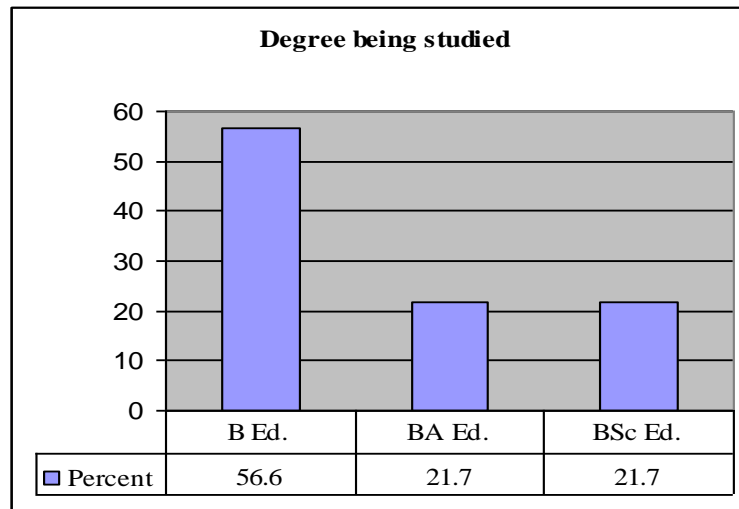


Chart 4.4: The degrees studied by the prospective teachers

The teachers are studying for bachelors' degrees. Most of them are studying B Ed (56.5%; 26 out of 46), followed by BA Ed (21.7%; 10 out of 46) and BSc Ed (21.7%; 10 out of 46).

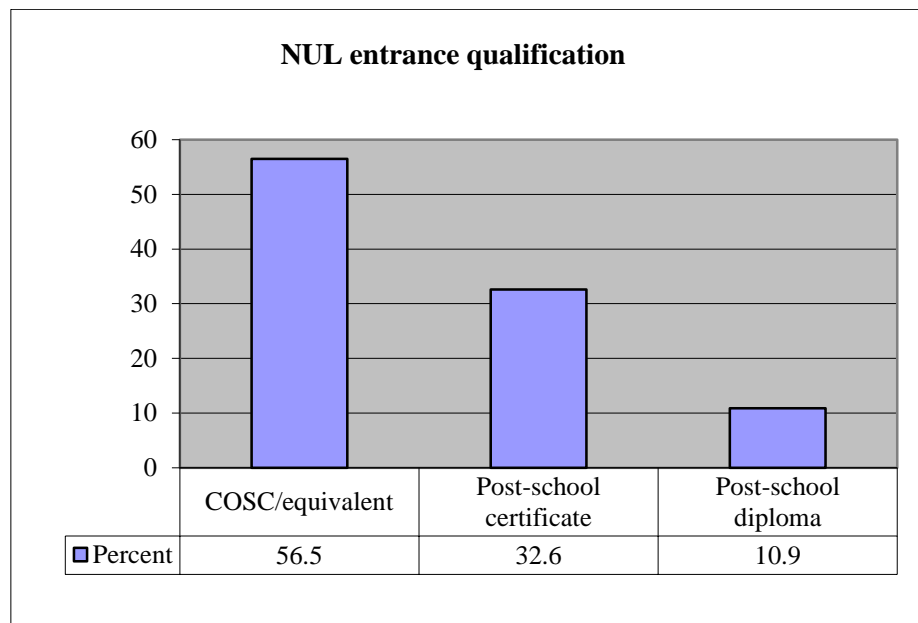


Chart 4.5: The prospective teachers' university entrance qualification

Chart 4.5 depicts prospective teachers' highest qualification when starting their bachelors' degree and it is evident that 56.5% (26 out of 46) had only COSC, 32.6% (15 out of 46) had some post-school teaching certificate, while 10.9% (5 out of 46) had a teachers' diploma when entering the university to pursue bachelors' degrees.

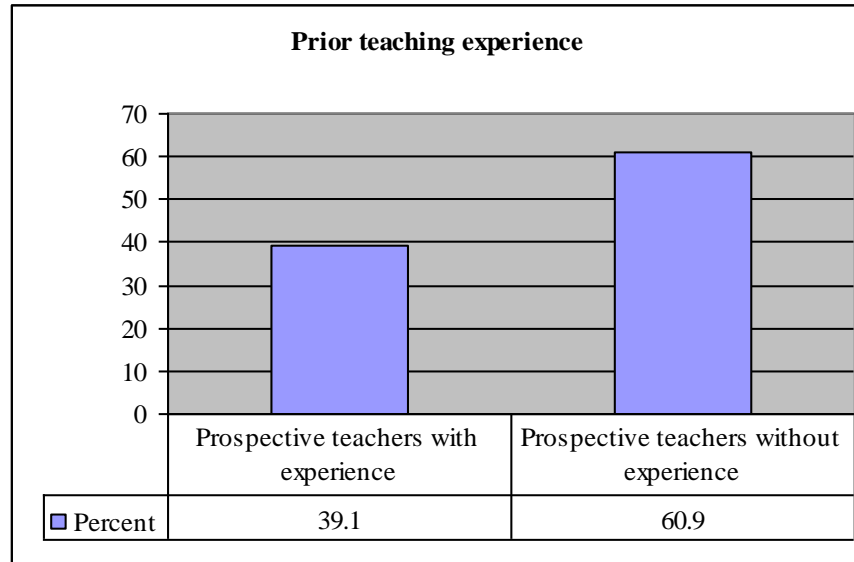


Chart 4.6: Prospective teachers' prior teaching experience

As shown in Chart 4.6, only 39.1% (18 out of 46) of the prospective teachers had taught before joining the university to study to be graduate teachers. Chart 4.7 presents data for the subjects that they taught. As depicted in Chart 4.7, 15.2% (7 out of 46) taught mathematics and sciences and 8.7% (4 out of 46) taught geography. Chart 4.7 below shows the subjects that were taught by the prospective teachers before entering the university to study for their degrees and Chart 4.8 shows how long the prospective teachers had been teaching before pursuing junior degrees at NUL. Percentages in Charts 4.7 and 4.8 add up to 39.1% (18 out of 46), which is the percentage of prospective teachers that had prior teaching experience.

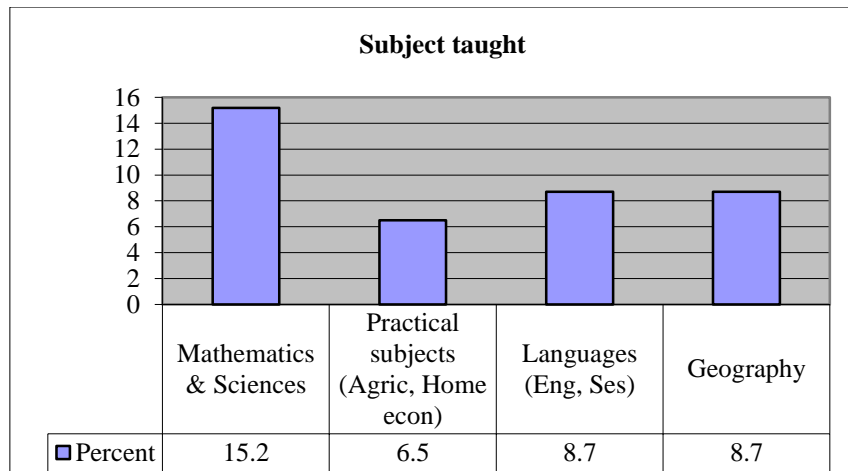


Chart 4.7: Subjects that were taught by the prospective teachers before pursuing studies at NUL

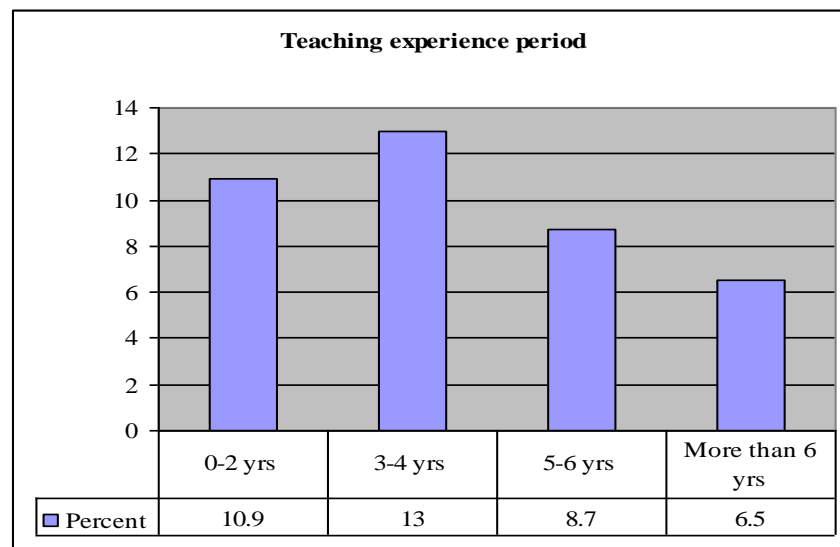


Chart 4.8: The number of years of prior teaching experience

Chart 4.8 reflects the extent of teaching experience the prospective geography teachers had when entering NUL to study for their bachelors' degrees. It depicts that 10.9% (5 out of 46) had 0-2 years' teaching experience, while 13% (6 out of 46) had 3-4 years' teaching experience, 8.7% (4 out of 46) had 5-6 years' teaching experience and 6.5% (3 out of 46) had more than six years' teaching experience.

4.3.2 Prospective geography teachers' perceptions of accessibility and availability of information in their teaching practice schools

The accessibility and availability of information are important in information-seeking. The prospective teachers were asked to indicate the information resources that were available in their teaching practice schools, including if the information resource provided them with sufficient information for teaching and whether they had any restrictions in using the information resource. Table 4.10 below indicates the information resources that the prospective teachers indicated were available in their respective teaching practice schools as explained in Chapter Three (section 3.4.2). It also indicates the percentage of the teachers who felt the resources in their schools provided sufficient information for their teaching as well as the percentage of those who felt no restrictions in using the resources. For instance, the table shows that 60.87% of the participants indicated that their teaching practice schools had libraries; 28.26% of them felt that the library provided them with sufficient information for teaching and 43.48% felt that there were no restrictions to using the library. Moreover, 91.30% of the participants indicated that their teaching practice schools had books, 54.35% found that the books provided sufficient information for teaching, and 65.22% experienced no restrictions in accessing the books.

Table 4.10: Availability and accessibility of information resources in schools

Information resource	Resource available		Resource provided sufficient information		No restrictions when using the resource	
	Freq. (n=46)	%	Freq. (n=46)	%	Freq. (n=46)	%
Library	28	60.87	13	28.26	20	43.48
Internet	10	21.74	7	15.22	6	13.04
Journals (printed and electronic)	8	17.39	5	10.87	5	10.87
Newspapers/magazines	20	43.48	11	23.91	15	32.61
Radio/TV	7	15.22	5	10.87	2	4.35
Reference books (e.g. encyclopaedia, dictionaries)	24	52.17	19	41.30	16	34.78
Books	42	91.30	25	54.35	30	65.22

4.3.3 Prospective geography teachers' information needs

Information is important in teaching, because effective teaching and learning depend on the ability to access information and use it strategically to advance knowledge and skills. Teaching requires information for various things on a daily basis; thus teachers are described as 'the population group that is active, experienced and critical users of information' (Taylor, 1991:219) and teaching and learning are associated with handling information (Karunaratna, 2008). The participants were asked to indicate the issues on which they needed information during their teaching practice. These issues and the number of times they were indicated by the prospective teachers are presented in Table 4.11 below which reports on a question to which multiple responses were possible, but were streamlined in the questionnaire.

Table 4.11: Information needs of prospective teachers

Information needs	Frequency (n=46)	%
Content	40	86.96
Teaching methods	33	71.74
Classroom management	23	50.00
Learners' assessment	26	56.52
Educational policies (legislation, teaching regulations)	27	58.70
Syllabus	25	54.35
Schools' performance in national examinations	23	50.00
Adolescence social problems (drug abuse, violence, pregnancies, etc.)	23	50.00

Table 4.11 presents data about the information needs of prospective teachers during their teaching practice; it is evident that 86.96% (40 out of 46) of the participants needed information on content, 71.74% (33 out of 46) showed that they needed information on teaching methods and 58.70% (27 out of 46) indicated that they needed information on educational policies.

The questionnaire requested prospective teachers to indicate where they found the information that they needed for teaching during their teaching practice. Most of the prospective teachers (67.39%) (31 out of 46) indicated that they found the information needed both in and outside school premises, while 26.09% (12 out of 46) found the

information within the school and 6.52% (3 out of 46) found the information needed outside the school. This is evident from Table 4.12.

Table 4.12: Places where prospective teachers found information

Place where information was found	Frequency (n=46)	%
Within the school	12	26.09
Outside the school	3	6.52
Both in and outside the school	31	67.39
Total	46	100.00

It was also necessary to establish whether the prospective teachers' information needs were satisfied by the information they found regarding teaching and the findings on this are presented in Table 4.13. This table depicts that 39.13% (18 out of 46) of the prospective teachers felt that the information they found often satisfied their needs, and 56.52% (26 out of 46) felt that the information sometimes satisfied their needs while 4.35% (2 out of 46) felt that the information never satisfied their needs. This is shown in Table 4.13.

Table 4.13: Degree of information needs satisfaction

Degree	Frequency (n=46)	%
Often	18	39.13
Sometimes	26	56.52
Never	2	4.35
Total	46	100.00

Most of the prospective teachers (60.87%) (28 out of 46) indicated that they felt that they had average information available for lesson plans, 26.09% (12 out of 46) had too much information and 13.04% (6 out of 46) experienced a shortage of information. This is reflected in Table 4.14.

Table 4.14: Experiences with regard to information needed for lesson plans

Experiences	Frequency (n=46)	%
Too much information	12	26.09
Average information	28	60.87
Shortage of information	6	13.04
Total	46	100.00

The prospective teachers were also asked to indicate their preferred information format. Chart 4.9 below indicates that 71.7% (33 out of 46) of the prospective teachers prefer printed information, while 28.3% (13 out of 46) prefer electronic information.

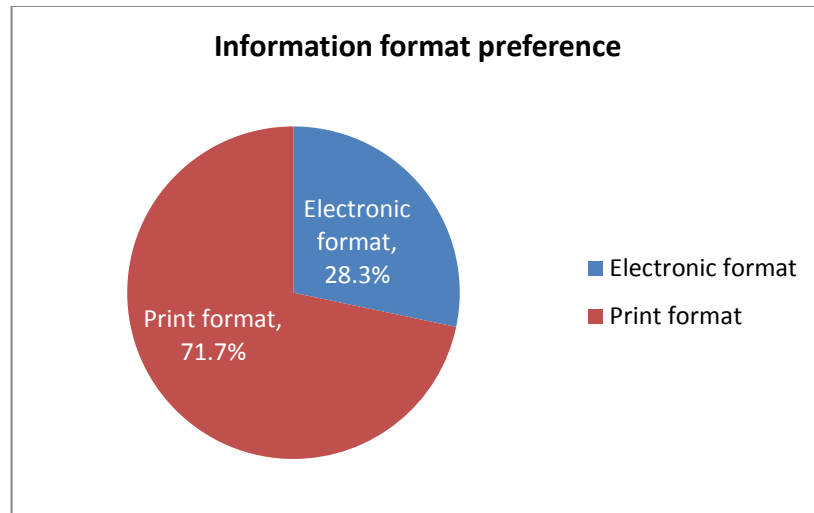


Chart 4.9: Prospective teachers' information format preference

4.3.4 Prospective geography teachers' information-seeking patterns

To establish the information-seeking patterns of the prospective teachers during their teaching practice, they were asked to indicate the different types of information-seeking they engaged in. The participants were further asked to indicate the difficulties they encountered during their teaching practice with regard to the information. The data are presented in the two subsequent tables.

Table 4.15: Prospective teachers' information-seeking styles

Style of information-seeking	Often		Sometimes		Never	
	Freq. (n=46)	%	Freq. (n=46)	%	Freq. (n=46)	%
Consulting information sources with a specific purpose in mind	27	58.70	12	26.09	7	15.22
Coming across needed information through regular interaction with information sources	7	15.22	28	60.87	11	23.91
Collaborating with others to seek information	21	45.65	18	39.13	7	15.22
Using others to seek information on your behalf	10	21.74	21	45.65	15	32.61

The terminology in Table 4.15 is different from the terminology used for in-service teachers in section 4.2.4.1 because the questions soliciting the style of information-seeking for

prospective teachers was in the questionnaire, which had to be simple, clear and unambiguous to avoid confusion. Nonetheless, in Table 4.15, the first row is interpreted as purposive information-seeking, the second row as serendipitous information-seeking, the third row as collaborative information-seeking and the last row as information-seeking through proxy. The prospective teachers mostly (58.70%) (27 out of 46) sought information with a specific purpose in mind, while 45.65% (21 out of 46) often collaborated with others to seek information and 15.22% (7 out of 46) often came across needed information through regular interaction with information sources such as the media only and 21.74% (10 out of 46) of them used others to seek information on their behalf. Although the respondents were asked to specify the people that they use to seek information on their behalf; only 6.52% (3 out of 46) of them specified these people. They mentioned that they used other students to seek information on their behalf, but this information is not shown in Table 4.15.

Table 4.16 reflects the difficulties that the prospective teachers experienced while seeking information related to teaching during their teaching practice. The difficulties encountered include:

- Inability to find relevant information easily (21.74%) (10 out of 46).
- Information found often outdated (23.91%) (11 out of 46).
- Inadequate time (23.91%) (11 out of 46).
- Information difficult to interpret and use for lesson plans (15.22%) (7 out of 46).
- Lack of information sources (30.43%) (14 out of 46).

Table 4.16: Information-seeking difficulties encountered by prospective teachers

Difficulty	Major difficulty		Minor difficulty		No difficulty - experienced	
	Freq. (n=46)	%	Freq. (n=46)	%	Freq. (n=46)	%
Information available was not adequately addressing the syllabus.	10	21.74	21	45.65	15	32.61
Could not find the relevant information easily.	6	13.04	19	41.30	21	45.65
Information was often outdated.	11	23.91	12	26.09	23	50.00
Did not have enough time.	11	23.91	13	28.26	22	47.83
Information was not easy to interpret and use for lesson plans.	7	15.22	20	43.48	19	41.30
Insufficient information sources.	14	30.43	17	36.96	15	32.61

Table 4.16 presents data on the responses for question 4.2 in the questionnaire (Appendix, D) to which multiple answers were possible. There was an option in the questionnaire for the respondents to specify any other difficulty experienced; none of the respondents completed this part.

4.3.5 Information sources used by prospective teachers

There are various sources of information that teachers may generally use in order to obtain information for teaching. It was important, in this study, to establish the information sources that prospective teachers used to identify the information they needed for teaching during their teaching practice. This included determining how often they used the information sources; these data are presented in Table 4.17. From this table it is evident that during teaching practice, the prospective teachers often used books (76.09%) (35 out of 46), followed by personal knowledge and experience (45.65%) (21 out of 46), then the teachers at their teaching practice schools (43.48%) (20 out of 46), followed by reference books (32.61%) (15 out of 46) and the school library (30.43%) (14 out of 46). Other sources such as the internet, teachers at the school, and reference books were sometimes used, while others such as government ministries, conference or workshop reports, associations and unions were mentioned as information sources by the prospective teachers. Table 4.17 emanates from section 5.1 of the questionnaire (Appendix D); it had an option for respondents to specify any other sources that they used that were not in the questionnaire; none of them responded to that question.

Table 4.17: Information sources used by prospective teachers

Information source	Often		Sometimes		Never	
	Freq.(n=46)	%	Freq.(n=46)	%	Freq.(n=46)	%
Internet	3	6.52	14	30.43	29	63.04
Books	35	76.09	7	15.22	4	8.70
Reference books (e.g. encyclopaedias, dictionaries)	15	32.61	17	36.96	14	30.43
Printed/electronic journals	7	15.22	14	30.43	25	54.35
Media (e.g. TV, radio, newspapers, etc)	8	17.39	17	36.96	21	45.65
School library	14	30.43	8	17.39	24	52.17
Personal knowledge/experience	21	45.65	18	39.13	7	15.22
Teachers at the school	20	43.48	21	45.65	5	10.87
Personal friends/family/relatives	8	17.39	21	45.65	17	36.96
Conference/workshop reports	3	6.52	10	21.74	33	71.74
Government ministries	1	2.17	5	10.87	40	86.96
Parastatal/private institutions documents	2	4.35	10	21.74	34	73.91
Associations/unions	0	0.00	1	2.17	45	97.83

4.3.6 Information communication channels used by prospective teachers

Part of this study aims to formulate strategies for information services; a proper information service may be designed if the preferred communication channels of the targeted users are known. Consequently, the prospective teachers were asked about the communication channels that they often used during their teaching practice. It was found that 78.26% (36 out of 46) of the prospective teachers often used face-to-face discussions. According to the data in Table 4.18 below, most of the other channels were used occasionally or were never used.

Table 4.18: Information communication channels used by prospective teachers

Channel	Often		Sometimes		Never	
	Freq. (n=46)	%	Freq. (n=46)	%	Freq. (n=46)	%
Face-to-face discussions	36	78.26	8	17.39	2	4.35
Post office mail	0	0.00	4	8.70	42	91.30
Email	1	2.17	4	8.70	41	89.13
Internet	2	4.35	12	26.09	32	69.57
Telephone	1	2.17	17	36.96	28	60.87
Cell-phone	7	15.22	14	30.43	25	54.35
Fax	1	2.17	3	6.52	42	91.30
Media (radio, TV, etc)	3	6.52	15	32.61	28	60.87

4.3.7 Recommendations on information service by prospective teachers

The last part of the questionnaire was an open-ended question that required the prospective geography teachers to make recommendations and suggestions on the improvement of the information service for secondary level geography teachers in Lesotho. The content analysis of their responses is presented below.

- The teachers regard and appreciate the internet as an information resource for current information of various kinds and they indicated that their teaching practice schools' management may lack information about the internet and how it can contribute to effective teaching because they are mostly older people. This is their perception that needs verification. These teachers strongly recommend that the internet should be available in schools for use by both teachers and learners.
- The library materials are outdated and therefore the government must supply more up-to-date information material regularly. It was highlighted that there is a need for a variety of books that provide current information and different ideas for teaching geography.
- There is a need for geography journals.
- Provision of a geography laboratory or classroom in each school where all the teaching aids and material will be displayed and stored easily was suggested.
- Workshops for geography teachers should be held regularly to assist them with teaching and information techniques.
- The school libraries should be manned by competent people who can take the initiative to go out and get information for the teachers.

Recommendations on an information service from the prospective teachers have to be interpreted along with those from the in-service teachers (in section 4.2.7), as well as suggestions from the officials from the institutions directly involved in secondary geography education in Lesotho (discussed in the subsequent section 4.4.5) in order to design and implement an appropriate information service for secondary-level geography teachers in Lesotho in the subsequent chapters.

4.4 DATA FROM PARTICIPATING INSTITUTIONS DIRECTLY INVOLVED IN SECONDARY LEVEL GEOGRAPHY EDUCATION IN LESOTHO

This section presents the data that were collected, as explained in Chapter Three (section 3.6.2), through interviews with officials who work in the institutions that are directly involved in secondary level geography education in Lesotho. The interview schedule is attached as Appendix B. The selection of the institutions, as explained in Chapter Three (section 3.5.2), was based on, among others, their involvement in secondary level geography education in terms of:

- Geography teacher training;
- Geography teacher professional development;
- Geography examination;
- Geography teaching and learning inspection; and
- Geography curriculum development.

During the data collection phase of this study, it was gathered that there is no official responsible for geography inspection in the Central Inspectorate. This is the section of the MOET that is responsible for inspection of teaching and learning in Lesotho schools and its participation in this study is considered important. Data were analysed and presented as a profile of participants, information dissemination to secondary level geography teachers, perceptions of information needed by secondary level geography teachers, communication channels used with secondary level geography teachers, and their suggestions for improving the information service to teachers.

4.4.1 Profile of participants from institutions involved in secondary geography education in Lesotho

Officials from the institutions that are involved in secondary level geography education in Lesotho were interviewed to inform the current study about the way they disseminate their information to the secondary level geography teachers, including their perception of these teachers' information needs, use of information communication channels and preferences. Their suggestions on an information service for these teachers are also included. The interview schedule is attached as Appendix B of this thesis. Table 4.19 presents data on the

profile of the individuals who participated in this study. This information is given to contextualise the participants and not necessarily for correlation. Out of 12 institutions that were identified, eight participated in the study. The intention was to interview officials from all 12 institutions, but despite all efforts it was impossible to find a person to interview in all the institutions. The researcher's personal knowledge as a former teacher and information obtained from the focus group discussions with in-service teachers were used to identify the individuals who were interviewed. These individuals are involved in disseminating information related to the various facets of secondary geography education, such as curriculum development, evaluation and testing through national examinations. Mostly they contribute to the development of teaching and learning of geography as a subject in secondary education in Lesotho. These institutions are considered as structures in place worth considering for the information service that is proposed in subsequent chapters.

Table 4.19: Profile of the officials interviewed

Institution	Designation	Qualification	Work Experience
BGTA	General Secretary	BA (Hons)	4 years as BGTA secretary. 6 years teaching geography.
BGTA	Chairperson of the Association	BA Ed	3 years as chairperson. 7 years teaching geography.
BBGTA	General Secretary	B Ed	4 years as the secretary. 16 years teaching geography.
ECOL	Geography Specialist	M Ed	13 years geography teaching. 8 years geography specialist.
LCE	Geography Educator Lecturer	M Ed	8 years geography teaching. 12 years LCE lecturer.
LGTA	General Secretary	B Ed	15 years geography teaching.
NCDC	Geography Curriculum Specialist	M Ed	15 years geography teaching. 1 year curriculum developer.
NUL	Geography Educator Lecturer	MA Ed (PhD candidate)	6 years geography teaching. 3 years LCE lecturer. 10 years university lecturer.
SDGTA	Deputy General Secretary	B Ed	6 years geography teaching.

Key: BGTA – Berea Geography Teachers' Association
 BBGTA – Butha-Buthe Geography Teachers' Association
 ECOL – Examinations Council of Lesotho
 NCDC – National Curriculum Development Centre
 NUL – National University of Lesotho
 LCE – Lesotho College of Education
 LGTA – Leribe Geography Teachers' Association
 SDGTA – Southern Districts Geography Teachers' Association

4.4.2 Information dissemination to secondary level geography teachers

All the individuals who were interviewed mentioned that they disseminated information to secondary level geography teachers. The following methods of information dissemination were mentioned:

- Face-to-face meetings.
- Workshops.
- Physical delivery of letters and documents.
- Telephones and cell-phone calls.
- SMS.

Face-to-face communication through meetings, informal chats, workshops, seminars and official dialogues features strongly. Challenges encountered when disseminating the information that were mentioned are:

- Letters and documents reaching the recipients very late or sometimes never;
- Rapid changing of cell-phone numbers of teachers who are members of the associations and failure of such teachers to notify their associations about changing their numbers; and
- Failure by teachers to respond to SMS messages, thus leaving the sender with uncertainty that the SMS had reached its recipient.

4.4.3 Information needed by secondary level geography teachers

There was some indication from all the individuals who were interviewed that they receive information requests from the secondary level geography teachers. It transpired during the interviews that the teachers need information to address problems related to content, in particular physical geography topics such as geomorphology, map reading, geology, plate tectonics and emerging environmental issues related to geography. They also need information about past question papers and their marking schemes. The information needs expressed here need to be interpreted together with those expressed by the in-service (in section 4.2.3) and prospective (in section 4.3.3) teachers for incorporation in the design and implementation of information services for secondary level geography teachers. The following response reflects some of the information requests that were mentioned:

Yes, my ex-students come to me for consultation. More often they come with the problems of content to me. Particularly some aspects of physical geography, for instance there is a section on geomorphology, where they deal with the landforms; they have concerns there. There is also a section of map reading that is also a real concern to them. They do not complain about how to teach the topics, but their concerns are mainly content-based. INT 4

The above statement gives an indication of information needed to address problems of content related to physical geography; the statement below also depicts information needs for additional topics such as time calculation, tourism, map reading, plate tectonics and population studies. In addition, it is evident that information about past examination question papers and their marking schemes is needed.

Very often teachers need questions and marking schemes. But there are other common topics that teachers need help with. These are time calculation at JC level, tourism, map reading both JC and COSC level. Plate tectonics at COSC level and population, we take it for granted that this topic is easy, but it is complicated. INT2

They call about the challenging topics; they often phone. You know for example, they call me and ask me how to treat the plate tectonics topic. They will call to ask how they should treat plate tectonics. Their concern is more on challenging topics, or some emerging environmental issues that are not necessarily on the syllabus, but related to the syllabus. INT5

We had NUL to present geology and geomorphology. A topic that we had learnt that the teachers deliberately used to avoid teaching. INT1

Information needs seem to depend on the complexity of the topic to be taught. The statement below further confirms a disparity in knowledge content mentioned in Chapter One (section 1.1) regarding physical and human geographical spheres among NUL graduates studying to be teachers in view of the type of degree programme they completed. This can be seen as part of the context of the teachers owing to their lack of proper teacher training.

The students that graduate at NUL (BA ED, B ED and BSc ED) do not have balanced content of physical geography and human geography. Our system is still creating that disparity. Science education students have more physical geography content and lack human geography content. In addition, the physical geography content that they have is too academic; it is not school-focused. The BA Ed/B ED students have more human geography content than physical geography. We have introduced a course at 3rd year level: *geography for the high school teacher*, which tries to address these content disparities. However, at the moment the science education students are not taking this course due to the high course load they have at 3rd year. We are currently working on the regulations that will allow the science education students to take this course, hopefully in the next few years they will be taking this course. INT 4

In principle, we are aware of the topics that challenge the teachers, or topics that the teachers mostly need information for. We really know them, and we try by all means to address them, and we still wish for more workshops and more sources of information. This is because we have realised that some teachers due to the complexity of the topics, they were not teaching such topics deliberately. You know geography syllabus has a physical aspect which is abstract and highly scientific, and the human geography. Most teachers are not comfortable with physical geography, and they were avoiding it, or misleading their learners, hence it was performed poorly at examinations. So we try by all means to help one another for the sake of our learners. INT 1

4.4.4 Information communication channels used by secondary level geography teachers

From the interviews it seems that information is mainly communicated through letters, physical delivery of documents, telephones/cell-phones and meetings. These are the channels of communication that are used because the secondary level geography teachers have access to them. Emails and internet are still not available and accessible to most teachers. Physical delivery of documents and letters is done through the following means:

- Learners in the schools are used by the teachers, including the secretaries of the teachers' associations. They send the letters to their membership through their learners whom they know live close to the recipient's home or school.
- Established nodal points are used for delivering examination papers and marking schemes. The associations have established nodal meeting points for the delivery of this information because the learners would not be used in those instances. However, this requires prior communication from the secretaries so that all the recipients gather at the nodal points on time.
- Officials in the MOET use their vehicles to deliver the information to the schools if it is urgent, otherwise the information is delivered to the district education offices for the principals to pick up.

Most of the interviewees indicated that they wished for electronic communication because it is faster and more reliable compared to the physical communication that they are using. It is acknowledged that the internet is not available in most schools and many teachers still do not have access to it. One of the interviewees indicated that even if there is access to the internet and email in their offices, there are still problems since they may have been cut off from the internet because of failure to pay the internet service provider.

There are very few teachers who would access the internet. Right from us here, we lack access to the internet. I don't know when was the last time we had internet here. It has been a long time since we were disconnected. It is true that there are some few schools that have internet, but the ability of the teachers to use such internet is a big question mark. There are very few teachers who would access such internet in the schools. INT5

On the other hand, it is noted that most of the teachers, if not all, have cell-phones that could be used to access the internet, given that it is now possible in Lesotho to have internet either through wireless modems or cell-phones. This is evidenced by the following statement:

Almost all the teachers and even some students have cell-phones, it is just that we are still confined to using the cell-phones only for calls and SMS. We have not explored the full capacity of the cell-phone for connecting to the internet. A lot of teachers have computers and laptops, and often they use them only for word processing. They have not yet explored the full capacity of their computers to acquire information from CD-Roms, and using the 3Gs and the EVDOs. These things are actually affordable. I also think that schools can afford to connect to the internet through ADSL. It is just that some of the schools are headed by older people who do not appreciate the technological advancements of the 21st century. INT5

Apart from internet access problems such as being cut off, it seems as if when accessing the internet, teachers may not realise the full potential of the internet as a valuable source for effective teaching; it might be that they lack or have limited skills to exploit the internet fully in teaching and learning.

4.4.5 Suggestions for improving teachers' information service

The interviewees were asked to comment on the overall improvement of the information service for secondary level geography teachers in Lesotho. The following is one of the comments:

Email and websites (internet) would really be helpful, but the schools do not have these facilities. If these things were available we would be functioning better. In essence I recommend that the teachers access and use the internet. This will help us with up-to-date information. But, believe me we still have a long way to go as teachers with regard to computers and the internet. INT1

The above statement indicates that email and internet through the websites would help in enhancing the information services for teachers and facilities have to be in place for accessing these useful resources to obtain the latest information. There is evidence that teachers lack the necessary computer and internet skills and therefore need training.

Number of workshops. You see what is happening is that there is a big gap between teachers, ECOL, Central Inspectorate and NCDC. Right now we have ECOL and Central inspectorate. This last June we had a workshop that was sponsored by Central Inspectorate because we approached this office as an association. And this really helped us a lot as we were able to even get other external resource persons. You see sometimes we come across examination questions that are not in the syllabus. We need to link from teaching, delivering syllabus, examinations through linking teachers, with these relevant bodies. We do not have a subject officer at the central inspectorate. The institutions were running as separate institutions, until at a late stage when we approached them and showed them the importance of working together. You see some questions on the examinations are topics that do not appear on the syllabus. INT 2

The above statement bears a suggestion for an integrated operating system among related institutions and/or constituencies such as the NCDC, the ECOL and the geography teachers.

I think we actually need a documentation centre that is well equipped, with internet of course. As well as other physical materials such as earth models, models for marine processes and tectonic plates that can be available for hire to the schools. There is also a need for such a centre to have videos because most of the schools now have electricity. Actually, if your documentation centre can have such resources, and hire them out to teachers, it can be very helpful. INT 4

The above statement is a clear suggestion of a central documentation centre to serve the teachers. This is similar to the resource centre that was suggested by the in-service teachers in the focus groups as indicated in section 4.2.7. In addition, the statement depicts the need for the availability of physical information objects such as models for geographical features such as the earth and marine processes, including multimedia information items such as videos. Some of these things were also mentioned by the in-service teachers.

What is actually going in every educator's mind is that learning should move from the traditional system to the 21st century. Personally, I would say that every educator and learner should take advantage of the information superhighway and connectivity to the internet. It is true that every time we say people may not afford to connect to the internet, but if you are not connected you are left behind. We cannot be depending only on books, for that matter printed books, it is time to explore all the other information sources brought by the information and communication technologies. INT 5

There is also an indication of the need to advance teachers' information literacy skills to embrace and utilise the latest developments of information technology in the modern information age in order to access relevant information essential for teaching geography.

4.5 CONCLUSION

This chapter has presented data collected from the focus group discussions with the in-service secondary level geography teachers and observation of school libraries (where they existed) in the schools whose teachers participated in the focus group discussions. Data were also collected from prospective geography teachers who are final-year education students majoring in geography through a questionnaire. The last section of the data was collected through individual interviews with people from institutions involved in secondary level geography education in Lesotho. A total of 82 in-service geography teachers participated in this study through 28 focus groups, while 17 observations of school libraries were conducted. 46 questionnaires were collected and used in the study and nine individual interviews were conducted with people representing these institutions. The spectrum of data collected and analysed offers insights that will be interpreted in Chapter Five.

CHAPTER FIVE: INTERPRETATION OF THE DATA

5.1 INTRODUCTION

The purpose of this study is to investigate the information needs and information-seeking patterns of secondary level geography teachers in Lesotho with regard to their teaching role in order to guide the design and implementation of an information service for these teachers. Data were collected to address the principal research question and sub-questions for this study that were posed in Chapter One (section 1.2).

This chapter interprets the qualitative and quantitative analysis of the data presented in Chapter Four. It focuses on addressing the study's principal question and research questions and bringing these in line with the subject literature. Qualitative data were collected through focus group discussions with in-service geography teachers, interviews with relevant officials from institutions directly involved in secondary geography education and partial observations of school libraries. Quantitative data were collected through questionnaires administered to prospective geography teachers. This study used the Leckie *et al* (1996) model of the information-seeking of professionals as its theoretical framework. Therefore, the interpretation of the data is not only guided by the study's research questions, but also by this model. Chapter Four was a broad presentation of the data from all the participants. This chapter not only interprets the data, but also focuses on addressing the study's research questions. Based on these research questions, the chapter has been organised into the following subheadings:

- The information needs of secondary level geography teachers in Lesotho.
- The secondary level geography teachers' information-seeking patterns.
- The information sources used by these teachers.
- The information sources available and accessible in the schools.
- Information communication channels used by these teachers.
- Recommendations on an information service for secondary level geography teachers in Lesotho.

Some of the information presented in Chapter Four is briefly repeated when considered necessary to contextualise the interpretations.

5.2 WHAT IS THE WORKING CONTEXT OF SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO?

According to Leckie *et al* (1996:179), in order to investigate the information-seeking behaviour of professionals, the broader working context in which professionals' practice is conducted must be closely examined and understood. This is also supported by Baker (2004), Johnson (2003) and Niedźwiedzka (2003). Hence this study tried to understand the working context of teachers participating in this study. Chapter Two (section 2.2.2) and Chapter Four (section 4.2.2) explained the interpretation of context in this study, namely that it focuses on the school environment, including its location in terms of different administrative districts of Lesotho, and whether it is in a rural or urban setting, or in the highlands or lowlands region (all outlined in Chapter Four, section 4.2.2). However, considering the interpretation in Chapter Two (section 2.2.2), the working context of teachers participating in this study also includes the following points:

- The broader work context of professionals, such as the socio-politico and economic conditions of their countries, their institutional settings, the availability of infrastructure for information service and information resources.
- The nature of the work, which might be scientific and/or non-scientific, type of profession, its discipline (science or social science) and the diversity of its roles, associated tasks and requirements.

5.2.1 What is the context of Lesotho secondary level geography teachers?

Lesotho is a developing country in Southern Africa facing challenges such as a high prevalence of HIV and AIDS, a high unemployment rate, poverty and limited information services and information infrastructure, as indicated in the Lesotho IFLA World Report (2010) and IFLA/FAIFE World Report (2007). As explained in Chapter One (section 1.1) and Chapter Four (section 4.2.2.1), schools, including teachers, are the responsibility of the Lesotho government, churches and communities. In Lesotho formal education started with missionaries who had to build schools, and later on the government intervened by paying teachers' salaries without taking over the schools. Hence most of the schools are owned by churches, followed by the community, and schools employ teachers, while the government pays their teachers' salaries. Lately there has been an increase in government schools (Ambrose, 2008; World Bank, 2005).

The work environment of Lesotho secondary teachers is marked by constraints such as lack of finances and teaching materials, lack of facilities such as libraries (Kakoma, 1999; Mafube, 2005) and overcrowding in classrooms. Where libraries exist, they have limited books that are outdated and not related to geography. ‘Over size classes and scarcities of resources coupled with lack of trained teachers has been an outstanding problem in Lesotho for a long time’ (Moloi *et al*, 2008:613). Most of the teachers who participated in this study (70%) have to teach 25-30 periods per week. A period is a 40-minute lesson in Lesotho. The average class size ranges from 40-70 learners per class. There is no single school that reported fewer than 40 learners in a class; instead the majority of the teachers reported between 50 and 60 learners. In addition, their schools have 10-15 streams⁵. Many streams in the schools mean there are many learners on the school premises using the limited facilities and resources of the schools. Furthermore, when one class is taken for an excursion, it means that the teachers have to plan and cater for many students in all the streams for that particular class, when compared with a school with one or two streams per class. Pattueli (2008:642) acknowledges the heavy teaching loads of teachers and notes that owing to their intense workloads, teachers have limited time to prepare for their classes.

The length of service of the teachers who participated in the focus group discussions ranges from less than six months to 31 years. The least qualified teacher had a diploma; the majority of the teachers had bachelor’s degrees and a few had postgraduate qualifications in the form of postgraduate diplomas, honours degrees and masters’ degrees. These teachers were qualified professionals with ample geography teaching experience and they were therefore in the best position to provide accurate information pertaining to this study and also to advise on the elements essential for their information service. The participants were class teachers (48.8%; 40 out of 82), heads of department (24.4%; 20 out of 82), ordinary teachers (21.9%; 18 out of 82), deputy principals (3.7%; 3 out of 82) and principals (1.2%; 1 out of 82), as explained in Chapter Four (section 4.2.1). This indicates a heavy work load, as the teachers have to teach and still take care of administrative responsibilities. It is important to appreciate and highlight that the participants in this study were qualified teachers, given that Moloi *et al* (2008:613) observe a lack of qualified teachers in Lesotho schools.

⁵ Lesotho secondary education takes five years and has five classes, usually referred to as Form A to E. Because of large enrolments, a class has different subclasses, e.g. Form A1, A2, etc. and these are referred to as streams.

5.2.2 The nature of work of secondary level geography teachers

Baker (2004:11) observes that some professionals do a traditional type of work in an institutional setting where information in various formats can be accessed easily. The teachers in this study work in a similar institutional setting even though, as pointed out in Chapter One (section 1.1) and confirmed by data in Chapter Four (sections 4.2.5.1), information is not easily accessible. The nature of the work of secondary geography teachers in Lesotho is not clear in terms of whether it is considered to be related to science or social sciences, given that in schools, geography resorts under social science, while in the curriculum document it is clustered with the sciences. The use of colleagues in agriculture, sciences and development studies, as well as farmers and miners in the communities, by the in-service teachers in this study is an indication of a multidisciplinary subject. This is in line with an observation that geography is multifaceted and multidimensional, spanning other disciplines such as the humanities, natural sciences and social sciences (Alkis, 2009; Broek *et al*, 1980; Hall *et al*, 1991; Sharma & Elbow, 2000).

5.2.3 The teachers' roles and associated tasks

According to Leckie *et al* (1996:181), professionals may have work roles such as service provider, administrator/manager, researcher, educator and student. This is also affirmed by Baker (2004) and Wilkinson (2001), even though they indicate different roles. Kirby and Bogotch (1996) mention two roles for teachers: an information disseminator/provider role (involving acquisition and distribution of information) and resource provider role (involving provision of instructional resources for teaching and learning). Similarly, Uibu and Kikas (2008) indicate two roles for teachers: a knowledge/information disseminator role and a developer role, because teachers support development of students' physical, cognitive and social skills.

From the data (Chapter Four, section 4.2.2.4) identifying only three key work roles, the researcher's experience as a former geography teacher, the Leckie *et al* (1996) model and other literature, such as the work of Kirby and Bogotch (1996) and Uibu and Kikas (2008), the following potential work roles are noted for secondary level geography teachers in Lesotho:

- **Administrative/managerial role**, such as a class teacher, head of department, principal or deputy principal.

- **Committee role**, which may be perceived as not only administrative, but also involving social responsibility for learners in various issues such as sport, social problems, discipline and conduct, citizenry, etc.
- **Educator role** entailing training of learners to acquire and master certain skills. This requires the teachers to assess their learners, solve technical problems and participate in curriculum planning and development, as they are educators.
- **Researcher role** entailing continuous assessment of learners' progress and trying out new approaches and teaching methods in different situations in order to develop expertise and perhaps ultimately present in workshops, seminars and conferences.
- **Student role**, given that some teachers might be studying part-time or through distance learning with universities to improve their qualifications. It is evident in the data from prospective teachers (Chapter Four, Chart 4.5 and 4.6) that some of them had taught before studying at NUL. This is an indication of teachers' willingness to further their studies in order to attain higher qualifications.
- **Service provider role**, given that they provide a teaching service to their learners.
- **Information provider role** as explained by Kirby and Bogotch (1996), because they have to share and give information to colleagues and act as proxies in information-seeking.
- **Resource provider role** as explained by Uibu and Kikas (2008), which involves provision of instructional resources for teaching and learning.
- **Caregiving role** for vulnerable learners such as orphans in the schools in view of the high prevalence of HIV and AIDS in Lesotho, as well as adolescents who face challenges such as unwanted pregnancies and drug and alcohol abuse.

Considering the work roles above, the working context and environment of secondary level geography teachers in Lesotho and the need for secondary level teachers to prepare learners for employment as pointed out in Chapter One (section 1.1), once again it seems that there might be other factors whose information needs and information-seeking might be revealed by everyday life information-seeking models such as Savolainen (1995) to supplement the Leckie *et al.* (1996) model.

Leckie *et al* (1996:181) indicate that within the professionals' roles, there are embedded tasks. To corroborate this view, Vakkari (1999:824-5) affirms that a worker's job consists of tasks that are well identified by the workers, as they are primary actors. Leckie *et al* (1996:181) identify tasks such as assessment, supervising, counselling and report writing. Based on the data collected in this study, one can also include problem-solving, decision-making, reading, records management, developing personal notes, information-seeking and keeping abreast with the latest developments in geography teaching and learning, etc. It is important to highlight that the counselling task is associated with the caregiving role and social responsibility teachers have for orphans and other learners who might be facing adolescents' problems such as pregnancies or alcohol and drug abuse. The theoretical framework sheds light on identifying the work roles and the associated tasks of the in-service teachers who participated in this study because the study's data made it possible to identify the educator, administrator and committee work roles, as well as other roles interpreted and based on the researcher's experience and the literature.

It also transpired in some focus group discussions that some of these teachers are involved in other community and vocational services, such as national curriculum development and planning panels, geography teachers' associations and other professional associations such as the Lesotho Educational Research Association, church service committees, district and national sports associations and various clubs that are found in the schools, such as the Red Cross, Girl Guides, Students' Christian Movement, Boy Scouts, Spiritual Club, etc.

5.3 WHAT ARE THE INFORMATION NEEDS OF SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO?

This section interprets the data on information needs that were presented in Chapter Four (sections 4.2.3, 4.3.3 and 4.4.3). In order to understand the information needs of secondary level geography teachers, including the context in which they look for information, both in-service secondary level geography teachers (section 4.2.3) and prospective geography teachers (section 4.3.3) were asked to mention the topics on which they need information. The individuals, for instance teacher educators, curriculum developers, etc. who work in institutions directly involved in secondary level geography education (section 4.4.3) were also asked to indicate the information requests that secondary level geography teachers make to them. The

section also interprets the information needs' data based on the theoretical framework guiding the study.

5.3.1 What are geography teachers' information needs with regard to their teaching role?

In Chapter One (section 1.2) the principal research question stipulates the teaching role, while the Leckie *et al* (1996) model mentions the educator role. The teaching role and the educator role are interpreted as one and the same role in this study. Given that this study is about teachers, the educator/teaching role is fundamental and this study's emphasis is on the information needs pertaining to this role; hence these are highlighted and discussed distinctively in this section because they address the principal research question directly.

The interpretation of the data from the in-service teachers as presented in Chapter Four (section 4.2.3) is that for the fundamental educator/teaching role, the nature of information needed is current and accurate information for the content to be delivered in class. Conroy *et al* (2000) also found that one of the information needs for European secondary school teachers was current information, mainly because things change a lot in modern times, also regarding geography.

In the interest of serving the users with their preferred information format, it was important to ascertain the information format preferences of the secondary level geography teachers in Lesotho. Therefore, they were asked to indicate their preferred information format as electronic and print. Secondary level geography teachers (both in-service and prospective) who participated in this study mostly prefer print format. Although most of the prospective teachers (89.2%; 41 out of 46) belong to the Net Generation as described by Leung (2004), Oblinger and Oblinger (2005) and Tapscott (2009), the majority of them (71.7%; 33 out of 46 in Chart 4.9) still prefer print format. The reason might be that Lesotho is a developing country with limited access to modern digital information super highways and people still lack awareness of advanced modern ICTs. The in-service geography teachers indicated that print format is convenient because it does not require any equipment to access. Moreover, 'the skills to utilise print sources are more widespread than for electronic sources' (Julien & Michels, 2000:10). In-service teachers indicated a preference for print format for personal use and audio-visual format for teaching material for abstract physical geography themes. Dias

Gasque and de Souza Costa (2003), as well as Merchant and Hepworth's (2002) studies, also found that teachers prefer information in print format.

The scope of information needed is mostly physical geography content for themes such as geology and geomorphology, plate tectonics, marine erosion, map reading, volcanism, etc. The need for information for physical geography content and similar themes was also revealed in the data from the interviews with individuals from institutions directly involved in secondary geography education in Lesotho (section 4.4.3). The scope of information needed also includes teaching methods and accompanying teaching materials such as models, maps, charts, etc. and how to motivate the learners in class. There is evidence in section 4.4.3 that the teachers need previous examination questions and their marking schemes. In section 4.3.3, prospective teachers indicate the need for information for content, teaching methods, classroom management, learners' assessment, educational policies, the syllabus, adolescence social problems and how the schools perform in national examinations. However, the prospective teachers failed to spell out the scope of content and its specific themes needed, probably because of the structured questionnaire, limited time of teaching practice and limited practical knowledge and experience of teaching geography. The nature and scope of secondary geography teachers' information needs as expressed by all the participants in this study were also noted in studies such as those reported by Conroy *et al* (2000), Lan and Chang (2002), Mundt *et al* (2006), Perrault (2007) and Shulman (1987). Rakumako and Laugksch (2010:140) also point to the key role of teachers' pedagogical knowledge and skills in their subject area; they indicate that knowledge and beliefs regarding pedagogy, students, subject matter and curriculum are related to teachers' effectiveness.

5.3.2 Which factors trigger the information needs of geography teachers participating in the study?

It is evident from the Leckie *et al* (1996) model that information needs may be triggered by the professionals' roles and tasks and influenced by intervening variables such as demographics (Hargittai & Hinnant, 2006; Johnson, 1997; Taylor, 1991) and context (Courtright, 2007; Wilson, 1999). This subsection discusses the information needs triggered by the geography teacher's roles and associated tasks, except the educator/teaching role, because it was discussed in section 5.3.1.

5.3.2.1 Information needs triggered by geography teachers' roles and associated tasks

The literature (e.g. Leckie *et al*, 1996; Niedźwiedzka, 2003; Vakkari, 1999) indicates that roles imply tasks that trigger information needs. The information needs for the educator/teaching role have been succinctly presented in section 5.3.1. It is evident from the data outlined in Chapter Four (section 4.2.2.4) that teachers who participated in this study also have committee and administrative key roles with specific tasks that trigger different information needs. For instance, the disciplinary committee role involves decision-making and problem-solving that often requires information from legislation, regulations and policies. In addition to the educator/teaching role, as shown in section 5.2.1, the other roles interpreted for the geography teachers participating in this study are administrative, caregiving, committee membership, information provider, researcher, resource provider, service provider and student. These roles have various associated tasks outlined earlier and as data pointed out, most of these roles, in particular the administrative role and committee and service provider role, involve decision-making and problem-solving and may trigger information needs related to learners' family and social background, learners' talents and capabilities, adolescents' social problems such as pregnancies, drugs and alcohol abuse, school regulations and policies, educational policies and legal framework, etc. As indicated in the literature review, at a minimum the knowledge base required for teaching includes knowledge of the learners and their characteristics (Shulman, 1987:7). Therefore, it is not surprising for teachers to have information needs regarding learners' social background, talents and capabilities. The caregiving role may trigger information needs on social assistance for orphans, HIV and AIDS, grief counselling, etc.

Data revealed that the in-service teachers need information on educational policies, regulations and legislation to perform their administrative roles and disciplinary committee roles, while 58.70% of the prospective teachers mentioned that they needed this information during their teaching practice. There was no room in the questionnaire for the prospective teachers to mention the reasons for this need. Knowing more about the educational policies, regulations and legislation is not only about performing administrative roles and disciplining teachers and learners. It may also include knowing more about the curriculum standards and syllabus requirements because these are some of the things that are documented as policies. The Snyman and Heyns (2004) study identified curriculum, classroom activities and supportive study materials as matters pertaining to the information needs of Afrikaans language teachers in South Africa.

Other roles, such as information provider, resource provider, researcher and student, may involve tasks such as information-seeking, keeping abreast with the latest development in geography teaching and learning, acquisition of information and teaching resources, information giving and sharing, reading, etc. and may trigger a wide range of geography related information needs and geography pedagogy. De la Vega and Puente (2010:317) indicates that teachers not only require sources of information on the curricular areas they teach, on pedagogy, didactics and information technology, but also on issues learners face. Given the emphasis on physical geography themes by most participants (in-service teachers and interviews with officials from stakeholder institutions) it is not far-fetched to think that these roles also trigger physical geography information needs.

5.3.2.2 Information needs triggered by geography teachers' context

Considering that context may trigger information needs (Courtright, 2007; Leckie *et al*, 1996; Wilson, 1999), this subsection discusses information needs that may be triggered by context. Pattuelli (2008) mentions pedagogical, institutional and personal dimensions of context for teachers that may trigger their information needs. These dimensions were also evident in the data collected from the secondary level geography teachers in Lesotho. The data indicate that teachers not only need to find content to deliver in class, but also have to get information about the teaching methods to use, bearing in mind the complexity of the topic and the type of learners. This is interpreted as the pedagogical dimension. Moreover, data revealed that secondary level geography teachers consult the syllabus documents, legislation, regulations and policies; this is considered as addressing the information needs related to the institutional dimension. Personal dimensions were evident when some teachers decided to consult farmers, miners or colleagues in their association, while others accessed and used the internet. This is because environment (urban, rural), age, established social networks and attitude to technology were factors that influenced the information sources that the teachers consulted.

5.3.2.3 Information needs triggered by the demographics of participants

As indicated earlier, the Leckie *et al* (1996) model and other authors such as Hargittai and Hinnant (2006), Johnson (1997) and Taylor (1991) point out that information needs may also be triggered by demographics. This subsection discusses demographical factors of the study's participants that seem to trigger information needs.

From Chapter Four (Table 4.1) it is evident that most of the in-service geography teachers (75.61%; 62 out of 82) who participated in this study have bachelors' degrees in Arts and Education, while 12.19% (10 out of 82) of them have science and science education degrees. Similarly, Chart 4.4 shows that 56.6% (26 out of 46) and 21.7% (10 out of 46) of the prospective teachers who participated in this study are studying B Ed and BA Ed respectively, while 21.7% (10 out of 46) are studying BSc Ed. Chapter One (section 1.10) pointed to the physical and human geography knowledge disparity that secondary level geography teachers graduating from NUL may have owing to their degrees, which may be a BSc Ed, BA Ed or B Ed. This factor also transpired in one of the interviews with officials from institutions directly involved in secondary geography education in Lesotho. (See Chapter Four, section 4.4.3.) As a result, one would assume that BSc Ed graduate teachers would need human geography information, while BA Ed and B Ed graduate teachers would need physical geography information. However, all the teachers, including BSc Ed graduates, expressed a dire need for physical geography information and actually indicated that physical geography is very abstract. It was noted that even though the BSc Ed teachers learn more physical geography content at NUL, they do not take a course called 'geography educator' that prepares prospective geography teachers to teach geography in schools. They study too much physical geography content that is very abstract and highly scientific, but lack the pedagogical skills to deliver it to learners. Therefore, proper geography teacher training covering relevant content and pedagogy is essential.

Leckie *et al* (1996:182) reveal demographic variables such as age, profession, specialisation, career stage and geographic location. There is no evidence in the data revealing the information needs being triggered by age, profession (type of degree in this study), career stage (number of years as a teacher) nor geographical location (urban vs. rural; lowlands vs. highland, district). The information needs the participants mentioned were the same irrespective of the age of the participants, their type of degree as discussed in the above paragraph, and their schools' district. However, these demographic variables influenced the preferences for information sources and the information-seeking patterns; seemingly they influence the information behaviour of the in-service teachers in the survey. For instance, differences are noticeable between the teachers' age and the use of the internet and the geographical location and the choice of information sources, such that the rural schools reveal a close working relationship with their communities. Career stage influenced the information-seeking in terms of where to start looking for information. These factors are discussed in

section 5.4.4. It is important to point out that there was a noticeable difference in the degree of information needs satisfaction between in-service teachers and prospective teachers who participated in the study and this is discussed in section 5.3.3.

5.3.3 Is the available information meeting the information needs of these teachers?

It is the ultimate goal of this study to guide the design and implementation of an information service for secondary level geography teachers in Lesotho. Therefore, it was imperative to establish if these teachers' information needs are being satisfied by the information that is available, lest one designs and implements an information service that is not needed. As a result, the teachers were asked to indicate if the information that they have satisfies their information needs. Prabha *et al* (2007) explain the information parameters within which users operate to determine what and how much information may meet their needs. These scholars indicate that users may decide that the information will be sufficient to meet their needs after chasing and evaluating references, after identifying content that is of interest and relevance to them.

As indicated in Chapter Four (section 4.2.3.5), the in-service teachers expressed dissatisfaction with the following:

- Information that they have is mostly outdated since it is mostly in the form of books that were published some years previously. It does not satisfy them because they need current information.
- There is some shortage of information generally to compare authors' views, clarify some topics and supplement textbooks' information where necessary.

Using the Prabha *et al* (2007) model of information needs satisfaction, one deduces that the information parameter of secondary level geography teachers in Lesotho is characterised by the need for current information and a variety of information sources to compare and contrast different views.

The majority of the prospective teachers (56.52%; 26 out of 46) indicated that sometimes the information they found satisfied their needs, while 39.13% (18 out of 46) showed that the information often satisfied their needs (see Table 4.13). Comparing these two percentages, one establishes that the information needs are not always addressed by the information that is available in the schools. This could be the reason why the teachers have to go beyond the

schools' premises to seek information. This means that there is a need for improvement and delivering more appropriate, timely, current and accurate information to secondary level geography teachers; such information should, however, be relevant to their needs, covering the scope of required information as discussed in 5.2.1. For instance, it is evident from the data that such information should be more related to physical geography, especially the more abstract and complex topics, and should not only be accurate and authoritative, but also current. It is also evident that teachers need information on general problems the learners are facing.

Although it often transpired during the focus group discussions with the in-service teachers that the information in their schools is outdated and limited in quantity, on the contrary 26.09% (12 out of 46) of the prospective teachers indicated that they experienced too much information when preparing lesson plans, while 60.87% (28 out of 46) experienced an average information load and 13.04% (6 out of 46) experienced a shortage of information (see Table 4.14). This contradiction between the in-service and prospective teachers should be seen in view of the fact that in-service geography teachers are professionals in practice with some exposure to teaching a variety of topics over an extended period of time and have more knowledge and experience of teaching geography. Most of the prospective teachers have limited experience or a total lack of experience in teaching and their teaching practice lasts only about three months. During this short period they may be given topics that are simple to teach with teaching materials and information available in the schools. While the teaching practice period provides practical teaching exposure to the prospective teachers, it is too short for gaining insights into the entire geography syllabus and its demands.

5.4 WHAT ARE THE INFORMATION-SEEKING PATTERNS OF SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO?

This section interprets the data on information-seeking patterns for secondary level geography teachers that were presented in Chapter Four (sections 4.2.4 and 4.3.4). Information-seeking is a process in which information needs are pursued, or in which problem-solving takes place in a particular context (Foster, 2004:228). The information-seeking process is initiated by a recognised need for information and a decision to act on it (Byström & Hansen, 2005:1055) and information-seeking should reflect the experiences of the information seeker (Foster, 2004:234). In this study, information-seeking is considered as

the actions that secondary level geography teachers (i.e. in-service and prospective) take to obtain the required information for teaching, following the information needs presented in Chapter Four (sections 4.2.3, 4.3.3 and 4.4.3) and interpreted in section 5.2.1. Investigating these information-seeking patterns was a process of examining ways in which the teachers find the information that they require for teaching, in particular how and where they look for such information.

Data from the in-service teachers were collected through focus group discussions, hence it is qualitative, and allowed the researcher to investigate information-seeking patterns. Data from the prospective teachers were collected through a structured questionnaire and did not permit deeper inquiry on information-seeking patterns. Hence data on information-seeking patterns from the prospective teachers and in-service teachers are presented separately.

5.4.1 What are the in-service geography teachers' information-seeking patterns?

This section interprets data on information-seeking patterns of the in-service teachers that were presented in Chapter Four (section 4.2.4). The information-seeking patterns were investigated by asking the in-service teachers how they usually find the information for teaching when they have to start a new topic in class. The results showed that the in-service teachers' pattern for the information-seeking process differs. Some teachers (mostly inexperienced) indicated that they start with the syllabus to establish all the details that need to be covered for the new topic and then move on to books. Others start with books, then consult other geography teachers, then science, agriculture and development studies teachers, if the topic is related to any of these subjects. There was some indication of using the internet, which shows that the teachers are taking advantage of information and communication technologies where available and accessible. The internet was reported to be used mostly in the urban schools, particularly by younger teachers. In addition, depending on the complexity of the topic, some of the teachers go to other neighbouring schools and/or their associations. If generalised, the findings on the information-seeking patterns of the in-service secondary level geography teachers in Lesotho for their teaching role can be interpreted as depicted in Figure 5.1 below. This is further explained in subsequent paragraphs.

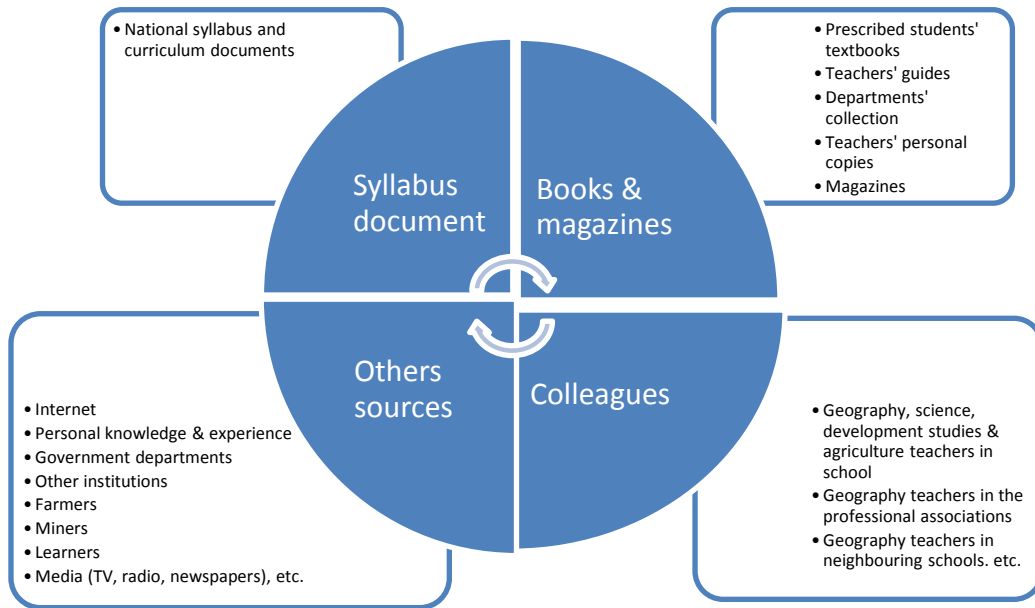


Figure 5.1: Secondary level geography teachers' information-seeking pattern

The information-seeking patterns presented in Figure 5.1 shows that the in-service teachers' information-seeking for the educator/teaching role starts with the syllabus (particularly inexperienced teachers), then the learners' textbooks; if the information is still inadequate or conflicting, more books and magazines are consulted. This is followed by consulting colleagues in the school. Some younger teachers in the town schools use the internet, while experienced teachers consult colleagues in other schools or in their associations. Depending on the topic, the teachers in rural schools consult the miners and farmers in their communities. It is important to point out that it was found that throughout the information-seeking process, personal knowledge and experiences are used mainly:

- As a source of information to critique the information that is found;
- To guide the process of teaching; and
- To guide the information-seeking process, that is, which sources are likely to be useful, given the task in hand.

The information-seeking pattern above affirms Sánchez and Valcàrcel's (1999) study, which found that in general teachers used the students' textbooks as the principal source of reference although they also consulted magazines and other textbooks if the students' textbooks were considered to provide insufficient information or if the teachers did not agree with the information provided in the students' textbooks. Heavy reliance on books by teachers was also revealed by Nwokedi and Adah (2009). In addition, Tanni *et al's* (2008)

study reveals that teachers often start by reading the textbooks to familiarise themselves with the topic. The use of colleagues as a source of information also appears in the Leckie *et al* (1996) model, while Noh *et al* (2004:1276) mention that teachers procure teaching and learning resources by various means, such as obtaining the materials distributed by local educational institutes, exploring the internet and subscribing to magazines.

Wilson's (1999) nested or onion model of information behaviour encompasses information-seeking behaviour, which also encompasses information search behaviour and then information retrieval in such a manner that the inner rings are subsets of the outermost ring (i.e. information behaviour). Information behaviour is the broader concept comprising information-seeking, information-searching and information retrieval. In Figure 5.2 below the idea of a nested model is borrowed to depict an onion model in an order moving from specific to general.



Figure 5.2: Secondary level geography teachers' information-seeking using the nested model

In Figure 5.2 the onion model is used to depict information-seeking, which starts from the small inner component and expands to the next ring, depending on the complexity of the information need, until the information need is addressed. The model also reflects commitment to information-seeking among the teachers who participated in the survey to pursue various sources on different levels to find information. These data, however, do not reflect on information-searching and retrieval through actual interaction with information systems, nor does it reflect on the fact that some information needs are not recognised. It was mentioned in Chapter Two (section 2.4.1), that this study focuses on active information-seeking because it is informed by the teachers' perceptions and views on their information-seeking and focuses only on the information needs recognised by the participants.

5.4.2 How do secondary level geography teachers seek information?

This section offers a combined interpretation of the data from the in-service and prospective secondary geography teachers. Both groups were asked about their style of information-seeking, with the question presented in a manner that both groups would understand. In Chapter Two (section 2.4.1), it was mentioned that active information-seeking can be done purposely, serendipitously, collaboratively and through proxy. Moreover, these four different styles of information-seeking were explained. The results of this study show that both the in-service and the prospective secondary level geography teachers engage in the four information-seeking styles.

The data for the information-seeking styles by the prospective teachers are presented in Table 4.15 (in Chapter Four) and show that:

- Purposeful information-seeking was engaged in by 58.70%, 27 out of 46 (often) and 26.09%, 12 out of 46 (sometimes).
- Serendipitous information-seeking was engaged in by 15.22%, 7 out of 46 (often) and 60.87%, 28 out of 46 (sometimes).
- Collaborative information-seeking was engaged in by 45.65%, 21 out of 46 (often) and 39.13%, 18 out of 46 (sometimes).
- Information-seeking through proxy was engaged in by 21.74%, 10 out of 46 (often) and 45.65%, 21 out of 46 (sometimes).

The data in section 4.2.4.1 show that the in-service geography teachers engage in these four information-seeking styles. For in-service teachers, qualitative responses are provided as evidence in Chapter Four (section 4.2.4.1), while for prospective teachers percentages only are given. This is because data were collected and analysed using different techniques for these groups. For instance, purposeful information-seeking is done by individuals for lesson planning. It is also done when there is a problem to be solved in the committees or tasks to be carried out to fulfil administrative roles. Serendipitous information-seeking was mentioned to be done through interaction with the media, in particular TV, radio and newspapers, to keep up to date with the latest developments. This is supported by Mundt *et al* (2006:9) when they mention that for keeping up to date with local and international affairs, mainly in the form of everyday life information-seeking, teachers use newspapers, magazines, TV, educational journals and the internet. In addition, Conroy *et al* (2000) found that the press and television are used by the teachers because they cover current affairs.

Discussing collaborative information-seeking and retrieval, Foster (2006) argues that ‘settings have emerged in which information is gathered specifically for collaborative purposes, or individuals collaborate directly or indirectly with other users to engage in seeking, searching and retrieving information’ (Foster, 2006:329). From the in-service teachers’ responses, it was established that collaborative information-seeking is done through team teaching, and the activities of the geography teachers’ associations where they prepare schemes and plans of work together, set the examination questions, including their marking schemes, and hold seminars. Therefore, the geography teachers’ associations seem to be settings in which information is gathered for collaborative purposes and where teachers collaborate for information-seeking. Deaney and Hennesey (2007) also mention collaborative efforts among secondary level geography teachers in the UK, such as collaboratively developed schemes of work and sharing of resources.

Information-seeking through a proxy, occurs when information is sought through someone else or some intermediary. Considering that Kirby and Bogotch (1996) and Uibu and Kikas (2008) indicate that teachers have the role of information provider and knowledge/information disseminator, involving acquisition and distribution of information, it is not surprising to find that the teachers (both in-service teachers and prospective ones) use other people to find information on their behalf, as shown in section 4.2.4.1 and Table 4.15 respectively. They use proxies such as the heads of departments, learners, younger teachers,

family and relatives such as children, nieces and nephews and sometimes farmers and miners in the communities. It is also not surprising to find that colleagues are often consulted because that is information-sharing and giving among professionals, as noted by Baker (2004), which might be interpreted as another form of information-seeking through proxies.

5.4.3 What are the challenges that secondary level geography teachers encounter when seeking information?

This section interprets challenges that both in-service and prospective teachers encounter when seeking information. Williams and Coles (2007a) indicate that the main barrier in information-seeking and use for teachers was limited time. Shanmugam (1999) also mentions barriers to information-seeking among educators as shortage of time, inadequate library facilities, unavailability and inaccessibility of information, and inability to locate up-to-date information. Table 4.16 shows the difficulties that prospective teachers face when seeking information. These difficulties could be summed up as lack of information sources and relevant information that could address the syllabus demands, lesson plan requirements and lack of up-to-date information, which is pertinent in teaching or in any profession. Limited time was also a difficulty that some of the prospective teachers experienced. Similarly, the in-service geography teachers expressed the challenges they faced as lack of resources such as time and money, telephones and the internet. Other challenges are the heavy teaching loads and too many learners in a class that make it difficult to find time for exhaustive information-seeking. This is coupled with a general lack of variety of information sources. A heavy workload was also pointed out by Snyman and Heyns (2004) as a factor affecting the teachers.

5.4.4 What are the factors that influence information-seeking of secondary level geography teachers?

There are factors that the teachers have to consider when selecting or seeking information; and these factors also influence their information-seeking processes. These factors have been articulated by scholars such as Mundt *et al* (2006:11) and Perrault (2007). In addition, Woodsworth and Williams II (1993:10) mention that the following factors are important to consider in the process of selecting information:

- Reliability of the source of information.
- Verifiability of the information.

- The currency of the information.
- The potential short-term and long-term useful life of the information.
- The actual versus dormant need for the information.

The in-service teachers were asked to indicate the factors that they would consider when selecting a book/document for geography teaching. The reason for this question was to inform the person who will be implementing the information service for these teachers about the factors to consider when selecting relevant information that will be disseminated to these teachers. Wu *et al's* (2005) study found that the teachers' choice of resources on the internet was determined by accuracy and currency of information, as well as the attractiveness of the web site. Shanmugam (1999) also found that information currency and relevance were very important considerations in information-seeking. Tanni *et al's* (2008) study found that when processing information, the teachers chose only the parts of a document that would be understood by their learners, so they simplified the vocabulary and reduced and synthesised information. Lundh's (2005) study indicates that it was considered more important to find material that is useful in classroom situations than finding what is scientific. In essence, the most important criterion for material selection is its applicability in the classrooms.

The teachers who participated in this study indicated that they considered the following factors when selecting books/documents for teaching geography:

- The contents should address the syllabus.
- The language should be appropriate for the level of the learners.
- Colourful illustrations in the form of diagrams, photos and maps are important.
- The learners' activities are considered because they enhance understanding of the concepts and principles.
- The date of publication is crucial because current information is considered to be vital in geography.

The need for the contents to address the syllabus concerns the relevance of information to teaching requirements. This is affirmed by Shanmugam (1999). The notion of considering the language level of the learners is also supported by Tanni *et al* (2008), and colourful illustrations to enhance understanding and to draw learners' attention are mentioned by Wu *et al* (2005). Lundh (2005) emphasises applicability of the information to the classroom

situation. Information can be applicable in the classroom if it is relevant, uses language that is appropriate for the learners, is associated with activities that will enhance learning and also has colourful illustrations; these are also the factors that the secondary level geography teachers in Lesotho mentioned. Currency of information was expressed under information needs and it is also indicated as a factor to consider when selecting information for teaching. This is also acknowledged by Shanmugam (1999) and Wu *et al* (2005).

As mentioned in Chapter Two (section 2.4.2), information-seeking may be influenced by different factors, such as the personality of the information seeker, the urgency of the information need, the context or situation of the information seeker and the availability of information sources (Heinström, 2005:229). In addition, information-seeking is affected by the sources of information and awareness of information (Leckie *et al*, 1996). Since this study is guided by the Leckie *et al* (1996) information-seeking model, it considered age and career stage, which are aligned with teaching experience, as well as other experience relevant to their work, geographic location of the schools where the teachers work and the teachers' qualifications. Although it was established in the subject literature that gender is a variable for the demographics, it was not considered in this study because the study focuses on teachers as professionals and it is envisaged that the professionals' gender may not be important in this case. However, in the focus groups it was evident that more female teachers reported the use of TV compared to male teachers, while more male teachers reported using newspapers than female teachers. This is an observation worthy of reporting, even though the initial intention was not to consider gender as a variable.

The results of this study show that information-seeking (but not the information needs as such; see section 5.3.2.3) among the in-service teachers is influenced by age, teaching experience and location of the schools. For instance, most of the younger teachers, who are also inexperienced, who are teaching in urban schools indicated that they use the internet. To some, the internet is available in their schools, while others mentioned that they go to internet cafés to access the internet in order to get information for their teaching. In most cases, the older teachers with long teaching experience indicated that they had never had any guidance or training on how to use the internet and various electronic resources; some also mentioned that they had never used the internet. They mentioned that they depend on the younger teachers as well as younger family members such as their children, nieces and nephews to find information on the internet on their behalf. However, they tend to use colleagues in their

schools, in neighbouring schools and even in their association more often when compared with the inexperienced, younger teachers. The reason could be that the experienced teachers have established networks and know more places where they can find information and they have less confidence in their ability to seek information using modern ICTs such as the internet. The researcher also found that the rural schools' teachers tended to consult the farmers and miners in their communities on topics related to farming and mining. Sometimes the farmers and miners are even invited to be resource persons in their classes. Yet, there was no mention of this in the urban schools. The reason could be that there are better working relations between the rural schools and their communities. In addition, there are more farmers and miners available in the rural areas compared to the urban areas.

There was no evidence that qualification has any influence on information-seeking. One would think that the teachers with a science education background would be seeking more human geography related information, while the teachers with a humanities background would be seeking more physical geography related information in view of their NUL training background. However, it transpired during all the focus group meetings that the teachers need more physical geography information and teaching material irrespective of their qualification. The reason could be the one mentioned by INT 4 (section 4.4.3) that the science education students at NUL do not take the geography educator course and therefore lack the pedagogy for the subject. In addition, the physical geography content that they study is too abstract for the learners, making it difficult to apply in the classroom. As noted earlier, it is important for teachers to find information that is applicable in the classroom.

Considering the theoretical framework guiding this study, one would like to summarise that Leckie *et al* (1996:185) point out that knowledge of various information sources and the perceptions formed about information retrieved play a crucial role in the overall process of information-seeking. These scholars argue that knowledge and awareness of information, in particular content, can determine the course of information-seeking. It is mentioned that professionals will consult sources with which they are familiar and have had prior success in using to satisfy an earlier information need. Professionals consult sources that they trust will provide accurate information in a preferred format. Furthermore, professionals use sources that they know will deliver the information on time and are accessible in terms of distance and cost. It transpired from the teachers that they use sources with which they are familiar and that they trust will provide accurate information. For instance, the use of colleagues in

other schools and in the associations occurs through established networks used mostly by the experienced, older teachers. These networks are trusted and respected because these teachers have used them over time and they are aware of their reputation (Leckie *et al*, 1996).

5.5 WHICH INFORMATION SOURCES DO SECONDARY LEVEL GEOGRAPHY TEACHERS MOSTLY USE?

The Leckie *et al* (1996) information-seeking model for professionals that is guiding this study articulates that the sources of information used by professionals are colleagues, librarians, handbooks, journals and their own personal knowledge and experience that they gained while training for their profession. It transpired that the in-service teachers mostly use colleagues, personal knowledge and experience, books, media and resource persons such as farmers, miners and institutions that have information related to geography. The internet was reported to be used by younger teachers in the town schools. There was very little indication that journals are used by these teachers. In fact, only two focus groups reported having journals and using them. The rest of these teachers indicated that they did not have access to journals. They last used journals when they were at university. It was also noted that the younger teachers who indicated that they used the internet were not yet fully taking advantage of free web journals.

Landrum *et al*'s (2002) study found that teachers generally rated colleagues, workshops and in-service presentations as accessible, trustworthy and usable sources of information and professional journals were found to be less trustworthy, less usable, and less accessible when compared with information from colleagues. In this study, it was found that the in-service teachers trusted their colleagues and their associations for information. It transpired that the in-service teachers only attend the workshops that are organised by their associations because it has been a long time since the MOET organised any workshops for them. It was evident that the teachers' associations were active in organising workshops and seminars and thus provided and facilitated a lot of information dissemination and sharing. However, the associations do not document the activities of these events into reports, which are deemed as important sources of information that could be consulted by teachers, because of lack of advanced documenting and report-writing skills. It is the researcher's opinion that in a situation of shortage of information sources, all efforts must be made to document things properly by producing reports, as they are potential sources of information. Information can

be made available in different forms and formats, and can be accessed through different means. The next section discusses internal and external sources of information.

5.5.1 Internal vs. external information sources

Krikelas (1983:17) refers to internal and external information sources in organisations and within and outside of people. Hence there is tacit knowledge and explicit knowledge; people tend to use both internal and external information sources. The results show that the secondary level geography teachers, both in-service and prospective, use both internal and external information sources, given that 67.39% (31 out of 46) of the prospective teachers mentioned having sought information both in and outside their teaching practice schools (see Table 4.12). In addition, the in-service teachers indicated that they used their books, colleagues in their schools, and colleagues in neighbouring schools as well as in their associations. There is also evidence of reliance on personal knowledge and experience, which is an internal source of information. They also mentioned that they used government ministries and other institutions, including farmers and miners in the communities, and internet cafés. This has also been confirmed in interviews with people in the institutions directly involved in secondary geography education in Lesotho. It is thus clear that internal and external sources of information are used. Williams and Coles (2007a) found that teachers tend to rely on readily available resources, particularly those available in the school. On the contrary, the teachers who participated in this study indicated that they made every effort to find information because they go even beyond their schools' premises. The main reason for this could be awareness of lack of sources in their schools.

Byström and Järvelin (1995:196) refer to people, experts, literature and official documents as information sources. The in-service teachers indicated that they used farmers and miners who are experts. The literature they claimed to use is mostly in the form of books: the syllabus, policies, regulations and legislation used in teaching and disciplinary cases are official documents and have been mentioned as some of the information sources consulted. The individuals who were interviewed from the institutions directly involved in secondary geography education are not only external sources of information, but also experts. They are also consulted for information; this was mentioned by the in-service geography teachers and confirmed by individuals who were interviewed. This is a clear indication of the use of external experts as information sources.

As indicated in Table 4.17, the prospective teachers indicated that they mostly used the following information sources:

- Books were used by 91.31% (76.09% often and 15.22% sometimes).
- Teachers at the schools were used by 89.13% (42 out of 46), which included 43.48% indicating often and 45.65% indicating sometimes.
- Personal knowledge and experience were used by 84.78% (41 out of 46), which included 45.65% indicating often and 39.13% indicating sometimes.
- Personal friends/family/relatives were used by 63.04% (29 out of 46), which included 17.39% indicating often and 45.65% indicating sometimes.
- Media were used by 54.35% (25 out of 46), which included 17.39% indicating often and 36.96% indicating sometimes.
- School libraries were used by 47.82% (22 out of 46), which included 30.43% indicating often and 17.39% indicating sometimes.

The above bullet points confirm once again the use of external and internal information sources. It is evident that both in-service and prospective geography teachers often use books, colleagues in the form of teachers and friends, personal knowledge and experience and media. Although the in-service teachers indicated that they used some government ministries, institutions and their associations, most of the prospective teachers indicated that they never used these sources during their teaching practice (see Table 4.17). In addition, while 47.82% (22 out of 46) of the prospective teachers mentioned having used school libraries during their teaching practice, the majority of the in-service teachers hardly ever used their libraries, as shown in 4.2.5.2. (School libraries are discussed in the next section.) The differences in the use of information sources by the in-service teachers and the prospective teachers could be attributed to the short span of the teaching practice period, lack of teaching experience and knowledge of institutions that could provide information on the part of the prospective teachers. It seems that there is over-dependency on internal information sources by prospective teachers during their teaching practice, while in-service teachers tend to use internal sources with some over-dependency on external sources.

5.5.2 School libraries and journals

Section 4.2.5.2 shows that the in-service teachers hardly use libraries and journals. Journals are not available in most schools, and where they exist they are outdated. Some schools do not have school libraries and neither do they have any public library in their vicinity. Moreover, where school libraries exist, the teachers mentioned that the libraries are manned by unskilled people who are incompetent to deliver the desired information service. This observation was also noted in Chapter Four (section 4.2.5.2). Furthermore, they are stocked with outdated information that is not even related to geography. The situation of school libraries found in this study confirms Kakoma's (1999) study, which found that most of the secondary schools in Lesotho do not have school libraries. Where libraries exist, they are manned by people with no qualification in librarianship, they do not receive adequate financial support and the opening hours are not consistent owing to shortage of staff and lack of guiding policies. O'Connor (2009:280) notes that school librarians have perpetually been in short supply because school librarians had less access to advanced education, both for socio-economic reasons and because of the availability of fewer library training programmes in the past. In the same vein, Mafube (2005) indicates lack of school libraries and information resources in the secondary education sector in Lesotho.

The poor situation of school libraries in Lesotho seems to be common in other African countries as well. Adeyemi (2008:96) reviews literature on school libraries' situation in several African countries such as Ghana, Kenya, Namibia, Nigeria, South Africa and Sudan. It is indicated that in South Africa, while some schools have excellent library facilities, others have nothing that can be vaguely called a library. There is low level of school library provision in township schools (Dubazana & Karlsson, 2006:8) and most schools have either no library or defunct library programmes (Zinn, 2006:21). Adeyemi's (2008) literature review indicates the situation of school libraries in Africa as characterised by:

- Untrained personnel who serve in libraries on a part-time basis because they are full-time teachers;
 - Inadequacies in funding and personnel;
 - Educational authorities' failure to address the needs of school libraries;
 - General lack of school libraries in many schools;
 - Poor standards of African schools' libraries when compared with developed countries;
- and

- Lack of coherent policies on school libraries.

Adeyemi's (2008) views have also been raised by in-service teachers who participated in this study as outlined in Chapter Four (section 4.2.5.2). These views are also corroborated by several studies in KwaZulu-Natal, South Africa such as Du Toit's (2009) study on school library policy and its feasibility for implementation in the province, Dubazana and Hoskins's (2011) study on promoting equitable access to school libraries, Dubazana and Karlsson's (2006) study on integration of the school library into the curriculum, Hoskins's (2006) study on libraries and teacher-librarians, Tiemensma's (2006) study on school libraries in support of voluntary reading, and Zinn (2006). Moreover, the partial observations of school libraries' that were discussed in Chapter Four (section 4.2.2.3) also show similar issues noted by Adeyemi (2008). For instance, all the school libraries that were observed in this study are staffed by people with no qualification in library and information science. Five school libraries that were observed are serviced by full-time English language teachers, while two are serviced by full-time school office clerks who serve in the library on a part-time basis. Nonetheless, ten school libraries observed were serviced by full-time staff. None of the libraries had any budget.

5.5.3 Information sources needed by in-service teachers

The in-service teachers were asked about information sources that were not available in their schools but that they felt they needed. They mentioned the internet, maps, charts, models and videos as the resources that they really needed. The teachers regard the internet as a source of current information that is needed by both the teachers and the learners. Great emphasis was placed on the internet as though it is perceived to be a solution to many information related problems in the schools. A similar perception about the internet among in-service secondary level geography teachers was noted by Perrault (2007:3) who cited that many teachers are convinced that the internet can help with instructional planning and the creation of learning activities for learners. Perrault (2007) further indicates that even though the internet has the potential to offer resources the teachers seek, some teachers' experience with the internet is that it is time-consuming. They express frustration with the quality of the results, while others are overwhelmed when a search yields thousands of results. In addition, the teachers may also not access the information they want adequately because they lack the necessary skills to use the internet efficiently and effectively. Most of the experienced in-service teachers (who are

older) indicated that they had never used the internet; neither had they ever had any guidance in using electronic databases. It is obvious that they do not have any internet navigational skills. Therefore, it is important that the availability of the internet is assured, along with training for its effective use.

As pointed out earlier, the in-service teachers need maps, charts, models and videos and regard them as teaching materials or aids that will enhance understanding of abstract physical geography among the learners. There was a clear indication that it is frustrating to teach some physical geography topics without these sources. The need for the internet, models and videos was also mentioned in most of the individual interviews that were conducted with stakeholders (see section 4.4.5). One notes that Borgman *et al* (2005:651) also identified maps, photography, census data and images as primary sources of information for geography educators.

5.6 WHICH INFORMATION SOURCES ARE AVAILABLE AND ACCESSIBLE AT SCHOOLS PARTICIPATING IN THE SURVEY?

Information sources have to be available and accessible in order to be used. Since the ultimate aim of this study is to guide the design and implementation of an information service for secondary level geography teachers, it was important to establish the information sources that are currently available in the schools so that the information service that is being designed can incorporate the information sources that already exist in the schools in order to avoid ‘reinventing the wheel’ and duplication of efforts. Both the in-service teachers and the prospective teachers were asked to indicate the information sources that were available in the schools, whether the sources provided sufficient information and whether they had experienced restrictions when using the sources.

The data on the availability and accessibility of information in the schools are presented in section 4.2.5.1 and Table 4.10, as collected from the in-service and prospective geography teachers respectively. In these data, 60.87% (28 out of 46) of the prospective teachers indicated that their teaching practice schools had libraries, 28.26% (13 out of 46) felt that the school libraries provided them with sufficient information and 43.48% (20 out of 46) experienced no restrictions in using the library. However, of the 28 focus groups that were held with the in-service teachers, only two focus groups expressed that they were not only

satisfied with the information from their libraries, but also experienced no restrictions in accessing the libraries. In the rest of the focus groups, the in-service teachers stated that their libraries had outdated books with no relevance to geography. It was evident from some of the in-service geography teachers' comments that accessibility and availability of information on the school premises present a problem. This is because although some schools have school libraries, the teachers do not have access to them owing to lack of personnel to open the library at convenient hours. Similarly, a few schools have access to the internet, but it is in the school offices and computer laboratories, with none in the staff room. In Lesotho schools, the office is used by the principal, deputy principal and secretary; the teachers use the staff room. Hence the teachers feel that facilities that are in the office are for the occupants of the offices, not for them. They believe that the internet would be accessible if it was available in the staff room. It was mentioned that the computer laboratory is intended for the practical training of learners who take computer science as a subject, thus making it less accessible for use by the teachers. De la Vega and Puente (2010:312) indicate that the availability of printed, audio-visual and electronic information to the teachers is limited.

5.6.1 Awareness of information among geography teachers in the survey

Considering that this study is guided by a theoretical framework of the Leckie *et al* (1996) model, it is important to highlight the component of awareness of information among the secondary level geography teachers who participated in this study. According to Leckie *et al* (1996:184-185), awareness of information concerns direct or indirect knowledge of various information sources and the perceptions formed about them. Table 5.1 links the factors comprising awareness of information from Leckie *et al* (1996) to the geography teachers in the survey.

Table 5.1: Awareness of information among geography teachers in the survey reflected in the Leckie *et al* (1996) model

Leckie <i>et al</i> (1996) awareness of information	Link to the geography teachers in the survey
Familiarity and prior success in using the information source	The use of farmers and miners in the communities in most rural schools that participated in the study is an indication that these teachers are familiar with the farmers and miners and aware of their willingness to offer information.
Trustworthiness (how reliable and helpful the information is)	The community (farmers and miners), as well as colleagues in other subjects, neighbouring schools and the professionals' association are trusted and considered reliable and helpful.
Packaging (convenience and usefulness)	Preference for print format, as it is considered convenient and useful, while the audio-visual format in the form of videos is helpful for teaching abstract physical geography topics.
Timeliness (found when needed)	The frequent use of information supplied by colleagues is an indication that colleagues are found whenever needed.
Cost (relatively cost-effective)	It is relatively cost-effective to use information in the vicinity. But owing to the complexity of information needs and lack of information sources in the schools, teachers go even beyond school premises to seek information.
Quality (level of detail, accuracy, etc.)	Certain books, particularly the textbooks prescribed during their teacher training at university, are considered to be detailed and accurate. However, textbooks for JC level are considered to be of poor quality because of typographical errors, lack of detail in articulating concepts and conflicting information.
Accessibility (relative ease of access)	Teachers tend to use information sources that are accessible to them; however, they still go out to seek more information, depending on the complexity of the need and their level of determination to find the information needed.

Table 5.1 focuses on information awareness component of the Leckie *et al* (1996) model based on the results of the study particularly on the in-service teachers. The next section focuses on the outcomes and feedback component of this model still based on the results of the study.

5.6.2 Outcomes and feedback component of the Leckie *et al* (1996) model in the survey

The last component of the Leckie *et al* model (1996) is about the outcome and feedback of information-seeking, which is described as the results of the information-seeking process (Leckie *et al*, 1996:187) and this includes completing tasks, meeting information needs and realising the operational benefits of achieving professional development goals (Leckie *et al*, 1996:187).

The outcome of and feedback on information-seeking for teachers studied depend on the roles and tasks that led to the need for information. As shown in Figure 5.3 and discussed in section 5.3.1, teachers show a high level of commitment to information-seeking; they go to great lengths to find information even beyond their premises, although they work under difficult circumstances. For instance, the educator role involves teaching. The outcome of information-seeking in the teaching situation is the recognition of the end of a topic. This means that the essential elements of the topic as required by the syllabus have been clearly communicated to the learners. This is usually identified through testing and evaluation of the learners at the end of the topic. It should be understood that one topic is covered over a number of lessons. During marking, the teacher gets some feedback on the outcome. The desired outcome is that the learners have learned about the topic, acquired the knowledge and mastered the skills associated with the topic. Some feedback is found immediately at the end of the lesson because the teachers may evaluate the lesson by asking a few questions to assess if the learners grasped the lesson objectives.

Based on the researcher's experience as a former geography teacher, the outcome of information-seeking might be the final result at the end of the national examinations. This is considered as important feedback on whether the information-seeking and information delivery has been successful. If the outcome is desirable, it means that the learners passed well. Therefore, the teacher knows that his/her information-seeking was desirable in the sense that the right information was obtained and was delivered appropriately to the learners. However, it should be noted that there are many factors that affect the performance of the learners in examinations.

The administrative role and committee role usually require information when there is a problem to be solved and/or when there is a need to address some issues. For instance, if one is in the orphans' committee, then one has to identify the orphans and look for organisations that offer social assistance to orphans. When the orphans receive social assistance, information-seeking might end. If there is a teacher or student who requires to be disciplined, information on the procedures will be sought and when the disciplinary action has been taken, information-seeking ends. However, in most situations the end might only be temporary since information-seeking resumes when similar situations recur.

In the model that is guiding this study, the outcomes are the results of the information-seeking process. It may be considered as the end result of the work related requirements of specified work roles and tasks (Leckie *et al*, 1996:187). The optimal outcome is when the information need is met and the professional has accomplished his/her task. However, it is possible that the outcome does not meet the information need such that the task is not accomplished and therefore further information-seeking is pursued. This has been outlined as the feedback loop on the model (Leckie *et al*, 1996:187). The teachers' information-seeking process starts with the syllabus, then books (textbooks and teacher copies). If the information is not enough or unsatisfactory, more sources, such as colleagues, additional books and the internet are consulted. There is evidence that the teachers make concerted efforts to find information. They only rest when they feel they have some information to accomplish the tasks. This contradicts Zipf's principle of least effort, as discussed by Case (2005) and Hertzum (2002). The reason could be that secondary level geography teachers are generally aware of the inefficiencies of their information sources.

Baker (2004:11) indicates that the Leckie *et al* (1996) model does not address information-giving in the information-seeking process of professionals, and yet some professionals have the task of sharing and giving information. There was some evidence of information-sharing and -giving in the study. This is done through the work of the professional associations where planning of the work is done together. Also, when colleagues exchange information and consult one another, it can be regarded as information-sharing and -giving. In the associations, common internal examinations are prepared, mainly the questions and the marking schemes. In the schools, there is evidence of information-giving and sharing in meetings, informal chats with colleagues and team teaching. Some inexperienced teachers actually share notes and compile departmental files.

The Leckie *et al* (1996) model was helpful in addressing the research questions for this study. The work roles and associated tasks of the secondary level geography teachers, the characteristics of the information needs they mentioned, and the information-seeking patterns of the teachers, including the challenges that affect their information-seeking as well as the information sources that they use, were identified. Figure 5.3 presents the data interpretation on the Leckie *et al* (1996) model.

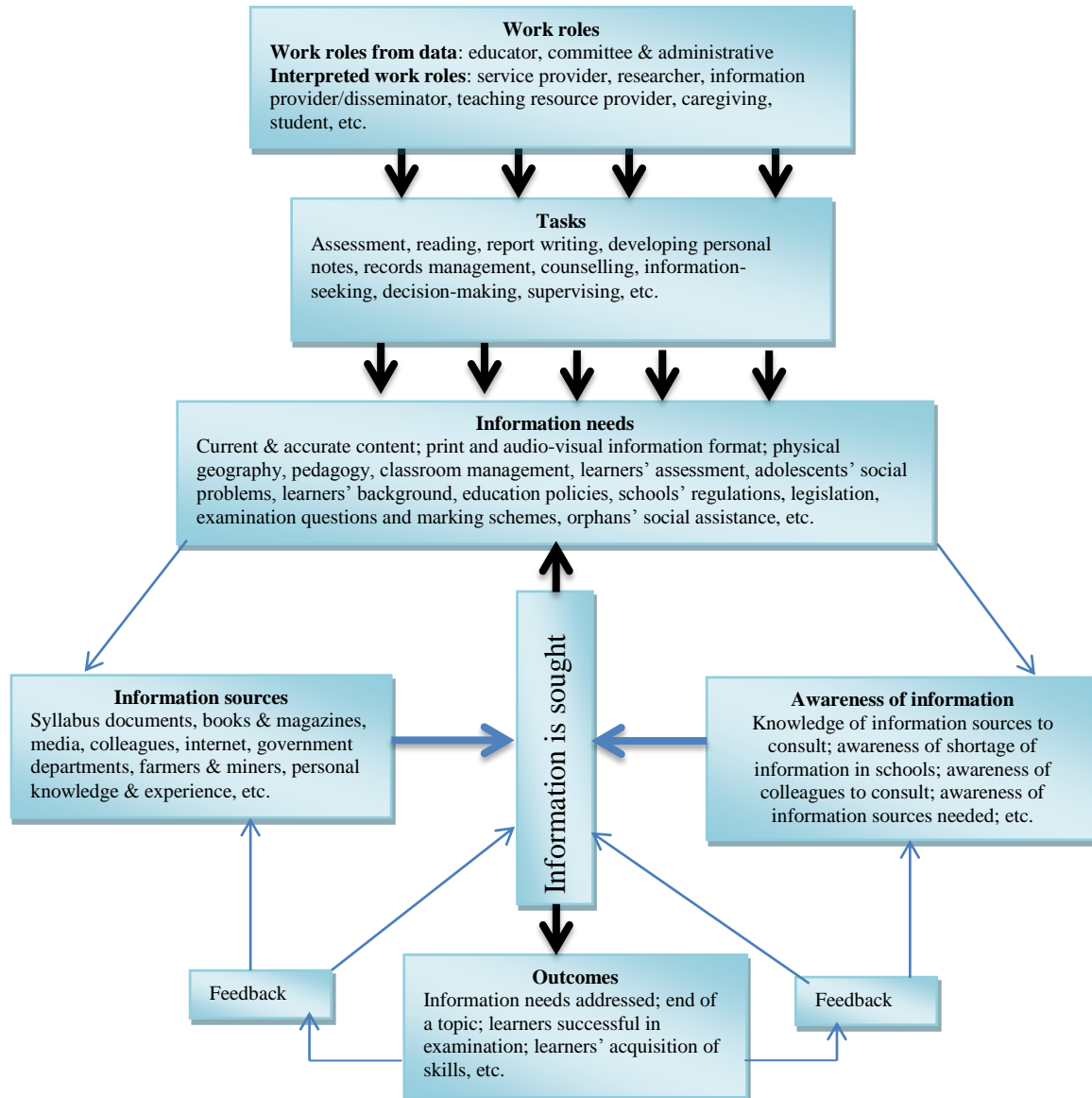


Figure 5.3: Data interpretation on the Leckie *et al* (1996) model.

5.7 WHICH INFORMATION COMMUNICATION CHANNELS ARE PREFERRED BY SECONDARY LEVEL GEOGRAPHY TEACHERS?

There are several channels through which information may be communicated or disseminated. Dewhirst (1971:306) found that interpersonal communication, that is, face-to-face conversations, telephone calls and meetings with colleagues in the same organisation, proves to be the most efficient means of finding or communicating useful information. Similarly, Listwon and Sen (2009) found that word-of-mouth was the most successful means of disseminating information in promoting or marketing library services. The results of this study show that the in-service teachers mostly use word-of-mouth, telephones and SMS to

communicate, depending on the distance, amount of information, the nature of information and the urgency of the information.

As shown in Table 4.18, the prospective teachers (95.65%; 44 out of 46, that is, 78.26% often and 17.39% sometimes) used face-to-face communication during their teaching practice. This was followed by cell-phones 45.65% (21 out of 46, that is, 15.22% often and 30.43% sometimes). Other channels of communication were used by very few prospective teachers, while some were never used. In addition, it emerged from the interviews that the teachers communicate face-to-face and by telephone and cell-phone.

The above results confirm Dewhirst (1971) and Listwon and Sen's (2009) studies that indicate that face-to-face communication is quite useful. One must also point out that the individuals representing stakeholder institutions that were interviewed also indicated that secondary level geography teachers communicate with them interpersonally or through cell-phones and telephones. Therefore, the data from all the groups of participants in this study confirm that face-to-face communication and phones are the preferred channels. Letters are used for official invitations when there are events such as workshops. Email and internet-based communication, although preferred and acknowledged to make communication easier and faster; can still not be accessed by the majority of the teachers and it is therefore not used extensively.

In summary, the feedback from secondary level geography teachers (in-service and prospective) who participated in the survey is reflected in Figure 5.4. The diagram includes the work roles, information needs, constraints, preferred information sources and communication channels and the factors influencing information-seeking.

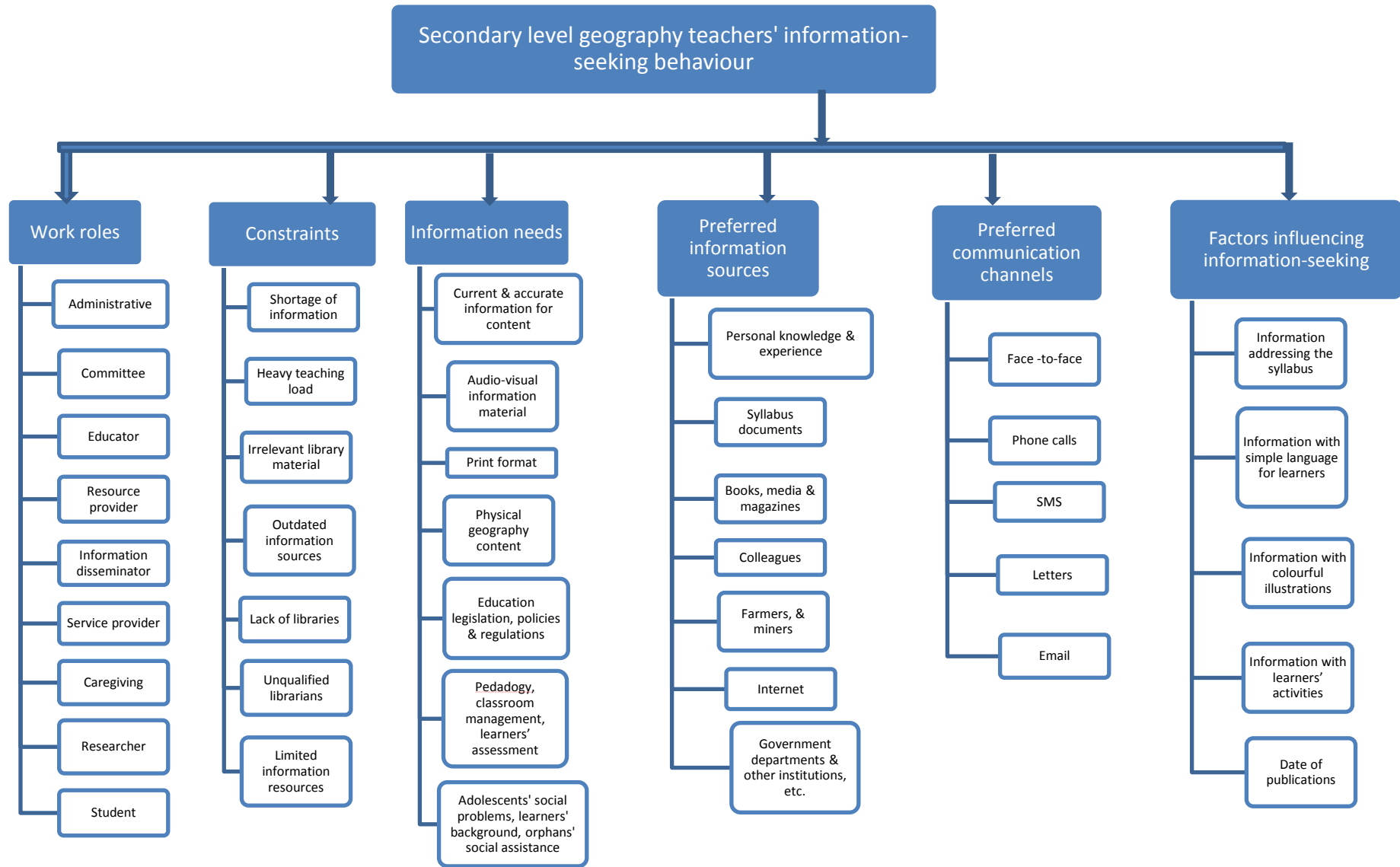


Figure: 5.4: Secondary level geography teachers' information needs and information-seeking patterns

The results of this study are reflected in Figure 5.4 as a summary of the information needs, information-seeking, information sources, communication channels, work roles and information constraints of secondary level geography teachers in Lesotho. It captures the key issues from the discussion in Chapter Four (sections 4.2 – 4.4) and sections 5.2 – 5.6. These key issues will be considered in Chapter Six that proposes an information service model for secondary level geography teachers in Lesotho.

5.8 WHICH INFORMATION SERVICE CAN BE RECOMMENDED FOR SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO?

All the participants were asked to recommend an information service that would be appropriate for secondary level geography teachers in Lesotho. The participants' recommendations were analysed based on the literature, such as Madden (2008) and the RUSA guidelines (2000) and it was established that these recommendations pertained to services, resources and access.

5.8.1 Services

It is evident from the data that the participants want audio-visual aids such as maps, videos, charts and models, particularly for various physical geography topics. In particular, the teachers need physical geography information, such as geology and geomorphology, landforms, plate tectonics, marine erosion, map reading, etc., as indicated by the in-service teachers and individuals from stakeholder institutions. In addition, the teachers indicated that they prefer information that is not only accurate, but current and in print format. The information should be relevant to the syllabus and appropriate for the level of their learners so that it can be used easily in the classrooms. This information should be made available in their schools for easy access and use.

5.8.2 ICTs and information resources

The participants acknowledged that Lesotho is one of the countries with a developing economy and schools generally lack resources such as ICTs. It would not be possible to provide all the schools with the resources that they need. Therefore, resource-sharing among schools was suggested by the in-service geography teachers and the individuals who were interviewed. Formation of resource centres was suggested to serve a cluster of schools (see

section 4.2.6). Information resource-sharing through school-clustering was studied by Nzimande and Stilwell (2008) in South Africa. These scholars indicated other countries such as Burundi, Ethiopia, Malawi, Nigeria, Zambia and Zimbabwe where information resource-sharing through school-clustering has been used. Furthermore, the scholars reveal a school-clustering model where a well-resourced school with suitable infrastructure and facilities is identified as a nodal or hub school, such that the hub school could be clustered with eight to ten schools to converge upon it to access resources. Information resource-sharing by a cluster of schools is worth considering for Lesotho secondary level geography teachers, as there is no single school that has all the resources that these teachers need.

Although some teachers suggested the establishment of information resource centres, other teachers, particularly those in isolated rural schools, indicated that they needed geography rooms in their schools. This is because there would not be time and money to travel to a resource centre at a neighbouring school, mainly because the schools are far from each other. It was mentioned that the geography rooms would serve as laboratories for geography and they should be equipped with all the necessary teaching aids and technologies for geography teaching and learning.

Another recommendation (see section 4.4.5) is the development of a documentation centre such as the IDC of the IE at NUL. This documentation centre exists to serve the NUL community as well as in-service teachers and researchers in the field of education with information. Such a documentation centre should have internet access, videos, models, charts and other information resources that could be rented out to schools. Nwagwu and Oshiname (2009) suggest the establishment of information centres/libraries to be coupled with enhancing the users' computer literacy skills that would improve information-seeking.

The in-service and prospective teachers regard the internet as an information source for current information of various kinds and clearly indicated that schools lack access to the internet and that it should be available in all schools for use by both teachers and learners. Barker (2009:1) indicates that free web-based materials may be the only hope for teachers in poor schools, since no books may be available for what a teacher needs to teach, there may not be enough books for all the students, or the available books may be out of date. This situation described by Barker (2009) is one that the in-service teachers mentioned they were facing. Therefore, it is not surprising to find that the teachers in Lesotho indicated a dire need

for the internet to serve their information needs. According to Akengin (2008:137), use of information technologies develops critical thinking skills in geography subjects, and internet resources enable students to learn easily about countries they have never been to or know. Akengin (2008:128) points out that the use of the internet and other information technologies, particularly in the field of geography, makes abstract phenomena and concepts concrete and consequently increases the interest of the learners in the subject.

Underwood (2007:3) asserts that the growth of the information society and the networked culture in South Africa is apparent. Cell-phones are ubiquitous and easily outnumber fixed-line installations: the technology has provided telecommunication services for many communities that would, otherwise, be unlikely to be connected to a fixed-line service. The cell-phone system has permeated even some remote areas in Lesotho where telephone communication was never thought of. One realises that many people, nowadays, including secondary level geography teachers in Lesotho, have cell-phones. As a result it was recommended (see section 4.4.4) that they should take full advantage of cell-phones' potential, such that they not only use them for calls and SMS, but also for internet access so that they are not left behind in the growing information society. After all, 'mobile and other electronic delivery mechanisms make possible the availability and delivery of services and information at anytime and anywhere' (Bryson, 2006:4). In view of current reports on mobile access to information sources, such as the creation of mobile library websites, OPAC mobile and the provision of SMS library services, as suggested by Griffey (2010) and Sheikh and Tin (2010), this may be a good solution to the problems of secondary level geography teachers in Lesotho, since they already have cell-phones and are constantly on SMS. Kirschner and Selinger (2003:5) maintain that children everywhere are creating their own virtual communities through the use of new technologies. They take part in discussion groups, navigate through virtual worlds and assimilate hardware and software as if it were second nature. They are light years ahead of their parents and teachers with respect to the possibilities of information and communication technology. It is envisaged that children in Lesotho would also be far ahead of their parents and teachers. This could be the reason why some teachers use their children, nieces and nephews as proxies for searching information on the internet.

5.8.3 Access

The teachers expressed a lack of variety of information sources such as the internet and consequently difficulty in accessing the latest relevant information; there is also an indication that physical geography information is sometimes neither available nor accessible. They made the following recommendations:

- The library materials are outdated and therefore the government must supply more up-to-date information material regularly. It was highlighted that there is a need for books that provide current information and reflect different ideas and perspectives for teachers.
- There is a need for geography journals. Therefore, schools and/or the Lesotho government should subscribe to some journals, because journals provide current information.
- Geography teachers' workshops should be held regularly to assist the geography teachers with teaching and information literacy training.
- School libraries should be manned by competent full-time people who can take the initiative to collect and disseminate accurate and current information in time.

The next section is a discussion of the interpretation of the data that were presented in the previous sections with regard to the Leckie *et al* (1996) model.

5.9 KEY FACTORS TO CONSIDER FOR THE DESIGN OF AN INFORMATION SERVICE FOR SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO

The following points summarise a selection of the interpretations presented in this chapter. These points are key issues that will be considered to guide suggestions for the design of an information service for secondary level geography teachers that will be dealt with in the next chapter:

- The information needs of the secondary level geography teachers in Lesotho are related to current and accurate information and for content to be delivered when teaching, as well as to cater for the other work roles of the teachers.
- The teachers need information materials in audio-visual format, e.g. maps, models, charts and videos related to physical geography topics such as geology and geomorphology (landforms and plate tectonics), marine erosion and volcanism, to name a few. Most of the teachers (in-service and prospective) prefer their information

in print format. This calls for a variety of information formats and the use of multimedia to cater for various purposes.

- The teachers also need information related to teaching methods or pedagogy, learners' assessment and social background, adolescence social problems and classroom management, as well as educational policies, regulations and legislation.
- While some prospective teachers indicated that the information they had during their teaching practice satisfied their information needs, most of the in-service teachers expressed dissatisfaction with the information that they had. The dissatisfaction was prompted by the fact that the information was mostly in the form of books that were published a long time ago. There was general lack of variety of information sources that would enable them to compare different views from books, to clarify information and to supplement the information found in the textbooks.
- The information-seeking patterns of in-service teachers is to start with the syllabus documents (this applies particularly to the inexperienced teachers), then the learners' textbooks, then other books that the teachers bought while at university or purchased through their schools, including magazines. Then they consult colleagues who are also geography teachers, science, agriculture and development studies teachers in the school. Sometimes the teachers use the internet, teachers in other schools or those in their associations, as well as some government ministries, institutions, farmers and miners. This shows variety of information sources that the study participants consult, and might mean inclusion of a variety of information sources in the proposed information service.
- The requirements of the syllabus, the language level of the learners, colourful illustrations and the date of publication are some of the key factors that in-service geography teachers use when selecting information for teaching geography.
- The teachers often seek information individually for a specific purpose. Sometimes the teachers collaborate to seek information. Collaboration is practised through team teaching, setting of common examinations and marking schemes in the schools and

associations, collection of information to compile departmental files and comparing notes and sharing ideas. Occasionally, the teachers ask other teachers, especially younger teachers and relatives, to find information on the internet on their behalf. In addition, the heads of departments are also often asked for information. The teachers also find useful information for teaching as they regularly interact with media such as TV, radio and newspapers.

- The teachers indicated limited time and lack of money and information resources as barriers to the information-seeking process.
- The sources of information that are mostly used by the secondary level geography teachers are books and colleagues.
- The schools have books, reference books, telephone lines, computers, photocopiers and school vans. There are some schools that already have facilities such as the internet, fax, TV and DVD players. A few schools also reported to have journals, even though these are donations rather than regular issues.
- Face-to-face communication, telephone and SMS are mostly used by the teachers to obtain and exchange information; letters are used mainly for official invitations to workshops, meetings, conferences, etc.
- The teachers recommend accessibility to the internet, as well as availability of geography rooms and resource centres for information-sharing, as some of the things that could improve the secondary level geography teachers' information service. The geography rooms are a kind of laboratory that should be stocked with audio-visual information materials that the teachers state they need for physical geography.
- Training of teachers for information literacy, particularly the use of email, the internet and other modern information e-resources is essential, given that some of the teachers had minimal training and guidance in using electronic information sources, while others never had any training, as shown in Chapter Four (section 4.2.4.4).

- High workloads for teachers mean that these teachers have limited time for lesson plan preparation and extensive information-seeking. Packaging of information related to the syllabus demands for geography is worth considering to render an effective information service.

Table 5.2 below reflects the key factors to be considered in the design of an information service for secondary level geography teachers in Lesotho, which will be done in the next chapter.

Table 5.2: Key factors to consider for the geography teachers' information service

Factors	Suggested approach to information service
Current information	Current awareness services
Variety of information formats	Collection of information in multimedia
Content for lessons	Variety of content related to geography, especially abstract physical geography themes
Social life information	Variety of information sources on HIV and AIDS, adolescents' social life, social assistance for orphans and vulnerable children, etc.
Pedagogy information	Variety of information sources for teaching methods and strategies, learners' assessment; classroom management
Reliability and accuracy of information	Seeking and disseminating information from reputable sources and agents
Information-seeking styles	Accommodating individual and collaborative information-seeking, information-seeking through proxies
Communication channels	Acknowledging and working through preferred channels of communication
Infrastructure	Acknowledging and working from existing infrastructure e.g. faxes, photocopying, printing; lobbying for improved internet access; lobbying for improved information infrastructure
Resource-sharing	Clustering of schools, inter-library lending systems, collaboration among researchers, stakeholder institutions, communities and teachers, development of resource centres
Media	Supporting access to various forms of media
Information dissemination	Tailor-made information packages for lesson plans and addressing the syllabus requirements
Training	Training of school librarians as people who can assist teachers with an information service; providing teachers with information literacy training, particularly the use of e-resources and the internet

5.10 CONCLUSION

This chapter interpreted the data that were presented in Chapter Four. Data interpretation was done according to major categories of analysis identified in section 5.1. These categories relate to the information needs and the information-seeking patterns of the secondary level geography teachers in Lesotho, as reflected in Chapter Four, and are based on the principal research question and research sub-questions outlined in section 1.2. The chapter also interpreted the data based on the Leckie *et al* (1996) information-seeking of professionals' model which was chosen as the theoretical framework guiding this study, as well as other literature and the researcher's experiences as a former geography teacher. The next chapter proposes an information service model for secondary level geography teachers in Lesotho based on the data that were presented and interpreted in Chapters Four and Five respectively. As a result, in Chapter Six there will be repetition of some points from Chapter Five because it is necessary to refer to previous points in order to make meaningful proposals.

CHAPTER SIX: PROPOSED INFORMATION SERVICE MODEL FOR SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO

6.1 INTRODUCTION

Chapters Four and Five respectively addressed the presentation and interpretation of the data for the current study. These previous two chapters presented the information needs of secondary level geography teachers in Lesotho and their information-seeking patterns, including their preference for information sources and communication channels. The chapters also revealed the suggestions from participants in the study on information service for these teachers. The ultimate aim of this study is to guide the design and implementation of an information service for secondary level geography teachers in Lesotho. It was revealed in both Chapters Four and Five that there is a need to improve the information service for secondary level geography teachers in Lesotho. This may be done through the strategic design and implementation of an appropriate information service specifically for secondary level geography teachers, bearing in mind their information needs and information-seeking patterns. As indicated in Chapter One (section 1.1), the development of appropriate information service depends largely on understanding the information needs and information-seeking behaviour of users (Hepworth, 2007; Wilson, 2006a).

An information service is fundamental in the provision of information for the teaching and learning process that occurs in schools for teachers to fulfil their roles and to meet with the educational challenges faced in their specific working context. Various needs and challenges for secondary level geography teachers emanating from the study as reflected in Chapter Five (Table 5.1 and Figure 5.4) are serious concerns warranting the design of an appropriate information service. The challenge for the designer and implementer of these teachers' information service is to tally the service, the information delivered, the needs of the targeted information users and the prevailing conditions in their country (Chiwere, 2008). Understanding the teachers' information needs and information-seeking patterns, including their preferences for information sources as well as their preferred process of satisfying these

needs, cannot be ignored because these issues are of paramount importance in the design and implementation of an information service for them.

This chapter draws on the literature such as the work of Chiware (2008), Kaur and Rani (2008), RUSA (2000) and Tarby and Hogan (1997) and the study's empirical findings to propose an appropriate information service for secondary level geography teachers in Lesotho. The suggestions and scope for the design and implementation of the information service also include the working context of the target users (as discussed in Chapter Five, section 5.2.1) to make it practical and feasible. This approach was also followed by Chiware (2008) in a study of business information needs, information-seeking patterns and information services for the small, medium and micro-enterprises sector in Namibia. The chapter also intends to address the latter part of the principal research question as mentioned in Chapter One (section 1.2), which is: **“How can the results of this study guide the design and implementation of an information service for secondary level geography teachers in Lesotho?”**

Therefore, this chapter discusses the following two major points.

- 1) Designing an information service for secondary level geography teachers in Lesotho:
 - Objectives of the information service proposed in this study.
 - Factors guiding the design of the information service for secondary level geography teachers in Lesotho.
 - Proposed information service model for secondary level geography teachers in Lesotho.
 - Evaluation of the information service for secondary level geography teachers in Lesotho.

- 2) Suggestions for implementing the information service for secondary level geography teachers in Lesotho:
 - Presenting the proposed model to stakeholders.
 - Setting up the task team for the proposed information service.

- Establishing infrastructure for the proposed information service.

Given that the discussions in this chapter are mostly based on the data that have been presented and interpreted in Chapters Four and Five respectively, as well as the literature that was reviewed in Chapter Two, there is some repetition of certain key points from the previous chapters. This is done in order to provide background to the strategies proposed in this chapter, but will be kept to a minimum.

6.2 DESIGNING INFORMATION SERVICE FOR SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO

Chapter One (section 1.1) explained that the need for information cuts across all spheres of life, but the relevance of information in the education of young minds and their teachers is crucial. Therefore, it becomes imperative to make sure that teachers have a relevant information service. It was also indicated that the researcher is a former geography teacher who is now an information practitioner at the Information and Documentation Centre (IDC) of the Institute of Education (IE), National University of Lesotho (NUL). In her current designation, she has to initiate and provide information services for various users in the field of education. It is envisaged that this study will be significant for the IDC of the IE at the NUL, given that it may help to address the following objectives and functions of the IE at the NUL:

- Serve as a consultative and advisory body to the MOET and other educational institutions, on matters affecting the training of teachers and on all educational matters.
- Organise in-service training and extra-mural programmes which may result in further development and continual improvement of teachers' abilities.
- Encourage and promote dissemination of professional information through educational journals or other publications (Institute of Education, NUL, 2010).

It is also presumed that the findings and the proposed information service from this study may be applied to other teachers in Lesotho, or even in other places with a similar setting. It is suggested that the information service proposed in this chapter be implemented by the IDC in the form of a collaborative partnership with the geography teachers and the institutions

that are directly involved in secondary level geography education in Lesotho. Therefore, the IDC is being proposed as the implementing agency of the information service model for secondary level geography teachers in Lesotho, while the institutions will be the stakeholders and the secondary level geography teachers will be the users of the information service. These stakeholders are outlined later in section 6.3.1. Chattopadhyay *et al* (2006) mention hiring an information specialist to lead the design and implementation of an information service. Relevant experience, knowledge and understanding of information behavior and information service design are some of the factors to consider when appointing an information specialist to spearhead the design and implementation of an information service for secondary level geography teachers in Lesotho.

Partnership and collaboration between schools, university departments and libraries suggested in this chapter are not new, given that Gresham and Van Tassel (2000) advocate educational partnerships between academic libraries and public schools and suggest that these partnerships could be in the form of circulation and borrowing of material by school students and teachers; librarian reference services, workshops for secondary school librarians and teachers, pre-visit orientations, and instruction sessions for high school students. Gresham and Van Tassel (2000) report a secondary school outreach programme at the University of Colorado at Boulder Libraries as an information literacy programme for 25 partner schools. Through the programme, secondary schools' students and their teachers discovered the value of information technologies. They also had a chance to access material and services provided by the University of Colorado. If developed countries such as the USA with better resources are forming partnerships between their universities and schools, then it is inevitable for developing countries such as Lesotho. The most important thing is to develop strategies that will make the information service safe, easy and manageable. It is equally important to define the goals and objectives of the information service.

6.2.1 Objectives of the information service proposed in this study

It is significant that the overall goals and objectives of the information service for secondary level geography teachers in Lesotho are defined at the design stage. Considering the key factors for the design of the information service for secondary level geography teachers in

Lesotho that were presented in Chapter Five (Table 5.1) and literature such as Cloutier (2005), Nzimande and Stilwell (2008), and RUSA (2000), the study realises the following objectives of the information service for these teachers:

- To collect and repackage relevant physical geography information to cover the scope of information needed by secondary level geography teachers as discussed in Chapter Five (section 5.3.1).
- To provide a range of information sources in multimedia formats relevant to the Lesotho JC and COSC geography syllabi.
- To create a reference service that serves as an inquiry and answer service for secondary level geography teachers in order to address the need for current and accurate content.
- To strengthen geography education research through provision of research services to researchers and teachers in line with Cloutier (2005), who suggests that information services may be document delivery services and research services, as well as with the researcher role interpreted in Chapter Five (section 5.3.2).
- To promote information resource-sharing among secondary level geography teachers and in Lesotho schools at large to address the shortage of information sources.
- To provide alerting services for newly released publications that are relevant to geography education to enable teachers to keep abreast with the latest developments.
- To encourage the use of facilities for internet access to enable the teachers to access information that is available on the internet.
- To evaluate the information service meant for secondary level geography teachers regularly.

It is envisaged that defining the objectives of the information service for these teachers might help them to fulfil their respective work roles (educator, student, researcher, information disseminator, resource provider, administrator, committee member, caregiving, service provider) and associated tasks in the work environment as presented in Chapter Five (section 5.2.3). The objectives may also be used for the evaluation of the proposed information service, as they may be used to measure the successes and failures of this information service.

In addition to proposing an implementation agency and information specialist as well as defining the objectives of an information service for secondary level geography teachers in Lesotho, there are other important factors from the data and the literature that have to be considered for the design of an information service for secondary level geography teachers in Lesotho.

6.2.2 Factors guiding design of information service for secondary level geography teachers

Bryson (2006:67) maintains that an information service has a responsibility for ensuring that all information, regardless of source or format, is subject to a managed life cycle that comprises six phases: planning, acquisition, maintenance, exploitation, evaluation and review, and retirement. As a result, the design and implementation of the information service for secondary level geography teachers also has to consider these phases of information, including the key factors emanating from this study that were reflected in Chapter Five (Table 5.1).

It is equally important, when designing an information service, to take into account the information needs of the users, their preferences for information sources and the resources around them, including the prevailing conditions in their country (Chiwere, 2008; Hepworth, 2007; Wilson, 2006a). There is a scarcity of resources in Lesotho and this may require resource-sharing as well as efforts to provide affordable services to both the service provider and the targeted users in order for such an information service to be sustainable. As a result, the ‘choice of a model in the design stage of information services, depends to a large extent, on the specific conditions prevailing in a particular country’ (Chiwere, 2008:60). This is because the purpose is to come up with services that will be realistic and achievable. Bearing in mind the literature above, in designing an information service for secondary level geography teachers in Lesotho, it may also be necessary to consider the following factors:

- Resource availability within the IDC (service provider) as well as the resources of the secondary level geography teachers (service users). These resources are human

resources, time, information and information sources, technology and existing networks.

- The secondary level geography teachers' information needs, information-seeking patterns and preferred information communication channels.
- The working context of these teachers as presented in Chapter Five (section 5.2.1).

Underwood (1990) explains that when designing information services, one must focus on the users of the information service and should think of operational issues by outlining specific products and the details of the service, including how it will be delivered and developed over time. In addition, it is important to establish the marketing strategies for the service, including its human resource and technology requirements. Therefore, in the design of the information service for these secondary level geography teachers, it is significant also to consider:

- The users of the information service;
- The services constituting the information service;
- The marketing strategies;
- Human resources; and
- Technology requirements.

The factors guiding the design of the information service for secondary level geography teachers in Lesotho are based on the work of Underwood (1990) and the results of this study and other models that were presented in Chapter Two (Figure 2.3 and 2.4); these are all incorporated in Figure 6.1 below. Each component is discussed in the subsequent sections.



Figure 6.1: Factors guiding the design of an information service for Lesotho geography teachers

6.2.2.1 Users of the information service

When designing the information service for secondary level geography teachers in Lesotho, it is important to meet their characteristics and requirements. Some of the characteristics of secondary level geography teachers identified in this study that have to be met are:

- These teachers work in schools located in different geographical areas of Lesotho. Some schools are in remote rural areas with limited or no infrastructure for easy access to information, while others are in urban areas with relatively good infrastructure and better access to information.

- The teachers face inconsistent availability of resources and facilities in schools, given that some schools have access to the internet and others do not have it. This is because schools charge different amounts for school fees. As a result, they have different resources. such that some schools have better facilities and resources than others. They also have different proprietors, as shown in Chapter Four (Table 4.6).

- Secondary level geography teachers need easy access to relevant and reliable information given their heavy teaching load due to a large number of learners in their classrooms, many streams and teaching periods per week.
- Many secondary level geography teachers need skills to use the internet and modern multimedia resources. Especially older and more experienced teachers reported using other people to search for information for them on the internet. It is also possible that even the younger teachers who reported using the internet still have insufficient skills to use it optimally. This might require training in internet searching and information literacy, as discussed by Fourie and Krauss (2010). ‘The value of information literacy and especially Internet search skills for teachers is well acknowledged because it increases access to a vast array of information resources, especially those freely available through Internet search facilities, enables teachers to tailor information according to their own circumstances (for example, for lesson plans and assessment) and improves the quality of learning material. Information literacy can also support teachers in coping with everyday life problems such as HIV-AIDS, children exposed to domestic violence and issues of environmental protection’ (Fourie & Krauss, 2010:109). In the case of Lesotho teachers, information literacy may support them to cope with everyday problems of adolescents and orphans.
- Considering the teachers’ qualifications in this study (see Chapter Four, Table 4.1) it is envisaged that qualified teachers with bachelor’s degrees will be willing and able to learn how to use information technologies and electronic resources such as the internet. In addition, since secondary level geography teachers make extensive efforts to find information (as depicted in Chapter Five, Figure 5.2), it seems viable that these teachers may be interested in learning information literacy skills, including the use of the internet.

6.2.2.2 Services constituting the information service

According to Rowley (2006:20), information services support access to information, typically relying upon information goods, such as documents and web sources, as a key element of service provision. ‘A typical information service is engaged in making available, controlling access to, retrieving, selecting, organizing, presenting, interpreting, tailoring, personalizing, and targeting information resources to support user activities’ (Rowley, 2006:20). As previously indicated, it is proposed that the information service be delivered by the IDC, and in order for this information service to be sustainable, fundraising and lobbying for resources to sustain the information service are vital. This is because the IDC and many other information centres in Lesotho that may also offer the information services being proposed here, are already operating with very limited budgets and should therefore strive to offer good services with very little expense. Offering services with limited budgets needs to be emphasised in view of the prevailing poverty in Lesotho, as well as the global economic crisis that has hit the world economy. This is because under these circumstances sponsorships and budget increases are unlikely.

Kaur and Rani’s (2008) study on information services and products in India reveals services and facilities (see Chapter Two, Table 2.1) for academic libraries. Some of these information services are already offered by the IDC. Given the results of this study, it is imperative for the IDC to do literature searches for teachers based on the syllabus demands and compile tailor-made information packages for secondary level geography teachers. The emphasis should be more on physical geography topics such as geology and geomorphology, plate tectonics, marine erosion, etc. that are more complex to teach and where it has even been reported that some teachers may avoid teaching them, while others may mislead the learners. In addition, clippings of relevant geography information from magazines, newspapers and other publications may be compiled for the teachers. Constantly keeping abreast with geography information for teaching and learning in secondary education is imperative because any information found will be disseminated to the teachers. Various current awareness options should be explored for these teachers.

According to Cloutier (2005), information services may include research services and document delivery services. The research services involve the mediated use of information resources by the information professionals to respond to the information requested by clients. The document delivery services concern the delivery of information sources such as books, reports, articles, etc. to the clients (Cloutier, 2005). The information service for secondary level geography teachers in Lesotho may include both research services and document delivery services that will be carried out by the IDC, if it is ultimately considered as the implementing agency. Given that there is no evidence in the data that suggests the need for research services, offering research services for secondary level geography teachers may seem inappropriate at this stage. However, considering that information needs may be unexpressed (Krikelas, 1983; Kuhlthau, 2004), unrecognised (Fourie, 2006; Wilson, 1999), or even dormant (Krikelas, 1983) and subjective, changing depending on situations (Case, 2007), it is significant to offer research services, bearing in mind the research role of teachers interpreted in Chapter Five (section 5.2.3). Leckie *et al* (1996) indicate student and researcher as some of the professionals' roles. Three roles were evident from the data in Chapter Four (section 4.2.2.4). However, in the analysis in Chapter Five eight roles, surfaced (section 5.2.3). Failure of the data to reveal all the roles interpreted in Chapter Five explicitly may be attributed to the study asking questions pertaining to the information needs and information-seeking patterns with regard to teaching. This might have led the teachers to think only of their roles as educators and leave out their other roles, such as being a student and/or researcher. Therefore, providing secondary level geography teachers with information research services may not be unwarranted because it might address those unexpressed or unrecognised information needs and even resuscitate dormant ones.

Document delivery information service may be rendered electronically or physically, depending on the format of the information and the technological capabilities of the users. Physical delivery of documents may be slower and costly, since it requires transport and courier services. The information service being proposed here may include both the research service and document delivery service either electronically or physically, depending on the urgency and type of information need, the distance and location of the client, the amount of information needed and the technologies available to the client. In this instance, the client is the secondary level geography teacher.

It is envisaged that these research and document delivery service will be rendered such that the information that needs to be researched is sent to the IDC for its staff to process on behalf of the secondary level geography teachers and when the information is found, it is disseminated to the client electronically free of charge. If the teachers require printed information, it may have to be sent to them for a fee. However, charging fees for information services is a complex issue that needs to be investigated in more detail before implementation. There will be cases where the teachers need only concise factual information. In such instances, the information may be sent through SMS free of charge. This is an option because the data show that the teachers communicate through SMS, telephone, cell-phones and face-to-face. All these channels should be open and available for use in the provision of the suggested services. However, only information that is sent to the teachers through the website, SMS, fax and email is likely to be delivered free of charge.

The document delivery service concerns the delivery of documents to the teachers electronically through the acquisition, packaging and presentation of accurate, authoritative and current information that addresses the needs of both the JC and COSC syllabi in Lesotho. This calls for information packaging or tailor-made information packages. This information should be posted on the IE website for free and easy access by secondary level geography teachers. This is because electronic information is becoming prevalent worldwide, and its use is growing exponentially because more users are recognising the potential that it offers in terms of access and retrieval (Boumarafi, 2010:350), even though some teachers who participated in this study still do not use the internet and lack the skills to use it.

Considering the preference for books among the participants in this study (in-service and prospective teachers) and recognising that books can be purchased and/or borrowed, it is essential to provide teachers with information about various books that can be purchased and borrowed. It is equally important for the IDC to keep track of newly published books on secondary level geography education so that it offers an alerting service to secondary level geography teachers on newly published books. Current awareness services, as pointed out by Fourie (1999, 2003), are necessary and were regarded as essential to include in this study (see Chapter Five, Table 5.2).

The teachers' preference for printed information due to lack of resources in their schools requires physical document delivery. Given that these teachers lack resources such as time and money for travelling to various places to obtain information and that the IDC does not have money to transport and/or post the documents physically to every teacher, it is suggested that physical document delivery may be done through professional associations, formation of cluster schools, resource centres, teachers who come to the IDC to collect such information and courier services to the teachers. Issues on covering these expenses have to be decided when the proposed information service is accepted and implemented by the IDC. Alerts on new book releases need to be posted on the IE website and sent to the teachers through email, their geography teachers' associations and resource centres.

Making audio-visual information materials such as maps, videos and models pertaining to physical geography related topics available is clearly an essential service for these teachers, given the results of this study. The results further show that some schools and teachers can afford to buy and/or hire material and others may only be able to afford to hire it. It is therefore imperative for the IDC to acquire audio-visual information material, particularly for physical geography, and offer hiring or sales services to secondary level geography teachers, depending on the need. Both sales and hire options are essential because, as indicated earlier, schools have different resources. Data indicated that these teachers need these information materials in their schools to be readily available whenever they are needed. In this instance, an ideal information service would be able to provide these audio-visual information materials in every school. The information specialist needs to bring such information materials to the attention of geography teachers and help to map it to their information needs whether expressed or unexpressed.

Collecting and providing access to information that is generated through the relevant workshops, particularly workshop reports for the geography teachers' associations, is also significant. This information could be useful to these teachers and may help to avoid re-presentation of topics that have been dealt with in previous workshops. It would enable teachers to review the workshop reports so that new workshops can focus on new issues. It was evident that the teachers do not compile any reports for the workshops that they hold in their associations. Where reports are compiled, they do not cover all the salient details owing

to lack of documentation and report-writing skills. Workshop reports are vital sources of information that can help secondary level geography teachers in many ways. For instance, beginning teachers may find the reports a good point of reference. The information literacy training suggested earlier and in Chapter Five (Table 5.2) and in Table 6.1 should consider including the training of secretaries in different geography teachers' associations on report writing.

Given that not all schools have libraries and where libraries exist, they are generally run by unqualified people, training of these unqualified librarians to collect, organise and disseminate relevant information is important and can be done by the IDC. In addition, where there are no school libraries, geography teachers may be guided and assisted to collect and store their own information through information literacy training. It is envisaged that training these teachers may help them to perform their tasks of information-seeking and developing personal notes that were pointed out in Chapter Five (section 5.2.3) with some degree of skill.

Electronic services have to be considered for an information service for secondary level geography teachers, even though their work context (see Chapter Five, section 5.2.1) is characterised by limited information infrastructure and limited access or lack of access to the internet. This is based on recommendations from some of the teachers who participated in this study, as well as the notion that electronic resources are cheaper and faster to get to users and do not take too much physical space for storage (Wu & Chen, 2008). Some teachers appreciate that ICT such as the internet are here to stay and are advancing at a high pace, such that people who are not using them will be left behind. The geography teachers' associations indicated that they encourage their members to use the internet, to the extent that during some of their workshops they refer them to some relevant websites. The use of the internet has been recommended by all sets of participants in this study. Consequently, designing and implementing information services that are internet-based may be a step in the right direction because 'if teachers receive adequate training and have ready access to an internet connection, then they would be eager to use computers and link to the internet' (Wu and Chen, 2008:835).

6.2.2.3 Marketing strategies

Marketing information services is very important for secondary level geography teachers who are the targeted users of the services, because they need to be aware of the existence of such services. The importance of marketing and promoting information service has been highlighted by Chattodadhyay *et al* (2006), Kaur and Rani (2008), Madden (2008), Underwood (1990) and Woodsworth and Williams II (1993). Rowe and Britz (2009:40) recommend a marketing plan for information services that considers and acknowledges political, economic, societal and technological environments. Rowe and Britz's (2009) framework for developing a marketing plan and strategies of information services may be considered for marketing the proposed information service for secondary level geography teachers in Lesotho. However, based on issues discovered from the data collection and consideration for these teachers' work environment and the researcher's personal knowledge and experiences of Lesotho teachers' context, the suggestions for marketing the information service proposed in this chapter draw on the literature, insights gained from the study and personal knowledge of the teachers' environment in Lesotho. At this juncture, it is envisaged that the proposed information service will be marketed through some of the following means:

- Contacting the schools, heads of department and secretaries of the geography teachers' associations to inform them about the service and also request them to pass the information to their geography teachers. During data collection the contact details of the schools, including those of the heads of department were collected and once the information service is ready, the teachers will be made aware of it through their schools, heads of departments and professional associations.
- Hands-on training workshops as proposed by Chattodadhyay *et al* (2006) on the technologies and systems that are to be used for this information service are another important way of marketing the information service. The IDC should consider holding workshops through the geography teachers' associations for hands-on training on the services that are to be delivered for secondary level geography teachers. Such workshops may also inform the teachers about various means of connecting to the internet in Lesotho.

- Radio programmes may also help to market the information service. This is important, bearing in mind that not all schools participated in this study and not all the teachers are members of professional associations. The radio programmes may be broadcast on a national radio station called Radio Lesotho that reaches the entire Lesotho. Since the information service proposed here will be a national service, the radio slot might be available free of charge. Considering that NUL already has a programme called ‘*Tseba ka University*’, translated ‘know about your university’, that is run on Radio Lesotho, it is suggested that this information service be presented on the NUL programme. In addition, NUL has its own radio station that may also be used to market the information service; the only shortcoming is that the NUL station only reaches the Maseru urban audience.
- Designing and printing flyers and posting information on the internet may also be a worthwhile marketing and communication strategy (Rowley, 2006:115). Printed flyers may be distributed during the university open day when all the high schools visit the university to learn about its programmes. Every year NUL holds a university open day, on which learners come with their teachers who can be asked to take the flyers for distribution in their schools. Flyers may also be distributed in workshops, conferences and meetings where teachers are present.
- Exhibitions of audio-visual material at various events that involve secondary level geography teachers, heads of department and principals of schools. The events may be workshops, conferences or celebrations of special days, such as geography day and world environment day.

6.2.2.4 Human resources

The importance of information resources for an information service has been highlighted by Chattodadhyay *et al* (2006) as well as Underwood (1990); it is also evident in models such as those proposed by RUSA (2000) and Tarby and Hogan (1997). The role of human resources in an information service for secondary level geography teachers in Lesotho needs to be

interpreted against the results of this study, the proposed implementation agency and the information services being proposed. Human resources are needed by the implementing agency, which in this study is suggested as the IDC of the IE at the NUL. The education resource centres, the secretaries of the geography teachers' associations and school libraries are perceived as collaborative partners. The IDC has qualified information practitioners who are capable of designing, implementing, marketing and evaluating an information service. In addition, RUSA (2000) guidelines encourage involving people who have knowledge of the information needs of the users. Chattodadhyay *et al* (2006) suggest hiring an information specialist to lead the design and implementation of the information service. This means that the information service being proposed here might necessitate considering the incorporation of such an information specialist. IDC staff members have been working with teachers and researchers in the field of education for a long time, therefore they are competent to handle the proposed information service.

However, because of limited funds the IDC may not be able to satisfy all secondary level geography teachers' information needs, especially if they require printed information that has to be physically delivered to them. As a result, the IDC may require help from the MOET resource centres, the teachers' associations and school librarians. Where necessary, the IDC staff can help to train relevant parties so that the information service for secondary level geography teachers is offered by competent people who understand the urgency and the importance of information in teaching. In the light of the above, capacity building becomes imperative for the information service model proposed in this chapter. This study perceives training to be part of capacity building.

6.2.2.5 Technology requirements

As indicated in Chapter Two (section 2.7.1), information services are a combination of information, technology and people, as well as the activities that provide these people with relatively easy access to information (Woodsworth & Williams II, 1993:03). In this instance, the information service may be perceived as those efforts taken to incorporate the information, technology and the people that help secondary level geography teachers in Lesotho to have relatively easy access to the information that they need. Nevertheless,

Chapter One (section 1.7) refers to an information service aiming to provide specific information to these teachers in order to carry out work-related tasks and activities.

Bryson (2006:7) advocates optimum use of technologies, emphasises full exploitation of technology and indicates that it is fundamental to be able to use computers, as well as hand-held and wireless devices, and to have knowledge of sources of information. This compels information service providers and their target users to strive for full exploitation of the technology that is available. In this instance, it is important to support secondary level geography teachers to take full advantage of all the technologies around and use them optimally and to lobby for more information and communication technologies. The data analysis in Chapter Five showed that cell-phone penetration among the teachers who participated in this study is high and it is therefore suggested that cell-phones should be used optimally not only for phone calls and SMS, but also for internet or mobile access to information resources (Banks, 2010; Chigona *et al*, 2008). It is therefore relevant to consider cell-phone technology when designing an information service for the secondary level geography teachers in Lesotho.

According to Nwezeh (2010:689) the internet has broken down barriers of communication access from anywhere in the world. It is fast, reliable, does not have many restrictions and has a limitless range of facilities which assist users to access vast amounts of information. It also offers an opportunity to access up-to-date research reports and knowledge in diverse fields, areas and subjects. Other authors acknowledging the value and benefits of the internet include Chigona and Mbhele (2008), Fourie and Krauss (2010) and Parent and Cruickshank (2009). The internet is core to most of the proposed services for secondary level geography teachers. As a result, internet infrastructure is considered as the most significant technological requirement for the implementation of an information service for secondary level geography teachers. The results of this study indicate that the teachers need the internet because they believe that the internet is a source of variety of current information. It is envisaged that the internet will make the delivery of an information service easier and faster. Perrault (2007) points out that the internet has the potential to offer resources teachers seek and this is supported by Hsu *et al* (2003). Considering that most of these teachers do not have access to journals, connecting to the internet may help them to access free journals on the

web through resources such as directory of open access journals (DOAJ) and international network for the availability of scientific publications (INASP). Accessing journals is important, given that they are some of the information sources that provide current information that teachers need because issues are published regularly. They may also need to access magazines such as *National Geographic* and journals such as the *Journal of Geography*, *Journal of Geography in Higher Education*, etc. In addition, this study found that the schools already have technologies such as telephone lines, photocopiers, computers and printers in the offices and laboratories where computer studies are offered. Some schools also have fax lines and internet access as well. These technologies are already in place and should be considered in the design of the teachers' information service.

Before proposing the model for an information service for secondary level teachers in Lesotho, it may be useful to reflect on the issues learnt from this study against envisaged technological requirements. Table 6.1 below depicts the problems identified from this study and possible solutions through technology. Some of these problems were presented as constraints in Chapter Five (Figure 5.4).

Table 6.1: Possible technology solutions for secondary level geography teachers

Problems identified	Possible solutions
Information resources <ul style="list-style-type: none"> • Limited access to various media • Limited/no access to internet • Lack of email facilities • Limited communication channels 	Internet access in schools Availability of information in multimedia Mobile access to information Using Web 2.0 social media applications Availability of facilities such as telephones, faxes, photocopying, scanning, etc. in the schools
Information literary and internet skills <ul style="list-style-type: none"> • Inadequate skills for internet use and other e-resources • Inadequate skills for report writing 	Information literacy and internet training Training on information representation and report writing
Library services <ul style="list-style-type: none"> • Lack of libraries • Unqualified librarians • Irrelevant library materials • Outdated information materials 	Training of school librarians Exploration of possibilities of mobile technologies Introduction of inter-library lending system
Heavy teaching load <ul style="list-style-type: none"> • Large number of learners • High number of teaching periods 	Use of the internet and computers in teaching and learning

6.2.3 Proposed information service model for secondary level geography teachers

Investigating the information needs and information-seeking patterns of secondary level geography teachers, taking into account the factors outlined in section 6.2.2 and reviewing relevant information service models (e.g. Kaur & Rani, 2008; Madden, 2008; RUSA, 2000; Tarby & Hogan, 1997), guide the design of the proposed information service for secondary level geography teachers in Lesotho, as reflected in Figure 6.2, which incorporates the discussion in the preceding section. In addition, ideas were also solicited from scholars such as Chattopadhyay *et al* (2006); Chen *et al* (2009); Chiware (2008); Cloutier (2005); Ju (2006); McMenemy (2010); Underwood (1990) and Woodworth and Williams II (1993). As a result, the information service model proposed for secondary level geography teachers in Lesotho was drawn up based on the Tarby and Hogan (1997) model, which was briefly discussed in Chapter Two (section 2.7.1).

Figure 6.2 below depicts the Tarby and Hogan (1997) model of hospital-based information transfer for patient information services. Although the model concerns the health science discipline and the current study concerns the education discipline, this model underpins provision of an information service to a group of users (i.e. patients). In the current study this group is geography teachers. Table 6.2 below outlines the Tarby and Hogan (1997) model and contextualises it to the information service model proposed in this study.

Table 6.2: Contextualising the Tarby and Hogan (1997) model for the current study

Components of the Tarby and Hogan (1997) model	Components of the proposed model
Patient	Secondary level geography teachers
Specialists in the hospital: <ul style="list-style-type: none"> • Physician • Nurse • Allied health • Ask-a-nurse • Pharmacist 	Specialists in geography education: <ul style="list-style-type: none"> • Geography education specialist • Geography teacher educators • Geography curriculum specialist • Geography education inspectors • Geography examination specialists
Information specialist	Information specialists at IDC
Commercial resources, unit resources and colleagues	Relevant institutions/individuals such as: <ul style="list-style-type: none"> • Geography teachers' associations • Communities (farmers & miners) • Bookshops, book vendors, publishers • Government departments, NGOs, parastatal & private institutions
In-house resource centre	IDC services and resource centre services
Electronic databases, electronic document delivery	Electronic databases at the IDC, research and document delivery
Community resources	Relevant institutions above are also community resources

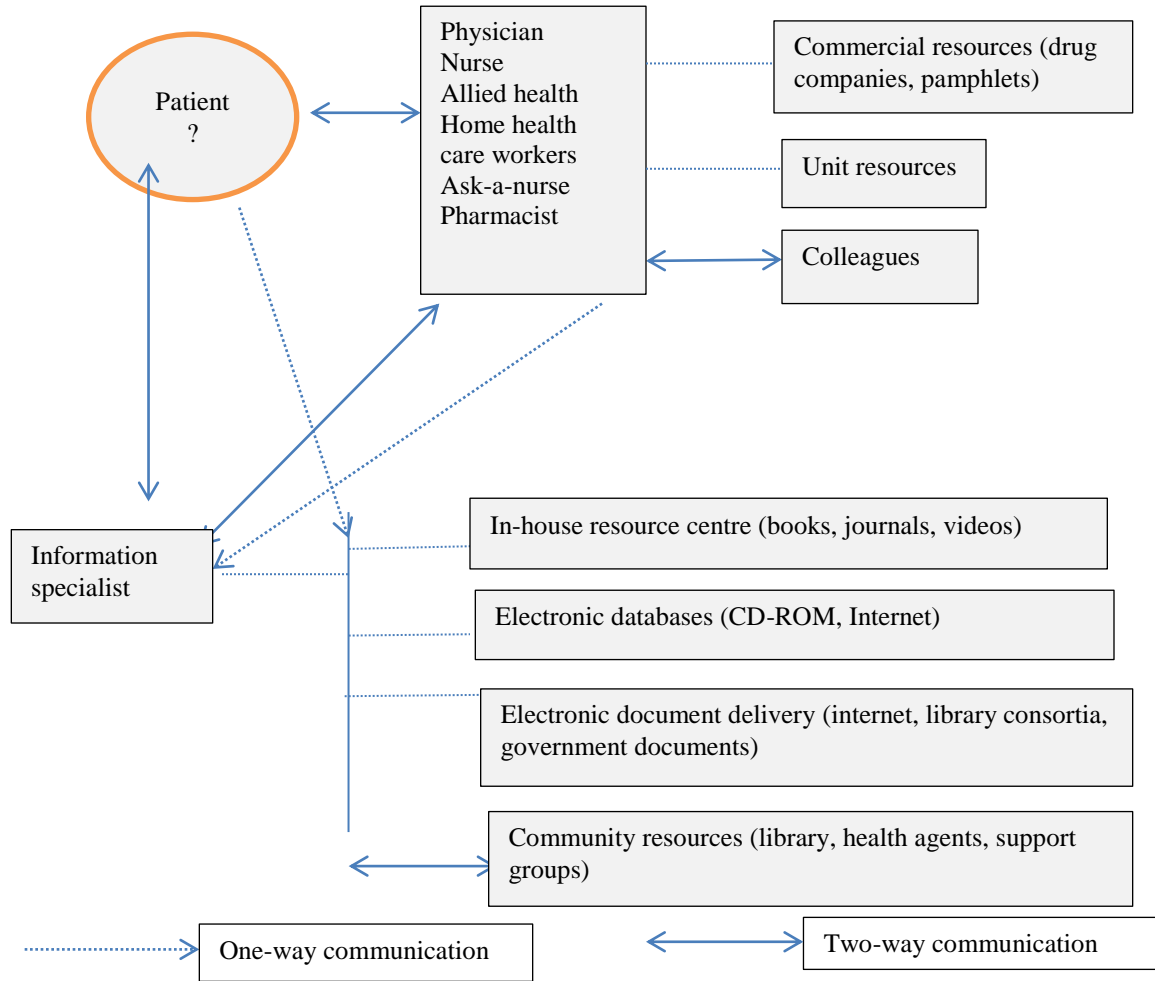


Figure 6.2: Hospital-based information transfer model for patient information service (Tarby & Hogan, 1997:163)

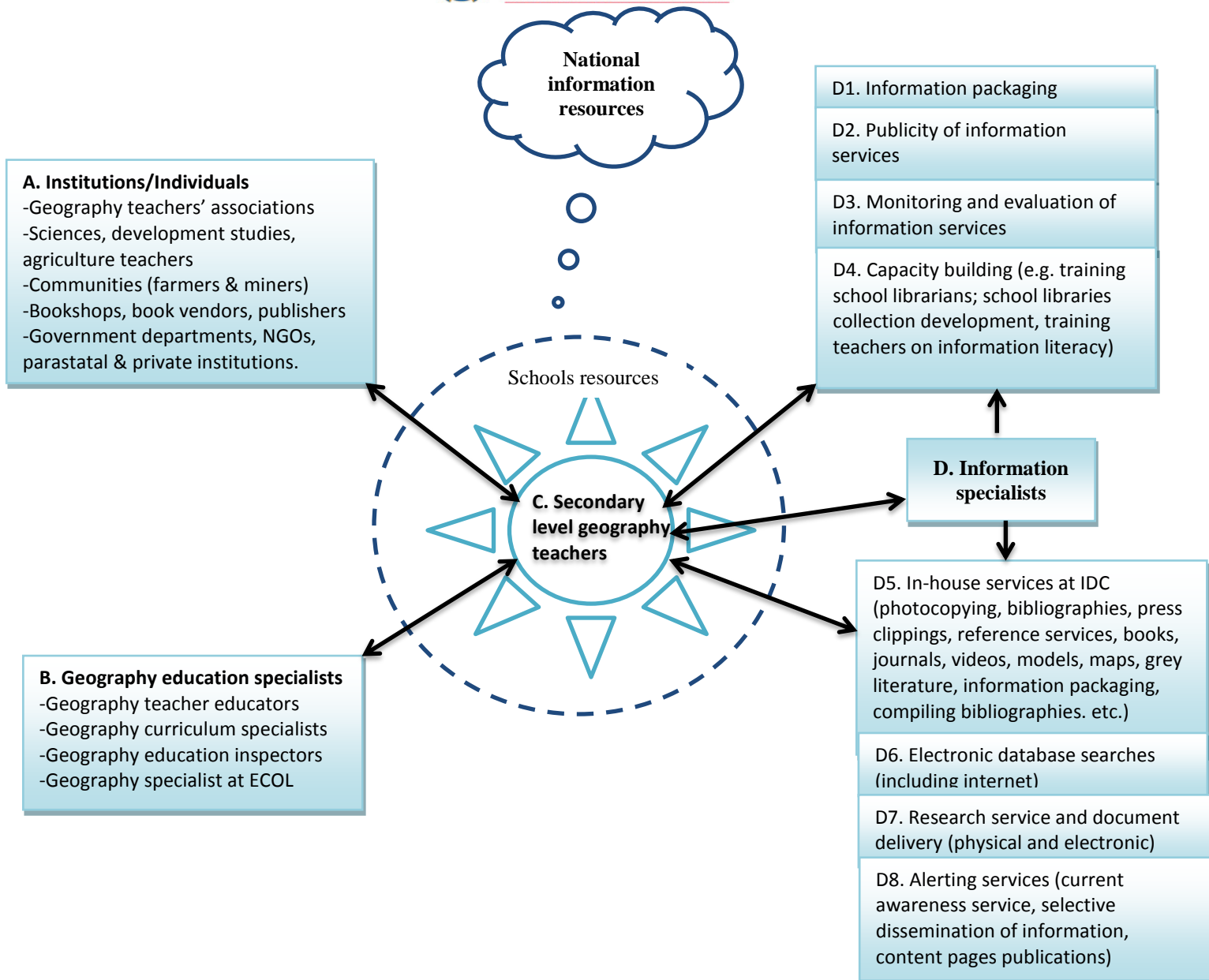


Figure 6.3: Proposed information service model for secondary level geography teachers in Lesotho

Figure 6.3 illustrates the proposed information model for secondary level geography teachers in Lesotho. It depicts that secondary level geography teachers are central to the proposed information service. It is their information needs, preferences and expectations emanating from the empirical study that need to be addressed through an information service. All the components of the model have been given codes A-D, and D1-D8 are services proposed to be rendered by the information specialists for the secondary level geography teachers; as depicted in Figure 6.3, these services can be directly accessed by the teachers. The components of the model are explained in Table 6.3.

The aim is to have an interactive model such that there is two-way communication between all the components A-D. For instance, there is two-way communication between the information specialist and the geography education specialists, secondary level geography teachers, and institutions and individuals who are often consulted for information by secondary level geography teachers. The geography education specialists are officials from institutions directly involved in secondary level geography education in Lesotho which participated in this study, as indicated in Chapter Three (section 3.4.3 and 3.5.3), who are already disseminating some information to these teachers.

The results of this study indicated that from time to time, teachers participating in this study solicit information from colleagues (in the professional associations, neighbouring schools, science, development studies and agriculture fields), communities (farmers and miners), institutions/individuals, geography education specialists and other sources of information. It is envisaged that these might help the information specialists to package information in order to deliver tailor-made information packages. The information specialists at the IDC will collect information from individuals, institutions and geography subject specialists and package it into tailor-made packages for teachers.

Open communication between the information specialists and secondary level geography teachers is important because it will help to acquire more detail on the information needs of these teachers and to send information to the teachers. Considering the results of this study and IDC resources, it is recommended that a website, email, SMS, telephone and fax facilities and opportunities for visits to the IDC for in-house services at the NUL be communication channels available for this service.

Bearing in mind that there is no single information centre that can meet all the needs of its users owing to limited resources, capacity building is significant if this information service is to be effective and sustainable. Capacity building is viewed as a long-term phenomenon that may be achieved in phases through training of school librarians, secretaries of the geography teachers' associations and possibly MOET resource centre personnel. Capacity building may also be achieved by introducing school information resource-sharing by establishing a school

libraries consortium, developing a common school library system and clustering schools and forming hubs. Capacity-building is also required for the information literacy and internet training for teachers in order to use modern e-resources effectively. Table 6.3 below reflects on each component of the model, including description and rationale.

Table 6.3: Components of the proposed information model for geography teachers in Lesotho

Component	Description	Rationale for inclusion in the service
A. Relevant institutions/individuals	Institutions and individuals consulted by the teachers in this study: Colleagues (in the professional associations, neighbouring schools, science, development studies and agriculture teachers) Communities (farmers and miners) Government departments and other institutions (e.g. NGOs, private institutions, etc.)	Teachers participating in the study already consult these institutions/individuals for information, which means that they have relevant information that might be used for tailor-made information packages for teachers. Some government departments, NGOs and private institutions may have information needed for social assistance of orphans, dealing with HIV and AIDS
A. Bookshops, book vendors, publishers	These are institutions that may have the latest information on books related to geography	Teachers expressed the need for current information and their preference for books. These might cater for the latest information from these institutions
B. Geography subject specialists	Officials from institutions directly involved in secondary geography education in Lesotho which participated in this study, as indicated in Chapter Three (section 3.4.3 and 3.5.3) who are already disseminating some information to these teachers	Already disseminate information to teachers. They are policy makers and have better knowledge of the geography syllabus and curriculum, geography examination and marking
C. Secondary level geography teachers	Core participants in the study Target users of the information service being proposed Their component includes their information needs, preferences and expectations as discussed in Chapters Four and Five	The proposed information service is for these groups and they are central to it
D. Information specialists	These information specialists are personnel at the IDC who will be executing the information services proposed for the secondary level geography teachers	As pointed out in the literature such as Chattodadhyay <i>et al</i> (2006) and Tarby and Hogan (1997), human resources with expertise are essential for the design and implementation of an information service
D1. Information packaging	It is a service that will be rendered by the information specialist for the secondary level geography teachers	Heavy teaching load of the teachers warrants readily available information that addresses the specific components of the syllabus
D2. Publicity of information service	This is the marketing of information services to various users and marketing strategies that will be used are explained in section 6.2.2.3	The information service has to be publicised among the target audience (Rowley, 2006) as explained in section 6.2.2.3
Component	Description	Rationale for inclusion in the service
D3. Monitoring and evaluation of information services	This is the evaluation of the information service from time to time to determine if it is still needed, has to be modified or stopped This is discussed in section 6.2.4. This will done by the IDC	After designing and implementing the information service, its impact, value and relevance need to be determined from time to time (Kaur& Rani, 2008)

D4. Capacity building	Collection development of school libraries, training of school librarians and training of secondary level geography teachers on information literacy and internet to be spearheaded by the IDC	Results of the study indicate the need to improve school libraries in Lesotho. The results also reveal lack of training of school librarians and inadequate information skills among teachers on the use of the internet and other multimedia electronic resources
D5. In-house services	These are in-house services that are regularly provided by the IDC, such as compiling bibliographies, press clippings, reference services and providing access to information sources such as books, journals, etc.	The IDC has been suggested as the implementation agency for the proposed information service. It has facilities and resources that are maintained regularly
D6. Electronic database searches	These include CD-ROMs and the internet and will be dealt with at the IDC	E-resources offer a variety of information sources that may help the teachers
D7. Research and document delivery service	To be done by the information specialists for the secondary geography teachers	To help address information that the teachers may need for their researcher role. The results of the study indicate that teachers need information in their schools; document delivery will help in that regard
D8. Alerting services	Current awareness services for teachers, selective dissemination of information, publicity of content pages for new releases	This component will address the need for current information expressed by the teachers. It might also keep teachers abreast with the latest developments in their field

6.2.4 Evaluation of information service for secondary level geography teachers in Lesotho

For the purpose of this study evaluation is only briefly mentioned with emphasis on the actual scope of the information service needed to be offered to reflect users' needs and information-seeking patterns. It has been established that after designing and implementing the information service, its impact, value and relevance need to be determined from time to time (Kaur & Rani, 2008). This was also reflected in Chapter Two (Figure 2.3). Therefore, it is important at the design stage to have an idea of how the information service being proposed in this chapter may be evaluated. The evaluation may be done at certain intervals after the successful implementation of the service, or it may become an ongoing exercise. The evaluation will help the implementation agency to learn from past experiences, thus improving service delivery, planning and allocation of resources, as well as review of information sources. Such evaluation might include assessment of user information needs and satisfaction with the service.

While defining objectives and goals is one way of aiding the evaluation process, regular user surveys may also be used for evaluation of the information service to determine whether the service should be continued, modified or withdrawn (Kaur & Rani, 2008). As mentioned in Chapter Two (section 2.7.4), there are instruments, such as SERVQUAL which developed into SERVPERF, that have been developed, tested and used in various settings to determine the quality and performance of services (Parasuraman *et al*, 1988). Considering the knowledge and experience gained from this study, it is suggested that surveys using questionnaires, interviews and focus group discussions with secondary level geography teachers as users of the information service may be the most suitable approach. This is because the implementation agency and the value of the methods used in data collection, analysis and interpretation for this study need to be noted during evaluation of the information service. The evaluation process may be undertaken in collaboration with the proposed task team.

6.3 IMPLEMENTING INFORMATION SERVICE FOR SECONDARY LEVEL GEOGRAPHY TEACHERS IN LESOTHO

The aim of the proposed information service model for secondary level geography teachers is to assist the implementing agency, which is the IDC, to conceptualise, plan and manage the entire process of developing and deploying information services for these teachers. The model involves institutions/individuals, teachers and geography education specialists who are perceived to have relevant information and interest in secondary level geography education in Lesotho, such that they may be referred to as stakeholders in the proposed model. This section explains the modalities of implementing the proposed information service, bearing in mind all parties concerned by the model, herein referred to as stakeholders.

As mentioned earlier, an in-depth analysis of data collected in the empirical component of this study, the literature and different factors was done before proposing the model outlined in Figure 6.3 to make it realistic and achievable. Since this model involves not only the IDC and its information specialists, but also other stakeholders, it is imperative to offer such stakeholders an opportunity to scrutinise the model further, bearing in mind their institutional goals and resources. Therefore, the implementation process should permit the parties concerned in the model (stakeholders) to scrutinise the resources (time, money, information and human), facilities, technologies and services that will be needed for the effective delivery of the ideal information service. Although it may seem like repeating the efforts of this study, this may help to critique the model further; in the process, any unforeseen omissions may be addressed.

It is envisaged that the specific implementation activities for the proposed model will include the following steps:

- Presenting the proposed model to the key stakeholders.
- Setting up the information services task team.
- Establishing the infrastructure for the proposed information service.

These will be discussed in the subsequent sections. Figure 6.4 depicts the modalities for the implementation of the information service for secondary level geography teachers in Lesotho.

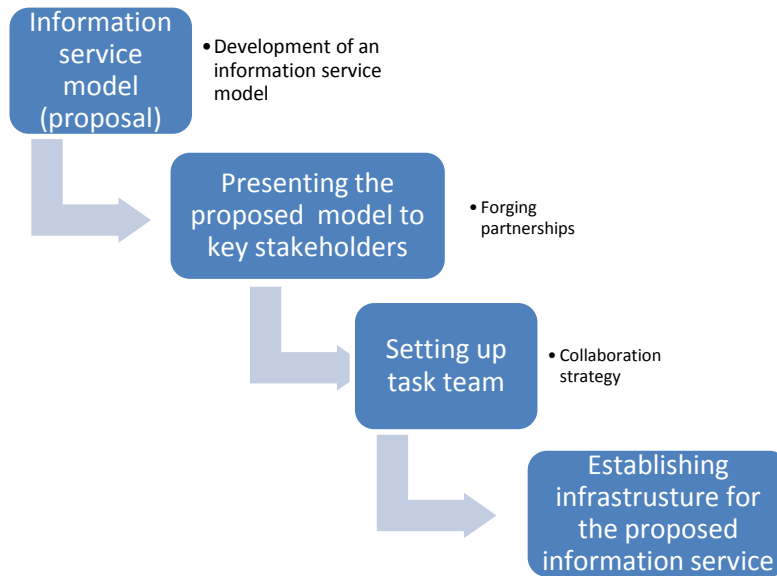


Figure 6.4: Modalities for implementing the proposed information service

6.3.1 Presenting the proposed model to stakeholders

In order for the proposed model to be thoroughly reviewed, it needs to be presented and known to the key stakeholders as well as the targeted users of the proposed information service. At this juncture, the key stakeholders in the provision of the information service for secondary level geography teachers in Lesotho are viewed as:

- The MOET, Principal Secretary and Chief Education Officer for secondary education. These are the officials who gave permission to carry out this study with the secondary level geography teachers. They are responsible for secondary education in Lesotho and whatever is being proposed here needs their support. This might open doors for financial support and policy developments by the MOET.
- The NCDC is responsible for developing and reviewing the curriculum and syllabi outlines. This body will be able to indicate if the information that is passed to the teachers and the learners will help to address the demands of the syllabus and the national set standards of teaching and learning, including helping to achieve the learning areas identified by the MOET, which were mentioned in Chapter One (section 1.1).

- The MOET Central Inspectorate is responsible for inspecting and ascertaining that teaching and learning take place appropriately in schools. Similar to the NCDC, it will help to review the information that will be passed to the teachers and learners through the website.
- In addition, the MOET Education Resource Centres and the ECOL are important stakeholders because the model suggests that the implementing agency should collaborate with the resource centres in the delivery of the information service. They need to be made aware of the proposed model so that they can indicate their interest and commitment and also how they envisage they will help.
- The committees of the secondary level geography teachers' associations are also key stakeholders. They will not only be representing their associations, but also the rest of the teachers who participated in this study. They will be in a position to indicate if their views were presented correctly and also review the proposed model to see if it will actually serve their needs.
- The principals of the secondary school that offer geography as a subject will have to be involved.
- The Lesotho National Library Service is also a key stakeholder because it is envisaged that its services will be required when training school librarians. This is because it already has a programme that assists school libraries with training and book loans in bulk for extended periods.
- The lecturers for the geography educators at the Lesotho College of Education and the NUL will play a part.
- The NUL authorities, in particular the Director IE, and the Pro-Vice Chancellor and the Head of the IE-IDC, are important people who should know about the proposed information service and soliciting their inputs and approval is crucial.

6.3.2 Setting up the information service task team

Through this study, a lot of fundamental work has been done. Firstly, the information needs of the secondary level geography teachers, including their preferred information formats, have been identified. Secondly, their information-seeking patterns, including their preferences for information sources, have been established. Thirdly, the information communication channels that secondary level geography teachers prefer to use were determined. Fourthly, the availability of information resources in the schools became known. Lastly, the recommendations on an information service for secondary level geography teachers were drawn from the in-service and prospective secondary level geography teachers, as well as the individuals who were interviewed. Many insights were gained through this study that might help to guide the task team to establish the information service proposed earlier.

It is envisaged that such a task team may be effective if it is made up of most of the key stakeholders, or at least their representatives. The main reason for bringing together various stakeholders in the task team is to ensure that their interests are also represented. It is assumed that the various stakeholders on the task team will contribute more expertise, knowledge and experiences essential for the delivery of an appropriate information service. The most important function of the task team will be to guide the implementation agency in policy development with more strategies and guidelines on how the information service will be managed and developed over time so that it is sustainable.

6.3.3 Establishing infrastructure for the proposed information service

The implementation of the service requires various types of resources and facilities. This study has already identified the target users of the proposed information service, including the conditions in which they work and their preferences for information sources and services. It has also already identified the implementation agency, its staff and other information resources. The study went further to propose the information service, the

human resource requirements, marketing strategies and technology requirements (see section 6.2.2).

However, since a task team comprising the implementation agency and key stakeholders is recommended, it becomes imperative to allow such a task team to establish more components that might have been omitted in this study. Although this study proposes an information service model for secondary level geography teachers, it has not taken full stock of all the existing information resources in Lesotho, which was not the intention of this study, because the focus was on deriving implications for an information service from the teachers' information needs and information-seeking patterns that can inform the design of an information service. It only focused on the information that is available in the schools. Yet it is important to establish what is available, what is required and how it can be obtained. Hence, forming a task team might be vital to assist in this regard.

6.4 CONCLUSION

Based on the data presented and interpreted in Chapters Four and Five respectively, existing information service models and other relevant literature, as well as prevailing conditions in Lesotho, this chapter proposed an information service model for secondary level geography teachers in Lesotho. The model is viewed as an end product of an analysis of the information needs and information-seeking patterns of secondary level geography teachers against their work environment and conditions in their country. The chapter explained the modalities for the design and implementation of an information service for secondary level geography teachers in Lesotho.

In the design phase, the chapter suggested the IDC as the implementing agency of this information service, which is a combination of services, human resources, technology and users' needs for easy access to information. It went further to outline the objectives of an information service for these teachers and ways in which this information service may be evaluated. The chapter highlighted some of the important factors that need to be considered for the proposed information service model. In the implementation phase, the chapter outlined three steps essential for the successful implementation of the proposed

information service model. It was explained that the model has to be presented to key stakeholders for further scrutiny and incorporation of ideas from parties concerned. The chapter also suggested the formation of a task team that might help the process of implementation and establish the appropriate infrastructure for the proposed service.

The next chapter presents the findings of this study and makes recommendations based on these findings. Some of the key issues pertaining to the information service proposed in this chapter appear again in Chapter Seven under recommendations. As a result, there are some points in Chapter Seven that may seem like a repetition of Chapter Six. This is because Chapter Six proposed the information service while Chapter Seven follows the study's literature review, data analysis and interpretation and makes recommendations, including recommendations for further research.

CHAPTER SEVEN: CONCLUSIONS

7.1 INTRODUCTION

This chapter presents the findings and the recommendations of the study that investigated the information needs and information-seeking patterns of secondary level geography teachers in Lesotho. The aim of this investigation was to guide the design and implementation of an information service for these teachers. The chapter presents the summary of the study findings, based on the principal research question and its sub-questions outlined in Chapter One (section 1.2).

The study's principal research question was: **What are the information needs and information-seeking patterns of secondary level geography teachers in Lesotho with regard to their teaching and how can these guide the design and implementation of an information service for these teachers?** This principal research question was broad and was further divided into the following sub-questions:

1. What are the information needs of secondary level geography teachers in Lesotho?
2. What are the information-seeking patterns of secondary level geography teachers in Lesotho?
3. Which information sources do these teachers mostly use?
4. Which information sources are available and accessible to these teachers at schools?
5. Which information communication channels are preferred by these teachers to access and exchange information?
6. What kind of information service can be recommended for the geography teachers in Lesotho?

The findings of the study are based on the data collected from various sources, using different data collection methods as follows:

- Prospective secondary level geography teachers, using a questionnaire.

- Focus group discussions with in-service secondary level geography teachers.
- Interviews with officials in institutions involved in secondary geography education in Lesotho.
- Partial observation of the school libraries in the schools where focus group discussions were held.
- Literature review.

This chapter discusses the findings of the study, based on the principal research question and its sub-questions as outlined in Chapter One (section 1.2), as well as the theoretical framework. It also discusses the implications for an information service for secondary level geography teachers, as well as the study's recommendations, including recommendations for further research.

7.2 FINDINGS

7.2.1 Findings about the principal question

The main aim of this study was to carry out an investigation to answer the question: **What are the information needs and information-seeking patterns of secondary level geography teachers in Lesotho with regard to their teaching and how can these guide the design and implementation of an information service for these teachers?**

The principal research question for this study is twofold. The first part establishes the information needs and information-seeking patterns of secondary level geography teachers in Lesotho and related issues, such as preferences for information sources and communication channels. The second part is about guiding the design and the implementation of the information service for the secondary level geography teachers in Lesotho. This concerns a proposal for a model that will address these teachers' information needs and information-seeking. The study was guided by the Leckie *et al* (1996) information-seeking model of professionals as the theoretical framework and this was explained in Chapter Two (section 2.2.1).

The data that were collected, analysed and presented, as well as the literature reviewed for this study and the proposed information service model presented in Chapter Six (Figure 6.3), provided the current study with the basis to conclude that delivery of an information service for secondary level geography teachers in Lesotho is not only necessary, but also feasible. Of importance is that this study has addressed all the research questions that were outlined in Chapter One (section 1.2) and this is evident in section 7.2.2. The study shed light on the working environment of secondary level geography teachers in Lesotho, their information needs and whether these information needs are met by the information that is available to them. The study established the information format(s) that the secondary level geography teachers prefer.

Moreover, the results of the study shed light on the information-seeking patterns of secondary level geography teachers in Lesotho, including their styles of information-seeking, the factors that influence their information-seeking and the difficulties they encounter when seeking information for teaching. In addition, the data were able to inform the researcher about the information sources that secondary level geography teachers in Lesotho use, including their preferred information sources, order of using the information sources and the information sources available and accessible in their schools.

Furthermore, the study was able to determine the information communication channels that the secondary level geography teachers in Lesotho often use and to incorporate these channels into the proposed information service model. Finally, suggestions for an information service for secondary level geography teachers in Lesotho were solicited from the study's participants. These suggestions and other factors, such as the prevailing conditions in the country, the resources available, the information needs and information-seeking patterns of these secondary level geography teachers, were considered to guide the design and implementation of an information service for them. As a result, the study (in Chapter Six) was able to propose an information service model for secondary level geography teachers in Lesotho and even suggested how the service may be implemented and evaluated.

7.2.2 Findings based on the research questions

This section presents the findings of the study in relation to each research sub-question. Each question is addressed individually, based on the results of the study.

Sub-question 1 – What are the information needs of secondary level geography teachers in Lesotho?

Conroy *et al* (2000) and Shanmugam (1999) found that the currency and relevance of information were very important considerations in information-seeking among the teachers they studied. Similarly, secondary level geography teachers in Lesotho specified the need for current and accurate geography content. It emerged that physical geography, in particular geology and geomorphology topics such as landforms and plate tectonics, as well as marine erosion and map reading, etc., were some of the areas where they need information most urgently. In essence, information related to physical geography is needed most, and should mostly be in audio-visual format.

The teachers indicated that obtaining information on the following is important to them:

- Teaching methods or pedagogy.
- Classroom management.
- Audio-visual teaching materials such as maps, videos, models and charts.
- Educational policies, regulations and legislation.
- Learners' assessment and social background, talents, interest and capabilities.
- Adolescence social problems.
- Social assistance for orphans.

The above information needs are in line with reports from the literature review, e.g Conroy *et al* (2000), Lan and Chang (2002), Mardis (2009), Pattuelli (2008), Shulman (1987) and Snyman and Heyns (2004).

The study found that the information that the secondary level geography teachers in Lesotho has does not always satisfy their information needs. The reasons are:

- Information that they have is mostly outdated, since it is mostly contained in books that were published some years ago; they need current information.
- There is a general shortage of information to compare authors' views, clarify some topics and supplement the textbooks' information where necessary.

It was also found that the secondary level geography teachers in Lesotho mostly prefer their information in print format. The in-service geography teachers indicated that print format is convenient in the sense that it does not require any equipment to access. Similarly, Dias Gasque and de Souza Costa (2003) also indicated that the teachers they studied in Brazil preferred print format in the form of books and newspapers and had not yet fully used new information technologies in teaching. However, considering advancements in modern information and communication technologies, the discussions on information services also consider internet and mobile access to information sources.

Sub-question 2 – What are the information-seeking patterns of secondary level geography teachers in Lesotho?

From the literature review, it was found that information may be sought for a specific purpose (Johnson, 2003), while it may also be found incidentally as one interacts with information sources (Foster & Ford, 2003). It was learnt that sometimes people seek information through other people (agents/proxies) and also collaborate to find information (Fisher *et al*, 2004; Hyldegård, 2006; McKenzie, 2003). It was found from the literature that the teachers generally seek information from sources that are readily available in their schools (Williams & Coles, 2007b). Moreover, the teachers prefer to seek information that is not only current, but also relevant and applicable to teaching (Mundt *et al*, 2006; Sánchez & Valcàrcel, 1999). The textbooks are the first point of information-seeking for the teachers (Nwokedi & Adah, 2009; Sánchez & Valcàrcel, 1999). In addition, the teachers tend to seek information that will be easily understood by their learners and go to the extent of simplifying the language and finding different means of presenting the information to the learners to enhance understanding and interest (Sánchez & Valcàrcel, 1999).

This study found that secondary level geography teachers in Lesotho engage in the following styles of information-seeking:

- Purposeful information-seeking is done by individuals for lesson planning. It is also done when there is a problem to be solved in the committees or tasks to be carried out for administrative roles.
- Serendipitous information-seeking was mentioned to be done through interaction with the media, in particular TV, radio and newspapers, to be up to date with the latest developments.
- Collaborative information-seeking is done through team teaching, and the activities of the geography teachers' associations where they plan their work together, set the examination questions, including their marking schemes, and hold seminars. Therefore, the geography teachers' associations could be viewed as settings in which information is gathered for collaborative purposes and where teachers collaborate to engage in information-seeking.
- It was found that information-seeking through proxies is done when the secondary level geography teachers in Lesotho use proxies, such as their heads of department, students, younger teachers, family and relatives such as children, nieces and nephews and farmers and miners in the communities to find information on their behalf.

A typical information-seeking pattern of the secondary level geography teachers in Lesotho was presented in Chapter Five (Figure 5.1). The study found that the secondary level geography teachers' information-seeking pattern starts with the syllabus (particularly inexperienced teachers), then the learners' textbooks, and if the information is still inadequate or conflicting, more books and magazines are consulted. This is followed by consulting colleagues in the school. Some younger teachers in urban schools use the internet, while experienced teachers consult colleagues in other schools or in their

associations. Depending on the topic, the teachers in rural schools consult the miners and farmers in their communities.

The study found that secondary level geography teachers consider the following factors when selecting books/documents for teaching geography:

- The contents should address the syllabus.
- The language should be appropriate for the level of the learners.
- Colourful illustrations in the form of diagrams, photos and maps are important.
- Provision for learners' activities is considered because these enhance understanding of the concepts and principles.
- The date of publication is of importance, because current information is vital in geography.

The study found that the difficulties that secondary level geography teachers encounter when seeking information to enhance teaching were:

- Lack of information sources and relevant information that could address the syllabus demands and lesson plan requirements, as well as lack of up-to-date information, which is pertinent in teaching and in any other profession.
- Lack of resources such as time and money, telephones and the internet.
- Heavy teaching loads due to too many learners in a class, many streams and many teaching periods per week, which make it difficult to have time for exhaustive information-seeking. This constraint is coupled with a general lack of variety of information sources in the schools.

Accessibility and availability of information, limited time, inadequate information search skills, information overload, high workload and task complexity were also factors identified in the literature as affecting information-seeking. A few examples are Conroy *et al* (2000), Gardiner *et al* (2006), Landry (2005), Leckie *et al* (1996), Prabha *et al* (2007) and Vakkari (1993).

Sub-question 3 – Which information sources do these teachers mostly use?

Secondary level geography teachers in Lesotho mostly use books, colleagues, personal knowledge and experience, media (i.e. television, radio and newspapers) and resource persons such as farmers, miners and institutions that have information related to geography. In the study being reported, the internet was found to be used by younger teachers in the urban schools. There was no indication that the teachers use journals, mainly because most of them do not have access to journals.

This study found that various colleagues were consulted by secondary level geography teachers in Lesotho in the following manner:

- All participating teachers in a school consulted one another, sharing and exchanging information.
- Some of the teachers also consult teachers from other schools, mostly through associations. However, a few indicated that they never consulted teachers from other schools.
- It transpired repeatedly that sciences, agriculture and development studies teachers are also regularly consulted for information regarding topics related to these subjects.

In this study, it was found that the in-service teachers trusted their colleagues and their associations for information. It transpired that the in-service teachers mostly attend the workshops that are organised by their associations because it has been a long time since the MOET has organised any workshops for them.

Most of the above issues were also noted from the literature. For instance, Leckie *et al* (1996) indicate that professionals use colleagues, personal knowledge and experience because they underwent training to master skills and knowledge. Similarly, Williams and Coles (2007a) point out that the teachers mostly use colleagues, in-service events and newspapers because these are readily available sources. In the same vein, Landrum *et al* (2002) found that teachers generally rated colleagues, workshops and in-service presentations as accessible, trustworthy and usable sources of information, whereas

journals were found to be less trustworthy, less usable, and less accessible when compared with information from colleagues. The use of information sources is predicted by its accessibility, trustworthiness and reliability (Julien & Michels, 2000).

Sub-question 4 – Which information sources are available and accessible to secondary level geography teachers at schools?

This study found that in Lesotho information sources' availability and accessibility differ from school to school because there is no policy guiding schools on how to access funding, for example how much has to be paid in school fees. Furthermore, there is no policy guiding the acquisition and development of infrastructure and facilities in schools. As a result, in Lesotho some schools have more resources while others have limited resources. The accessibility of resources to teachers also differs, depending on the number of resources and the number of teachers and learners that have to share the resources. The situation in respect of specific resources in Lesotho schools is:

- Internet penetration in Lesotho is still very low; the situation is worse in schools owing to limited funds. Where the internet is available it is shared by many teachers and learners. Internet access is available in the computer laboratory and in the offices, not in the staff room. One of the three NEPAD e-schools that participated in the study had one computer in the staff room with internet access, but it had to be used by 26 teachers.
- Books, textbooks and teachers' guides, as well as dictionaries and encyclopaedias, are available in schools. However, most of the teachers criticised the encyclopaedias for being outdated.
- Some schools have libraries, while others do not. The participants mentioned that their libraries have outdated books, are not functioning because of a staff shortage, and generally lack geography books and material. These are some of the factors that prevent them from using their school libraries. Lack of access to libraries also means no access to modern databases and e-resources.
- Teachers and learners are the human information sources that are available and easily accessible to teachers in the schools. Occasionally, farmers, miners,

teachers' younger family members and relatives are consulted, but this happens outside the school premises.

- Telephones, photocopiers, printers, fax machines and computers are some of the technologies available in the schools that can be used to access information resources. However, the teachers have limited access to them or no access at all to some of these resources, but this differs from school to school.
- Almost all the teachers have their own cell-phones, which they use for making phone calls and communicating by SMS to access and exchange information, including organising activities for geography teachers' associations. It was suggested that it was time for the secondary level geography teachers in Lesotho to use their cell-phones optimally to access the internet.

Sub-question 5 – Which information communication channels are preferred by these teachers to access and exchange information?

This study found that the secondary level geography teachers in Lesotho mostly use word of mouth, telephones and SMS. However, they would like to have various channels of communication in order to send and receive information fast and easily. They emphasised that the use of the communication channel depends on the following:

- The amount of information being exchanged; if one wants some documents or just a brief explanation of a concept.
- The distance from the person with whom one would like to communicate.
- The information being communicated; some information may be sensitive and confidential.
- The urgency of the information need.

Sub-question 6 – What kind of information service can be recommended for the geography teachers in Lesotho?

There are many strategies that could be employed for a secondary level geography teachers' information service. The establishment of an information service for the secondary level geography teachers in Lesotho should be a collaborative effort between the Ministry of Education and all its constituencies, the schools as learning environments,

tertiary institutions involved in teacher training and private and non-governmental organisations.

According to all participants in this study, an information service for Lesotho secondary level geography teachers could be improved by making the internet available and accessible to these teachers. The study found that secondary level geography teachers in Lesotho perceive the internet as a source of a variety of information that is also current.

It was found that an information service that will provide secondary level geography teachers in Lesotho with information that is not only accurate but also current in their preferred format is really necessary. Such information should be relevant to the syllabus and appropriate for the level of their learners so that it could be easily used in the classrooms. In addition, the information should be made available in their schools for easy access and use. This is very important for teachers working in remote rural schools. Moreover, the study found that secondary level geography teachers in Lesotho need audio-visual information materials such as maps, models, charts and videos that address most of the topics related to physical geography and therefore should be served with such materials.

It was found that some teachers acknowledge that Lesotho is a developing country that is faced with limited resources. As a result, they suggest information resource-sharing through the clustering of schools and through resource centres, because in their opinion the government may be unable to afford to provide each and every school with all the resources that it needs.

The establishment of geography rooms, which are perceived as geography laboratories that could address the information needs of the secondary level geography teachers, was also suggested for the improvement of the information service.

Chapter Six outlined the factors that should be borne in mind when designing an information service for the secondary level geography teachers in Lesotho. The chapter proposed the information service model for these teachers, including how the information service may be implemented and evaluated over time.

7.2.3 Implications for an information service for secondary level geography teachers in Lesotho

The title of this study is: **The information needs and information-seeking patterns of secondary level geography teachers in Lesotho: implications for information service.**

It is imperative to draw implications for an information service for the secondary level geography teachers in Lesotho that emanate from this study. These implications focus strongly on issues pertaining to the design and implementation of an information service for secondary level geography teachers in Lesotho and were mostly discussed in Chapter Six, which proposed the information service model for these teachers. In order to avoid unnecessary repetition, this section only presents a summary of implications from Chapter Six.

When designing the information service, one has to address secondary level geography teachers' information needs and information-seeking patterns (Agosto & Hughes-Hasell, 2005; Hepworth 2007; Kuhlthau, 2004), and also the technologies and the infrastructure in place (Chattopadhyay *et al*, 2006; Chiware, 2008; Underwood, 1990; Woodsworth & William II, 1993). Chattopadhyay *et al* (2006) indicated that it is important to appoint an information specialist when designing and implementing an information service and the study suggested that the information specialist should have insight, knowledge, expertise and the interest to function as an information specialist. The study equally realised the significance of the implementing agency that will be responsible for the delivery of the information service for the secondary level geography teachers.

In view of Chiware's (2008) suggestion of a task team, including various stakeholders that should be involved in the design, implementation and evaluation of information services, efforts were made to include geography education specialists in the proposed model in Chapter Six (Figure 6.3) to serve the purpose of such a task team.

Secondary level geography teachers' preference for both print information and technological advancements such as the internet implies that the proposed information service should include traditional print services and electronic services and that these have to involve:

- Defining the goals and objectives of these teachers' information service;
- Designing and implementing a relevant information service to be delivered to these teachers;
- Developing policies and regulations and mobilising resources, including fundraising to help improve the service and its sustainability;
- Evaluating the information service for its impact, value and relevance from time to time;
- Knowing the users of the information service who are the secondary level geography teachers in Lesotho, in particular their information needs, information-seeking patterns and information communication channels, as well as the location of their schools;
- Developing marketing strategies for the information service so that the users know about it;
- Identifying the resources, such as human resources, required for the establishment of the information service, as well as the technology and infrastructure requirements;
- Checking resources' availability to the implementation agency as the service provider and to secondary level geography teachers as the users of the service. These resources include human resources, time, information, technology and existing networks, and information resources; and
- Recognising the prevailing poverty in Lesotho.

7.3 FINDINGS RELATED TO THE LECKIE *ET AL* (1996) MODEL

This study is guided by the Leckie *et al* (1996) model as its theoretical framework (see Chapter Two, section 2.2). Chapter Five interpreted the data based on the Leckie *et al* (1996) model; this section presents the findings of the study related to the theoretical framework.

The Leckie *et al* (1996) model proved useful for investigating the information needs and information-seeking patterns for teachers studied including their work environment and work roles. These teachers not only have heavy workload, but also additional roles and

responsibilities such as preparing learners for employment and committee roles that involve caring for orphans as a result of HIV and AIDS even though their schools have limited resources. It was found that these teachers seek information serendipitously, collaboratively and sometimes through proxies such as younger teachers, learners and family members; making their information-seeking more complex to be revealed by the Leckie *et al* (1996) model alone. Supplementing the Leckie *et al* (1996) model with other everyday life information-seeking models such as the one suggested by Savolainen (1995) might be necessary in future. Furthermore, it was evident that the Leckie *et al* (1996) model alone would not help to guide the design of the information service for these teachers hence other information service related models such as RUSA (2000) and Tarby and Hogan (1997) were used for guiding the information service model proposed in Chapter Six.

More findings related to the Leckie *et al* (1996) model are presented in Table 7.1 below, which covers all the components of the model as presented in Chapter Two (Figure 2.1) and other salient features as discussed by Leckie *et al* (1996). The work roles emanating directly from the data and those added through interpretation as discussed in Chapter Five (section 5.2.3) are outlined the Table 7.1.

Table 7.1: Findings related to the Leckie *et al* (1996) model

Leckie <i>et al</i> (1996) model	Findings of the study
Five work roles identified as student, researcher, administrator/manager, service provider and educator.	Eight work roles identified as student, researcher, committee, administrator, educator, service provider, caregiving, information provider/disseminator, resource provider.
Tasks given are assessment, counselling, supervising, report writing.	Tasks found in this study are assessment, reading, report writing, developing personal notes, records management, counselling, information-seeking, decision-making, supervising.
Information needs are influenced by intervening variables such as demographics, context, etc.	There was no evidence of any of these factors influencing the information needs in this study. All the teachers expressed similar information needs. Demographics such as age, gender, career stage and geographical location had an influence on the selection of information sources, the style of information-seeking and information-seeking patterns.
Sources of information for professionals are colleagues, librarians, handbooks, journals, personal knowledge and experience.	Geography teachers in Lesotho use information sources such as syllabus documents, books, colleagues in their schools (geography, science, development studies, agriculture teachers) and colleagues in neighbouring schools and their professional associations. They also use other sources such as the communities (farmers and miners), personal knowledge and experience, internet, media, government departments and other institutions. They use neither journals nor librarians.
Awareness of information – knowledge and perception of information sources play a role in the overall information-seeking process.	Knowledge of information sources determines whether they will be used or not. For instance, the school libraries and librarians are not used because the teachers suspect these are respectively inadequate and incompetent. Farmers and miners who are perceived to provide correct information are consulted and even invited to the classroom.
Other factors influencing use of information sources are familiarity, trustworthiness, packaging, timeliness, cost and quality.	In this study these factors still influenced the choice of information sources. For instance, colleagues and books are heavily used because of familiarity, trustworthiness and timeliness. The teachers' preference for information in print format and audio-visual format impinges on packaging. However, the study's participants consider: <ul style="list-style-type: none"> • The contents should address the syllabus; • The language should be appropriate for the level of the learners; • Colourful illustrations in the form of diagrams, photos and maps are important; • The learners' activities are considered because they enhance understanding of the concepts and principles; and • The date of publication is crucial because current information is considered to be vital in geography.
Outcome and feedback is the results of the information-seeking process such as completing tasks, meeting information needs and realising the operational benefits of achieving professional development goals.	Outcome is the result of information-seeking realized through completing tasks and meeting the information needs. They are diverse and depend on the roles and tasks that led to the need for information. A few examples of the outcomes for the teachers studied include completing a topic in class, learners passing examinations and tests, solving problems, finding social assistance for orphans, etc.

7.4 LIMITATIONS OF THE STUDY EMANATING FROM DATA

During data analysis it was noted that the formulation of sub-question 4 (Which information sources are available and accessible at schools to these teachers?) was not adequately addressed on its own; it was rather answered from the data collected for sub-question 3 (Which information sources do these teachers mostly use?). This was unfortunately not noted during the pilot study or during data collection. This shortcoming might, however, be addressed by a study in progress on renewal of secondary education in Lesotho that is being conducted by the IE at the NUL. The study aims among others to establish suitable facilities and infrastructure in the schools. The task team for the information service proposed in Chapter Six may have to consider the relevant findings of the renewal of secondary education study once the study has been completed.

7.5 RECOMMENDATIONS

There are several approaches to the development of an information service. The aim of this study was to investigate the information needs and information-seeking patterns of the secondary level geography teachers in Lesotho and then guide the design and implementation of an information service. Based on the findings, the study makes the following recommendations:

7.5.1 Implementation agency for the proposed information service

Given that the provision of the information service for secondary level geography teachers in Lesotho is not only essential, but also feasible, this study recommends an implementation agency that will carry out the establishment of this information service to the secondary level geography teachers in Lesotho. As indicated in Chapter Six, such an implementation agency should appoint an information specialist and a task team to spearhead the process and modalities for implementing an information service for the teachers. Considering the information service proposed in this study, the implementation agency should undertake a feasibility study to determine, among others, the cost of creating and maintaining websites and identify cost-effective strategies for the delivery of such information.

Chattopadhyay *et al* (2006), Kaur and Rani (2008), Madden (2008), RUSA (2000), Underwood (1990) and Woodsworth and William II (1993) show that human resources (staffing), resources and equipment are major components of information services. The feasibility study recommended above should therefore also identify the staffing, information and equipment needed for the long-term provision of this information service. This is because it is evident that the proposed implementation agency will have to provide more staff dedicated to this information service, especially when the demand for the service increases. This is important given that the government of Lesotho is building schools to increase access to education. All these new schools offer geography, and therefore it is expected that there will be an increasing number of geography teachers demanding the proposed service.

7.5.2 Collaborative approach for the delivery of information service

Taking into account the complexity of information needs and information-seeking patterns and processes leading to the design and implementation of an information service, this study recommends that the proposed implementation agency collaborates with relevant bodies in providing the information service and also for training of school librarians and secondary level geography teachers. In this instance, a partnership programme can be undertaken by the university, relevant constituencies of the MOET, the secondary level geography teacher trainers and the secondary level geography teachers. This was mentioned in Chapter Six (6.3.2) as a task team. Gresham and Van Tassel (2000) advocate educational partnerships between academic libraries and public schools. Similarly, Chiware (2008) proposes a team of stakeholders for the implementation of information services for small and medium enterprises in Namibia, while Tarby and Hogan (1997) provide a model for collaborative development and implementation of patients' information services in a hospital. Collaborations, particularly for developing information literacy, have been advocated in the literature (e.g. Crouse & Kasbohm, 2004). This is only to show that there are already a few cases of collaboration that can be followed or adapted.

7.5.3 Allowance for traditional print and modern electronic information formats

Given that the teachers still prefer their information in print rather than electronic format, but recognising that the internet plays a crucial role in the development of digital information resources, bringing about important changes in libraries in terms of access and storage of information is unavoidable (Garibay *et al*, 2010:125). It is recommended that the information service consider both the print and electronic environments. Baruchson-Arbib and Bronstein (2007) advocate designing information service and sources that support both print and electronic environments because they will support traditional practices of users while also adapting information technologies. To corroborate this view, Brophy (2000:162) indicates that there is growing consensus that a more effective approach to information services, at least in the short or medium term, may be to develop services that draw on the best of both the traditional (meaning print) and the electronic worlds.

7.5.4 Compiling and disseminating tailor-made information packages

Secondary level geography teachers have relatively heavy workloads resulting from the number of learners per class, number of streams in the schools and number of periods per week. This gives them limited time to seek the information that they need exhaustively. Therefore, easily accessible information is crucial. Perrault (2007) maintains that searching for and verifying information poses a challenge to teachers already pressed for time. Landry (2006) also notes time and information overload as factors hindering information-seeking. It is therefore recommended that all possible efforts be taken to provide the teachers with the information that they need for teaching in their respective schools. Firstly, the availability of geographical information that is appropriate for the learners at secondary education level is very important. Such information should address the needs of the syllabus and should have colourful illustrations that will enhance understanding, and must be applicable in classrooms. This information is vital to supplement the learners' textbooks and teachers' guides. Perrault (2007) indicates that teachers consult sources such as notebooks or folders containing items such as lecture notes, hand-outs, audio-visual materials and tests from previous years when preparing for lessons.

Secondly, it is recommended that the geography education specialists mentioned in the proposed model in Chapter Six (Figure 6.3) be part of the task team that may help to serve as a consultative body for information on secondary level geography education, particularly for reviewing information that will serve as personal notes for the teachers, which will be disseminated to teachers through the channels they prefer. The notes may be posted on the internet, be available on CD or printed. This is because most of these teachers indicated that they prefer to have information in print format because of lack of the right equipment. Nevertheless, these teachers have to embrace technological advances and their opportunities because these are unavoidable (Garibay *et al*, 2010).

7.5.5 Availability of information resources

Given that secondary level geography teachers mentioned that they need audio-visual information materials, more financial resources should be available for the procurement of these information materials. The bookshops and publishers in Lesotho should stock the information materials that the teachers need so that those who can afford it may purchase them. Mundt *et al* (2006) suggest that librarians can help gather classroom resources and curriculum materials on a particular subject in the same place for easy access. Therefore, it is recommended that where school libraries exist, the librarians should make an effort to stock audio-visual material for geography and make it easily accessible to these teachers. In addition, the school librarians should be proactive to get information for teachers. For instance, regular visits to government departments and other organisations that these teachers often consult for information may help the teachers. Instead of these teachers going out to find the information, school librarians should source such information for them. Some of these institutions were mentioned in Chapter Four (section 4.2.5.2) under information sources used by the teachers. Mundt *et al* (2006) further propose that those running libraries should also consider putting together web resources on an easy-to-navigate platform and publicise these to teachers. In principle, it is recommended that audio-visual geography material requested by the teachers should be made available through various modes.

7.5.6 Building up personal files and information collections

Personal knowledge and personal files and information collections are some of the important sources of information for various professionals. This is evident from the work of Du Preez and Fourie (2009), Leckie *et al* (1996) and Perault (2007). Realising the challenges of information shortage in their schools and the value of information collection for teaching, in-service geography teachers who participated in this study emphasised the importance of buying books and laptops during professional training with book allowances from their sponsors. It was noted that there is too much dependency on library books and journals at university, so much that students do not build up their personal collections. Yet, access to university library services stops immediately they complete their studies. It is consequently recommended that professionals start building up personal files and collections during training in institutions of higher learning and this should continue even in the world of practice. Secondary level geography teachers, like other professionals, should also develop strategies to raise funds to purchase books, computers and relevant information materials needed for teaching. These teachers should also build up their personal notes, files, hand-outs and the audio-visual information materials that they need. If necessary, the information literacy training suggested for secondary level geography teachers must include skills for audio-visual material production. In addition teacher training curriculum needs to include development of teaching and learning resource packs in multimedia.

7.5.7 Easy access to syllabus documents

The teachers indicated that they consult the syllabus documents when seeking information on teaching. During this study, it was found that on the one hand the JC syllabus is available on the internet on the MOET website, which makes it easier to access. The same syllabus is also available at the NCDC because it is produced and developed there. On the other hand, the COSC syllabus for Lesotho is developed and produced by the University of Cambridge as geography syllabus 2223. Although syllabus 2223 is on the internet, at the time of data collection for this study it could only be accessed by certain people who had the right user names and passwords. Yet, other geography syllabi, such as 2217, which are studied in other parts of the world, except Southern Africa and Brunei, which study syllabus 2223 and 2230

respectively, are on the internet and can be accessed by everyone. Furthermore, geography syllabus 2217 documents for the years 2010, 2011 and 2012 are all on the internet, including past question papers and the examiners' reports. This puts Lesotho and the rest of Southern African countries that are still using the University of Cambridge examination system at a disadvantage. It is recommended that geography syllabus 2223 be made available on the internet in the same way syllabus 2217 is available. At the time of reporting on this study, syllabus 2223 could only be accessed at ECOL as a print copy.

7.5.8 Introduction and maintenance of alerting services

Secondary level geography teachers in Lesotho indicated that they need current and accurate information and obviously these teachers do not have anything in place to keep them up to date in their field. As a result, current awareness services are recommended for secondary level geography teachers in Lesotho. A system of alerting services may be similar to the one noted by Fourie (1999, 2003) incorporating materials that are freely available on the internet, such as newsletters and journals, including table of contents services from publishers, journal platforms, book alerting services and email notifications from publishers and vendors, as well as other alerting services from search engines. In addition, alerting may also be done through existing facilities in Lesotho, such as noticeboards, free radio programmes and printed newsletters available to teachers.

Fourie (1999:379) maintains that current awareness services have been used by information specialists as a method of keeping selected groups of users up to date with new information. Fourie (2003:184) notes current awareness services as a system for notifying current documents to users of library and information services and also as a service which provides a recipient with information on the latest development in his/her subject area, as well as a selection of one or more notification systems on new materials. It is recommended that studies on current awareness services for different professionals should be considered when developing current awareness services for secondary level geography teachers in Lesotho. One may consider Fourie and Bakker's (2009) study on current awareness services for oncology nurses in both the Netherlands and South Africa, Fourie and Claasen-Veldsman

(2007a, 2007b) for oncology nurses in South Africa, Rossouw and Fourie (2007) for the legal profession and Fourie (2003) for acquisition librarians.

7.5.9 Documentation and dissemination of information for the activities of geography teachers' associations

Mundt *et al* (2006) observe that professional development is a key factor affecting teachers' information universe, such that teachers attend workshops and work together as a team to integrate ideas and methods learnt in the workshops. Empirical data also point to secondary level geography teachers trusting their associations and these associations are actually active in disseminating information to the teachers through letters, workshops, excursions and meetings. However, these geography teachers' associations are not producing any reports for their activities and do not publish any annual reports other than those of the president and treasurer. It is therefore recommended that all the activities of the associations be documented in the form of written reports because these could create a wealth of information that can keep teachers up to date and be a future information source of reference. The reports will then be disseminated to members.

7.5.10 Formation of a national geography teachers' association

During data collection, it was also noted that all the geography teachers' associations function as separate bodies with no interaction with one another and yet they operate in a small country with meagre resources. It is recommended that the geography associations in the various districts join together to form one strong national geography association comprising different chapters at district level that can even develop a newsletter for the dissemination of information. This model of operation is used by the Lesotho Science and Maths Teachers Association (LSMTA). Mathematics and science are compulsory subjects in all schools. Teachers of these subjects form the biggest group when compared with elective subjects such as geography and yet they have one national association. It is imperative for geography teachers to join together to form one big national association so that they could perform their activities on a larger scale and be in a better position to mobilise resources and raise funds. LSMTA not only produces a newsletter, but also holds national functions, such as the science fair, which are well known. Newsletters are important because they are an effective tool that can provide teachers with the latest information (Fourie, 2003).

Furthermore, if the Information and Documentation Centre of the Institute of Education, National University of Lesotho is ultimately considered as the implementation agency for the establishment of an information service for secondary level geography teachers, it should resuscitate its newsletter, called *IE NEWS*, and have a section for events and news pertaining to secondary level geography teachers.

7.5.11 Sustenance of the information service

In order for the proposed information service model outlined in Chapter Six to be sustainable, training, marketing, fundraising and lobbying for resources are crucial. It is therefore imperative for the implementation agency to develop strategies on training, marketing, fundraising and mobilising of resources. Marketing strategies for the information service proposed in this study, outlined in Chapter Six (section 6.2.2.3), are recommended. The study also recommends the training strategies outlined in Chapter Five (Table 5.1), including the appointment of an information specialist and a task team that will help with fundraising and mobilising of resources. It is equally important to consider follow-up surveys for the evaluation of this information service to determine if it needs to be discontinued, modified or improved. This is because the literature, for example Chattopadhyay *et al* (2006) Cloutier (2005), Ju (2006), Kaur and Rani (2008), Madden (2008) and RUSA (2000), points out that evaluation of information services is vital. There is a need to re-examine the information needs of secondary level geography teachers constantly because information needs are not static and there are other factors or intervening variables that affect them (Leckie *et al*, 1996). It is recommended that the process of re-examining these information needs become part of the evaluation that is proposed in Chapter Six (section 6.5). Brophy (2005) provides a model of information service evaluation that can be used for the evaluation of the geography teachers' information service.

7.5.12 Exploration of mobile devices for information access

Arguments supporting mobile technology as a solution include the fact that mobile technologies are ubiquitous, affordable and easy to use (Chigona *et al*, 2008). Kinshuk (2005) acknowledges that with recent developments in mobile technologies, further possibilities are emerging to provide information services through mobile phones, hand-held

computers and personal digital assistants (Griffey, 2010). Chigona and Mbhele (2008), Chigona *et al* (2008) and Chigona *et al* (2009) deal with the prospects of mobile internet in South Africa among socially excluded people and students and the role of the internet in alleviating social exclusion. Similarly, Parsons (2010) considers information access and information provision through mobile devices within higher education libraries. These studies provide possible ideas to consider when exploring mobile devices for information access for Lesotho teachers.

Underwood (2007:3) asserts that the growth of the information society and the networked culture in South Africa is apparent. Cell-phones are ubiquitous and easily outnumber fixed-line installations; the technology has provided telecommunication services for many communities that would be unlikely to be connected to a fixed-line service. According to Chigona *et al* (2008), there has been a significant increase in the diffusion of cell-phones in South Africa and much of the world, such that cell-phone technology has advanced rapidly and continues to do so. As a result, cell-phones have become one of the most important communication, social, business and entertainment devices of the 21st century. This increase in cell-phone connectivity is also realised in Lesotho. In this study, teachers frequently referred to the use of cell-phones that they use mainly for phone calls and SMS. It is recommended that secondary level geography teachers consider using their cell-phones to access the internet. This is because the teachers indicate that they need the internet because they believe it will provide them with a variety of information that is current and yet they cannot access the internet in their schools, mainly because it is not available. It is of paramount importance for schools' principals to make an extra effort to make the internet available and accessible to teachers in their schools because in this era, internet accessibility has become a necessity. James (2010) offers affordable alternatives, such as communal institutions that share the cost of using the internet across a large number of people and internet kiosks, for accessing the internet in rural areas in developing countries.

It is further recommended that once teachers access the internet, they should take full advantage of platforms and facilities for communication and information access available through the internet, such as instant messaging. Nielsen (2009) explains instant messaging as

a facility that could be considered for today's library and information service users as they not only look for information on the internet, but also take part in conversations, sharing and producing their own information on the internet. Instant messaging has developed as a result of the growing conversational pattern of communication on the internet. Therefore, the secondary level geography teachers may have to embrace such technological advancements. This calls for them to access information by using many platforms such as Facebook, blogs, wikis and instant messaging of clients, most of which can be accessed through cell-phones.

7.5.13 Introduction of inter-library lending through school libraries consortium

The empirical data showed that secondary level geography teachers use books heavily as some of the information sources readily available in their schools; they also trust some of the information from books. But it is also evident from the data that all the schools do not have all the books that they need. It is therefore recommended that schools start inter-library lending systems through a school libraries consortium. According to Taole and Dick (2009:5), library consortia have been established in many parts of the world in response to an increasing demand for information and the inability of libraries to have all resources on site. It was found during data collection that some informal inter-lending of books and other sources of information is already happening among the individual teachers and through their associations. It is recommended that this be formalised into proper information resource-sharing with clear policies and guidelines. If school libraries form a consortium, its functions, goals and objectives, as well as the policies and guidelines, may be learned from the Lesotho Library Consortium, which is an existing consortium of academic, national, public and special libraries in Lesotho (Taole & Dick, 2009). Another resource-sharing approach worth considering for Lesotho schools is the clustering of schools strategy noted from Mokgaboki (2002) and Nzimande and Stilwell (2008). However, Nzimande and Stilwell (2008:235) caution that not all cluster communities will be the same and a community's preparedness to embark on clustering is likely to differ from one area to the next.

7.6 SUGGESTIONS FOR FUTURE RESEARCH

The investigation of secondary level geography teachers' information needs and information-seeking patterns is the first study of its kind in Lesotho. This study went further to guide the design and the implementation of an information service for these teachers. Concerns that have emerged from this study require further examination regarding an information service for secondary level geography teachers in Lesotho.

- This study did not address the information literacy levels of secondary level geography teachers, nor did it determine if these teachers have the necessary skills to use the internet effectively, as well as various multimedia information resources available today. It was found that there are some teachers who have used the internet, while others have never used it. Therefore, studying the information literacy levels of these teachers and assessing their internet skills are important.
- Comprehensive stocktaking of all the information resources in various sectors that could help secondary level geography teachers in Lesotho is foreseeable. It is important to know who has what in order to identify gaps and avoid duplication of efforts in the midst of limited resources and poverty in Lesotho.
- Comparative analysis in terms of accessing the internet on cell-phones and computers is essential. This is important in order to establish how large amounts of information will be downloaded from cell-phones.
- E-readiness in Lesotho schools and various modes of internet access, including their cost and effectiveness for schools, also need to be studied.
- A feasibility study on clustering of schools for information resource-sharing and a feasibility study on school libraries consortium are equally important. These studies can shed light on effective means of information resource-sharing within schools.
- A study on teachers' information-seeking behaviour in non-work contexts using Savolainen's (1995) everyday life information-seeking model might help to gain

more insight on the teachers' information needs and information-seeking behaviour, which might better inform an information service. Such a study may be a comparative analysis of the Leckie *et al* (1996) model with the Savolainen (1995) model on teachers' information behaviour because it might yield insights that would improve the information service proposed in Chapter Six, especially when considering findings on information needs related to the teachers' roles such as the caregiving role in the midst of HIV and AIDS prevalence in Lesotho, and the student role as discussed in Chapter Five (section 5.2.3).

- The high prevalence of HIV and AIDS in Lesotho and increasing number of orphans calls for a study on information-seeking behaviour of other caring professions such as counsellors, nurses, orphanage managers and social workers (De Vos *et al*, 1998) to develop their new or adapted information-seeking model and their information service. For teachers, further studies may focus specifically on the caregiving role identified in this study.

7.7 CONCLUSION

This chapter presented the findings on the principal question and its sub-questions that were originally outlined in Chapter One (section 1.2), as well as the Leckie *et al* (1996) model that was used as the theoretical framework in this study. Based on the findings, the chapter also made recommendations that would help to improve and sustain information services for secondary level geography teachers in Lesotho. Moreover, recommendations for further relevant research were also outlined.

Some of the concluding remarks for this study were presented earlier as research findings on the principal question in section 7.2.1 and there is no need to repeat these. Nonetheless, the researcher concludes this chapter by pointing out that the study achieved its goal of investigating the information needs and the information-seeking patterns of secondary level geography teachers in Lesotho. The study has also shown the importance of understanding fully the information needs and information-seeking patterns of the targeted users if a proper information service is to be developed and established. It has also demonstrated that the prevailing conditions of the country, the intended users of the information service and all the

resources that are available have to be considered when designing the information service. The study also indicated that it is significant to determine the information literacy levels and the internet skills of the secondary level geography teachers in the light of the proposed electronic information service.

The provision of an appropriate information service to secondary level geography teachers in Lesotho is important, particularly at this stage where the government of Lesotho has embarked on building schools in order to increase accessibility to education. The majority of these government schools offer geography, and this means that the government is acknowledging the importance of geography in education. It is anticipated that there will be an increase in the number of geography teachers. In the academic year 2009/2010, NUL has seen a noticeable increase in the number of students studying to be geography teachers. As a result, access to information for secondary level geography teachers is imperative. It is crucial to point out that access to information is not the only factor that will make a contribution to effective teaching and learning.

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APPENDIX A - FOCUS GROUP DISCUSSIONS' SCHEDULE

FOCUS GROUP DISCUSSIONS SCHEDULE FOR THE SECONDARY GEOGRAPHY TEACHERS

Information needs and information seeking patterns of secondary geography teachers in Lesotho: implications for information service.

Likonelo Bitso

I am a PhD student in the Department of Information Science, University of Pretoria. The title of my study is outlined above. As part of my research, I have to carry out an empirical study using focus group discussions with the secondary geography teachers in Lesotho. Our discussion will be focused on your information needs and information-seeking patterns for purposes of your teaching.

Your participation in this study is totally voluntary and there will be no consequences if you do not want to be interviewed. If you agree to participate in the interview, you still have the right to withdraw at any time during the interview. If you feel uncomfortable to answer some questions, please feel free to decline answering those questions. I assure you that all the information you provide will be treated with the utmost confidentiality.

May I request your permission to voice record the interview proceedings? I will personally guard these recordings to ensure the highest confidentiality. Please feel free to decline being recorded if you are uncomfortable with it.

I am willing to answer any questions that you may have regarding this study. My contact details are: Institute of Education, National University of Lesotho, P.O. Roma, 180. Tel: +266 28322141 or +266 58864935 or +27 78 419 8701
Email: connie.bitso@up.ac.za or likonelobitso@yahoo.com

If you agree to participate in this study, please append your signature below.
Participants' signatures:

Signature.....	Signature.....
Signature	Signature.....
Signature.....	Signature.....

Researcher's signature.....

Location **Date**

Number of participants in the focus group.....

Time interview starts..... **Time interview ends.....**

Each participant will receive a copy of this consent form

1. BACKGROUND INFORMATION¹⁵

Please tell me:

- Number of classes (streams) in this school.
- Average number of learners per class.
- Number of teachers that are currently teaching geography in this school.
- Your teaching load (number of periods per week).
- Your other roles and responsibilities that you have in this school e.g. sports teacher, class teacher, disciplinary committee.
- Number of years you have been teaching.
- All the subjects that you teach.
- Your highest qualification.
- Your position (principal, head of department).

2. INFORMATION NEEDS

I would like to know about your information needs regarding your teaching.

2.1 How often do you need information for ... ?

- Content.
- Teaching methods.
- Classroom management.
- Assessment.
- Adolescence social problems such as substance abuse, violence, pregnancies, etc.
- Other roles and responsibilities that you mentioned earlier in the background information.
- Any other thing that I have not mentioned.

2.2 Is the information that you find generally satisfying your information needs?

3. INFORMATION-SEEKING

I would like to know how you usually find information for your teaching.

3.1 If you want information that you are going to use for teaching, particularly a new topic, how do you usually find it?

3.2 Please tell me the challenges that you usually encounter when you have to find information for teaching.

3.3 Do you have any suggestions on how these challenges may be resolved?

3.4 Have you had any training or formal guidance on how to find information, especially from various electronic sources?

3.5 As you gain teaching experience, is there still a need to make an effort to find more information for your teaching?

¹⁵ This question was formulated to make the participants at ease; it was part of the introduction between the researcher and the participants.

3.6 If you were to select a book/document for teaching geography, which factors would you consider?

4. INFORMATION SOURCES

I would like to know the information sources that you use to find information for teaching.

4.1 Do you use the library? Where is this library?

4.2 Do you use the internet? Where do you access the internet?

4.3 Do you have adequate books? How do you acquire these books? Are you satisfied with their information?

4.4 Do you use reference books such as encyclopaedias, dictionaries, etc.

4.5 Do you use journals?

4.6 Which media (TV, radio, newspapers, etc.) do you often use?

4.7 Which people do you consult for information?

- Colleagues at this school.
- Colleagues from other schools.
- Other professionals such as farmers, miners, etc.
- Any other category not mentioned above.

4.8 Which institutions do you consult for information?

- Government ministries.
- Private companies.
- Institutions of learning.
- Associations/unions.
- Any other category.

4.9 Do you use personal knowledge and experience?

4.10 Is there any information source that is not available to you that you would like to use?

4.11 Are most of your information sources in electronic or print format? Which of these formats do you generally prefer?

5. INFORMATION SHARING

I would like to know how you generally share information related to your teaching.

5.1 Do you have departmental meetings /workshops? How often?

5.2 Have you attended any geography teachers' workshop or conference?

5.3 Are you a member of any teachers association?

5.4 Have you ever gone out to look for information on the same topic and come back to compare notes?

5.5 Have you ever divided a topic into sub-topics and gone out individually to find information on the different sub-topics and come back to share it with colleagues?

5.6 Is there any other way that you share or exchange information?

6. INFORMATION COMMUNICATION

6.1 Which modes of communication do you often use to obtain and exchange information?

6.2 Are there any other modes of communication that you would like to use to obtain and exchange information?

6.3 Are there any information and communication technologies that you believe would provide a better service to you?

7. INFORMATION SERVICE

I would like to have your suggestions on an information service for the secondary geography teachers in Lesotho.

7.1 What kind of information material would you like to receive?

7.2 How should the information material be delivered to you?

7.3 Are there any other suggestions that you may have regarding your information service?

THANK YOU VERY MUCH FOR YOUR TIME

APPENDIX B – INTERVIEW SCHEDULE

**INTERVIEWS SCHEDULE FOR THE OFFICIALS IN INSTITUTIONS INVOLVED IN
SECONDARY GEOGRAPHY EDUCATION IN LESOTHO**

**Information needs and information seeking patterns of secondary geography teachers in
Lesotho: implications for information service.**

Likonelo Bitso

I am a PhD student in the Department of Information Science, University of Pretoria. The title of my study is outlined above. As part of my research, I have to carry out an empirical study using interviews with the institutions that disseminate information to the secondary geography teachers in Lesotho. The interview will be focused on your experiences and opinions with regards to information service delivery for the secondary geography teachers in Lesotho.

Your participation in this study is totally voluntary and there will be no consequences if you do not want to be interviewed. If you agree to participate in the interview, you still have the right to withdraw at any time during the interview. If you feel uncomfortable to answer some questions, please feel free to decline answering those questions. I assure you that all the information you provide will be treated with the utmost confidentiality.

May I request your permission to voice record the interview proceedings? I will personally guard these recordings to ensure the highest confidentiality. Please feel free to decline being recorded if you are uncomfortable with it.

I am willing to answer any questions that you may have regarding this study. My contact details are:

Institute of Education, National University of Lesotho, P.O. Roma, 180.

Tel: +266 28322141 or +266 58864935 or +27 78 419 8701

Email: connie.bitso@up.ac.za or likonelobitso@yahoo.com

If you agree to participate in this study, please append your signature below.

Participant’s signature

Researcher’s signature.....

Location

Date

Time interview starts.....

Time interview ends.....

Each participant will receive a copy of this consent form.

1. BACKGROUND INFORMATION

Please tell me about:

- The main function of your institution.
- The work that you do in this institution.
- Number of years you have been working in this institution.
- Your work with the in-service geography teachers.
- Your experience, if any, regarding geography in the secondary schools.

2. INFORMATION DISSEMINATION

2.1 Do you disseminate information to secondary geography teachers?

2.2 How do you disseminate the information to these teachers?

2.3 Please tell me about the challenges that you encounter when disseminating information to these teachers.

2.4 Do you have any suggestions on how these challenges may be solved?

3. INFORMATION NEEDS

3.1 Do you receive any information requests from the secondary geography teachers?

3.2 If you receive information requests from these teachers, what kind of information requests do you receive?

3.3 In your opinion, what are the major issues that these teachers may need information for?

4. INFORMATION COMMUNICATION

4.1 Which modes do you use to communicate information with the secondary geography teachers? Please give reasons for using these modes.

4.2 Which modes do these teachers use to communicate information with you?

4.3 Are there any information and communication technologies that you believe would provide a better service, which are not available to the teachers?

5. INFORMATION SERVICE

5.1 What is your overall comment on the improvement of the information service for the secondary geography teachers in Lesotho?

THANK YOU FOR YOUR TIME

APPENDIX C - OBSERVATION SCHEDULE

OBSERVATION SCHEDULE FOR SCHOOL LIBRARY SERVICES

**Information needs and information seeking-patterns of secondary geography teachers in
Lesotho: implications for information service.**

Likonelo Bitso

Name of school.....

Location.....

Items	Observation remarks
Does the information in the library cover all the schools' subjects? Are the topics required by the geography teachers sufficiently covered?	
Is the information updated regularly?	
Is there any inter-library service or effort to solicit external information for the teachers?	
Is the library conveniently located for the geography teachers?	
Which facilities are available in the library?	
Is there enough staff to provide the information service required by the teachers? Establish the staff qualifications.	
Is the information service timely?	
Is there any budget for the library?	

APPENDIX D - QUESTIONNAIRE

PROSPECTIVE SECONDARY GEOGRAPHY TEACHERS' QUESTIONNAIRE

Information needs and information-seeking patterns of secondary geography teachers in Lesotho: implications for information service.

Likonelo Bitso

I am a PhD student in the Department of Information Science, University of Pretoria. The title of my study is outlined above. As part of my research, I have to carry out an empirical study using this questionnaire for the prospective geography teachers at the National University of Lesotho. These are final-year education students who are majoring in geography. The questionnaire requests information on your experiences regarding your information needs and information-seeking patterns during your teaching practice.

Your participation in this study is totally voluntary and there will be no consequences if you do not fill in this questionnaire. All the information you provide will be treated with the utmost confidentiality.

I am willing to answer any questions that you may have regarding this study. My contact details are:

Institute of Education, National University of Lesotho, P.O. Roma, 180.

Tel: +26628322141 or +26658864935 or +27 78 419 8701

Email: connie.bitso@up.ac.za or likonelobitso@yahoo.com

Your time and support are much appreciated.



1. DEMOGRAPHIC INFORMATION

1.1 Please indicate your age range:

20-25	
26-30	
31-35	
36-40	
Older than 40	

1.2 Degree being studied.

B Ed	
BA Ed	
BSc Ed	
Other, specify	

1.3 NUL¹⁶ entrance highest qualification.

COSC ¹⁷ or equivalent	
Post-school teaching certificate	
Post-school diploma	
Other, specify	

1.4 Where did you do your teaching practice?

School	
Proprietor	
District	

1.5 Have you taught before? (This does not include teaching practice)

YES	
NO	

If yes, please provide the following information:

Number of years you were teaching	
The subject(s) you were teaching	
Your position e.g. teacher, principal, head of department	

¹⁶ NUL is the National University of Lesotho.

¹⁷ COSC is the Cambridge Overseas School Certificate.

2. ACCESSIBILITY AND AVAILABILITY OF INFORMATION IN SCHOOLS

2.1 What is your opinion about the information resources at the school where you did your teaching practice? Please tick **only** if you found that the resource was available, if you think the information resource **provided sufficient information** for teaching and if you experienced **no restrictions** on use the information resource.

Information resource	Information resource was available	Information resource provided sufficient information	No restrictions on using the information resource
1. Library			
2. Internet			
3. Journals (printed and electronic)			
4. Newspapers/magazines			
5. Radio/TV			
6. Reference books (e.g. encyclopaedia, dictionaries)			
7. Books			
8. Other, specify			

3. INFORMATION NEEDS

3.1 Please indicate by ticking the issues on which you needed information during your teaching practice

Information need	Tick
1. Content	
2. Teaching methods	
3. Classroom management	
4. Learners' assessment	
5. Educational policies (legislation, teaching regulations)	
6. Syllabus	
7. Schools' performance in national examinations	
8. Adolescence social problems (drug abuse, violence, pregnancies, etc.)	
9. Other, specify	

3.2. Where did you find the information that you needed? (**Tick only one**)

Within the school	
Outside the school	
Both at school and outside the school	

3.3 How often did the information that you found satisfy your needs? (**Tick only one**)

Often	<input type="checkbox"/>
Sometimes	<input type="checkbox"/>
Never	<input type="checkbox"/>

3.4 During the teaching practice, what did you generally experience with regard to information that you needed for your lesson plans? (**Tick only one**)

Too much information	<input type="checkbox"/>
Average information	<input type="checkbox"/>
Shortage of information	<input type="checkbox"/>

3.5 Which information format do you generally prefer? (**Tick only one**)

Print	<input type="checkbox"/>
Electronic	<input type="checkbox"/>

4. INFORMATION-SEEKING

4.1 Please indicate your style of information-seeking and frequency of information-seeking during teaching practice. (**Please tick only one column in each row**)

Scope of effort	Often	Sometimes	Never
Consulting information sources with a specific purpose in mind	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coming across needed information through regular interaction with information sources such as media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaborating with others to seek information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using others to seek information on your behalf (please indicate the kind of person you use e.g. other students, family, friends, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2 During the teaching practice, what were the difficulties that you encountered when you were seeking information at school? (**Please tick only one column in each row**)

Difficulties	Major difficulty	Minor difficulty	Did not experience
Information available was not adequately addressing the syllabus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Could not find the relevant information easily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information was often out-dated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did not have enough time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information was not easy to interpret and use for lesson plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was lack of information sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. INFORMATION SOURCES

5.1 How often did you utilise the following information sources during your teaching practice?

Information source	Often	Sometimes	Never
1. Internet/electronic databases			
2. Books			
3. Reference books (e.g. encyclopaedia, dictionaries)			
4. Printed/electronic journals			
5. Media (TV, radio, newspapers, etc.)			
6. School library			
7. Personal knowledge/experience			
8. Teachers at the school			
9. Personal friends/family/relatives			
10. Conferences/workshops reports			
11. Government ministries (specify ministry)			
12. Para-statal/private institutions documents (specify institution)			
13. Associations/unions (specify which one)			
14. Other, specify			

6. INFORMATION COMMUNICATION

6.1 How often did you use the following modes of communication to obtain information during the teaching practice?

Method	Often	Sometimes	Never
Face-to-face discussions			
Post office mail			
E-mail			
Internet			
Telephone			
Cell-phone			
Fax			
Media (radio, TV, etc)			
Other, specify			

7. INFORMATION SERVICE

7.1 What is your overall comment on the improvement of the information service for the secondary geography teachers in Lesotho?

Thank you for taking time to complete the questionnaire!