

ABBREVIATIONS AND ACRONYMS

ALE	Adult Learning and Education
AU	African Union
BEST	Better Environmental Science Teaching
CDU	Curriculum Development Unit
CLT	Cognitive load theory
DEO	District Education Officer
DPED	Deputy Provincial Education Director
EAS	Environmental and Agricultural Science
ECD	Early Childhood Development
ES	Environmental Science
ESL	English as a second language
FGD	Focus group discussion
ICT	Information and Communication Technology
L1	First language or mother tongue
L2	Second language
LAD	Language acquisition device
LEP	Limited English Proficiency
LoLT	Language of Learning and Teaching
NGO	Non-Governmental Organisation
NS	Nature Study
NUFU	Norwegian Programme for Development, Research and Education
OAU	Organisation of African Unity
OBE	Outcomes-Based Education

PED	Provincial Education Director
RNCS	Revised National Curriculum Statement
RS	Rural Science
SACMEQ	Southern Africa consortium for monitoring educational quality
SADC	Southern Africa Development Committee
SLA	Second language acquisition
SLL	Second language learning
STEM	Science, Technology, Engineering and Mathematics
TIC	Teacher-in-charge
UATS	Unified African Teaching Service
UEM	Eduardo Mondlane University
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNISA	University of South Africa
ZPD	Zone of proximal development

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CHAPTER 1

INTRODUCTION AND OVERVIEW

1.1 Background to the study

The offline English Dictionary defines environmental science (ES) as the study of the factors that have an effect on the environment and its systems, particularly the interaction of its biological, chemical and physical components. It is an interdisciplinary field of study that comprises science subjects like biology, botany, zoology, ecology, soil science, chemistry, geology, mineralogy, hydrology, oceanology, limnology and geodesy. Geology is earth science. Mineralogy is a branch of geology in which learners study the structure, properties and identification of minerals. Hydrology is a branch of geology in which learners study the distribution, uses and conservation of water on earth and the atmosphere. Oceanology is the study of the biological and physical facets of oceans. Limnology is the scientific study of the biological, geological and physical properties of fresh water bodies. Geodesy is a branch of geology in which scientists study the earth's shape and the identification of the actual position of geographical points. Environmental science is sometimes confused with environmental studies, which is the study of the social sciences that attempts to construe human relationships, perceptions and environmental policies.

In the Zimbabwean context, ES for pupils at primary school is a combined subject which aims to sensitise pupils about themselves and the physical environment in which they live. This subject offers primary school pupils a chance to scrutinize and resolve everyday challenges that people encounter, such as soil erosion, pollution, drought, floods, deforestation, wildlife depletion, global warming, starvation and diseases. Pupils also learn to develop basic scientific skills like observing, inferencing, measuring, graphing, explaining, discussing, describing, estimating, enquiring, investigating, predicting, testing, designing and inferring.

Primary school ES is also intended to develop in pupils some fundamental scientific knowledge. In the process, pupils will acquire positive attitudes towards their environment. It is hoped that pupils will be able to utilise the acquired scientific knowledge, principles, skills and attitudes to find solutions to challenges they encounter in real life situations and make informed decisions when the need arises.

In ES, Zimbabwean primary school pupils cover the following topics:

- Water;
- Soil, grass and grazing;
- Trees and forestry;
- Crop plants and animals;
- Health and pollution;
- Energy and fuels;
- Weather;
- Materials and technology; and
- Landforms and maps.

All the nine topics listed above are repeated in all the seven primary school grades. The intricacy of the subject matter increases as pupils move up the grades. For instance, the topic 'Water' is covered in all the seven grades. In grade one, pupils learn about the simple properties of water, such as its lack of taste and colour, its ability to flow and make objects wet, its indefinite shape that is determined by the shape of its container and finally pupils learn about conservation of water. In grade two, pupils explore to find out where water can be found in their vicinity and other areas; investigate the uses of water by living organisms and explore ways of conserving water.

In grade three, pupils conduct very simple experiments to show that water flows from high to low areas; investigate to establish where water collects and how it can be stored. In grade four, pupils conduct simple experiments to show that water can percolate through the soil and some porous rocks; that water cannot filter through impervious rocks to form underground water source; that underground water held in the soil and pervious rocks can rise to the surface naturally or artificially; and finally that there are protected and unprotected sources of water.

In grade five, pupils conduct simple experiments to illustrate that water changes from the liquid to the gaseous state under certain conditions and vice versa; and that water evaporates at different rates under different conditions. In grade six, pupils conduct simple experiments to investigate the three states of water and that water is never lost from the water cycle. Finally, in grade seven, pupils learn about the solvent properties of water; pollution and water-borne diseases. The same arrangement is followed with the rest of the topics.

By the end of their primary school ES course, learners should be able to demonstrate that they have acquired some fundamental scientific concepts and principles. They should also be able to conduct simple experiments to investigate their own scientific ideas and produce plausible conclusions. They should also be able to identify natural resources; manage, improve and

conserve the environment through the application of fundamental scientific concepts and skills (CDU, 1994:i).

The type of science that was taught in primary schools in Rhodesia, now Zimbabwe, in the 1950s was Nature Study (NS). In NS, the science that pupils were made to learn was very shallow. Children were asked to copy diagrams of plants, insects and other animals from a textbook and labelled their parts (Young, 1988:3). In those days, pupils were asked to draw and label plants like the sundew and maize. They were also asked to draw birds like the turtle dove and swallow and creatures like the cicada and the scorpion. The only Science textbook that primary school pupils possessed was called *The Outdoor World Book One to Book Six*. Diagrams of organisms that pupils drew were copied from those *Outdoor World* textbooks.

The Rhodesian Government decided to improve the education system of the Black people. In 1974, the Rhodesian Government set up the Lewis - Taylor Committee of Inquiry and tasked it to investigate how the education system of the Black people could be amended (Gamira, Ndamba & Mswazi, 2010:228; Mandiudza, Chindedza & Makaye, 2013:2). The Lewis-Taylor Report of 1975 suggested the phasing out of NS and Environmental and Agricultural Science (EAS) replaced it. The actual teaching of EAS was started in 1982.

More commissions of inquiry were set up by the Rhodesian Government to look into the European and African education systems with the view of improving them. Some of these commissions were the Frank Tate Commission of 1929 which urged the government to introduce compulsory practical subjects in the curriculum; the Fox Commission of 1935 which discouraged the teaching of academic subjects only with few practical skills for White children and recommended the introduction of a curriculum with more than one course of learning; the Kerr Commission of 1952 which advocated for the offering of skills to Black pupils; the Judges Commission of 1963, which introduced Vocational and Technical Education for African schools; and the Lewis-Taylor Committee of 1974 which advised the government to offer skills to all learners, regardless of race. Unfortunately, the recommendations that were made by the different commissions of inquiry were only implemented in schools for Whites only (Mandiudza, Chindedza & Makaye, 2013: 124). Neither the issue of the medium of instruction in schools, nor the issue of a language policy in the country, was ever raised by any of those commissions.

In 1929, another commission of inquiry called the Frank Tate Commission was set up by the Rhodesian Government to re-examine the European Education only. Nothing was suggested for the African Education. The Frank Tate Commission advised the government to offer

compulsory practical subjects for Whites only. Implementation of that policy ended in 1980, when Zimbabwe became independent (Dokora, 2015:1). Another commission known as the Fox Commission was instituted to reassess the education for Whites again just a few years after the Frank Tate Commission. The Fox Commission was against the teaching of academic subjects only to Whites. It recommended a secondary school curriculum with both academic and practical subjects for White children. The academic and practical course had been recommended by some of the previous commissions (Dokora, 2015:1). African Education continued to be denigrated. The Rhodesian government was totally against the furtherance of Africans (Mungazi, 1989:267). Again, neither the issue of the national language policy nor the medium of instruction in schools was raised.

In 1951, the Rhodesian Government decided to look into African education with a view of improving it. It appointed the Kerr Commission to make recommendations on the African education to assist it in its policy resolutions (Maravanyika, 1990:20). In 1952, Doctor Alexander Kerr Commission advised the Rhodesian government to introduce mandatory education for all citizens (Dokora, 2015:1). The Kerr Commission also advised the government to offer skills to African children. It was the Kerr Commission's recommendations that resulted in the establishment of the Unified African Teaching Service (UATS) as part of the 1959 National Education Act, which set up different curricula and conditions of service for Blacks and Whites (Mandiudza, Chindedza and Makaya, 2013:124). The use of the mother tongue as a LoLT throughout the primary school was never suggested.

In its bid to continue improving the education system for learners, the Government of Rhodesia instituted the Judges Commission in 1962. That commission recommended, among other issues, a full primary education for all, irrespective of race; a junior secondary course with an emphasis on vocational training, reflecting the employment opportunities of each locality; and a merger of the two systems of education, namely: the European and the African divisions of education (Maravanyika, 1990:20). The Judges Commission had been mandated to scrutinize the different types of schools in the country, allocation and distribution of resources in schools, distribution of responsibility and the work of government and industrial bodies. The Judges Commission queried why there were two systems of education, namely: the European and the African systems. That Commission also examined what was happening in the primary schools, the different types of schools that existed in the country, education for the girl child and the issue of financing education. The Judges Commission deplored the marginalisation of children on farms and rural areas. It also recommended the provision of primary education for all. But, most importantly, the Judges Commission is well known for recommending the use of English

as the LoLT in all subjects except indigenous languages. That caused the government to promulgate a policy that denigrated local languages (Mandiudza, Chindedza and Makaya, 2013:124).

The Lewis-Taylor Committee that was instituted in 1974 attempted to implement some of the recommendations of the Judges Committee (Dokora, 2016:1). The Lewis-Taylor Committee Report of 1975 suggested the following changes: from oral and essay writing examinations to multiple choice tests; from the teaching of History and Geography to Social Studies, from NS to Environmental and Agricultural Science (EAS). The consequences of that change were unfortunate. The teaching of essay writing, History and Geography was relegated to an outer edge. English compulsorily became the LoLT in all subjects. African languages were marginalised (Mandiudza, Chindedza & Makaye, 2013:129).

Throughout the colonial error, education policies were tailor-made to boost White interests against possible Black competition in controlling the economy, the politics of the country and its administration. Education for Whites was basically free and compulsory up to the age of fifteen and was state responsibility, whereas African education was in the hands of various organisations, the majority of whom were missionaries. There were a few government schools for Blacks in cities and towns. There were also church schools and private schools. There were bottlenecks in African education to move from one grade to the next and from primary school to secondary school. For Whites, such bottlenecks did not exist (Maravanyika, 1990:21).

In 1980, Zimbabwe attained its independence. The new government took over a system of education that was founded on racial discrimination (Ministry of Education, Sport and Culture, 2008:1). For example, the colonial government of Rhodesia made European education compulsory, but the African education was not. For every dollar a Black child received from the colonial government, the White child received 20 times more (UNESCO International Bureau of Education, 2001:4). Consequently, the 1982 population census revealed that 63% of the adult population in Zimbabwe was either illiterate or semi-illiterate.

As a result of these inequalities it was very prudent for Zimbabwe to re-examine its education system in order to put right the inherited disparities (Shizha,2007:308). Reforms in education were instituted. The report on ALE reveals that the government launched a literacy campaign in 1983. By 2002, the state had acquired a literacy rate of 97% from 63% at independence. The primary education programme for adult learners is a seven-year course done in a period of three years. Its primary goals are to mobilise and encourage illiterate and semi-illiterate adults to acquire basic skills in reading, writing and arithmetic, using the mother tongue and also to

foster skills training. I attribute the successes of ALE to the use of the mother tongue as the LoLT. The LoLT in African schools is the major obstacle in students' achievement in class (Shizha, 2005:65).

The Presidential Commission of Inquiry into Education and Training, which was also known as the Nziramasanga Commission, was instituted in 1998 to scrutinise the inherited education system in Zimbabwe. That commission strongly recommended that an overhaul of the whole education system was necessary to make it relevant to the needs of independent Zimbabwe. The Commission advised the Zimbabwean Government to make education at all levels accessible to all those who needed it, from ECD to tertiary education. It also urged the government to upgrade indigenous languages and to develop ICT and practical skills at primary school level. The government was also advised to consider the marginalised groups like the girl child, the disabled and vulnerable children as special cases requiring special attention (Institutional Repository at University of Zimbabwe. Staff Publications).

The government of Zimbabwe also also contracted Lewin and Bajah (1991) to assess the teaching and learning of EAS subject. Their recommendations resulted in the production of the Primary School ES Syllabus authored by CDU (1994) currently in use. Lewin and Bajah (1991) also made recommendations on the teaching and examination of ES and provided the framework for training teachers in teachers' colleges and retraining teachers in the field to teach ES. Again, the issue of the medium of instruction was never discussed.

In Zimbabwe, the Education Act (1987) representing government policy on the medium of instruction in schools prior to the 2006 amendment stipulates that grade four to university should be taught in English (Education Act, 1987a; Thondhlana, 2002:33; Siwela, 2013:19; Shizha, 2007:313; Makanda, 2011:38). My observation was that there was no match between that Education Act which represented policy and practice. The Education Act (1987b) stipulates that the mother tongue of the learners should be used as the LoLT prior to Form One. Again, my observation was that there was no match between that Education Amendment Act that represented policy and practice. As a primary school college lecturer, I have also observed that teachers use English as a LoLT at all levels of the primary school. For the majority of these learners, English is a second language (ESL). Are these learners proficient enough to use English effectively as a language of learning and teaching (LoLT)? Are there no challenges resulting from the use of ESL in teaching ES at primary school level? It is against this background that I have decided to pursue this study in which I am advocating for a multilingual approach when deciding which language(s) to use as the LoLT during ES lessons in

Zimbabwean primary schools.

1.2 The research question

What communication problems arise from the use of English as a second language (ESL) in teaching and learning Environmental Science (ES) at primary school level in Zimbabwe?

1.3 Sub-questions

- To what extent is the Education Act of 1987 that represents the language policy in Zimbabwe useful to teachers and learners at primary school level?
- Is there a match between the Education Act of 1987 that represents the language policy in Zimbabwe and classroom practice at primary school level?
- How do learners use language during Environmental Science lessons?
- To what extent are primary school pupils proficient enough to learn Environmental Science using English as a second language?
- What makes pupils fail to participate in discussions during Environmental Science lessons?
- To what extent can the mother tongue be used as the medium of instruction in Environmental Science lessons?

1.4 The aims and objectives of the study

1.4.1 The research aim:

The research aims to investigate the problems caused by the use of English as a second language in the teaching and learning of Environmental Science at primary school level in Zimbabwe.

1.4.2 The research objectives are to:

- establish whether there is a language policy in Zimbabwe;
- investigate the usefulness of the Education Act of 1987, that represents the language policy currently in use in Zimbabwean primary schools;

- ascertain whether there is a match between policy and practice during the teaching and learning of Environmental Science at primary school level;
- establish how learners communicate with their teachers and with each other in Environmental Science lessons at primary schools;
- establish the language of learning and teaching Environmental Science currently in use from grade four to grade seven in Zimbabwean primary schools;
- explain why grades 4 to 7 learners are not eager to participate in class discussions during Environmental Science lessons;
- establish the learners' level of proficiency in English as a second language (ESL);
- explore the attitudes of grades four to seven learners and teachers towards the use of indigenous languages as languages of learning and teaching Environmental Science in Zimbabwean primary schools; and
- investigate empirically, how grades four to seven teachers and their pupils communicate in class during Environmental Science lessons.

1.5 Research design and methodology

1.5.1 Research design

There are several types of research designs that a researcher can choose from but there is no one type that can be singled out as the best design or the worst design. The choice of a research design depends on the researcher's research questions. The one that I selected was the best one to answer my research questions (Matthews & Kostelis, 2011). To achieve my objectives in this study, I used the qualitative research design because it was the one that allowed me to make "knowledge claims" that are embedded on constructivist perspectives (Galt, 2008:20). That enabled me to describe the phenomena that I was interested in "with great richness, in the original language of my research participants" (Creswell, 2007:60).

As a qualitative researcher, I was able to get closer to my participants' perspectives through the use of in-depth interviewing of my participants and observation of my participants in their natural setting. I also utilised focus group discussions and analysed participants' documents. My preference for the qualitative design over the quantitative one was based on the premise that quantitative researchers are not in a position to capture the participants' perspectives since

they depend on secluded, inferential pragmatic methods and materials (Denzin and Lincoln, 2011:9).

My choice of this paradigm in which I utilised an inductive approach, enabled me to construct theory rather than use an already existing theory to prove something (Kumar, 2011:57). Trafford and Leshem (2008:98) contend that an inductive approach to research utilises different forms of interpretative analyses of meaning-making to obtain non-generalisable conclusions. Through my choice of the inductive approach I was able to: (i) summarise a huge amount of different forms of data into data that is easy to manage; (ii) derive clear connections between my research objectives and the findings that were revealed from the varied raw data that I had collected and (iii) come up with theories about the processes which are evident in my raw data (Thomas, 2003:2).

The theoretical framework informing this study is the phenomenological case study, which enabled me to understand my participants' perspectives and views concerning the phenomenon that I was studying (Leedy, 1997:161). I was also able to understand this phenomenon that I was studying by listening to all my participants who were experiencing it (Leedy, 1997:161).

1.5.2 Research method

My fieldwork in the natural setting formed the cornerstone of my data collection methods. It enabled me to engage in fruitful conversations with the grade four to seven teachers and learners who were the participants of my study. I was able to observe and understand the phenomenon that I am studying as it is experienced by these participants (Leedy, 1997:158). I observed how my research participants interacted in class during ES lessons and how they attached meanings or interpret their ways of interaction. I observed ES lessons conducted by grades 4 to 7 teachers teaching ES to their ESL learners. In addition to direct observation of ES lessons, I also employed the following methods: in-depth interviews, focus group discussions and document analysis. The use of more than one method to collect data on the same topic is known as triangulation. Leedy (1997:169) defines triangulation as the process of using several data collection methods, data sources, analysts, or theories to check the validity of the findings. Triangulation can also be defined as the use of several qualitative methods in combination or the mixed methods approach, whereby the researcher combines qualitative and quantitative methods (Flick, 2018:23). In this study, I have used triangulation as it has been described in the former situation. The use of triangulation methods gave me the opportunity to compare my

results from the different methods that I employed and different participants of my study, and by so doing, validity and reliability of my results were increased (Rothbauer, 2008: 894).

1.6 Population of my study

A population can be defined as a group of individuals who comprise the same characteristics (Creswell, 2012:648). The target population for my study were the grades four to seven primary school teachers and their pupils who use ESL to teach and learn ES, respectively in Zimbabwean primary schools.

1.7 Participants of my study

The participants of my study were teachers and pupils who used ESL as the medium of instruction to teach and learn ES respectively, in Zimbabwean primary schools. These were grades four to seven teachers and their pupils from a selected rural primary school, an urban high density primary school and an urban low density primary school. Grades one to three were supposed to be taught using their mother tongue, so they were not part of the population under study. A total of twelve teachers and their classes were the participants of my study. These categories were chosen because they fully represented the crop of teachers and pupils in Zimbabwean primary schools. This is so because the majority of the teachers and pupils in Zimbabwean primary schools use ESL to teach and learn ES respectively.

1.8 Sampling procedures

Samples for qualitative research studies are generally much smaller than those used in quantitative studies (Mason, 2010:1; Yin, 1994:3). If large samples like those used in quantitative research are used in qualitative studies, this does not result in a corresponding rise in data collected by the qualitative researcher because a saturation point will be reached at a certain point. This saturation point is the point of diminishing that manifests itself when the data starts to repeat itself if the researcher continues to collect more and more data (Glaser & Strauss, 1967:1).

In this study, my sample was small. I collected my data from three schools. I used the fourth school for my pilot study. From each of the three schools, I purposively selected one class from each grade level, starting from grade four up to grade seven. That gave me four classes per school. I ended up with twelve classes from the three schools. The class teachers became the

twelve teachers who participated in my study. Those twelve teachers assisted me in selecting information rich pupils who also became the other twelve participants. So, the total number of participants for my study was twenty-four.

To choose the school, class and participants, I used ‘purposive sampling’ because that enabled me to select information-rich cases for my study (McMillan & Schumacher, 1993:378). Also, “the units selected are especially qualified to assist in our investigations,” and “population parameters found in the population can be represented in the sample” (Du Plooy, 1995:63).

1.9 Sources of data

I collected data for my study from two sources. These were primary data and secondary data. In the former, I observed behaviour of pupils during and out of lessons. I also observed pupils’ exercise books and I also asked questions. In the latter, I read reports by school officials like education officers, school heads, deputy heads and teachers in charge. I also analysed teachers’ documents like plan books and record books and inspection reports by Ministry of Primary and Secondary Education officials. I did that during document analysis.

1.10 Data Collection Techniques

In this study, I was a non-participant observer when I collected my primary data. I observed ES lessons in progress. My observations were covert, that is they were not concealed; but they were overt, that is they were open. The other methods that I used to collect my data were face-to-face in-depth interviews, focus group discussions and document analysis. The use of more than one method to collect data on the same topic is called triangulation (Leedy, 1997:169). This is a way of assuring the validity of research through the use of a variety of methods to collect data on the same topic. It also involves the use of different types of samples.

1.11 Data Analysis

I analysed my data as it came. It is crucial to do so because what is learned from data collected at one point in time can also be used to determine subsequent data collection activities (Leedy, 1997:158). The data that was in the form of words, phrases, sentences, paragraphs and pages, was first reduced and then displayed and finally conclusions were drawn as suggested by Walliman (2011:131).

I transcribed all the video-tapes from my lesson observations, interviews and FGDs. I played the video tapes over and over again as I checked my video transcriptions, correcting all errors. I then organised all the data. I gave codes to my transcriptions and field notes drawn from observations, interviews, or document reviews. I identified codes, categories, patterns and themes. I ended up with theories.

1.12 Trustworthiness

I achieved that through the use of the following: triangulation, member checking, outlier analysis, long-term involvement and chain of evidence.

1.12.1 Triangulation

It is now very common for qualitative researchers to utilise the use of multiple sources of data or views. This is done in order to bring many perspectives to bear on the phenomenon (Richards, 2015:26). Triangulation can be defined as the process of using multiple data collection methods, data sources, analysts, or theories to check the validity of the findings (Leedy, 1997:169). Triangulation can also be used to refer to two situations: (i) Using several qualitative methods in combination; and (ii) Combining qualitative and quantitative methods (Flick, 2018:23). In this study, I used triangulation in the context of the former.

1.12.2 Member checking

Design for 'triangulation' requires the researcher to check for validity through the use of multiple methods or data types as part of the analysis process. 'Member checking' is usually done at the end when the research report is almost ready. The researcher will have the report reviewed by those who were the participants of the study. These participants will check to see if they agree with what the researcher has recorded and concluded (Richards, 2015:159). In this study, all the participants concurred with my video transcriptions and findings.

1.12.3 Outlier analysis (examining extreme cases)

This is used to refer to the examination of those cases that differ very much from the majority of individuals, situations or cases that have been examined. These extreme cases can be used to strengthen the findings by determining what is present or absent in them as compared with the more common examples (Leedy 1997:169). In this study, I did not come across such extreme cases.

1.12.4 Long-term involvement

Long-term involvement is used to increase the reliability and validity of findings. I collected data over a long period of time so that I was in a better position to distinguish situational perceptions from more consistent trends (Leedy, 1997:168). I was in the field for twelve months.

1.12.5 Chain of evidence

In my study, I established a strong chain of evidence among research questions, methodology, raw data, and findings. That assisted me in strengthening the reliability and validity of my study. If readers can follow my reasoning, they can determine whether the conclusions offered are logical or not (Leedy, 1997:169).

1.13 Ethical considerations

1.13.1 The ethics of writing were also observed.

Using human beings as participants in research raises the issue of ethical standards (Leedy, 1997:116). The ethical challenges may start from the beginning of a study and persist up to the end of the final report – and often for some time after (Richards, 2015:14). I started working on my project after I had been granted approval to do so by the College of Education Research Ethics Review Committee of the University of South Africa (UNISA). My certificate is dated 13th April, 2016. The certificate reference number is indicated as Ref: 2016/04/13/50830872/34/MC (See Appendix 15).

In addition to the approval by the Research Ethics Review Committee of UNISA, permission was also sought from the relevant authorities to conduct research in schools (Appendix 1). My fieldwork only commenced after I had been granted permission by the Ministry of Primary and Secondary Education in Harare (Appendix 2), Provincial Education Director in Masvingo and District Education Officer (Appendix 3) and School Heads (Appendix 4). Participants were not coerced to participate in my study. They received Participant Information Sheets (Appendix 5) which spelt out what was involved in my study. They made informed decisions to participate and completed Consent Forms (Appendix 7). Pupils completed Assent Forms (Appendix 9). Each parent also completed the Consent Form to allow his/her son/daughter to participate in the study. All participants also signed anonymity and confidentiality Forms. Participation was voluntary and anyone had the right to withdraw at any time without any penalty. I assured all participants that they were not going to be harmed in any way.

1.13.2 Human rights were observed.

I assured all my participants that they would have respect for personal dignity. Confidential information provided by my participants was held in strict confidentiality. Research findings were presented sincerely without alteration. A declaration signed by the participants, indicating their readiness to take part in the research and acknowledging that the intention and method of the research project have been explained, may well be a protection for the participants and myself. That statement contained a clause indicating that if at any time during the research procedure any participant who decided to discontinue to be associated with the research effort, had the right to withdraw (Leedy, 1997:116-7). I included that clause in my 'participant information sheet' (See Appendix 5).

1.14 Conceptual Analysis

1.14.1 Coding

In qualitative data analysis, 'coding' means assigning simple words or short phrases to represent the meaning of a larger part of the original written or visual data. Whether supported by computer software or not, the analyst must make the coding decisions for every item, including what to code and how to do it (Yin, 2011:308).

1.14.2 Code-switching

This is the phenomenon of moving back and forth or alternating between two or more languages or between two dialects or registers of the same language. It is also called code-mixing. It usually occurs more in oral discourse than in writing (Gardiner-Chloros, 2009:1).

1.14.3 Constructivism

- a.** The view that social reality is a joint production that is created by the nature of the external conditions in combination with the perspectives of the person observing and reporting about these conditions. Subsequently, all social truth, because it is constructed in this manner, therefore assumes a relativist rather than an absolute nature (Yin, 2011:308).

1.14.4 Constructivist approach

The constructivist approach is a learner-centred approach that emphasises the importance of individuals actively constructing their knowledge and understanding with guidance from the teacher, an adult or a more capable peer.

1.14.5 Constructivist theories

Constructivist theories look at the way in which learners make sense of their world as a result of their experiences and how they are active participants (Tassoni, Beith, Bulman, Forbes & Griffin, 2010:64).

1.14.6 Culture

Kirk, Gallagher, Coleman, and Anastasiow, (2009:26) define culture as the attitudes, values, traditions, and language that family and friends transmit to children. Yin (2011:308) defines culture as “An invisible social structure, embracing groups of people larger than kin groups, who share a common language, religion, or ancestry not always coinciding with political institutions or geographical boundaries. Members of the same culture tend to follow similar everyday practices or customs, such as cooking, dressing, respecting kin relationships, and celebrating life events such as births, marriages and deaths.”

1.14.7 Epistemology

The philosophical underpinnings of a researcher’s beliefs regarding the nature of knowledge and how it is derived or created. The particular belief represents a person’s epistemological position (Yin, 2011:309).

1.14.8 Fieldwork

Conducting empirical research in real-world settings or the “field”, usually requiring the use of qualitative methods (Yin, 2011:309).

1.14.9 Language

Rathus (2007:294) defines language as “the communication of thoughts and feelings by means of symbols that are arranged according to rules of grammar.”

1.14.10 Language acquisition

Language acquisition is the practice by which humans acquire the ability to perceive and comprehend language, as well as to produce and use words to communicate (Viteri, 2013:1).

1.14.11 Ontology

One's philosophical beliefs about what constitutes social reality, and especially whether realities are singular or multiple (Yin, 2011:311).

1.14.12 Semiotics

This is the science of signs or of sign systems.

1.14.13 Worldview

A broad and deep system of thinking about the methods to be used in social science research, based on having a particular ontological perspective (i.e., how chosen methods do or do not capture real-world realities and whether there is assumed to be a singular reality or multiple constructed realities).

1.14.15 Zone of proximal development (ZPD)

It is defined by Vygotsky as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under the adult guidance or in collaboration with more capable peers” (Vygotsky, 1978:86).

1.15 Summary

This chapter is entitled ‘Introduction’ because I am introducing the reader to the whole research process. I started by looking at the definition of ES and what it is all about. I then went on to give the Zimbabwean context of ES in primary schools. In giving the background information of my study, I chronicled the brief historical background of the teaching of science in primary schools in Zimbabwe. The government of Zimbabwe was trying all it could to improve the teaching and learning of this subject. A lot of work has already been covered in this area. Despite that, I have identified a gap that has not been adequately tackled. The gap concerns a

multilingual approach in the identification of the language of learning and teaching science in Zimbabwean primary schools.

I am concerned about the use of ESL in the teaching and learning of ES at primary school level. During my long experience as a primary school teacher and as a primary teacher training college science lecturer, I have observed that primary school pupils are not proficient in the LoLT used during ES lessons. Existing literature supports my observations. This research aims to investigate problems emanating from the use of ESL in learning and teaching of ES at primary school level. To realise the objectives of my study, I decided to use the qualitative research design. Fieldwork formed the basis of my data collection methods. To collect my data, I used four methods namely: direct observation, in-depth interviews, FGDs and document analysis. I observed ES lessons taught by grades 4 – 7 teachers teaching their ESL learners. I also interviewed teachers and pupils. Focus group discussions were also held. I also analysed pupils' written work and teachers' documents. I used a video camera to collect data from ES lessons, in-depth interviews and FGDs. I transcribed the video tapes and analysed my data.

1.16 Overview of the Chapters

1.16.1 Chapter 1: Introduction and overview

In this study, I am investigating problems emanating from the use of ESL as the LoLT in ES lessons in Zimbabwean primary schools. In the first chapter I gave an overview of the whole research project. It is in this chapter that I stated the gap in knowledge that I identified. I stated the research question, aims and objectives of the study as well as the research design and research method. I also stated my data collection techniques and their subsequent analysis. I also stated some ethical considerations. I defined the key terms that I used in this study. Finally, I gave a summary of the whole chapter.

1.16.2 Chapter 2: Second language acquisition and uses of language

In my second chapter I started off by giving the theoretical framework informing this study. I then went on to review literature that is related to my study. I focused on language acquisition, issues of language policy, issues of languages of learning and teaching at school. I also reviewed existing literature on the use of ESL as the medium of learning ES and how it impacts on the learning of ES in Zimbabwean primary schools.

1.16.3 Chapter 3: Research design and data collection

In this chapter, I stated my ontology and epistemology. I then went on to explain my research design. I explained how I conducted my pilot study and how it helped to perfect my sampling techniques and data collection processes. I explained my data collection methods and my long engagement in the natural setting. The methods that I used to collect my data were direct observation, in-depth interviews, FGDs and document analysis. I used a video camera to capture data from lesson observations, in-depth interviews and FGDs. I used triangulation to provide trustworthiness to my data. I did my coding manually and analysed my data as it came. I stopped collecting more data when the saturation point was reached.

1.16.4 Chapter 4: Data presentation and analysis

In chapter 4, I started off by transcribing video tapes of lesson observations, in-depth interviews and FGDs. That was followed by coding of the data, including data from document analysis in which I analysed pupils' written work in ES and teachers' documents. The teachers' documents included their Scheme-cum-plan books and supervision critiques written by the Ministry of Primary and Secondary Education Officials. I stopped coding my data when the saturation point was reached, that is when no new themes, patterns or concepts were no longer emerging from the data. My findings were supported by existing literature.

1.16.5 Chapter 5: Conclusions, recommendations and limitations of the study

In this final chapter, I wrote conclusions based on my findings and supported by existing literature. These findings were answering my research sub-questions. I explained how I extracted meaning from the research data (Trafford & Leshen, 2008:128). Only conclusions which could be 'justifiably' drawn from the findings were made (Bell, 1987:128). I made conclusions which were supported by evidence. Trafford & Leshen (2008:128) advise researchers as follows: Explicit, substantiated and defensible reasons for conclusions should be given. I did not offer conclusions on matters that were not part of my research. No new material appeared in this final chapter (Bell, 1987:128). I provided answers to all my research questions. I also stated some recommendations based on my findings. I concluded this chapter by stating the limitations of my study.

CHAPTER 2

SECOND LANGUAGE ACQUISITION (SLA) AND USES OF LANGUAGE

2.1 Introduction

In Zimbabwean primary schools, the widespread practice that I have observed is that pupils use their mother tongue as the medium of instruction to learn ES and other subjects from Early Childhood Development (ECD) up to grade 3. From grade 4 up to grade 7, English becomes the LoLT in class. But for most pupils, this is a second or third language which they only come across for the first time when they start going to school (Shumba, 1999:5). In this study, I am arguing that these primary school pupils are not yet proficient enough in this language to use it as their LoLT ES, bearing in mind that most of these learners are getting their first exposure to English when they start going to school.

I conducted this study to investigate problems that arise as a result of using ESL to learn ES at primary school level in Zimbabwean schools. In this chapter, I am reviewing studies that have already been conducted in Zimbabwe and other countries on the use of ESL as a medium of instruction at school in general and in Science lessons in particular. The issue of language policy in Zimbabwe is also reviewed. The theoretical framework that informed this study will also be given. I will also chronicle and interrogate local and international events that are relevant to this study. In the process, focus will be given on the most recent findings in this area of study. Gaps or contradictions existing among these findings, and any other related issues, will also be reviewed.

2.2 Theoretical Framework

My theoretical framework is meant to give me a strong scientific research base and provide a pillar of support for the whole thesis. This theoretical framework will also provide the scientific justification for my thesis. It will reveal that this investigation is not just coming out of the blues, but that it is grounded in and based on scientific theories. The ensuing conceptual framework and literature review will serve as its backbone and help to further analyse existing findings that will help to bridge the gap in this study.

2.2.1 Research design

The theoretical framework underlying the focus of my study is the phenomenological case study. Phenomenology and case study are types of research methods that are used in qualitative research. The main differences between the two is that case study is an in-depth and detailed investigation of a single event, situation or an individual over a period of time, whereas phenomenology is a study that is designed to understand the subjective, lived experiences and perspectives of all the participants. The two methods are analysed separately to give a better understanding of what is meant by phenomenological case study in sections 2.2.1.1 and 2.2.1.2.

2.2.1.1 Case study research

Yin (1984:23) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. In other words, it is an in-depth and detailed investigation of the development of a single event, situation, practice, problem, anomaly, an individual or an organisation over a period of time (Yin, 2014:103; Burawoy, 2009:57; Stake, 2005: 454). Yin, Merriam and Stake (2015:136) observe that a case study is one of the most frequently used qualitative research methodologies. Case studies are often used to explore and unearth complex issues such as social issues like corruption, prostitution, drug addiction, unemployment and poverty. They can also be used to examine certain practices in education, medicine, agriculture and many other fields. So, a case study can also be defined as a research strategy, an empirical inquiry that investigates a phenomenon within its real-life context (Ridder, 2017:281).

In a good case study, the researchers start by identifying and defining the research problem; then they select the cases. The advantages of a case study are easily detected in its detailed description and analysis that leads to a clearer understanding of how things happen the way they do and why. The researchers then decide the suitable techniques for data collection and analysis. In case study research, random sampling does not work. Researchers rely on information-rich cases. Every sample can be unique. There is no sample that represents a larger population. Therefore, purposive sampling is the way to go in case studies. Researchers choose the case because it is of interest (Stake, 2005:454). They can also choose it for theoretical reasons (Eisenhardt & Graebner, 2007:27). After identification of the case, researchers go into the field, that is the natural setting, to collect data, evaluate and analyse it.

Yin (2014:103) stresses the point that interviews are the most important sources of data collection but considers other sources of qualitative data as well. In this, this study, I relied heavily on in-depth face-to-face interviews as one of my methods of data collection. Yin (2014:134) goes on to explain that data triangulation is designed to narrow problems of construct validity because multiple sources of data provide several measures of the same phenomenon (Cohen & Crabtree, 2006:1). Case data can lead to the identification of patterns and relationships, and this results in the creation, extension, or testing of a theory (Gomme, Hammersley & Foster, 2000:13). Data collection methods in a case study are observations, questionnaires, interviews, document analysis and focus group discussions. This study utilised all these methods, except questionnaires. Case study researchers usually triangulate data as part of their data collection tactic, resulting in a detailed case description (Ridder, 2016:11; Stake, 2005:454; Dooley, 2002:346; Burns, 2000:459).

2.2.1.1.1 Types of Case Study

There are several types of case study and their uses depend on the researcher's type of study (Hayes, Kyer & Weber, 2015:8). Some of these types of case study are briefly described below:

- Illustrative case study (providing narrative accounts)

These types of case study are usually descriptive in nature. They make use of one or two instances of an event to show the existing situation. Such case studies help to make what is not familiar, and they also help to clarify the topic in question. In other words, such case studies help to demystify cases (Hayes, Kyer & Weber, 2015:8).

- Exploratory case study (as a pilot to other studies or research questions)

These are pilot case studies that are conducted ahead of the main investigation. Their purpose is to locate areas that need to be improved, e.g. research instruments, before carrying out the main study. The main disadvantage of the exploratory case study is that researchers can be satisfied by the initial findings from the pilot study and proceed to release those initial findings prematurely as the real findings of the study (Hayes, Kyer & Weber, 2015:10).

- Cumulative case study

These case studies are normally used to compile information that is collected from different sites at varied times. The main issue concerning such studies is to utilise the findings from

those studies and generalise them without having to repeat the studies in order to save resources like money and time (Hayes, Kyer & Weber, 2015:17).

- Critical instance case study

These case studies examine one or more sites in order to investigate a situation of unique interest without any need to generalise findings. This method is useful for answering cause and effect questions (Hayes, Kyer & Weber, 2015:12).

All research designs have their strengths and limitations. The merits of a particular design make it suitable for selecting it as the most appropriate one for addressing a particular research problem. In this study, the case study is the best design for answering my research questions. Its strengths outweigh its limitations. These strengths and limitations are analysed in 2.2.1.1.2.

2.2.1.1.2 Strengths and limitations of case study

2.2.1.1.2.1 Strengths of case studies

There are a number of advantages in using case studies (Yin, 1984: 15).

- They help to simplify complicated concepts (Zaidah, 2007:1);
- They expose the participants to real life situations, which is almost impossible to achieve with other designs (Robson, 2002:178; Zaidah, 2007:4).
- They help in adding value to the participants through discussions on concrete subjects (Zaidah, 2007:4);
- They improve analytical thinking, communication, developing tolerance for divergent views on the same subject, ability to defend one's point of view with logic;
- They enhance team work for the participants, making them efficient over time;
- The many solutions which come out of the cases act as ready references when similar problems arise (Cohen, Manion & Morrison, 2011:293);
- They allow a lot of detailed information to be collected, which cannot be easily obtained through other research designs Zaidah, 2007:5);
- Data collected is a lot richer and is of greater depth than can be found through other methods since their data collection methods include direct observation and interviews (Yin, 2009:11);

- They can be easily conducted where large samples of similar participants are not readily available; and
- They can help researchers to adapt new ideas and produce new hypotheses that can be tested later (Cohen, Manion & Morrison, 2011: 293).

From the above list, it can be noted that the case study method has many advantages that make it a very suitable method for conducting different types of research. It can be employed in both quantitative and qualitative designs.

2.2.1.1.1.2 Limitations of case studies

Despite these advantages, case studies have received criticisms (Yin, 1984:21).

- The researcher's biased views can influence the direction of the findings and conclusions (Yin, 1984:21).
- Data collected cannot be generalised to the wider population (Denzin & Lincoln, 2011:304). But it can be argued that formal generalisation is overvalued as a source of scientific development; the force of a single example is underestimated (Flyvbjerg, 2016:13). Denzin and Lincoln (2011:304) also argue that it depends on the case one is speaking of, and how it is chosen.
- Chances of bias in data collection are higher and this can influence results more than in other designs (Denzin & Lincoln, 2011:309). Leedy (1997:219) points out that in any research, data bias cannot be avoided. He suggests that what is important is to remember to acknowledge the effect that bias may have had in distorting them when formulating conclusions.
- It might be difficult to find an appropriate case study to suit all subjects; and
- It consumes more time when compared with other designs. They are often labelled as being too long, difficult to conduct and producing a massive amount of documentation (Yin, 1984:21).

From the above list, it can be noted that this method, like any other method, also has some limitations but, despite that, it continues to be a very useful method used in many spheres of life.

Many case studies can last three to six months but they can continue for years (Herrick, 2016:1). To avoid wasting time, Herfors (2016: 10) offers the following suggestions: The

researcher may need to have some special knowledge in the topic that is researched. In this particular study, I had the special knowledge Herfors is alluding to since I had been in this field for more than three decades. There should be a timeline for all the steps to be taken, including a deadline for everything. Reaching out to the right participants can also be a time saver. These participants need to be given information on why and how they will be involved in the study. A timetable that suits both participants and researcher should be put in place. Yin (2007:111) also stresses that it is important to be prepared before the process of data collection. He identifies 5 important attributes of organised case study researchers as follows: They should have the ability to ask the right questions and interpret them correctly. They should be good listeners and be objective in all situations. They should be adaptable to new situations. They should have a clear idea of the issues being studied. Lastly, they should not be influenced by warped or distorted perceptions.

Advantages of case study research far outweigh its disadvantages. Because of these strengths, case study is a particularly appealing design for applied fields of study, such as education, social work, administration and health. This list is not exhaustive. Case study can be successfully implemented to bring about change and improve practice. This method has proved to be particularly useful for studying educational innovations, evaluating programmes and informing policy. In this study, it is intended to inform policy.

2.2.1.2 Phenomenology.

Denzin & Lincoln, (2011:16) define phenomenology as a complex system of ideas associated with the works of Edmund Husserl, Martin Heidegger, Jean-Paul Sartre, Maurice Merleau-Ponty and Alfred Schutz.

Phenomenological research involves trying to understand the essence of a phenomenon by examining the views of people who have experienced that phenomenon (Leedy, 1997:161). As the researcher works with rich descriptive data, common themes begin to emerge (Kleiman, 2004:7). The term 'phenomenology' was derived from the word 'phenomenon' (Smith, 2013:1). In my phenomenological case study, the phenomenon that I am interested in studying is the experience of Zimbabwean primary school pupils whose L1 is not English during ES lessons.

Phenomenology is interested in the individual experiences of people (Starks and Trinidad, 2007:1375). It usually involves lengthy periods of field work, in-depth interviews with subjects, and sometimes researchers will interview the same subject several times to get a full picture of

their experience with the phenomenon (Yilmaz, 2013:312). In this case, I interviewed primary school pupils whose L1 is not English, to see how they coped with learning ES using ESL. I also interviewed stake holders like the learners' teachers, to get their opinions on this issue. The parents of the participating pupils were involved by way of granting assent to permit their children to participate in this study. Besides interviewing people, I also observed pupils learning ES in their classrooms following their normal timetables, i.e. in their normal setting. Besides interviews and observations, other data collection methods that I used were focus group discussions and document analysis.

After the interviews are done, a phenomenological researcher will look back through them, searching for patterns (Hancock, Windridge and Ockleford, 2007:17). Maybe most of the learners talked about how they struggled to comprehend what their teachers say during ES lessons. That's a pattern, and it can tell me something about the learners' proficiency in the medium of instruction. Essentially, phenomenological research is looking for the universal nature of an experience.

Every research method has its own strengths and limitations (Sumeracki, 2018:1). Phenomenological research has several strengths, for instance it can provide a very rich and detailed description of the human experience. By examining the interviews that I held with the learners, I was able to get a very good view of what learners are going through during ES lessons. I would not have got that detailed view if I had just handed out questionnaires for them to complete. However, everything hinges on the articulateness of the participants and the researcher's objectivity and freedom from bias when interpreting the data. More strengths and weaknesses of the method are listed below:

2.2.1.2.1 Strengths of phenomenology:

- Perhaps the biggest benefit of phenomenological research is the fact that it can provide us with a profound, detailed understanding of a single phenomenon (Ayres, 2017:1).
- The themes and meanings of an experience emerge from the data. The qualitative nature of the method allows the researcher to notice trends and look at the big picture. The data are not subjected to statistics that restrict the interpretation (Hycner, 1985:291).
- It helps to understand a lived experience and brings meaning to it. This may contribute to the development of new theories, changes in policies or responses (Smith & Eatough, 2012:441).

- Its results may help expose misconceptions about an experience. It may be a means to have the voices of the participants heard, prompting action or at least challenge pre-conceived notions and complacency. The results can also help to influence the decision of policy makers (Silverman, 2011:400).
- Chosen from enough individuals, the data one can receive through phenomenological research is rich and impressive. Through this type of research, a truly unique approach to understanding a phenomenon is achieved (Ayres, 2017:1).

The advantages listed above make phenomenology a very useful method that is used in research.

2.2.1.2.2 Limitations of phenomenology

- Research participants must be able to articulate their thoughts and feelings about the experience being studied. They may find it difficult to express themselves due to language barriers, age, cognition, embarrassment, and so on (Giorgi, 2012:5). In this study, I allowed participants to explain their thoughts and feelings in any language they chose. So, the question of language barriers was out.
- Phenomenology requires sound researcher interpretation, making data reduction an important component to reduce biases, assumptions and pre-conceived ideas about an experience or phenomenon. Researcher-induced bias can influence studies, and this is particularly true with phenomenological research (Ayres, 2017).
- Results are not subjected to statistical tests, even with a larger sample size. It does not produce results that can be generalised (Hall, Chai & Albrecht, 2016:138).
- It may be difficult to gain access to participants. That was not a problem for me because I stayed in the field for quite some time before I embarked on of data collection. Participants tend to behave more and more naturally as a researcher stays longer on sight (Elland-Gray, Jeffrey, Chobak, & Crann, 2015:1).
- Presentation of findings may be difficult. The subjectivity of the data may lead to difficulty in establishing reliability and validity (Ayres, 2017).
- Policy makers may give less credibility to phenomenological study (Giorgi, 2012: 10).
- Gathering data and data analysis may be time consuming and laborious (Creswell, 2013:44).

If I add the advantages of case study research to those of phenomenology I find out that they outweigh the disadvantages of the two designs added together. Therefore, it is my fervent hope that this phenomenological case study will inform policy when policy makers constitute a

national language policy in Zimbabwe. Hopefully, the policy makers will make an informed decision when deciding the most suitable languages of learning and teaching ES and other content subjects at primary school level, which will not disadvantage any group of learners as is the case currently.

2.2.2 Second language acquisition (SLA) theory

My study has also been greatly influenced by the SLA theory which proposes that there are five clear-cut stages of SLA as initially indicated by the linguist Stephen Krashen (Haynes, 2015:13; Oliveri, 2015:23). Krashen postulates that everyone learning to speak English goes through these stages to master the language. It is similar to the way children learn to speak their local language. Children learn this useful skill of speaking without prior theoretical knowledge (Krashen, 1987). The length of time spent by learners at a particular stage differs from learner to learner (Haynes, 2005:7).

Haynes (2015:14) and Oliveri (2015:31) contend that becoming literate in one's L1 is a challenging task, let alone acquiring extra skills in a second language. The learner really needs to exert a lot of effort and practice. Every language has its own set of rules and new language learners often get confused when deciding which set of rules to follow. Second language learners also experience language shock when learning a new language (Miller & Endo, 2004:787).

People learn a second language through a process that is known as second-language learning (SLL), or second-language acquisition (SLA), or L2 acquisition. Second language is used to refer to any language learned after a person has acquired a first language. SLA can also be used to refer to a person's acquisition of a third, fourth, and subsequent languages (Gass & Selinker, 2008: 7). The word 'acquisition' was normally used in the past to refer the subconscious way of learning, but now 'learning' and 'acquisition' are being used interchangeably.

Krashen (2013: 1) still maintains that there is a very sharp difference between 'learning' and 'acquisition.' He argues that we can acquire a language, and we can learn a language. The acquisition part of it occurs subconsciously. It happens when we are not aware that it is happening. It can happen when we are having a conversation, or reading a book, or watching drama or a film. It can also happen when we are singing a song. We think we are having a conversation, reading a book, watching drama or a movie or even singing a new song. Yes we are doing all those things, but at the same time, we may be acquiring a new language. Also,

once we have acquired something, we are not usually aware that something has happened. We tend to store this knowledge subconsciously in our brains. Both written and oral language are capable of being acquired (Krashen, 2013:1).

Acquisition is sometimes referred to as ‘picking up’ a language. When someone says, “I was in South Africa for sometime, and I picked up some Zulu,” it means he or she acquired it. Krashen describes language learning as a conscious process. We do it deliberately. During the process of learning, we exert some effort and we know we are learning. At school we learn a language, for instance when we talk about English grammar and language rules” If we have not yet mastered the language that we are learning, it becomes very difficult, if not impossible, to use that language to learn any subject, let alone Science.

2.2.2.1 The five stages of SLA

2.2.2.1.1 Stage 1: Preproduction or Silent period

At this stage, the new language learners are not yet able to speak their L2. They may have a vocabulary of up to five hundred words (Haynes, 2007:21). There are some learners who do not go through the silent period. They just start by speaking. Usually, such learners will be imitating the people who know that language. The silent period lasts three to six months (Ellis, 2008: 74). These learners take advantage of friends who speak their language (Haynes, 2005:3). I have observed that in our primary schools we have pupils at this stage, even at grade seven level. Such learners are likely to find it hard to grasp any concepts taught in English. Some of them may not have friends to benefit from because they all want to speak in their mother tongue at home and in class when their teacher is not listening. At home everyone speaks in their mother tongue. There are no newspapers, no radios and no television sets in most rural homes and at some homes in towns and cities too. “For most pupils, English is a second or third language which they only encounter in the school setting and in lessons,” (Shumba, 1999:5).

2.2.2.1.2 Stage 2: Early production

At this stage, the new language learners are now able to utter one to two words. They can also learn by rote, although they may make mistakes. Learners have acquired a vocabulary of about a thousand words. The duration for this stage is usually six months (Haynes, 2007:31). Haynes (2005:6) urges teachers to assist learners at this stage by following these steps:

- Ask ‘yes/no’ and ‘either/or’ questions.

- Accept one or two-word answers.
- Let learners participate in some of the class activities.
- Use pictures and realia as media.
- Adjust the content to suit the language level of the learners.
- Use pictures to build learners' vocabulary.
- Give learners some listening activities.
- Simplify the content materials to be used. Focus on key vocabulary and concepts.

A lot of effort, hard work and patience will be required for one to succeed in implementing the ideas listed above.

My observation as a primary school teacher as well as a college science lecturer was that the use of only one or two-word answers is typical of our primary school learners. Existing literature supports this (Shizha, 2012:89). The majority of them are at this stage. They do not volunteer to answer open-ended ES questions when asked by the teacher. They do not engage in lengthy discussions in English to explain an ES concept (Shumba, 1999:5) .

2.2.2.1.3 Stage 3: Speech emergence

The new language learners have now acquired a vocabulary of about three thousand words and they are now able to ask simple questions and they can communicate using phrases. They frequently make grammatical mistakes. Haynes (2005:8) suggests the following exercises to assist them:

- Let them read short, simplified passages in the new language.
- Ask questions on charts and graphs.
- Match vocabulary words on cards with definitions on charts.
- Let them read flashcards to teach vocabulary.
- Ask them to read to each other in pairs.
- Let them compose short stories that are based on their personal experience.

The activities listed above cannot be achieved in a short space of time. Also, one needs to select what is suitable to his or her learners and one also needs to consider the resources that are available to them.

At this stage, learners' written work is replete with many grammatical and spelling errors as they try to master the complexity of the English grammar and sentence structure. Many

students may be translating written assignments from native language. The language of science compounds the problem (Shumba, 1999:32; 1998:40, 45).

2.2.2.1.4 Stage 4: Intermediate fluency

Most of the new language learners now have a vocabulary of about six thousand words. They are now able to construct more complex sentences. Learners may make frequent errors with more difficult sentence structures. Few learners can be found at this stage (Haynes, 2005:8).

2.2.2.1.5 Stage 5: Advanced fluency

This last stage usually takes five to ten years. The time taken by learners to be very proficient differs. It depends on the language the learners are learning (Haynes, 2007: 35). Here, it is interesting to note that most of our primary school learners graduate from primary school before the ten years is up. Under normal circumstances, learners take two years to complete ECD and seven years to complete grades one to seven. This gives a total of nine years.

2.2.2.2 Comparisons of L2 acquisition with L1 acquisition

The way adult people learn their L2 is different from the way children learn their L1 in three ways. The first one is that the brains of children are not yet fully developed but adult people have fully developed brains and they already have a first language that guides their thinking and speaking. At times some adult people who are learning a second language attain very high levels of proficiency, but the way they pronounce their words remains non-native.

The second point is that some errors made by L2 learners when speaking emanate from the influence of their L1. For instance, if Spanish speakers who are learning to speak English want to say that it is raining, they are likely to omit the subject 'It' and just say "Is raining." But French speakers who are also learning to speak English, usually do not make that mistake. The reason is because it is normal to omit the use of pronouns and impersonal subjects in Spanish but not in French (Cook, 2008: 233). In Shona, there are no long and short vowel sounds. This may affect the way learners pronounce their English words. For instance in the English words mate and mat, the underlined syllables are pronounced differently because in the former word, the vowel has got a long sound, but in the latter, it has a short sound. But, in Shona, syllable sounds never change. For instance, *a, e, i, o, u* or *ba, be, bi, bo, bu* are always pronounced the same. Some pupils can pronounce a word like 'time' as 'teemeh'. The influence of the first language on the second is known as negative language transfer.

The third point is that when people are learning their L2, the way they speak their L1 changes in a subtle manner. Such changes can be experienced in other aspects of language like pronunciation, as I have just explained above; syntax and the gestures the learner makes and other things they are likely to observe (Cook, 2008:235). For instance, French speakers speaking English as a second language pronounce the 't' sound in French differently from monolingual speakers of French (Flege, 1987). This kind of change in pronunciation has also been noticed at the onset of L2 acquisition. For instance, English speakers change their pronunciation of the English 'p', 't' and 'k' sounds, and English vowels, when they start to learn the Korean language (Chang, 2012:250). That kind of influence of the L2 on the L1 made Vivian Cook to come up with the idea of *multi-competence*, which makes people see the different languages they speak as related systems in their minds and not as separate systems (Cook, 2008:235).

2.2.3 Zone of proximal development (ZPD)

This study is also greatly influenced by Vygotsky's theories. His zone of proximal development (ZPD) supports a theory of assisted learning. A learner can only accomplish a certain task after having been assisted by a 'more capable peer' (Vygotsky, 1978:86). Tasks within the ZPD are those that a child cannot do alone but could accomplish with the assistance of significant others such as their teachers, parents, siblings, more competent peers or adults (Moore, 2015:276). The learner develops meaning with the assistance of the teacher or more capable peers who play an important role in negotiating meaning through a shared discourse. Vygotsky sees language as the mediator of this shared discourse and according to him, language and thought are inseparable. In other words, one cannot think without language (Cummins, 2000: 6; Bouwer, 2011:54; Walker, 2011:36; McLeod, 2010:2; Santrock, 2009:53; Rollnick, 2008:95; Slavin, 2012:41; Nomlomo, 2007:74; Kumpulainen & Wray, 2004: 27; Chaiklin, 2003 & Ishihara, 2012:104). ZPD is sometimes referred to as "zone of potential development (Bruce, Meggitt & Grenier, 2010: 75). Vygotsky observes that skills and strategies can be effectively developed when learners interact with peers. He advises teachers to use cooperative learning exercises so that the more skilful peers assist the less competent learners. Vygotsky also observes that any learner who is at the ZPD for a certain task will complete the task successfully if he or she is given the appropriate assistance and enough impetus (McLeod, 2010:2). The ZPD is sometimes used interchangeably with the term scaffolding. This term scaffolding was coined by Wood, Bruner and Ross (1976:89). For scaffolding to be most effective, it must be responsive to a learner's needs (Coon & Mitterer, 2007: 114). Once learners have mastered their tasks, the scaffolding can then be removed and in future, the

learners will be able to perform similar tasks without the scaffolding (Wood, Bruner and Ross, 1976: 90).

2.2.4 Semiotic mediation

Semiotics is the study of signs and symbols, particularly as a type of language and communication, whereas mediation is a noun derived from the verb mediate. According to The Oxford Universal Dictionary Illustrated, 3rd Edition (1959:1226), to mediate means to “act as an intermediary; to intervene for the purpose of reconciling.” For mediation to take place, there ought to be a mediator, that is someone who will mediate; there must also be something to be mediated, that is content released by mediation and finally there must be someone or something that will be subjected to the mediation procedure, that is the mediatee to whom/which mediation changes (Bartolini Busi & Mariotti, 2008:751). In educational spheres, mediation is a common term that is used to refer to the ability to assist in the creation of the relation between learners and the educational material to be learned or to the successful completion of a task (Bartolini Busi & Mariotti, 2008:752).

Vygotsky (1978:40) maintains that the major characteristic of human learning is due to the fact that it is a semiotic process. What this means is that it is a process of making meaning. The basis for all learning is language. When children are learning to speak, they are learning a semiotic activity that has been evolving for many generations, regardless of their culture. He goes on to explain that semiotic acts are acts of meaning and meaning can be translated by different semiotic ways. Language is an excellent example. Other examples are maps, road signs and mnemonics. Because Vygotsky attached more importance to language than to other semiotic ways or other modalities of meaning, the phrase “semiotic mediation” has become synonymous with “mediation by means of the linguistic sign” (Vygotsky, 1962).

Hasan (2002:3) contends that tools are abstract, psychological and semiotic in nature, hence the term semiotic mediation. At times we talk about artificial tools. By implication, we are suggesting that they have a social origin. Therefore, language too, is a social phenomenon because it is an abstract tool for semiotic mediation. Because language and culture are inseparable, then in using and learning language, children learn their culture (Haliday, 1980:3). The contribution of the social aspect to the child’s cognitive growth takes centre stage to Vygotsky’s discourse of semiotic mediation. Wherever language is being used, there is semiotic mediation going on. We owe the concept of semiotic mediation chiefly to the work done by Vygotsky and his colleagues (Wells, 1986:59).

2.3. Code-switching

Code-switching is defined by Esen (2014) as a phenomenon in which a speaker “alternates between two or more languages, or dialects or varieties of language, in one conversation.” (Akmajian, Demer, Farmer and Harmish (2010: 305) define code-switching as a phenomenon in which a mixture of different languages are used during an oral discourse. Gumperz (1982:59) offers another definition of code-switching as follows: “it is the juxtaposition within the same speech exchange of passages of speech belonging to two different grammatical systems or sub-systems.” The fourth definition of code-switching comes from Valdes-Fallis (1981:25) who defines it as the “alternating use of two languages at the word, phrase, clause or sentence level.” In this study, I shall consider these four definitions of code-switching that I have alluded to above as my operational definitions.

Eastman (1992:13) contends that code-switching plays a very important function of assisting speakers to understand each other well during a discussion or a speech. During code-switching, the grammars of two languages work at the same time to pass on the intended meaning. This occurs wherever there are two or more people who speak the same two languages (Fromkin and Rodman, 1998:544). Esen (2019:7) adds that speakers of two or more languages use certain methods to make communication more effective and meaningful. He cited the use of code-switching as one way to do so. In doing so, the bilinguals use two languages within a sentence or discourse. A person who is bilingual is able to communicate, to varying extends, in a second language (Crystal, 1987:17). Esen maintains that code-switching is a natural habit that occurs between multilingual speakers who speak the same two or more languages.

2.3.1 Factors influencing code-switching

Mareva and Mapako (2012:36) assert that code-switching is controlled by several parameters. They identified a speaker’s lack of proficiency in a language as one of the major causes. This is usually triggered by failure of speakers to articulate themselves in the language in which they are talking. To make up for that, they cross over to another language that is common to both speakers (Crystal, 1997:104). This is the situation that obtains in almost all our ES lessons. I have observed both teachers and pupils code-switching many times during ES lessons at all the schools I have been to. This is also supported by existing literature: “For better understanding of ES, they (pupils) preferred that teachers code-switch between English and their local language in the teaching of ES” (Shumba, 2000:14). So what is the point in clinging onto the

use of English only as a LoLT when teachers and learners are indicating to us in a subtle manner that the use of ESL only as the LoLT is failing to work?

Crystal also observes that sometimes speakers code-switch because they want to identify with a social group. This can also be used to exclude other people who do not speak a certain language from participating in their conversation. Crystal (1997:104) argues that code-switching may also be triggered by the speaker's attitude towards the listener. That attitude may range from friendliness to hatred.

2.3.2 Uses of code-switching

In Kenya, findings of studies by Ogutu (2006:43) reveal that learners and their instructors may be triggered to code-switch to another language in class by one or more of the following factors:

- Pupil comprehension is lacking;
- Teachers want to motivate learners;
- Presence of tension in the classroom;
- Teachers want to prevent boredom;
- The need to make communication clearer; and
- Learners misbehaving.

Gumperz (1982:2) identifies more uses of code-switching as follows:

- Teachers and pupils habitually use it as an extra meaning-making resource;
- Teachers use it to mark the end of one activity and signal the beginning of another;
- Teachers use it to separate classroom discipline from lesson material;
- Teachers use it to identify a pupil to talk in class;
- Teachers use it when addressing a particular pupil or group excluding the rest of the class; and
- To change the focus from reading a text aloud to talking about the text.

My experience has shown me that all the uses of code-switching listed above are also applicable to the Zimbabwean situation and they go a long way in improving communication in the classrooms of ESL learners.

The use of code-switching in the classroom is prevalent and it involves use of different languages in the same conversation when both speakers know the same languages (Cook,

1991:403). If the teacher knows the learners' first language, it becomes easy for him or her to code-switch to his or her learners' first language when explaining a difficult concept in ES.

2.3.3 Code-switching in learning and teaching activities

Code-switching can be regarded as an effort to utilise the power of first languages as LoLT (Marungudzi, 2014: 465). Through code-switching, learners utilise their first language as a learning store (Iqbal, 2011:468). Researchers concur that code-switching is very useful during lessons inside the classroom as well as outside the classroom (Ahmad, 2009:49; Adendorf, 1993:141; Nwoye, 1992:365; Canagarajah, 1995:173; Holmarsdottir, 2007:5; Myers-Scotton, 2005:3). Code-switching can also be utilised as an invaluable method of teaching learners their second language (Cook, 1989:50). This only confirms the point that I have alluded to above concerning a multilingual approach when promulgating the national language policy.

Code-switching enables teachers and pupils to achieve some of their educational goals because it makes communication easy (Adendorf, 1993:141). It also helps teachers to explain meanings of words and the study of language use in semantics and pragmatics respectively better than they can do it using the pupils' L1 or their L2 (Myers-Scotton, 2005:3). During lessons, code-switching is also very useful in content delivery and classroom management (Adendorf, 1993:151; Canagarajah, 1995:178). My comment here is that if code-switching promotes effective communication in class, then it should be encouraged and legalised. Policies which militate against effective communication in and outside the classroom should be amended for the betterment of the learners. Shumba, Voss and Zilg (1997:18) observed that some teachers were reluctant to code-switch to their learners' L1 during ES lessons and made the following comment: "There seemed to be a certain degree of reluctance to code-switch to vernacular even when pupils appeared to have difficulties with English language for them to appreciate the concepts targeted to be developed."

Code-switching improves motivation and participation in the classroom (Shumba and Manyati, 1998:27; Keane, 1999:34). Also, it affords the ESL learners room to utilise their mother tongue, thereby enabling them to enjoy their human right resulting in a reduction of the cultural and language shock. It also reduces the gap between the learners' home language and the LoLT at school.

Marungudzi (2014:466) sees code-switching as an important resource that classroom practitioners should not be embarrassed to use. In this study, the researcher is advocating for the need by policy makers to legalise code-switching in class. There is evidence in existing

literature that learners themselves support this noble idea: “For better understanding of ES, they (learners) preferred that teachers code-switch between English and their local language in the teaching of ES (Shumba, 2000:14).

2.3.4 Disadvantages of code-switching

Certain multilingual quarters argue that code-switching is a sign of linguistic weakness or inadequacy and some people who insist on the traditionally correct way of doing things, especially of handling the English language, militate against the smooth execution of code-switching when it occurs in their classrooms. In some cases, learners are discouraged from using their local languages (Palmer, 2009:19). Some linguists also argue that an open view towards code-switching may lead to an overuse of code-switching by teachers (Cook, 2001:413). Some researchers posit that code-switching is negative for budding students, since they use it to compensate for lack of knowledge and that they will not be able to do well both in neither their L1 nor in their L2 (Grosjean, 1982:83). Some people also argue that code-switching is time consuming and that learners will also end up lacking proficiency in both their L1 and L2. Learners may not be able to embrace their own culture (Aguilar, 2015:45). When code-switching is over done, it may end up influencing the learner’s L1 or L2 or both of the languages, which will result in language decay (Aguilar, 2015:47; Algarin-Ruiz, 2014:9).

2.4 Language policy

2.4.1 Issues of language policy in Zimbabwe

A number of proposals have been put forward regarding the use of languages in Zimbabwe and other southern African countries (Nhongo, 2013:1209). Zimbabwe promulgated its Education Act (1987) that stipulates that the three main languages of Zimbabwe, namely: Shona, Ndebele and English should be taught in all primary schools starting from grade one. Shona and English should be taught in all areas where the local language of the majority of the residents is Shona. Ndebele and English should be taught in all areas where the local language of the majority of the residents is Ndebele. From grade one up to grade three, the learners’ mother tongue should be used as the LoLT at school. I support the use of mother-tongues from grade one up to three as stipulated in the Education Act because “the best medium for teaching a child is his mother tongue. He learns more quickly through it than through an unfamiliar linguistic medium,” (UNESCO, 1953). From grade four upwards, English should be used as the LoLT. Shona and Ndebele should be taught as subjects on an equal-time allocation as the English language. In

areas where minority languages exist, the Minister may authorise the teaching of such languages in primary schools in addition to Shona or Ndebele.

That Education Act promoted English as the language of instruction throughout the education system, but it denigrated indigenous languages. That exposed the “dominance and hegemony of English” (Shizha, 2012:786). Learners whose mother tongues were neither Shona nor Ndebele did not benefit from the use of the mother tongue as LoLT (Muchenje, Goronga and Bondai, 2013: 502).

The writer is of the opinion that the mother tongue policy should have been extended for all pupils in Zimbabwean Primary Schools and beyond because research points out that language acquisition can take between five and eight years (Howard Research and Management Consulting Inc., 2009: 20). Besides, “all African children have the unalienable right to attend school and to learn in their mother tongues. Every effort should be made to develop African languages at all levels of education” (Mazrui, 2004:129; Nhongo, 2013:1210).

2.4.2 Issues of language policy in Africa

Mutasa (2006:3) deplors African governments for doing a lot of planning that is not matched with the expected implementation. He intimates that there are three declarations that have been made concerning the issue of languages in Africa. These are: The Language plan of action for Africa, The Harare and The Asmara Declarations. When heads of state and government met at the Organisation of African Unity (OAU), now African Union (AU) in Addis Ababa, Ethiopia from 28th to 30th July, 1986, they emphasised the importance of language as part and parcel of culture (OAU, 1986) and that economic and social development can be accelerated through the use of indigenous African languages. Some of the key issues discussed were as follows:

- The need by member states to be pragmatic and make decisions that are useful and practical so as to develop and promote their indigenous languages;
- The need for all African nations to promulgate a language policy that reflects their cultural and socio-economic realities;
- The need to use African languages as official languages of the state in education, politics, cultural and political affairs of the state;
- The need to use African languages as vehicles of mass literacy campaigns; and
- The need to consider multilingualism when promulgating a national language policy, (OAU,1986).

In Zimbabwe, none of the key issues alluded to above has been implemented. The plans are still on paper decades after their proposal. Implementers need to be proactive.

Some of the aims and objectives of the Plan of Action were to:

- Encourage all states to have a clearly defined language policy;
- Ensure that indigenous languages take their rightful role as means of official communication in the public affairs of each Member State; and
- To encourage the increased use of indigenous languages as LoLT at all educational levels.

To date, none of the objectives listed above has been achieved. Zimbabwe has not yet promulgated a clearly defined language policy. All the indigenous languages of Zimbabwe are not being utilised fully. One critical resolution that came out during the conference was that each country should have a clear Language Policy Document that spells out how every language spoken in the country is used. Up to the present moment, Zimbabwe is one of the countries that still has not put in place a clear language policy document. Besides announcing that those languages which were regarded as minority languages are now official languages, what else has the government done to promote those languages which are now regarded as official languages?

The Asmara Declaration was held in Asmara, Eritrea from 11th to 17th of January 2000 (Mazrui, 2012:130). Some of the resolutions at that conference were that African languages must be upgraded so as to make them a basis for the future empowerment of Africans. It was also resolved that all African children have the right to go to school and use their home languages as the LoLT at school and that every effort should be made to develop African languages at all levels of education. (The Asmara Declaration on African Languages and Literatures, 2000).

Nhongo (2013: 1210) laments lack of implementation years after these declarations have been made. In many African countries, including Zimbabwe, there are no national official language policy documents. What exists are just education acts and circulars (Nhongo, 2013: 1211). Zimbabwe is still lagging behind in terms of implementation, hence this study.

2.4.3 Issues of the language of learning and teaching (LoLT) at school

In 1998, President R.G. Mugabe set up the Presidential Commission of Inquiry into Education and Training that is popularly known as the Nziramasanga Commission. It was constituted so that it could inquire into the Zimbabwean education system that had been inherited from the

colonial government of Rhodesia. Its report revealed the strengths and weaknesses of the education and training system then. The Commission recommended a complete overhaul of the system to make it relevant to the needs of independent Zimbabwe. The Commission recommended, among other things, the provision of access to education for all citizens at all levels, from pre-school to tertiary and life-long education; the upgrading and development of indigenous languages; development of ICT skills; teaching of practical skills at primary school level and giving special attention to the marginalised groups like the girl child, the disabled and vulnerable children (Institutional Repository at University of Zimbabwe. Staff Publications).

Proposals were made to use the learners' mother tongues as the LoLT at school (Nhongo, 2013:1209; Nziramasanga Report, 1999:156) That would help to raise the standards of education of Zimbabweans. Government was urged to review its policy on indigenous languages and make them a compulsory part of the curriculum. Zimbabwe needs a clear and explicit language policy.

Before 2006, the learner's first language was used as the LoLT in schools from pre-school up to the third grade only. From the fourth grade onwards, English became the LoLT. Were those pupils proficient in the English language? The Presidential Commission did not question that, yet as Setati (2011:7) puts it explicitly: "Language proficiency is important for both social and academic interactions."

Debates on LoLT in most multilingual African countries, is a contemporary issue (Pitman, Majhanovich & Brock-Utne, 2010:1). On the same issue, Vakalisa (2000:24) also noted with concern in her inaugural lecture at the University of South Africa (UNISA), that the language of instruction is "an unresolved matter in many multilingual countries."

Zimbabwe is a multilingual country (Peresuh & Masuku, 2002:27; Gotosa, Rwodzi and Mhlanga, 2013:88; Viriri, 2003:2; Nhongo, 2013:1208; Shizha, 2012:786; Makanda, 2011:10). 82% of the population of Zimbabwe are Shonas and 14% are Ndebeles. Whites and Asians are less than 1% and the other ethnic groups are 3% (US Department of State report on Zimbabwe, 2011). The indigenous languages that were previously considered as minority languages by the colonial regime have now been granted official status. These languages are as follows: Chewa, Chibarwe, English, Kalanga, Koisan, Nambya, Ndau, Ndebele, Shangani, Shona, Sign language, Sotho, Tonga, Tswana, Venda and Xhosa (Constitution of Zimbabwe Amendment (No. 20) Act 2013: 17).

In a report on Harare Intergovernmental Conference on Language Policies in Africa written for UNESCO, Chimhundu (2002:10) summarises the attributes of a specific, coherent and realistic national policy of an African country. He intimates that first and foremost, the language policy should define short, medium and long-term goals. Secondly it must take stock of the problems to be resolved and finally, it must determine the methods and resources to be used and spell out the mechanisms to be set up. The linguistic landscape of the country and the region should be considered in order to come up with the basis for the strategies to be laid down. For instance, in Zimbabwe, Shona is spoken in Manicaland, Mashonaland and Masvingo while Ndebele is spoken in Matabeleland. The dialects would also have to be considered to come up with the linguistic landscape of the country. In addition to this, the functions of each language by the state and its citizens should also be specified. For instance it has to be explicitly stated which language(s) would be used as LoLT and for which subject(s)? Which language(s) would be used as the language(s) of commerce? Parliament? Road signs, and so on.

Chimhundu (2002:32) observes that in Zimbabwe there is no clear, coherent and explicit language policy framework. His sentiments are echoed by Thondhlana (2002:30); Viriri (2003:2); Shizha (2007:302) and Makanda (2011:2). Instead, there is just an Education Act. Prinsloo (2012:26) contends that the major goals of a language policy are: to facilitate total involvement in all national issues through education for all; to ensure that learners are supported in their educational endeavour, and hence to have multilingualism as an approach to use of language in at school; to upgrade and develop all the official national languages; to support the teaching and learning of all the other languages used by learners, communities and government; to correct limitations resulting from mismatches between the home language and the LoLT; and to develop programmes to redress previously denigrated languages. According to Prinsloo, the underlying principle is to keep home language(s) but offer additional language(s). For instance, ESL can be introduced while learners continue to use their first language as the LoLT at school. Clearly, this is not happening in Zimbabwe.

During the formulation of the policy on language in the 1997 document in South Africa, the Working Group's report to the Minister of Education on values in Education identified two important aspects namely: the importance of studying through the language one knows best and the fostering of multilingualism. At primary school, secondary school, and even at tertiary level, the language that a learner knows best in Zimbabwe and indeed elsewhere, is the learner's mother tongue or first language.

On languages to be taught and the LoLT in Zimbabwean schools, Section 62 of the Zimbabwe Education Act was repealed to extend the use of the mother tongue as a LoLT up to grade seven. Sign language is the LoLT for the deaf and hard of hearing at school (Zimbabwe Education Amendment Act, 2006). However, from my long experience as a college lecturer, I have observed that there is tension between the Education Act that represents the national language policy and practice. English continues to dominate as the LoLT in Zimbabwean primary schools. The hard of hearing are not segregated from inclusive classrooms. Unfortunately, these classrooms are manned by teachers who are illiterate in Sign Language.

The current ES syllabus requires teachers to use a pupil-centred approach (CDU, 1994:6). This approach is intended to trigger curiosity, which should lead to logical and systematic questioning by pupils. It should also encourage exchange of ideas among pupils, which should enable them to view problem identification and problem solving from different angles. However, the writer strongly feels that the issue of language should not be ignored if pupils are to share ideas, ask questions and answer high order open-ended questions and not just literal questions as I have observed during ES lessons. This brings about the question of proficiency in the LoLT again. If pupils are not proficient in the LoLT, the pupil-centred approach alluded to above is likely to be problematic in implementing.

Ndawi and Peresuh (1998:59) maintain that “a curriculum design may prescribe a high standard of education but whether it will be achieved depends on such essential factors as the availability of adequate human, material and financial resources.” That may be true to a certain extent. But my own observation is that there is still something missing. If learners and teachers are unable to communicate effectively, then all the other improvements are in vain.

Findings of studies done so far have revealed that the use of ESL as a LoLT is a barrier to effective learning and teaching, particularly in Science (Shizha, 2012:787; Setati, 2011:20; Brock-Utne & Desai 2010:11). Viriri (2003:2) shares the same view when he says, “Learning in foreign languages would take longer than in a mother tongue”, and “Our indigenous languages, Shona and Ndebele inclusive, are the right media of instruction that ensure understanding and transfer of knowledge.” Shizha (2007:307) also has this to say in support of this idea, “The language of instruction in African schools is the major obstacle in students’ cognitive development and learning outcomes.....”

The studies alluded to above reveal the advantages of using the learners mother tongue in the learning of science concepts. The findings of a study conducted by Nomlomo (2007:17), reveal that teachers and learners communicate better in their first language and that learners perform better in lessons conducted using their first language too. In Zimbabwe, this is clearly not the case. The majority of our primary school pupils are using ESL as the LoLT (Shumba, 1999:5; Young, 1988:6).

I have observed over the years, that many pupils rarely ask questions and they seldom take part in class discussions during Science lessons in Zimbabwean Primary Schools. I ascribe that to the learners' lack of proficiency in the medium of instruction. I have also observed that even when English was the official language of instruction in class, in practice, learners and their teachers at primary and secondary school used both English and the pupils' mother tongue in class oral discourse. This practice is known as code-switching. Gotosa, Rwodzi and Mhlanga (2013:88) concur, "Practically, the mother tongue is used in class oral discourse only through code-switching; a practice teachers and pupils have devised in order to solve classroom language problems." These observations are also supported by Muthwii and Kioko (2004:4) who regard it as a learner's right to feel safe and confident in class. The use of English as a LoLT seems to disorient most ESL learners. They become passive and silent in class (ibid). Muthwii and Kioko attribute this to two factors. Either they lack the ability to express themselves in the LoLT being used, or they feel uncomfortable to use a foreign language.

2.5. Studies conducted in some African countries on LoLT in schools

2.5.1. Nigeria

Okebukola (2013:62) contends that Nigeria is the most densely populated African country. It has a population of 165 million people. This means a quarter of the world's Black people are found in that country. Nigeria is the third most ethnically and linguistically diverse country in the world after New Guinea and Indonesia. There are 450 different indigenous languages in Nigeria. Nigerians from different ethnic groups are able to communicate with each other through Pidgin, which is a type of broken English.

Despite all the negative factors alluded to above, Nigeria still has a language policy, which states that the LoLT at primary school is the local indigenous language from grade one to grade three, with English being taught as a subject. English is introduced slowly as a LoLT together

with the local indigenous language at grade four [National Policy on Education, 2004, Section 4; p 16, as cited in Okebukola (2013:62)].

Okebukola wonders what would happen to a lower primary school teacher who cannot speak a local language that has been made the LoLT. The choice of the LoLT would not be an easy matter, bearing in mind that these pupils have so many different mother tongues? The other challenge could be in lack of learning resources like text books in the local languages. Research should be conducted to enlighten the situation (Okebukola 2013:81).

Okebukola (2013:63) conducted a study to find out if there was a match between policy and practice in the use of the mother tongue for teaching Science in primary schools in Nigeria. His findings revealed that there was no match at all between policy and practice, especially in urban Science classrooms. His findings also revealed that the use of the mother tongue was higher in rural schools than in urban schools. Other findings showed that for communication among pupils in urban and rural science classes, English was the mediating language. Okebukola recommended that as a topic for future research.

In a longitudinal study conducted by Bamgbose (2005:15), instruction using Yoruba, one of the local languages in Nigeria, was compared to instruction using ESL. The findings showed that children who were taught in Yoruba performed much better than those who had been taught using ESL, despite the fact that those who had been taught in ESL had a specialist teacher of English.

In another study by Etim (1985:39), the results revealed that in the multilingual Plateau State of Nigeria, primary school teachers preferred English to Hausa as the medium of instruction in class. Even though teaching and learning resources in Hausa were readily available and comparable to those in English, teachers still preferred the use of English to prepare their learners for higher education. In an attempt to explain the relationship between the choice of a medium of instruction in class and its justification, Ager (2001:119) says the preference for English by individuals and communities is based on economic and pragmatic opportunities. Ager (2001:119) observes that international organisations often have a language policy and that global corporations frequently employ a standardised form of communication; and that these plans required the use of English in most cases.

Acquisition of English has become the most wanted achievement everywhere (Fasold, 1997:90). Fasold maintains that the acquisition of English has become a good investment worldwide, because it offers access to higher education, higher chances of getting employment, and to upward social mobility.” The implication here is that the choice of English was not

based on educational grounds.

2.5.2. Niger

In Niger, Chekaraou (2004:7) conducted a study on the use of Hausa language in primary schools. He observed that teaching in a mother tongue promoted active teacher-student interactions which enabled students to develop their critical thinking skills which were transferable to all learning experiences even when the mother tongue ceases to be the LoLT later at a higher level.

2.5.3. Ghana

Wilmot (2003:12) conducted a study in which the LoLT was changed from English to the pupils' first language. His findings revealed that pupils scored much better when they were taught in a language which they knew than in a foreign language. His findings also revealed that learners who were erroneously classified as low achieving were actually very brilliant. They were thought dull because their school had incorrectly assessed them because they had failed to master the foreign language which they were using as the LoLT in class.

2.5.4. Malawi

Kaphesi (1999:28) revealed that Malawi was a multilingual country where 15 languages were spoken. Their school syllabus indicated that the LoLT at school was the pupils' first language. Kaphesi (1999:52) revealed that the general feeling among Malawians was that it was not feasible to implement the use of the first language as the LoLT at school because it was cumbersome and very costly. Others were worried that it would cause chaos in the classroom, create tribalism and retard English learning. Majority of the unlearned people supported the use of local languages. An in-depth interview revealed that their choice was not based on educational grounds but rather on ethnocentrism. Teachers had a negative attitude towards the use of local languages as LoLT. Most of them associated English with meaningful learning and indigenous languages with meaningless learning.

Mchazime (2001:1-331) conducted a study to establish whether ESL was the most appropriate LoLT in Social Studies (SS) at upper primary school level in Malawi. The same study also sought to find out if the use of ESL boosted pupil participation in the learning process or not and whether the use of Chichewa, spoken by 72% of the population, favoured pupils whose

first language was Chichewa more than those whose first language was Chiyao, spoken by 13.8% of the population (Mchazime, 2001:22).

The findings revealed that Standard seven pupils were not proficient enough to use ESL as the LoLT in SS. Mchazime's findings also revealed that pupils who were schooled in Chichewa outscored those who were schooled in ESL. She also found out that there was no difference in performance between pupils taught in Chichewa and those taught in Chiyawo. Therefore, it can be concluded that pupils perform better when the LoLT at school is an indigenous language than when it is ESL and that the use of ESL is a barrier to learning.

2.5.5. Zambia

Nkosa (1999:23) reveals that in the 1950s, the white missionaries in Zambia corroborated and collaborated with the colonial regime to encourage the use of indigenous languages as LoLT at school. They argued that it was appropriate to teach the African children arithmetic, reading and writing in their mother tongues before English was introduced to them. During the first four years of primary schooling, the seven officially recognised indigenous languages of Zambia, namely: Bemba, Kaonde, Lozi, Lunda, Luvale, Nyanja and Tonga, were used as the LoLT in their respective regions.

Zambia got its independence in 1964. The use of indigenous languages as LoLT continued until 1965. The Black government that took over reversed the situation. It recommended schools to use English as the LoLT at all levels. That policy was implemented in 1966. Schools stopped using the seven official languages of Zambia as the LoLT.

2.5.6. Republic of South Africa (RSA)

In RSA, change was also witnessed in education with the introduction of a new curriculum [Curriculum 2005 and Outcomes-Based Education (OBE) and its revised form, the Revised National Curriculum Statement (RNCS), 2002]. The introduction of OBE was done to provide quality education to all RSA children, irrespective of race (Nomlomo 2007:21).

According to the RSA Department of Education (1996:3), the official languages of the RSA are IsiZulu, Sepedi, Afrikaans, IsiXhosa, English, Sesotho, XiTsonga, SiSwati, Setswana, Tshivenda and IsiNdebele. The RSA Constitution (1996:11) states that everyone has the right to receive education in the language or languages of their choice in public educational institutions. But, on the ground, it appears there is no match between policy and practice. Indigenous

languages are not being used as LoLT at school. The reason is that the majority of the population seems to have a negative attitude towards the use of African languages as LoLT in schools. This seems to be a common problem in all African countries.

The RSA Languages Draft Bill was drafted to facilitate individual empowerment and national development by promoting the equitable use of the official languages and thus ensuring that all RSA citizens have the freedom to exercise their language rights by using the official languages of their choice (RSA Council on Higher Education, 2001:2). However, even though all learners are entitled to choose their medium of instruction at school, on the ground this does not obtain because the majority of South African learners and their parents regard English as a major international language. Consequently, learners and their parents feel that it is crucial for learners to develop the ability to read, write, listen to and speak English so as to develop their potential. Despite the preference for English by learners and parents, Madileng (2007:8) laments the low proficiency in ESL by learners. She sees it as a challenge for English educators to find ways and means of motivating the ESL learners to improve their English proficiency.

Nomlomo (2007:7) attributes the current negative attitudes towards the use of African languages as LoLT in schools to a number of factors that have something to do with the racial discrimination of the apartheid system. One of the factors is related to the high status that was given to English and Afrikaans as languages of socio-economic mobility during the apartheid regime. Secondly, the implementation of Bantu education by the apartheid government gave the impression that learning through indigenous languages was a barrier to their access to socio-economic advancement. As Bantu Education was associated with poor or inferior education, the use of indigenous languages in education is now regarded as providing low quality education. English is still taken as the only language for good education and upward socio-economic mobility. Setati (2011:17) observes that the problem of selecting a suitable LoLT in RSA is prevalent. He ascribes learners' poor performance at school to their lack of proficiency in English, the LoLT.

Lewin (2000:35) also ascribes the numerous problems met in science learning to the lack of proficiency in English. He goes on to explain that for the disadvantaged learner, "Science is taught through a medium of instruction which is not a mother tongue." Mutasa (2002:9) echoes these sentiments. He asserts that if pupils do not understand the LoLT used in science lessons, they will not be able to learn any science.

2.5.7. Namibia

The official languages of Namibia are German, Afrikaans, Oshiwambo, English, Lozi and Herero Lozi (SADC Trade, industry and Investment Review, 1998:2). According to Munetsi (1996), Namibia made English its LoLT in its primary schools, despite the fact that this language was not spoken outside school by the majority of pupils and teachers. The choice of English as a LoLT in schools was based on political reasons rather than on educational ones (Swilla, 1992:140).

2.5.8. Mozambique

Mozambique is also a multilingual nation like all African countries. Twenty languages are spoken in that country (Johnsen 2011:1) Portuguese is the official language of Mozambique as well as the LoLT in all schools despite the fact that pupils meet it for the first time when they start going to school. Children have to learn everything in Portuguese as they learn this language even though they are not yet proficient in it. This makes learning unpleasant to learners (Johnsen, 2011:1).

Findings of a pilot study that was conducted in Mozambique revealed that learners who were schooled in their first language achieve better results than those who were schooled in Portuguese. More and more people are becoming interested in bilingual education now. Many parents have indicated that they now want their children to use their first language as the LoLT during their first years of primary school (Johnsen, 2011:3).

Edwardo Mondlane University (UEM) is located in Maputo. Professor Nguga is the head of the Centre for African Studies at the Faculty of Arts and Social Sciences at UEM. He is coordinating a project called 'Standardisation and Harmonisation of Cross-Border Languages, whose goal is to change the educational system from a Portuguese school to a mother tongue school. They are working in collaboration with the University of Zimbabwe (UZ) and the University of Oslo (UO) in Norway. This project is supported by The Norwegian Programme for Development, Research and Education (NUFU).

Mother tongue languages such as Changana, Shona and Sena have been taught in pilot schools in Mozambique from the first grade to the third grade (Johnsen, 2011:5).

Professor Nguga is very hopeful that in Mozambique mother tongues could become LoLT in higher education institutions like UEM (Johnsen, 2011:6).

2.5.9. Zimbabwe

Zimbabwe is also a multilingual nation of sixteen languages (Muchenje, Goronga and Bondai (2013:504). In Zimbabwe, there is a completely different scenario from that of Mozambique in that in Zimbabwe, local languages such as Shona and Ndebele have been LoLT for a very long time. The Education Act (1987a) stipulates that the mother tongue should be used as the LoLT in primary school from grade one to grade three. From grade four up to tertiary education, English becomes the LoLT. That Education Act was later amended to extend the use of the mother tongue as a LoLT up to grade seven (Education Act, 1987b).

The officially recognised languages of Zimbabwe are as follows: Chewa, Chibarwe, English, Kalanga, Koisan, Nambya, Ndau, Ndebele, Shangani, Shona, sign language, Sotho, Tonga, Tswana, Venda and Xhosa (Constitution of Zimbabwe Amendment (No 20) Act 2013:17). The languages that are widely spoken in this country are Shona, Ndebele and English (Shumba & Manyati, 2000:43; Johnsen, 2011:19). Shona and Ndebele were the only indigenous languages that were given the official language status in the past. But at the moment, there are fifteen indigenous languages that enjoy the official language status (Constitution of Zimbabwe Amendment (No.20) Act, 2013:17). However, English remains the primary language of government, commerce and the LoLT in schools (Shumba & Manyati, 2000:35; Thondhlana, 2002:3).

In Zimbabwe children's ability to speak and write English, the LoLT at school, differs greatly depending on the kind of community they came from. For instance, rural and urban high-density children have less exposure to spoken English than those from urban low-density areas. Policy makers should consider such differences when deciding Zimbabwe's language policy in future. Pupils in rural and urban high density schools are likely to benefit more by using their first languages as media of instruction than through the use of ESL (Dube & Cleghorn, 1999:11; Machakanja, 1999:42).

Teachers have a challenge of frequently code-switching from their second language to their first language when teaching at grade 3 level (Dube and Cleghon, 1999:12). The authors ascribe that behaviour to the fact that these teachers are responding to the needs of their learners

through code-switching. Munetsi (1996:14) contends that most pupils face challenges when the LoLT is suddenly changed to English, in all subjects. The young learners are suddenly overwhelmed with texts written in English in all subjects except in indigenous languages. These texts are usually written as if they are meant for L1 learners. Munetsi (1996:16) is advocating for “purposeful maintenance of the mother tongue in schools to assist with development of learning in L2 especially where the teacher was also an L2 speaker of English.”

In a study conducted by Shumba, Voss and Zilg (1997:18), the findings revealed that the majority of the pupils in the classes observed, lacked proficiency in the English language. Similar findings were obtained by Shumba (2000:15; 1999:5, 48, 49; 1998:40; Shumba, Voss and Zilg, 1997:17, 22, 26); Buchholz, Mukwirimba and Shumba (1997:184). The authors also noted that there seemed to be a certain degree of reluctance to code switch to L1 even when it was very clear that pupils were having difficulties in understanding English, the LoLT. As a result of their lack of proficiency in the LoLT, pupils could neither participate in discussions nor answer the teacher’s questions. Shumba, Voss & Zilg (1997:17) observed that the challenge of the lack of proficiency in the LoLT was aggravated by the fact that teachers ignored language and communication problems that pupils encountered.

In another study, Shumba and Manyati (2000:46) noted with concern that, some college lecturers criticise student teachers for using mother tongues and code-switching during teaching practice. “Indigenous languages are important vehicles for conveying indigenous knowledge systems that link Environmental Science to real-life experiences” (ibid). The college lecturers were adamant even where it was very clear that the LoLT was making life very difficult for the pupils.

Findings of another study by Shumba (1995:276), revealed that teachers were not united on the issue of using mother tongues to teach science. Some felt that topics like ‘Reproduction’ could not be taught using indigenous languages because in some communities, it was taboo to mention terms like penis, vagina, testis and so on.

The conclusion that can be drawn from the studies on LoLT conducted in Zimbabwe and other African countries is that children learn and understand what they are taught at school better when they are familiar with the language used as the instructional medium than through a foreign language. The language that children know best is their mother tongue.

2.6. A review of methods and/or findings of studies conducted in some African countries on the use of ESL as LoLT.

2.6.1. Buchholz, Mukwirimba and Shumba (1997)

In a study conducted by Buchholz, Mukwirimba and Shumba (1997:2), the researchers visited all the ten primary teachers' colleges dotted all over Zimbabwe. A lot of resources were used in trying to cover all the teachers' colleges in the country. The researchers admitted that the visits were made under considerable time pressure. "One would have liked to have much more time for the very interesting interviews showing a high level of consciousness of the problem addressed during the interviews and an encouraging willingness to look for improvements," lamented Buchholz, Mukwirimba and Shumba (1997:2). To avoid such pressure, this particular study was confined to only three selected schools. The researchers cited above could have had enough time for their 'interesting interviews' had they employed the case study method. Results of the interviews were immediately analysed and synthesized in preparation for the next move. That was done so that any leads developing from the analysis could either be followed or avoided in future so as not to waste time on issues that were not critical. Lecturers, who were the main stakeholders, were involved in the identification of training and related support needs. This particular study also adopted the same style by analysing data as soon as it was collected and involved the main stake-holders who were the grade 4 -7 teachers and their pupils.

2.6.2. Shumba, Voss and Zilg (1997)

In their Baseline survey of the BEST programme in primary schools and teacher training colleges in Zimbabwe, Shumba, Voss and Zilg (1997) explored the teaching and learning situation in ES through the use of interviews, lesson observations and questionnaires. Vital information was obtained through the use of interviews. Grade six pupils were made to complete the questionnaires. Some of them ended up getting spoilt. I attributed that to lack of proficiency in English, the medium of communication that was used. I decided not to use questionnaires in this study for the main reason that pupils would not complete them well because they lacked proficiency in the English language. But as for interviews and lesson observations, I decided to adopt them for reasons already alluded to.

2.6.3. Southern Africa consortium for monitoring educational quality (SACMEQ)

In a study conducted by the ministries of primary education in Kenya and Zimbabwe in

collaboration with the Southern Africa Consortium for Monitoring Educational Quality (SACMEQ), the findings revealed that the majority of grade 6 pupils in Kenya and Zimbabwe lacked enough proficiency in English to enable them to use it as a LoLT in grade 7. The same study also revealed that in Uganda, Zimbabwe and Kenya, 35%, 54% and 87% of the pupils respectively, were virtually illiterate in English. Despite these findings, the affected governments continue to expect teachers to deliver their lessons in English. Children should not be forced to learn in a language that they do not understand well (Pitman, Majhanovich & Brock – Utne, 2012:3).

2.6.4. Qorro (2010)

The findings of a study conducted by Qorro (2010: 4), indicated that students entering Form 1 in Tanzanian secondary schools were not proficient enough in English to use this language as a LoLT. But the same learners were found to be reasonably good in Kiswahili, an indigenous language which is an L1 for the majority of the learners. The proficiency of the learners in English is so low that one teacher remarked as follows: “In reality most teachers code-switch. If they speak in English only, it is like teaching dead stones. Lack of proficiency in the English language is also observed at university level (Pitman, Majhanovich and Brock – Utne, 2010: 5). Would Tanzanian learners be different from Zimbabwean learners? If secondary school and university learners lack proficiency in the English medium of instruction, what more should one expect from primary school pupils?

2.6.5. Shizha (2008)

In another study conducted by Shizha (2008:80) in Zimbabwe, the findings were that the use of ESL as a medium of instruction in primary schools was the main factor that silenced learners in science classes (Shizha, 2012:788).

The Education Amendment Act of 2006 has extended the use of the learner’s L1 as the LoLT to grade seven. But, is this what is happening on the ground? The answer is negative. English is still dominating at all levels of the primary school. What problems arise as a result of the use of ESL in teaching ES at primary school level? It is against this background that I have decided to pursue this study in which I am advocating for a multilingual approach when deciding which language(s) should be used as the LoLT during Science lessons.

Two conclusions can be drawn from the above studies. The first one is that more detailed

information can be obtained from a small sample than from a large one and the second one is that children understand more when they are taught through their mother tongue than when the medium of instruction is ESL.

2.7 Language and communication

2.7.1 What is communication?

Kirk et al (2009:223) define communication as the exchange of thoughts, information, feelings, and ideas. It requires three elements: a sender, a message, and a receiver. Communication only takes place when all the three elements are present and working. The sender initiates the communication by sending a message. The receiver gets the message and interprets it to understand what it means. If the receiver fails to understand what the message means, then there is no communication.

2.7.2 The Communication process

The communication process involves the exchange of information between a sender and a receiver. The sender encodes an idea into a message and transmits the message to a receiver who decodes the message and reacts. In this study, the sender can either be the teacher or pupils and the receiver can also either be the teacher or pupils. Encoding symbolises the ES concepts that the teacher or pupils wish to communicate. Symbols in the form of words, nonverbal cues, or instructional media are designed to communicate only messages. Meaning cannot be transmitted because it lies in the significance that the encoder (ES teacher or pupil) attributes to the symbol. The receiver of the message (ES teacher or pupil) will also assign meaning to that symbol. The greater the agreement between the sender (for instance, the ES teacher) and the receiver (for instance, the pupil) regarding the meaning of the symbols, the greater the probability of understanding between the two parties (teacher and the learner). Therefore it is critical for teachers to select symbols that have mutual meaning for them and their intended receivers (their learners) (Lunenburg & Ornstein, 2008:179). The question of proficiency in ESL comes in. If pupils do not understand what the teacher is saying then there is no communication. Lack of proficiency in the medium of instruction becomes a barrier to communication and consequently it becomes a barrier to learning.

Communication through language is the main ability which distinguishes humans from all other species on earth (Dednam, 2011:126). Prah (2007:3) concurs with (Dednam:2011:126):

“Language is one of the distinctive features which distinguishes us from the animal world. We are, in effect, ‘talkative animals’. Through language humans communicate their thoughts to others who are familiar with the specific language system. It also enables humans to function independently in their world,” (Dednam, 2011:126). Miller (2008:121) defines language as “an arbitrary set of abstract symbols governed by a set of rules that determines how sounds, words and word parts, and phrases can be combined to make meaning” that enables a person “to describe things, ideas, beliefs and so on.” Santrock (2009:275) defines language as “a form of communication – whether spoken, written, or signed – that is based on a system of symbols.” Lunenburg and Ornstein (2008:193) give a much simpler definition as follows: “Communication is the transmission of information from a sender to a receiver through the use of common symbols.”

The attributes of language, as described by Jalongo, (2000:50), are as follows: Because we send and receive messages through the medium of language, therefore language is communicative. Since language is a system of signs and meaning-making symbols, we can conclude that language is abstract. Because there are rules which determine pronunciation of sounds in words and arrangement of words in sentences in any language, it can be concluded that languages are governed by rules. People are able to interact with each other through a language. So it can be concluded that language is social. Finally, language can be described as versatile since it can be rearranged and combined without any limits and utilised to convey future information.

Miller (2008:121) defines communication as “the interchange of ideas, beliefs, thoughts, feelings, and emotions” and it can “occur through various means, both verbal and nonverbal”. Jalongo (2000:52) observes that there are two basic means of communication namely: linguistics, that is verbal and paralinguistics, that is nonverbal. The former refers to the production of words and sentences while the latter concerns facial expressions, gestures, body posture and intonation. People can also communicate through writing and reading.

According to Tchudi (1994:55), the main functions of communication are to inform others through discussions, reports, demonstrations, lectures and essays; to express feelings of love, admiration, love, disappointment and frustration; to be creative in activities such as drama and story-telling; to greet others, to control others and to teach.

2.8 Language and culture

Santrock (2009:275) defines language as a form of spoken, written or signed communication, that is based on a system of symbols. All languages share certain common attributes but there

are some aspects of language that are unique. A person's language and culture determines the way that person thinks (Nunan 2007:200). All cultures have their own ways of teaching, learning and education. It has now been realised that teaching needs should be sensitive to the cultural and environmental contexts in which they are done (Nunan, 2013:47).

Kirk et al, 2009:26) define culture as the customs, values, attitudes and language that families and friends pass on to their children. Prah (2007:83) gives a more concise definition of culture as everything that is the result of human creation which include all tangible materials and products of humanity and intangible creations like language, religion, customary usages and everyday practices. It is the sum-total of these time-tested habits, attitudes, tastes, manners, shared values, traditions, norms, customs, arts, history, institutions and beliefs of a group of people that define for them their general behaviour and way of life. Culture changes continuously. Some aspects are dropped, others are adapted or adopted and passed on to future generations.

Prah (2007:98) argues that if culture is the main factor that determines our attitudes, tastes and morals, then language is the key aspect of culture. He explains that it is in language that culture is passed on, explained and designed. Furthermore, he clarifies that language is also a record of culture. Therefore, when one learning a language, one is learning a culture (Bruce, Meggitt & Grenier, 2010:116). Therefore, it follows that when we introduce English as a LoLT in our primary schools, we are introducing a foreign culture into our system too soon before pupils have even fully acquired their own culture? Pupils' mother tongue is part of the pupils' culture. Cummins (2000:31) has often advocated for bilingual education and use of mother-tongue instruction.

Findings of studies conducted by Qorro (2010:75) have revealed that in Tanzania, even at secondary school level, learners using ESL still lack proficiency in that LoLT in class, yet the same learners were quite proficient in their local languages (Pitman, Majhanovich & Brock-Utne, 2010: 4). In support of that point, Brock-Utne adds: in reality most teachers use code-switching. If they speak in English only, it is like 'teaching dead stones', she quotes one of the teachers. University students too lack proficiency in English. An audit report from the Dar es Salaam University says that learners have challenges in using English as the LoLT (Pitman, Majhanovich & Brock-Utne, 2010:7).

We use our language to understanding our culture (Shizha 2007:7). Thondlana (1999:35) has similar views: "Language and culture are seen as being intimately related". Further, she goes on to say that language acquisition is a process of socialization and enculturation to the

extent that language is usually the principal way through which children learn to behave as members of the society in which they live and to adhere to its culture, mode of thought and action, beliefs and values. In short, language reflects culture.

Valentino (2010:67) advises teachers to refrain from demanding all learners to communicate in English only without taking into consideration their language limitations. She goes on to reveal that the majority of teachers and administrators do not have the prerequisite requirement necessary to deal with learners whose L2 is English. The situation is exacerbated by the fact that these teachers and administrators do not speak the different local languages of these learners and they are also ignorant of their cultures. Finally, she advises that it is important to bear in mind that learning a new language also means learning a new culture. She is affirming that culture and language cannot be separated.

The relationship between culture and language is also echoed by Jiang (2000:37) when she posits that language is a part of culture. Brown (1994:165) echoes the same sentiments: “a language is part of a culture and a culture is a part of a language; the two are intricately interwoven so that one cannot separate the two without losing the significance of either language or culture.”

This is indicating to us that our pupils use their vernacular in class to remember, to reason, to communicate with classmates and so on, but they must translate these thoughts to ESL first before communicating with the teacher (Siwela, 2013:51). In other words, the learners’ inner language is in their mother-tongue, but their expressive language is in ESL. Language and thought are so closely related that it is almost impossible to consider one without the other (Vygotsky, 1934/1986 cited in Honig, 2010:23).

Slavin (2012:80) points out that some culturally-based habits have important consequences for classroom teaching. Setati (2011:28) sees culture as a critical factor in determining how learners speak and interpret words. “Meanings of words are determined by their uses within a linguistic and cultural setting, and these settings differ from culture to culture. To fully function in a particular language, a person needs to understand the mechanics such as grammar and possess the knowledge to apply that language to different contexts, people, and uses”, Meyer (2002:120). This is supported by Valentino (2010:67) when she says that it is important to remember that learning a new language also means that one must learn a new culture. Are we therefore, not overburdening the primary pupils when we use ESL to teach them science? Setati (2011:19) maintains that the learning of science demands a learner to be proficient in the LoLT of that subject as well as in the language of science, which is, acquiring the special vocabulary

of science.

The above allusion helps to clarify why effective learning happens in an atmosphere that embraces the learners' mother tongue since that revitalises various internal development processes that a child has acquired in his socio-cultural environment (Meyer, 2002:122). Zevernbergen (2001:204) echoes Meyer's sentiments "Classroom interactions are imbued with cultural components that facilitate or inhibit access to the scientific content." I support the above allusion. The LoLT should be the learners' L1 and the examples given in lessons should be from their culture and experience. Learning would still be inhibited if the learners are not yet proficient in the LoLT being used during the lesson and the examples given to explain concepts are from a foreign culture. For instance examples of proteins would include traditional dishes learners know very well. Other examples might comprise the following: traditional medicines and herbs, flora and fauna from the learners' environment, shelter and habitats, agricultural products and food preservation, reproduction and contraception, beliefs, norms and values. By promoting science teaching in mother tongues, we are helping to preserve our indigenous cultures. Implementing this is possible. The majority of Zimbabwean black pupils speak either Shona or Ndebele (Viriri, 2003:2), unlike the case of Nigeria with 450 mother tongues, 8 mother tongues in a single class (Okebukola 2013:5).

2.9 Role of language in learning and teaching of Science

Studies on the importance of language in science learning have been going on for quite some time now (Okebukola, Owolabi & Okebukola, 2013:63). Since the end of the last century, researchers have been investing on studies to investigate how language enhanced or militated against the smooth teaching and learning of science. Findings of studies by Fafunwa, Macaulay, and Soyinka (1989:31) show that the LoLT has positive attitudinal effects on how children learn science and their attainment of science concepts. Other studies by Olarewaju (1986:6) and Blankson (2006:9), found that the positive effect was mediated by student variables such as the need for achievement, home support, and their general intelligence. Generally, findings of studies on language and science learning indicate an overall positive result (Okebukola, Owolabi & Okebukola, 2013: 63).

The study by Okebukola, Owolabi and Okebukola (2013) was intended to find out if there was any match between the national language policy and practice by observing what transpired in selected schools in rural and urban areas of Nigeria. Their findings also revealed other issues that needed to be considered in constituting their national language policies.

Communication is not the only use for language. We also use it for expressing our cultural outlook of the world. Communication is a critical tool for inclusion of indigenous science into the school science curriculum (Shizha, 2007:307). Language is also used for communicating scientific concepts to pupils (Okebukola, 2013:62). Bennett, (2003:173) echoes the same sentiments: “Language is the most important resource for communicating ideas.” However, she laments that many pupils find the science subject difficult to understand. Simala 2001:311) contends that language enables us to understand and make sense of the world of science. The mediator of all our knowledge and experience of science concepts and principles is language.

Language is at use when learners and teachers interact in the science classroom. In any subject, learners need basic language skills to understand information and express their ideas on it. Learners also use language to get skills that are critical for them to earn a living (Yushau, 2004:183). ESL learners find communication in science difficult mainly because it is impeded by the use of a language which is difficult for them (Cummins, 2000:200).

Language is very critical in the learning and teaching of science because it is used by learners to develop their scientific knowledge. Teachers also use it to communicate scientific concepts to their pupils as well as to understand their pupils’ learning processes. Language is a very vital tool that is used for expressing ideas and information. Lemke (1998: 88) gives the following examples of different linguistic and non-linguistic modes used for communication as: “listening and talking; reading and writing; discussing and arguing; narrating and describing; using actions, images and symbols. All these are ways of signalling meaning and semiotics.”

Valentino (2010:76) contends that any kind of teaching in any subject involves use of language. Derewianka (1995:124) also believes that language and learning are inseparable: “The content of any learning is ultimately embodied in language. To learn content is to learn language.” He goes on to explain that one of the functions of education is to help children to explore and make sense of their world. That cannot happen without language. Language enables us to explain the relationship that we observe between phenomena. Children use language to observe, describe, define, compare, contrast, group and classify organisms and objects in nature. Pupils use language to ask questions about what they observe. They use it in scientific enquiry to answer their own questions, observe changes taking place, noting patterns, grouping and classifying animate and inanimate objects and carrying out simple comparative tests (Bianchi & Booth, 2014:38). Therefore, pupils should be proficient in theLoLT to master basic scientific skills. Poor linguistic skills can inhibit learning (Siwela, 2013:52).

When learners use their mother tongue as the LoLT, they are generally thought to have an advantage over their counterparts who are being taught in a second language or third language (Oyoo, 2015). It is impossible for learners to learn effectively when they do not have the necessary language skills to do so in the LoLT (Setati, 2011:9).

In science teaching, language is critical in communicating scientific concepts to learners. The findings of studies involving practitioners in several countries reveal that teachers do most of the talking in classrooms (Oyoo, 2015:12). In a science lesson, language encodes the science message from the teacher and learners decode the message only if they understand the language. A biology lesson taught in Chinese to a group of students who understand only Yoruba is described by Fafunwa et al (1989) as sowing seeds on a rocky surface (Okebukola, Owolabi & Okebukola, 2013:64). Therefore, language plays a critical role in the teaching of ES concepts. This means that a teacher's language is vital in teaching and learning of science (Oyoo, 2015:13).

Bennett (2003:174) contends that the importance of language in the teaching of science has always been acknowledged. Pupils should become familiar with the vocabulary of science if they are to understand science subjects (ibid). Though obviously important, this aspect of language is only part of the story. She explains further that understanding science is more than just 'knowing the meaning' of particular words and terms, it is about 'making meaning' through exploring how these words and terms relate to each other. This can only be achieved if teachers and pupils are able to communicate effectively with each other, and this places language at the centre stage of science teaching. Indeed, this is what makes the LoLT important.

Vygotsky (1978:26) observes that children solve practical problems with the help of their speech as well as their eyes and hands. This observation is highly applicable to ES lessons. A constructivist approach to learning puts emphasis on the requirement for careful inquiry to extract pupils' ideas and the importance of offering room for pupils to explain their reasoning through oral discourse. Pupils are expected to use their ideas and the language of science to contribute meaningfully in science lessons.

In teaching, language can be used in different ways such as explaining, describing, discussing, questioning and formulating arguments. Other ways of passing on information include visual representation whereby symbols and images are used. This is true of science, which makes vast use of diagrams, charts, chemical symbols, graphs, mathematical symbols, formulae and

equations. The study of the use of language, signs and symbols to communicate meaning is known as semiotics (Bennett, 2003:175).

Bennett (2003:176) draws our attention to the key issues and important questions that are often asked by people concerning language in science lessons. I have summarised them below as follows:

- What factors make debates on language in science lessons a contemporary issue?
- What challenges do pupils face when dealing with the specialist vocabulary of science and related terminology? What solutions can be proffered?
- To what extent does classroom discourse in science lessons enhance or inhibit cognitive development?
- How does writing in science lessons enhance learning? To what extent should pupils be encouraged to utilise different writing styles?
- How does reading in science lessons enhance learning? How can it be used most effectively?
- How does research in language use and theories of language development contribute to recommendations for strategies to utilise in the classroom?

2.10 Mother tongue and the medium of instruction at school

2.10.1 Advantages of using mother tongues as media of instruction at school

In 1951, a UNESCO meeting held in Paris recommended that primary education should be provided in the pupils' first language because it is culturally, psychologically, and pedagogically more appropriate to do so. The UNESCO report revealed that children should use their first language as the LoLT when they begin their schooling. That should be done so as to bridge the gap between home and school (UNESCO 1953/1968:691).

Shizha (2012) regrets the continued use of education systems inherited from colonial governments, which he describes as "hegemonic and disruptive to African cultural practices, local languages, indigenous theories of knowledge and ways of knowing." He maintains that ESL learners in Africa face challenges in learning at school because of the wide gap between the school curriculum and the cultural experiences they bring from their homes and communities into the classroom. The school curriculum does not adequately reflect the pupils' cultural experiences. What is taught in schools, how it is taught and the LoLT are some of the things that need attention (ibid).

Shizha (2012:785) is advocating for a LoLT in schools that will motivate learners to learn better and participate fully in their learning. Shizha maintains that the education system in postcolonial Zimbabwe is a colonial legacy of the British system. Despite the fact that Zimbabwe attained its independence way back in 1980, learners are still using the English language as the LoLT in ES and other subjects. Yet, as Shizha rightly points out, language is not only a medium of communication, but it is also a vehicle for transmitting and receiving cultural knowledge.

Pupils who use their indigenous languages as the LoLT are likely to be very active in class and are also likely to do well in their studies (Muchenje, Goronga & Bondai, 2013:505; Maseko & Dhlamini, 2014:60; Shizha, 2007:2012). The OAU Language Plan of Action for Africa encouraged African governments to step up the use of African languages as LoLT at all educational levels (Mutasa, 2006). Zimbabwe and other African countries have still not yet implemented that recommendation.

The well documented empirical studies of mother tongue-based education programmes in African countries confirm that the use of the mother tongue helps in the acquisition of skills and knowledge in education (Kadodo & Mhindu, 2013:108; Maseko & Dhlamini, 2014:59). In Nigeria, the six-year Yoruba instructional medium demonstrated unquestionably that a full six-year primary education in the mother tongue with ESL taught as a subject was not only viable but gave better results than teaching all subjects using ESL. Another benchmark study that proved that the mother tongue instruction is the best is the Modiano's study in the Chiapas Highlands of Mexico. His findings showed that indigenous learners effectively transferred literacy skills from the mother tongue to the L2 and out-performed monolingual speakers of Spanish. Makoni, Smitherman, Ball and Spears (2003) also report that in Niger it was observed that girls and women were reluctant to speak in French in class because they were afraid of making mistakes because they were not proficient in the French language. But when they were permitted to speak in their mother tongue, their language shock was reduced and participation in class activities increased. Despite the fact that findings of many empirical studies reveal that there are several benefits of using the learner's first language as the LoLT, the Zimbabwean education system continues to enforce the use of English as the LoLT in primary schools (Maseko & Dhlamini, 2014:59).

2.10.2 Disadvantages of using the mother tongue as the media of instruction at school

Gore (2017:1) observes that people always question whether Zimbabwe has the capacity to use local indigenous languages as LoLT at school and whether these indigenous languages have the

requisite vocabulary in mathematics and science. He contends that in some instances, it is not always feasible to use the mother tongue as a LoLT at school and even when possible, there are some factors which militate against its effective use. For instance, we cannot translate all numbers into Shona or any indigenous language when teaching Science.

The results of a study carried out by Ndamba (2008:171) on LoLT in class preferences reveal that in Zimbabwe, pupils and parents prefer English as the LoLT at Infant level, despite the fact that there are challenges in using ESL. This calls for attitude change for people to appreciate the role played by the first language in the early years of schooling. African parents believe that the best way to learn a foreign language is to use it as a LoLT (Ndamba, Van Wyk and Sithole, 2017:22). Kamwangamalu (2004:131) observes that Black parents and pupils are aware of the social, economic and political power of the English language and believe that their own language has no economic benefits either locally or internationally. Moodley (2000:111) summarises it up by saying “The reason why people like me choose English is very simple. There is an entire world of knowledge, skills, jobs, power and influence which is totally closed to us if we can only speak an indigenous language.”

In another study conducted by Chivhanga and Chimhenga (2013) to explore the effects of using indigenous languages in formal education in Zimbabwe as well as to investigate opinions and attitudes of primary school teachers towards teaching science using an indigenous language, their findings reveal institutional and attitudinal barriers to using Shona as a LoLT in science. Their results also reveal that some teachers frustrate and silence learners by demanding the use of the English-only discourse in their teaching. When it came to using Shona, an indigenous language, as the only LoLT, lack of material resources, education language policies, attitudes of teachers and administrators were found to be offering resistance. Changes in language policy, production of indigenous learning resources and transformation of teacher education curriculum are some of the recommended solutions that are required in order to promote indigenous languages as LoLT for science education and schooling in general.

The success of using mother tongue as a LoLT policy depends on people’s attitudes towards first languages and ESL (Ndamba, 2008: 106). The attitude of Zimbabweans towards the use of the mother tongue as a LoLT is negative. Zimbabweans prefer English to local languages because English offers them better opportunities for employment compared to local languages. English is regarded as a subject that empowers them to compete well in the global village. English guarantees them access to the system and equal opportunity to participate in it

(Adegbija, 1994:3). Therefore, changing to indigenous languages such as Shona or Ndebele is regarded as a direct threat to their perceived job opportunities.

The results of a recent study by Ndamba and Van Wyk (2018), reveal that there are barriers that militate against successful implementation of language policies. Ndamba and Van Wyk identify one of the major barriers of implementing the mother tongue policy in Zimbabwe as being state induced. This is evidenced by the fact that all the participants in this study were ignorant of the of the Education Amendment Act of 2006. That was caused by lack of dialogue between the policy makers and the policy implementers (Ndamba & Van Wyk, 2018:57). The Zimbabwean Government is also doing very little to promote mother tongue policies (Mutasa, 2006:15). Another revelation from that study was that in practice, African indigenous languages are not being used as LoLT in Zimbabwe (Ndamba, 2017:18). Ndamba and Van Wyk (2018) lament the lack of support in the form of educational material in the mother tongue.

UNESCO (2008:44) compiled a summary of the challenges met when trying to institute mother tongue instruction in schools as follows:

- Students, parents and teachers may resist use of L1 as the LoLT;
- Presence of many local languages in the community may aggravate the challenges of the use of L1 as the LoLT for all children;
- People may disagree in trying to identify a common language for all that can be used as the LoLT;
- The minority language community may be marginalised and their language may not be selected to be used as a LoLT.
- There may be a dearth of appropriately trained teachers who may qualify to teach the language;
- Lack of incentives for teachers;
- Lack of educational resources in the language;
- L1 may be an unwritten language;
- L1 may not be generally recognised as a legitimate language; and
- New terminology for modern academic discourse may need to be developed.

The challenges met when trying to institute mother tongue instruction in African schools, which are listed above, show that there is still a long way to go before the use of indigenous languages can be accepted as the LoLT in schools.

Despite the disadvantages alluded to above, UNESCO underscores the need to recognise the importance of mother tongue instruction in primary schooling (UNESCO's Global Monitoring Report, 2008).

2.11 A review of current proposals for mother tongue use as LoLT in Zimbabwe

Gotosa, Rwodzi and Mhlanga (2013) observe with concern that implementation of the proposals for the use of mother tongue as a LoLT in Zimbabwe is failing to take off the ground. Gotosa et al are critiquing the proposals for the use of the mother tongue as a LoLT that have been suggested by Thondlana (2002), Viriri and Viriri (2013), Gora (2013) and Phiri, Kaguda and Mabhena (2013). In this study, I am re-examining the proposals put forward by these four studies and in addition to that, critique the proposals by Gotosa, Rwodzi and Mhlanga who are also critiquing the four studies alluded to above.

Thondhlana (2002) is advocating for the use of indigenous languages as the LoLT in primary schools. She argues that pupils are exposed to a second language before they have fully mastered their first language which jeopardises proficiency in the mother tongue because the focus by teachers at school and parents at home is now on English only. Indigenous languages are now being marginalised. She also observes that in some cases, children come to school when they are already proficient in their mother tongues but soon begin to lose this as their focus shifts to develop proficiency in English both at school and at home. Therefore, her proposal is that the mother tongue instruction be extended from grade three up to grade seven so as to give adequate time for the acquisition and development of cognitive, affective and social skills through the mother tongue. Gotosa, Rwodzi and Mhlanga (2002) are questioning when the English medium of instruction will be introduced.

There are well-documented empirical studies of mother tongue-based education programmes in African countries which confirm that use of the mother tongue helps in the acquisition of skills and knowledge (Kadodo & Mhindu, 2013:108; Maseko & Dhlamini, 2014:59). Studies by Thomas and Collier (2002) proved that learners who were taught through the use of English and mother tongue achieved better results than those who were taught through the use of English only. In Nigeria, studies by Bamgbose (2005) compared instruction in Yoruba mother tongue and ESL. Learners taught using Yoruba performed better than those taught using ESL. In Niger, Chekaraou (2004), compared use of Hausa mother tongue with the use of ESL as the LoLT at school. That study revealed that mother tongue instruction enhanced active teacher-pupil interactions which enabled learners to develop their critical thinking skills which were

transferrable to all learning experiences, even when the mother tongue ceased to be the medium of instruction at a higher level. In Malawi, Mchazime (2001) compared the use of ESL with Chichewa mother tongue when teaching Social Studies at primary school level. Her findings revealed that pupils lacked proficiency in ESL and that ESL retarded the pupils' performance.

The issue of the level at which Thondhlana would propose to introduce English as a medium of instruction is irrelevant because she was only focusing on the medium of instruction at primary school level. In the researcher's opinion, it needs a different study to identify the level at which this should be done. That will be outside the scope of Thondhlana's study.

Despite the negative attitude towards the use of mother tongue as LoLT, the implementers who happen to be teachers and lecturers know what is supposed to be done, and that is using that mother tongue. So they code-switch now and then from ESL to mother tongue. Studies by Ogutu (2006:43) confirm that learners and their teachers may switch to another language during learning for several reasons. The most common ones are: to ensure that learners comprehend the teacher's explanations; to facilitate self-expression and communication; to enhance student interest, response and participation. The attitude issue can be corrected if there is a language policy that the government can enforce. Some vernacular languages can be imposed on other vernacular languages because there is no language policy in Zimbabwe.

The fact that primary teacher training colleges teach students how to teach all subjects in English and not in indigenous languages has been cited by Gotosa et al (2013) as evidence for lack of full implementation of the original Education Act of 1987. That is not true because the original Education Act (1987a) stipulated that Shona would be used as a LoLT from grade one up to grade three. Tertiary institutions only use indigenous languages for teaching indigenous languages as subjects.

Gotosa et al (2013) want details of how languages would be used given the multilingual setting in Zimbabwe. Phiri, Kaguda and Mabhena (2013) report of a situation where in one class there are Ndebele, Shona and English L1 learners. Again, the question of a language policy arises. Teachers for ESL classes can be bilingual (Shona/English; Ndebele/English) or multilingual (Shona/Ndebele/English). Books and Examinations can continue to be in English. The use of indigenous languages is to make explanations simpler to the teacher and clearer to the learner.

In response to the question "What has changed to warrant extension of mother tongue to grade seven?" I am arguing that studies have proved that primary school pupils whose L1 is not English are not yet proficient enough to use English as a medium of instruction in class.

Gora (2013) proposes that the Education Act be adhered to as far as the medium of instruction for grades 1 to 3 is concerned. From grade 4 to 7, she suggests that only Mathematics and English should be taught in English. Code-switching to indigenous languages when necessary should be allowed. I do not agree with her because all subjects including Mathematics and English require simpler explanation in indigenous languages. For the rest of the subjects which are Shona/Ndebele, Religious & Moral Education, Social Studies, ES & Physical Education, she suggests that Shona and Ndebele should be used. I think that all subjects should be treated the same, that is, they should be taught in English with legalised code-switching. No subject is more important than the other. Viriri (2002) talks of linguistic hegemony of an indigenous language by another. The researcher concurs with Gotosa et al (2013) that all indigenous languages previously taught up to grade 3, should continue to be taught up to grade 7 in the areas in which they are spoken. If there is a language policy, the government can easily get this implemented.

The researcher concurs with Gotosa, Rwodzi and Mhlanga (2013) that government and policy makers should legalise what is currently happening in classrooms. A multilingual policy that allows all indigenous languages to be used during code-switching by those who can speak those languages should be put in place. English should continue to be the language of instruction. Textbooks and examinations should continue to be in English. Learners whose L1 is not English should not be taught by teachers who do not speak any indigenous language, particularly at lower primary school.

2.12 Problems caused by the use of ESL as a LoLT

Challenges met when trying to use ESL or L2 as a medium of instruction at school have been topics of investigation in many studies (e.g. Okebukola, 2013; Phiri, Kaguda & Mabhena, 2013; Siwela, 2013; Prinsloo, 2012; Johnsen, 2011; Setati, 2011; Madileng, 2007; Nomlomo, 2007; Shizha, 2007; Bennett, 2003). Their findings generally indicate that there are challenges emanating from the use of ESL when teaching science in schools.

ESL primary school pupils who go to school daily are analogous to non-English speaking families which immigrate to countries where English is spoken. English language learners face a plethora of problems as they begin to build new lives in a strange land in the case of the immigrants or as they start schooling in the case of Zimbabwean primary school pupils. The problems stem primarily from linguistic and cultural differences, and they are not the fault of the teachers (Miller & Endo, 2004). It is important that teachers understand these problems so

that they can provide these students with the help they need.

Where ESL is used as a medium of instruction, learners face problems because their task is three-fold. First, the pupils have to make sense of the instructional tasks, which are presented in a second language. Secondly, they have to attain a certain level of linguistic proficiency that can enable them to achieve the intended learning objectives. Finally, the learners are faced with the problem of mastering the content itself (Phiri, Kaguda & Mabhena, 2013). If the learners' mother tongue is used as the medium of instruction in ES lessons, then the problem of comprehending or interpreting the tasks is out. Again, becoming proficient in English will not be necessary for pupils to learn ES. The only problem left will be that of learning the ES content.

2.12.1 Language shock

Miller and Endo (2004:787) identify the most common phenomenon that language learners experience when adjusting to their new environment as 'language shock'. This term refers to the anxiety learners experience when first entering an educational institution in which the language of communication used is not familiar to them. It usually happens in schools where learners may struggle to understand the language that is used as the LoLT in and outside their classrooms. This feeling of anxiety may be aggravated by the ignorance of other learners and some teachers. Some learners have been mocked by their peers because of the way they speak English. In some cases teachers allowed their learners to communicate in their local languages (Miller & Endo, 2004:787). This aggravates the anxiety of some children who may not be proficient in that local language.

The anxiety created by language shock results in greater difficulty in performing well academically, especially when trying to learn the new language. This also applies to children trying to learn science. Stephen Krashen's affective filter theory becomes applicable, that is, when a learner experiences high stress, the affective filter is switched on, and the learner will have difficulty in acquiring the new language. When the affective filter is down, language acquisition occurs more efficiently and quickly. Lack of motivation and self-esteem are also factors that trigger the affective filter and so prevent students from learning their new language. Therefore, teachers need to provide an environment that reduces stress and anxiety. Teachers should also refrain from throwing their ESL learners into the deep end. They should treat these learners as beginners. Sometimes teachers talk to the ESL learners as if they are speaking to English L1 learners. At times, their demands are not commensurate with the level of these

beginners. Books and texts should be carefully selected to suit their level. Work that is too demanding can also trigger the affective filter, and so should be avoided.

I have observed teachers who take the lead in laughing at learners because they have failed to do this and that. This triggers the affective filter, which demotivates and prevents pupils from learning ESL or ES or both. Teachers should discourage pupils from mocking and laughing at their peers when they speak in broken English, mispronounce English words or give a wild answer when asked a question in ES.

2.12.2 Dilemma between home language and LoLT

Some learners are sitting on the horns of dilemma. At home they are expected to speak their first language but at school they are being pressurised to speak in English. In Zimbabwe, most family members know some English. If pupils bring homework from school, they need the support of family members. They should also be afforded the time to study at home. Parents can also assist by buying their children some English supplementary books to read at home. The few who have television sets and radios should make sure that their children utilise them effectively by tuning in to educational channels. They can also just tune in and listen to English news bulletins or any English programmes and report what they have heard to their family members. This way, English ceases to be a language of the classroom only. It becomes demystified. In my lecturing career, I have come across a primary school that punishes pupils for speaking in Shona when they are within the school premises. Every pupil is expected to speak in English.

2.12.3 Embrace own culture

New language learners are likely to be more successful if they are encouraged to embrace their own culture as they learn the new language. They should be encouraged to add to their existing language and culture, rather than to exchange their own for the new one (Mushi, 2001; Olsen, 2000). When pupils learn science through ESL in Zimbabwe, their teachers should draw on their learners' experiences and encourage them to embrace their own culture. For instance, when they are teaching about organisms their examples should be drawn from the flora and fauna of the learners' local environment. Those from other environs may also be included. Teachers need to remember the old adage used to introduce principles of teaching, which says we teach from known to unknown, from simple to complex and from concrete to abstract. We find 'the known', 'the simple' and 'the concrete' in the child's culture. Armed with their

culture, the Zimbabwean Primary School pupil can now invade other ‘unknown’, ‘complex’ and ‘abstract’ cultures, starting with the English one.

2.12.4 Eurocentric curriculum and pedagogy

Another challenge that many immigrant children face is understanding the curriculum and pedagogy used in America’s schools. The curriculum is largely Eurocentric. The immigrant pupils are not accustomed to it and they find it lacking an appreciation of other cultures. Here in Zimbabwe the African pupils find the English culture lacking an appreciation of their culture. No two cultures are the same. Understanding the differences may seem obvious but appreciating the nuances may need an expert.

2.12.5 Cognitive load

The cognitive load theory was developed in 1998 by John Sweller, and the School of Education at New South Wales University released a paper in August 2017 that carefully examined the theory (Heick, 2017:1). The paper explains that: “Cognitive load theory is based on the fact that the human brain processes and stores information. The human memory can be divided into working memory and long-term memory. Information is stored in the long-term memory in the form of schemas and that processing new information results in ‘cognitive load’ on working memory which can affect learning outcomes,” (ibid).

In other words, the Cognitive load theory maintains that, because short-term memory is limited, learning experiences should be designed to reduce working memory ‘load’ in order to promote schema acquisition (Heick, 2017:1). Use of short-term memory and use of working memory cannot be done at the same time. For instance, supposing a teacher asks learners to critically examine various named systems, which require higher-order thinking, while also defining and ‘making sense of’ what the ‘named system’ is and how it works, the teacher would be overloading the learners’ short-term memory. This is so because the learners do not yet ‘understand’ the named systems. It means the learners would need to consistently access their short-term memory while processing – while ‘learning.’ The concept of ‘the named systems’ is not yet in their long-term memory. So, as they ‘create knowledge,’ that is, moving new information into existing or emerging schema, their short-term memory becomes overwhelmed because it is the primary ‘ground zero’ for the learning. For the learners to learn under such circumstances, they would be fighting an up-hill battle. That explains the cognitive load theory (Heick, 2017:1).

Definition of Cognitive load theory

Sweller, (1988:257) defined his cognitive load theory as a theory that offers guidance that is meant to help in the presentation of information in a way that enhances pupil activities that increase academic achievement. This theory asserts that working memory has a limited capacity that includes partly self-determining factors to deal with auditory/verbal material and visual/2- or 3-dimensional information as well as an efficiently long-term memory that is not limited, keeping schemas that vary in their degree of mechanisation. For instructional activities are enhanced when the working memory load is reduced and schema construction is encouraged.

According to Sweller (2011:37-76), cognitive load theory employs evolutionary theory to make human cognitive architecture and use it to develop new instructional actions. The theory asserts that information can be separated into biologically primary knowledge that we have evolved to acquire and biologically secondary knowledge that is important for cultural activities. Secondary knowledge, unlike primary knowledge, is the subject of instruction. It is processed in a way that is comparable to the manner in which biological evolution processes information. When dealing with secondary knowledge, human mental processes require a very large information store, the contents of which are required largely by obtaining information from other information stores.

Baddeley (1992:281) defines working memory as the system for short-term maintenance and processing of information, that is needed for the performance of complex cognitive activities such as comprehension, learning and reasoning.

Depending on the prevailing circumstances, pupils can find learning varying between being very easy to being very hard (Sweller, 1994:295). In one instance, some pupils were asked to describe their experience with the dentist when the majority of them had never been to a dentist. When lack of the necessary background knowledge that is needed to do an assignment or to learn new information is added to language difficulties, learners experience a heavy 'cognitive load.' which is usually lightened if the learners are at least able to draw on their own experiences and knowledge. For instance, during ES lessons, the teacher and pupils should be encouraged to include traditional dishes when they give examples of proteins, carbohydrates, foods rich in starch, fats, etc. Other examples might comprise the following: traditional medicines and herbs, flora and fauna from the learners' environment, shelter and habitats,

agricultural products and food preservation methods, reproduction and contraception, issues of conservation (e.g. through taboos and totems), beliefs, norms and values. Inappropriate instructional designs can impose a heavy extraneous cognitive load that inhibits learning. Learning becomes very difficult if cognitive load is high (Sweller, 1994:308).

The Cognitive Load Theory (CLT) is a theory that explains how the cognitive load produced by learning tasks can inhibit learners' ability to process new information and to create long-term memories. There are three types of cognitive load, namely: intrinsic cognitive load, extraneous cognitive load and germane cognitive load (Heick, 2017:01). Intrinsic cognitive load is difficult to eliminate because there will always be difficult concepts to teach in science. However, the teacher can reduce it by breaking it down into smaller, simpler steps that are easier for pupils to tackle.

Extraneous cognitive load is created by difficulties imposed on the learners by the teacher. Pupils can have difficulties in following the teacher's instructions. They should be simple, clear and straight forward for all pupils to follow. Lack of proficiency in the LoLT can also contribute to the creation of an extraneous cognitive load. Instructions in ESL should be explained to make sure all pupils are aware of the tasks to be done. If there is need, the teachers can also code-switch to the pupils' indigenous language to make sure that all the pupils have understood what is expected of them. Use of ineffective teaching methods can also cause pupils to face challenges. Some concepts are better explained when illustrated with a diagram as opposed to a verbal narration only. Other concepts are easier to comprehend when demonstrated visually using models or video illustrations, e.g. eclipse of the sun or moon.

Germane cognitive load is produced by the building of schemas. Schemas are what permit us to treat multiple elements as a single element. They are the cognitive structures that make up the knowledge base (Sweller, 1988:260). Schemas are acquired over a life time of learning, and may have other schemas within themselves. The difference between an expert and a novice is that a novice has not acquired the schemas of an expert. Learning requires a change in the schematic structures of long-term memory and is confirmed by performance that progresses from awkward, error-prone, sluggish and hard to smooth and effortless. This change occurs because as the novice becomes increasingly familiar with the material, the cognitive characteristics associated with the material are altered so that it can be handled more efficiently by working memory. From an instructional perspective, information in instructional material must first be processed by working memory. For schema acquisition to occur, lesson delivery should be designed to lessen the working memory load. Cognitive load theory is concerned

with techniques for reducing working memory load in order to ease the changes in long-term memory associated with schema acquisition (Sweller, 1988:261).

Germane load is advantageous because it assists in learning new skills and other information. A memory schema is a conceptualisation of a particular idea or object that tells us what to expect when we encounter it in future. We hold schemas for people, objects, events, roles, etc. The first time we experience something new can be frightening, as we do not have a schema that tells us what to expect, thereby producing a germane cognitive load. An example is boarding an aeroplane for the first time. The first experience helps us to anticipate and understand it in future.

Application of the cognitive load theory (CLT)

CLT has many implications in the design and production of learning materials which must, if they are to be effective, keep the cognitive load of the learners at a minimum during the learning process (Sweller, 1999:1). Teachers can apply the CLT to help pupils learn ES more effectively. By simplifying concepts, providing individual, easy to understand explanations and removing superfluous details, they can reduce extraneous cognitive load to make their ES lessons very effective and enjoyable.

2.12.6 Cultural load

- **Definition of cultural load**

Culture is the characteristics and knowledge of a particular group of people, encompassing language, religion, social habits, cuisine, music and arts (Zimmermann, 2017:1). Culture can also be defined as a shared set of meanings, or a cognitive map of meanings (Spradley, 1980:5). The cultural knowledge that any group of people have is their knowledge of that map. The group's culture influences the behaviour of its members (Berry, 2000; Matsumoto, 2001:4).

'Cultural load' refers to the way cultures and languages are related and the amount of indigenous knowledge that is required to make sense of anything or participate in an activity. Meanings of words are culturally-based, i.e. they are determined by the uses of the words within linguistic and cultural settings. They differ from culture to culture. In a class of more than forty pupils, there are likely to be some cultural differences even though the pupils may

speak the same indigenous language. For some, what the teacher considers as his or her pupils' first language may not be their first language. This is common in towns and cities.

Another pedagogical problem that many students face is 'cultural load'. Lightening the 'cultural load' on students can make learning more enjoyable for them (Meyer, 2000:789). Meyer suggests that this can be done by treating these ESL learners, their homes and communities, and their indigenous languages and cultures with respect. He advises that learners should not be judged. The teacher can begin by building personal relationships with the learners and their families and by making an effort to include aspects of each child's culture in the classroom on a regular basis. The teacher should also learn to pronounce each learner's name correctly, finding out where each learner comes from, and gathering a little background information about each one. The teacher should also learn to accept different ways of speaking English. It is also crucial to know the culture of the learners one is teaching, including what is taboo and what is not.

2.12.7 Language load

The Howard Research and Management Consulting Inc. (2009:16) observes that L1 English-speakers sometimes face considerable challenges in learning the scientific vocabulary. This problem becomes exacerbated in learners whose L1 is not English. When the teacher talks in class, his speech may be full of words that are new to ESL learners. This can put a great deal of pressure on learners as they try to comprehend what the teacher is saying or what they are reading. To reduce this heavy 'language load' for the learner, teachers can utilise a number of strategies such as rewriting difficult passages using simpler words or explaining the original language in simple terms; rewriting complex sentences into smaller simpler sentences; and identifying very difficult words, define them, and explain how they are used. The teacher should make an effort to select words and sentence structures that will help the student learn rather than inhibit their performance in the classroom. The teacher must be careful not to trigger the affective filter. Visual aids can also be used to underpin what is said. Examples of organisms, materials, artifacts and so on, should not be alien to the learners. If they are, they need to be explained fully with the aid of media.

2.12.8 Indigenous languages versus English

The issue of whether language learners should be allowed to use their indigenous language while learning English or not is a contemporary one (Miller & Endo, 2000). Some studies that

have been conducted reveal that there are benefits to students in continuing to use their indigenous languages both in the classroom and at home (Lindholm & Adan, 1991; Cazden & Snow, 1990; Chou, 2001; Duran, 1983; Bankston & Zhou, 1995;). Findings of these studies reveal that ESL learners who maintain their L1 as they learn English have acquired an important acquisition of being bilingual. It is also believed that learners who continue to use their L1 have greater opportunities of becoming proficient in English. Bilingual speakers have been found to have a lower dropout rate than monolingual speakers of English (Miller & Endo, 2004:789). Therefore, teachers and parents are urged to encourage ESL pupils to continue using their indigenous languages both at home and at school.

2.12.9 Language of Science

Wellington and Osborne (2001:1) observe that learning the language of science is an important aspect of science education and that in every science lesson delivered by the teacher, language is taught. The two authors go on to explain that one of the biggest problems met by pupils learning science is learning the language of science (p. 9). This problem of learning the language of science is experienced by both learners whose L1 is English as well as those whose L1 is not English. Generally, L1 English-speakers face substantial challenges in learning the scientific vocabulary. This problem is aggravated in learners who speak English as a second language. The use of the first language in teaching the English second language learners has proved to be a key way out to this challenge (Carrier (2005).

Learners in Tanzanian secondary schools have been observed to lack enough proficiency in English to enable themselves to use it as a LoLT at school, but they are practically good at written communication in Kiswahili, an L1 for the majority of the learners. To go round this problem, most teachers code – switch from English to the learners’ L1. If the teachers teach in English only, “it is like teaching dead stones,” says one of the teachers. In Tanzania, lack of proficiency in the English language is also observed at university level (Pitman, Majhanovich & Brock – Utne, 2010: 5). If secondary school and university learners lack proficiency in the English medium of instruction, what should one expect from primary school pupils whose L1 is not English? Language is the major barrier in learning science to most learners (Wellington & Osborne, 2001:

2.13 Summary

In this study, I am investigating problems that arise as a result of the use of ESL in learning ES in Zimbabwean primary schools. In this chapter, I explained the theoretical framework that informs this study. I chose the phenomenological case study research design because it is the most suitable one that answers my research questions. This study is also influenced by the Second Language Acquisition (SLA) Theory which proposes that there are five major stages through which a human being passes during a second language acquisition. Haynes (2015) and Oliveri (2015) observe that learning to speak and write in one's mother tongue is often challenging, let alone acquiring the same skills in a second language. There are several factors that can militate against the smooth acquisition of a second language.

Vygotsky's theories also played a major role in informing my study. Through his ZPD, learners can only complete certain tasks, such as acquisition of L2 and grasping of ES concepts, after having been assisted by teachers, parents, siblings and more competent peers or adults. The learners develop meaning with the assistance of teachers, more capable peers and so on. Language is the mediator of this shared discourse. Vygotsky (1962) maintains that it is impossible to separate language and thought. He sees the major characteristics of human learning as a semiotic process, which is a process of making meaning. Wherever language is being used, there is semiotic mediation going on. We owe the concept of semiotic mediation to Vygotsky and his colleagues.

The concept of code-switching was also discussed in this chapter. Code-switching can be defined as a phenomenon in which speakers alternate between two or more languages in one conversation. It facilitates communication and understanding between the speakers. In class, code-switching is influenced by several factors such as the learners' language deficiency. It is useful when learners fail to understand what the teacher is saying in a lesson. Researchers agree that code-switching has important functions inside and outside the classroom. Through it, motivation can be improved. However, some people argue that code-switching is time consuming and that learners end up lacking proficiency in both their L1 and L2.

Issues of language policy in Zimbabwe and elsewhere were also discussed. Prinsloo (2012: 26) gives a summary of the main aims of a national language policy. Some of these aims are to: enhance full participation in national issues through equal access to education; develop all the national official languages; support the teaching and learning of all languages used at school, religious activities, international trade and communication and sign language; redress disadvantages emanating from mismatches between the home language and the LoLT; and

develop programmes which redress previously disadvantaged languages. What we need to do is to maintain our local languages but at the same time assist learners to acquire their second language (ibid).

Some studies conducted in Zimbabwe reveal that the country lacks an effective clear, coherent and explicit language policy. Instead, there is an Education Act of 1987 that stipulates that English, a second language to the majority of the learners, should be used as the LoLT from grade 4 upwards. Learners in grade 3 and below should be taught using their mother tongue as the LoLT. That mother-tongue policy was amended to extend the use of the child's mother tongue as the LoLT up to grade 7.

Well documented empirical studies conducted on LoLT in and out of Zimbabwe reveal that the best medium for teaching a learner is his or her mother tongue. These studies also reveal that language is critical in communicating scientific concepts to pupils. However, other studies reveal that stakeholders like teachers, parents and the learners themselves, preferred English as the LoLT in science and other subjects because indigenous languages have no economic benefits locally and abroad. Findings of several studies conducted in Zimbabwe and elsewhere reveal that there are challenges to be encountered when ESL is used as the LoLT science in primary schools.

Studies conducted by Thomas and Collier (2002) showed that learners who were taught using two languages, that is bilingually, performed better than those who were taught using English only, that is monolingually. All African countries are multilingual and independent, but English and other foreign languages such as French and Portuguese remain the only LoLT in schools. The issue of the use of the mother tongue at primary school level has not been successfully implemented in Zimbabwe, hence this study.

Finally, this chapter discusses the possibility of using the mother tongue as a LoLT in class. Advantages of using it as a LoLT are highlighted in previous studies that are reviewed in this chapter. Currently, ESL is the medium of instruction for the majority of our learners. Problems caused by the use of ESL as a LoLT are also highlighted in some studies reviewed in this chapter.

CHAPTER 3

RESEARCH DESIGN AND DATA COLLECTION

3.1 Introduction

Zimbabwe is a multilingual nation with 16 official national languages (Constitution of Zimbabwe Amendment (No. 20) Act 2013:17). The dominant languages are Shona and Ndebele, which are spoken in Mashonaland and Matabeleland respectively (Gotosa, Rwodzi and Mhlanga, 2013; Nhongo, 2013; Shizha, 2012; Makanda, 2011). English, the L1 of a minority of the population of Zimbabwe, is the language of government and commerce. English is also the official LoLT at school from grade 4 upwards according to the Education Act of 1987. But for grades 1 – 3, the pupils' mother tongue is used as the LoLT. Despite the fact that this Act was amended in 2006 to extend the mother tongue policy to grade 7, English continues to be used as the LoLT at all levels of the primary school. That is the observation that I have made from my long experience as a lecturer at a primary school teachers' college.

In Zimbabwe, English is not the L1 for the majority of the learners. In this study, I am arguing that at primary school level, pupils whose L1 is not English have not yet mastered enough English to enable them to use it as the LoLT in ES. So there are bound to be problems as a result of this practice. In this study, I am investigating these problems that arise as a result of the use of ESL as the LoLT in ES lessons at primary school level.

3.2 Paradigm Worldview

A paradigm is a framework of ideas and beliefs through which we interpret the world and interact with it. In other words, it is a wide world perception (Galt, 2009:11). We can also define a paradigm as a basic set of beliefs that guide action (Guba, 1990:17). My worldview is a basic set of beliefs and assumptions that guide my inquiries. These assumptions include ontology and epistemology. Ontology is the nature of reality and epistemology is how we gain knowledge about what we know (Galt, 2009:12).

Ontology

Ontology is the assumption that we make about the kind and nature of reality and what exists (Richards, 2003:1), whereas epistemology is about the assumptions that we make about “the

very bases of knowledge, that is, what it is, how it can be obtained, and how it can be communicated to others” (Cohen, Mannion and Morrison, 2007:7). The kind of epistemological assumptions that we hold about knowledge deeply affects how we go about acquiring knowledge of social aspects. We select the methods that we wish to use in our studies according to our epistemological assumptions.

If knowledge is seen as hard, objective and tangible, it requires the researcher to assume an observer role and apply scientific methods such as testing, measuring, and so on. But if, on the other hand, knowledge is seen as personal, subjective and unique, then it requires the researcher to reject the use of scientific methods and assume a greater involvement with his or her participants (Al-Saadi, 2014).

There are several types of ontologies and epistemologies. For the purposes of this study, I shall focus on only two of the main ones.

Positivism and objectivism

Positivism, which is an epistemological position, stresses on the importance of objectivity and evidence in searching for truth and the world is not affected by the researcher. Also, facts and values are very distinct, making it possible to conduct objective inquiries. Researchers distance themselves from any impact on their research findings. Also, positivist epistemology holds the position that meaning and meaningful realities already exist in objects waiting to be discovered. When we observe objects around us, we are simply discovering meanings which have been there all along. Also, according to the positivist and objectivist paradigm, truth is static and is always objective.

Interpretivism and constructivism

Proponents of interpretivism and constructivism hold the view that there are other ways of knowing about the world other than direct observation, namely, our perceptions and interpretations of the world around us. We use our perceptions to interpret what our senses tell us. As such, knowledge of the world is based on our ‘understanding’ which arises from our reflection on events rather than only on lived experiences (Ormston, Spencer, Barnard & Snape, 2014). In contrast to the positivist and objectivist tradition, interpretivism and constructivism approaches argue that knowledge is produced by exploring and understanding (not discovering) the social world of the people being studied, focusing on their meaning and interpretations. That is, meanings are socially constructed by the social actors in a particular context. In this opposing tradition, researchers construct meanings and interpretations based on those of their

participants. Their research process is inductive, meaning that they aim to generate theories from the data collected, rather than use data to test already existing theories. Another difference between the two approaches is that in interpretivism and constructivism, researchers become personally engaged in the research and, as such, findings are influenced by their perspectives and values. Finally, in interpretivist and constructivist traditions, the methods used in studying the natural sciences are not suitable for the study of the social world and that social reality cannot be captured or portrayed accurately because there are different perceptions and understandings of reality (Bryman, 2008; Cohen et al, 2007; Crotty, 1998; Ormston et al, 2014; Snape & Spencer, 2003).

My epistemological and ontological assumptions

As a proponent of interpretivism and constructivism, I hold the view that there are some other ways of knowing about the world other than by direct observation. These are our perceptions and interpretations of the world around us. People use their perceptions to interpret what their senses tell them. This means that my knowledge of the world is based on my understanding which is based on my reflection on events and also on lived experiences of my participants (Ormston, Spencer, Barnard & Snape, 2014). In contrast to the positivist and objectivist tradition, I believe in interpretivism and constructivism approaches that argue that knowledge is produced by examining or investigating and understanding the social world of my participants, focusing on their meaning and interpretations. In this opposing tradition, I will construct meanings and interpretations based on those of my participants. My research process is inductive. This means that I intend to generate a theory from the data that I will collect, rather than use this data to test an already existing theory. Being a proponent of interpretivism and constructivism, I will become personally engaged in this research. My findings will be influenced by the perspectives and values of my participants. Finally, I believe that the methods that are used in studying the natural sciences are not suitable for my study of the social world because such methods will not give correct results and that social reality cannot be captured accurately because there are different perceptions and understandings of reality (Bryman, 2008; Cohen et al, 2007; Crotty, 1998; Ormston et al, 2014; Snape & Spencer, 2003). Therefore, I shall focus on qualities of entities and on processes and meanings that are not investigated through the use of experiments or examined in terms of quantity, amount, intensity or frequency.

The research method that I intend to use is the phenomenological case study. I will be very close to my participants in their 'natural setting' throughout the long period of my fieldwork.

Time required for data collection, analysis and interpretation is lengthy (Burns, 2000:13). I will utilise a wide range of interconnected methods, hoping to get a better fix on the subject matter at hand (Denzin & Lincoln, 1994:21). This is known as triangulation. The concept of triangulation was taken up by Denzin who distinguished four types of triangulation. The first is data triangulation, which refers to the use of different data sources. I will study spoken and written representations and records of human experience using multiple methods and multiple sources of data. The main ways of collecting data are interview, observation and documents (Punch, 1988:174). In addition to these methods identified by Punch, I shall also add a fourth one, the focus group discussion, to increase the validity and reliability of my results. I shall analyse my data through coding. I will collect open-ended emerging data with the intent of developing themes from the data (Galt, 2009:21). I shall seek answers to questions about how social experience is created and given meaning.

The practices of research that I shall use are as follows: I shall focus on a single phenomenon namely, using ESL to learn ES at primary school level; I shall select participants who have all experienced the phenomenon that I am studying; I shall position myself and collect participant meaning; I shall bring my personal values into my study; I shall collect my data from the 'natural setting' of my participants; I shall validate the accuracy of my findings; I shall interpret my data; I shall corroborate and collaborate with my participants; and finally I shall create an agenda for language policy reform.

My choice of qualitative research was guided by my worldview or paradigm stances, beliefs and assumptions as well as my choice of interpretive theory, framework or lens.

3.3 Research design

A research design represents a sequence of decisions that comprise the strategy explaining how you will conduct your research (Trafford & Leshem, 2008:90). No one type of research methodology is better than another, the design that is selected should be the best one that answers your research questions (Denzin & Lincoln, 1994). My research questions in this study are better addressed by the qualitative research design. That is why I decided to use this research design.

The contrasting schools of thought regarding theory development and knowledge building are deductive (quantitative) and inductive (qualitative) research methods. The former develops theories or hypotheses and then tests out these theories or hypotheses through empirical observation. It is the most widely used research approach in the natural sciences. In the latter,

the researcher develops hypotheses and theories with a view to explaining empirical observations of the real world. These empirical observations can be based on many factors, for instance, personal experience (Crowther & Lauesen, 2017). My experience showed me that what I have observed personally motivates me intrinsically. Researchers can develop their own explanations and theories about what they have observed through their personal experience. Alternatively, theories can be developed to explain observed data and information. Different types of information and data can be used to develop theories in inductive research. This study is one.

The greatest strength of inductive research is its flexibility. It does not require any establishment of a-priori theories or hypotheses. On the contrary, researchers can build their theories based on their observations, thereby allowing a problem or issue to be studied or approached in several possible different ways with alternative explanations of what is going on. Inductive research also enables more flexibility in research design. This includes aspects such as sample size and type of data.

Inductive research begins from a description or observation and then proceeds towards an explanation. In other words, the inductive approach is initially concerned with observations, which then lead to a development of a hypothesis or theories in order to explain those observations. The researcher may then see the need to investigate those issues and/or problems in order to develop theories to first explain the observations, and then maybe solve those issues and/or problems.

The inductive approach is the most suitable approach for the use and interpretation of qualitative data. On the contrary, the deductive approach, with its emphasis on measurement, can only utilise quantitative data. Some problems can neither be solved by the inductive approach nor the deductive approach. They require both qualitative and quantitative aspects. An example of when a combination of inductive and deductive methods may be required is when a researcher begins a research project using inductive methods and approaches by first observing and measuring a phenomenon or problem that he or she wishes to explore. This results in development of theories that he or she tests using deductive methods and approaches.

To realise the objectives of this study, I decided to employ the qualitative research design rather than the quantitative research design because in the former, I am able “to describe the phenomena of interest with great richness, in the original language of the research participants,” (Trochim, 2009:153). In addition to that, I “make knowledge claims based on constructivist and/or advocacy participatory perspectives” (Galt, 2008:20). Also, “researchers tend to keep

field notes as they participate in the fieldwork – often in natural field settings” (Mouton, 2001:107). The qualitative approach is also referred to by a number of terms, namely: naturalistic, constructivist or post positivist approach (Leedy, 1997:104).

Qualitative research is an in-depth exploration of what people think, feel or do and, crucially why? If you want to know why certain people behave as they do and what barriers there may be to their changing that behaviour, you would use qualitative research to explore those issues. It’s about getting people to talk about their opinions so you can understand their motivations and feelings. It’s about getting people to expand on their answers so that you can get more insight into their attitudes and behaviour. It’s all about getting underneath people’s responses to find out what is driving their decisions (Mooney, 2014).

This type of research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. It means that these researchers study things in their natural settings, attempting to make sense of or interpret these things in terms of the meanings people bring to them. The research involves the studied use and collection of a variety of empirical materials – case study, personal experience, introspection, life story, interview, and observational, historical, interactional and visual texts – which describe routine and problematic moments and meanings in individuals’ lives (Denzin & Ryan, 2007:580). Its methods are interpretative and aim to provide a depth of understanding. It is also characterised by its aims, which relate to understanding some aspects of social life, and its methods which (in general) generate words, rather than numbers, as data for analysis (Bricki & Green, 2007:2).

Qualitative research methods provide rich data about real life people and situations and are more able to investigate behaviour and to understand it within its wider context (De Vaus, 2002:5). Qualitative data collection methods emerged after it had been realised that traditional quantitative data collection methods were unable to express human feelings and emotions (William, 2005:85). Also, quantitative researchers are not able to capture the subject’s perspective because they have to rely on “more remote, inferential empirical methods and materials” (Denzin & Lincoln, 2011:9). If you want to get inside your customers’ minds, you need to do qualitative research (Mooney, 2014). The most popular qualitative research methods include interviews, case study, focus groups and questionnaires with open-ended questions (Yamagata-Lynch, 2010). However, qualitative research is often criticized for lacking generalisability, being too reliant on the subjective interpretations of researchers and being incapable of replication by subsequent researchers” (De Vaus, 2002:5).

As a result of choosing this type of paradigm, my study will develop and construct theory. I will use an inductive approach to research. “An inductive approach to research uses various forms of interpretative analysis of meaning-making to arrive at non-generalisable conclusions (Traffold & Leshem, 2008:98). My reasons for using the inductive approach were to: condense the extensive and varied raw data that I collected through observations, interviews, focus group discussions and document analysis, into a brief summary format; establish clear links between the research objectives and the summary findings derived from the raw data; and develop a model or theory about the underlying structure of experiences or processes which are evident in the text (raw data) (Thomas, 2003:2).

The theoretical framework influencing this study is the phenomenological case study “that attempts to understand participants’ perspectives and views of social realities” (Leedy, 1997:161). Its purpose is “to understand what a specific experience is like by describing it as it is found in concrete situations and as it appears to the people who are living it” (ibid). In this case, ‘the people who are living it’ are the Zimbabwean primary school pupils and their teachers. Phenomenology is sometimes considered a philosophical perspective as well as an approach to qualitative methodology. It is a school of thought that emphasises a focus on people’s subjective experiences and interpretations of the world. That is, the phenomenologist wants to understand how the world appears to others (Trochim, 2009:159).

3.4 Pilot study

As soon as I received my research clearance certificate from the University of South Africa, authorising me to start doing my fieldwork, I immediately applied to the Ministry of Primary and Secondary Education for permission to go into some four schools in Masvingo Province to collect data for my research. I collected data for my study from three schools and I used the fourth school for my pilot study. When permission was granted, I went to my pilot school to test my research instruments as well as to rehearse my whole process of data collection. Interview schedules need to be piloted (Breakwell, Smith and Wright, 2012:375). Although my in-depth interviews were unstructured, I still proceeded to test a number of things. It is also important to note that piloting is just as important for unstructured interviews as it is for structured interviews (ibid p.376).

In my first stage of piloting, I tested whether my explanation for the interview was understood by a small sample drawn from the same population as teachers and pupils I intended to interview. To ascertain whether they had understood I asked that pilot sample to explain the

interview back to me in their own words. I discovered that they could hardly do so in English. So I asked them to do it in a language of their choice. Their faces brightened. Suddenly all of them raised up their hands to indicate that they wanted to talk and I said to myself, “So English was the stumbling block!” They gave correct explanations in English mixed with Shona, that is code-switching from English to Shona. Getting the explanation for the interview right is fundamentally important. Not only will it influence the data you get from the interviewees, but it is very likely going to have a big impact on whether the teachers and pupils are willing to be interviewed at all (Breakwell, Smith & Wright, 2012:375).

The most important explanations that I wanted to get from that pilot sample concerned the following: significance of the research, significance of the particular individual’s participation in the study, confidentiality of all data and the possibility of withdrawing from the interview whenever any participant decided to do so. What I discovered was that I had to be very careful with my use of English. It was very necessary for me to explain again in Shona. I also needed to allow the interviewees to respond in Shona whenever they could not express themselves in English.

I also used the same pilot sample to test comprehension of all the questions that I intended to ask when collecting data during in-depth interviews and FGDs. I amended the introduction and a few questions. Surprisingly, researchers often go through the motions of piloting and then ignore what they find (Breakwell, Smith & Wright, 2012:376). I retested the revised explanation and all questions for comprehension using a different sub-sample of teachers and pupils at the pilot school. I was satisfied that everything was in order.

I used the revised interview schedule to establish whether the answers given by the interviewees were the ones that interested me. I was happy to see that I was getting data that was genuine. However, I did not make use of that data for my data analysis.

I also observed ES lessons in progress and video-taped the several lessons using the equipment that I was going to use in my main study. I was rewarded by those rehearsals. I discovered that my video camera batteries got exhausted in the middle of a thirty-minute lesson. So I needed to pack spare batteries so that I would not be stranded in the middle of a lesson. I also played back the tapes. I also discovered that if I positioned myself right at the back of the classroom, I would not be able to hear clearly what the teacher and those pupils seated in front were saying. So I changed my position to a point that was more or less central so that I could hear all the speakers during the lesson. To get good pictures I discovered that I needed to position myself with my back at the very large windows as opposed to facing them because a lot of light was

getting in through them. Also I found out that dark rooms produced poor pictures. So I asked teachers to switch on their lights wherever they were available.

3.5 Research method

The general purpose in qualitative research is to understand and interpret phenomena as they occur in natural settings. Researchers who use qualitative methods generally spend time in the field observing, talking to people, and analysing artefacts and products of the setting under study. Researchers seek to make meaning from the information gathered from these multiple sources, but the purpose is simply to understand the setting, not to generalise findings beyond it. Thus in a qualitative study, those who are studied are chosen purposively rather than randomly” (Hendricks, 2006:2-3). In this study, I selected my samples purposively.

Richards (2015:1) gives the conceptual analysis of qualitative methods as “ways of studying people and their social worlds by going there, observing them closely, in their natural setting, and learning how they understand their situations and account for their behaviour.” She goes on to explain that there are many, very different, qualitative research methods, but all attempt understanding of individuals or small numbers of cases.

Fieldwork formed the basis of data collection methods in this study. Field research can also be considered as either a broad approach to qualitative research or a method of gathering qualitative data. The essential idea is that I go into the field to observe the phenomenon in its natural state or in situ and typically take extensive field notes that are subsequently coded and analyzed (Trochim, 2009:160). “It allows the researcher to engage in informal conversation with the participants and to observe and understand the phenomenon as it is experienced by them,” (Leedy, 1997:158).

Analysis aims to generate new accounts or explanations out of this rich data, rather than test existing theories. I should be trying to test something new, rather than testing something that is known.

3.6 Obtaining permission to conduct research

I wrote a letter to the Secretary in the Ministry of Primary and Secondary Education in Harare, to request for permission to conduct this research in four primary schools in Masvingo (see Appendix 1). Permission was granted unreservedly on the same day (See Appendix 2). I was directed to take the positive response from the Head Office in Harare to the Provincial

Education Director (PED) in Masvingo to request for permission to conduct my research in schools under their jurisdiction. Permission was also granted unreservedly by the PED (see Appendix 3). Armed with these two letters, I was instructed to visit the District Education Officer (DEO) to get clearance before I went into the schools. Permission was granted unreservedly too. The DEO stamped and signed the letter from the PED to show that permission had been granted by his office (See Appendix 3). Finally, I wrote other letters addressed to the school heads to seek permission to conduct research in their schools (see Appendix 4). I presented all the letters from Head Office and the Provincial Offices to the school heads. Again, permission was unreservedly granted.

3.7 Sample size

A total of 12 teachers and 12 learners (three from each of the following grades: 4, 5, 6 and 7) were selected purposively. The 12 teachers were the selected teachers who taught grades 4 to 7 at the selected schools. All the classes that participated in this study were all manned by experienced teachers and student teachers who were doing their teaching practice. Only experienced teachers participated in the study. The student teachers were just observers. They were neither observed teaching nor were they involved in the interviews and focus group discussions. Twelve parents who were the parents of the selected learners from the 3 selected schools where the study was conducted only participated by signing consent forms for their children who were participating in the study. These parents also did not participate in the interviews and focus group discussions. The pilot study was done at the 4th school.

3.8 Selection of participants

The standard used in choosing participants and sites is whether they are “information rich” (Patton, 1990:169). The selection criteria for the three schools were as follows:

- A rural primary school with a minimum enrolment of 500 learners;
- An urban high density primary school with a minimum enrolment of 500 learners; and
- An urban low density primary school with a minimum enrolment of 500 learners.

Although I had spent two weeks, getting to know the participants, it was not possible for me to identify “information-rich cases that manifest the phenomenon intensely, but not extremely, such as good students,” (Patton, 2002:234). Therefore I had to rely on administrators to select

information-rich teachers and teachers to select information-rich pupils. I requested school heads to assist by identifying competent teachers, i.e. teachers with the following attributes:

- They made the most of all teachable moments and made learning fun and relevant for all learners;
- They had full knowledge of what they taught, and were articulate and communicated well;
- They worked with minimum supervision and did their best in everything they did.

I requested selected teachers to assist by identifying clever pupils in their classes since I was not able to identify them. Clever pupils were defined as those with the following attributes:

- Those who could readily give information when asked to do so and were not shy; and
- Those who were intelligent or quick to learn, understand and devise or apply ideas.

3.9 Gaining access

Obtaining access to my research field was not a problem to me. I attributed that to the fact that I was able to explain to the participants what I wanted to do, how I wanted to do it, and crucially why I wanted to do it. I had the necessary documents to that effect. I presented the participant information sheet (see Appendix 5) to the participants. That participant information sheet summarized who I was, the purpose of my study, why that particular participant was being invited to participate and the nature of their participation in this study. I also explained that participation was voluntary and that they were under no obligation to consent to participation. Participants were free to withdraw at any time and without giving a reason. The issues of confidentiality and anonymity were also spelt out. Participants were given a letter requesting them to participate in an interview (See Appendix 6). They were also asked to complete a 'Consent to participate in this study form' (Return slip) (See Appendix 7) if they were willing to take part as participants. Every parent of a participating pupil was given a letter requesting parental consent for primary school pupils to participate in a research project (See Appendix 8). Each of those learners who were participating also received a letter requesting assent from learners in a primary school to participate in a research project (See Appendix 9).

Each of the school heads of the selected schools received a participant information sheet and another letter that invited them to participate in this study even though they were not going to be observed teaching. They were also not going to be interviewed. I felt that it was prudent for

them to know what was happening in their schools and to judge for themselves if the methods I was using in my data collection were ethically acceptable.

At the rural school, the responsibility of introducing me to the participants of this study was that of the school head. At the two urban schools that responsibility was delegated to the deputy heads, who organised everything for me and introduced me to the participants. They actually took me to meet the selected teachers and pupils in their classrooms. I explained what my research was all about and what the participants were expected to do. All the classes that I visited were manned by student teachers and experienced teachers. The experienced teachers were the class teachers as well as the mentors of those student teachers. Only the class teachers were requested to participate in my study. I gave the participant information sheet (See Appendix 5) to all the administrators and the participants. I also gave them letters requesting adults to participate in interviews as well as the consent to participate in this study (return slip) which they signed and returned. The student teachers were just observers.

I spent two weeks getting to know the teachers and their learners before data collection began. I did that in order to reduce Hawthorne effect. Hawthorne effect, also known as observer effect, is the tendency of participants to change their behaviour when they are aware that they are being observed. The longer the observer stays on site, the more natural the participant behaves and the less the Hawthorne effect (Cherry, 2010:15).

3.10 The Hawthorne effect

Cherry (2018:1) explains that the Hawthorne effect, is the tendency of some people to change their behaviour when they are aware that they are being observed by researchers rather than because of any manipulation of independent variables. According to Cohen, Manion and Morrison (2011:186), Hawthorne Effects threaten to contaminate research treatments in educational research when subjects realize their role as guinea pigs. The presence of the researcher alters the situation as participants may wish to avoid, impress, direct, deny or influence the researcher (ibid p. 246).

The Hawthorne effect was first described in the 1950s by Henry A. Landsberger during his analysis of experiments conducted during the 1920s and 1930s. The term ‘Hawthorne’ was derived from the name of the place where the experiments were conducted in Illinois. The Western Electric’s Hawthorne Works electric company that was situated just outside Hawthorne conducted research to determine whether there was a relationship between productivity and working conditions. The original purpose of the Hawthorne studies was to

examine how different aspects of the work environment, such as lighting, the timing of breaks and the length of the workday, had on worker productivity.

In the Western Electric Hawthorne Works electric company's most famous experiment, the focus of their study was to determine whether increasing or decreasing the amount of light that workers received would have an effect on how productive workers were during their shifts. The researchers observed that productivity seemed to increase as a result of the changes, but what was surprising was that productivity decreased once the experiment was over (Cherry, 2018:1). The researchers also observed that almost any change to the experimental conditions led to increases in productivity. When illumination was reduced to the levels of candlelight, production still increased. Production still improved even when breaks were eliminated entirely and the workday was lengthened. Those results were surprising. The researchers concluded that workers were actually responding to the increased attention from their supervisors. Researchers suggested that productivity increased due to attention and not because of the changes in the experimental variables. Landsberger defined the Hawthorne effect as a short-term improvement in performance caused by observing workers.

To counter the Hawthorne effect in this study, I followed the advice given by Cohen, Manion and Morrison, (2011:246) as follows: "Typically the problem of reactivity is addressed by careful negotiation in the field, remaining in the field for a considerable time, ensuring as far as possible a careful presentation of the researcher's self."

3.11 Data collection methods

3.11.1 Direct observation

Observation is the process of gathering open-ended, firsthand information by observing people and places at a research site (Creswell, 2007:236). In this study, I was a direct observer. My observation was non-participant. A nonparticipant observer is an observer who visits a site and records notes without becoming involved in the activities of the participants (Creswell, 2007:238). The nonparticipant observer is an "outsider" who sits on the periphery or some advantageous place (e.g. the back of the classroom) to watch and record the phenomenon under study (ibid).

I observed how the research participants interacted during ES lessons in class and how they attached meanings or interpreted their ways of interaction. I observed ES lessons delivered by grades 4 to 7 teachers teaching ESL learners at purposively selected schools. The normal

timetable of each class was adhered to as much as possible. The venues of the lessons were the usual learners' classrooms, that is the participants were in their "natural setting". I also observed learners outside the classroom. These observations were conducted from the second term of 2016 up to the second term of 2017. During my direct observation of the lessons, I tried to be as unobtrusive as possible so as not to bias my observations. My observations were overt and not covert. This means that my observations were open to view. I did not attempt to conceal them. Scholars and researchers possess a variety of opinions, ranging from utter opposition to complete acceptance, about whether it is ethical to conduct covert observations (Patton,2002). Professional associations and institutional review boards are cautious and skeptical about approving covert observations (Creswell, 2007:254). I recorded the data through a video camera and some field notes.

Observation instruments designed by other researchers for this purpose were not used because "no existing coding scheme does the job that you want it to" (Robson, 1993:210). Coding schemes contain predetermined categories for recording what is observed (Siwela 2013:26). In addition to direct observation of ES lessons, I also employed the following methods: in-depth interviews, focus group discussions (FGDs) and document analysis. According to Mooney (2014) the most commonly used qualitative approaches are focus groups and in-depth interviews. Mooney also believes that face-to-face interviews and group discussions are the best way to get this kind of in-depth feedback. Yin (2014) concurs with Mooney when he emphasises the fact that interviews are the most important sources of data collection. Very useful data was obtained in this study through the use of in-depth interviews.

3.11.2 In-depth interviews

Equally popular to observation in qualitative research is interviewing. Rubin and Rubin (2012:29) outline interviews as "in-depth qualitative interviewing," which is characterised by three features namely: (1). Interviews look for "rich and detailed information , not for yes-or-no, agree-or-disagree responses." (2). Instead of giving question categories, questions are open-ended. (3). Questions and their order are not fixed: they can be adapted to the flow of the interview conversation. A qualitative interview occurs when researchers ask one or more participants general, open-ended questions and record their answers (Creswell, 2007:240). In-depth interviews differ from direct observation primarily in the nature of the interaction. In interviews, it is assumed that there is a questioner and one or more interviewees. The purpose of the interview is to probe the ideas of the interviewees about the phenomenon of interest

(Trochim, 2009:159). In this study, I was the interviewer and the interviewees were the teachers and their learners and the phenomenon of interest was the use of ESL in learning Environmental Science at primary school level in Zimbabwe.

I interviewed 12 teachers and 12 learners. All the interviews were face-to-face and unstructured. The unstructured interview is a powerful research tool that is widely used in social research and other fields. It is capable of producing rich and valuable data (Punch, 2005:172). Unstructured interviewing involves direct interaction between the researcher and a respondent or group (Trochim, 2009:161). It differs from the traditional structured interviewing in several important ways:

- i. Although the researcher may have some initial guiding questions or core concepts to ask about, **there is no formal structured instrument or protocol.**
- ii. The interviewer is free to move the conversation in any direction of interest that may arise.

Consequently, unstructured interviewing is particularly useful for exploring a topic broadly. Trochim (2009:161) observes that unstructured interviewing may very well be the most common form of data collection of all. Punch (2005:172) also observes that there is a wide range of unstructured interviews which include the traditional type of unstructured interview which is the non-standardised, open-ended, in-depth interview, that is sometimes known as the ethnographic interview. Punch explains that unstructured interviewing is used as a way of understanding the complex behaviour of people without imposing any a priori categorisation which might limit the field of inquiry. Fontana and Frey (1994:172) identifies seven aspects of unstructured interviewing as follows:

- Accessing the setting;
- Understanding the language and culture of the respondents;
- Deciding on how to present oneself;
- Locating an informant;
- Gaining trust;
- Establishing rapport; and
- Collecting the empirical materials.

How each aspect is handled will depend on the nature of the situation and the respondents.

These interviews included both individual interviews, that is one-on-one, as well as group interviews that included FGDs. The data was recorded through video-recording and written field notes.

Each time the interviews were held, introduction of all the participants was done first, then I explained why the interview was being conducted. I established good rapport with the participants. Confidentiality forms were signed by me and the participants. Easy questions were asked at the beginning of each interview and more difficult questions followed as the interview progressed. We agreed on when to meet next. I thanked the participants at the end of each interview. In the next interview, I asked more open-ended questions. A total of 12 in-depth interviews were held.

3.11.3 Focus group discussion (FGD)

There are several types of group interview, which are also known as focus group discussions (FGDs). These FGDs can be unstructured, semi-structured or highly structured. Because different types of group interviews have different purposes, which type should be used in a particular research situation depends on the context and research purposes (Punch, 2005:171). In this study I used the semi-structured FGDs.

The FGD method is a way of collecting qualitative data, which usually involves engaging a small number of participants in an informal group discussion (or discussions), ‘focused’ around a particular topic or set of issues. The discussions will be based on a series of questions (the FGD schedule), and the researcher will act as a ‘moderator’ for the group: posing questions, keeping the discussions flowing, and enabling the group members to participate fully (Silverman, 2011:168-9). In other words, the moderator assumes the role of a facilitator during the group discussions. FGDs normally comprise 5 to 8 participants brought together to discuss a number of topics, guided by a moderator. The dynamics of the interaction between participants is an important feature of an FGD (Mooney, 2014). The proceedings are video-recorded and transcribed. I coded and analysed the video transcriptions during the focus group discussions. I was the moderator and grades 4 to 7 teachers and their pupils were the participants. The role of the researcher changes in a group interview, functioning more as a moderator or facilitator, and less as an interviewer (Punch (2005:171). In that position of a moderator, I was facilitating, moderating, monitoring and recording group interaction (ibid). I did not request anyone to act as the moderator because I wanted to safe-guard the confidentiality and anonymity of the participants. Their discussions were centred on the use of

ESL and indigenous languages as the LoLT in Environmental Science lessons. For the focus group schedules, see Appendix 10. Twelve focus group discussions were held.

3.11.4 Document analysis

Documents are a rich source of data for social research (Punch, 2005:184). In case studies, documentary data may be collected in conjunction with interviews and observations (ibid). In conjunction with other data, documents can be important in triangulation, where an intersecting set of different methods and data types is used in a single project (Denzin, 1989:25). Document analysis usually refers to existing documents as opposed to transcripts of interviews conducted for the research. The documents can include newspapers, magazines, books, Web sites, memos, transcripts of conversations and annual reports. Usually written documents are analysed with some form of content analysis (Trochim, 2009:159). Analysis of documents is done in order to produce reliable evidence about the phenomenon under investigation (Silverman, 2005:123). For Punch (2005:184) the range of documents which might be used by social scientists includes diaries, letters, essays, personal notes, biographies and autobiographies, institutional memoranda and reports, and government pronouncements and proceedings. MacDonald and Tipton (1996:199) emphasise that , in documentary research, nothing should be taken for granted, and they recommend Denzin's triangulation framework to make sure that everything is checked from more than one angle.

In this study, I analysed pupils' ES written exercise books, teachers' documents as well as relevant assessment documents by Ministry of Primary and Secondary School Education Officials. A letter requesting assent from learners in a primary school to have their documents analysed was given to all the pupils whose documents were analysed (See Appendix 11). The parents of those learners whose books were analysed also completed consent forms to indicate that they did not object to the idea of having their children's books analysed.

3.12 Sources of data

I used two types of sources of data. These were primary data [observing behaviour and pupils' exercise books; pupils' responses to questions posed by their teachers during lessons and by the researcher during interviews] and secondary data [lesson observation reports by school officials like Provincial Education Director (PED), Deputy Provincial Education Director (DPED), District Education Officer (DEO), Education Officer (EO), Inspector, School Head, Deputy

School Head, Teacher in Charge (TIC) or Class teacher/Mentor; class teacher's or student teacher's documents like scheme books, plan books, and record books (Document analysis)].

3.13 Data collection and analysis

I started to analyse my data as soon as I started to collect it. I did so for two reasons. The first one was to avoid a situation whereby the data would accumulate to become too massive to handle. The second reason was that mistakes made in one situation would be avoided in future. I used a video camera to record the proceedings of ES lessons, in-depth interviews and FGDs. I transcribed the video clips as soon as I got to my office whilst all the information was still fresh in my mind. I also referred to my field notes for any events that occurred off the field of the camera. I used my photocopier to record any information that I needed from pupils' ES exercise books and the teachers' record books. I did everything myself to safeguard the confidentiality and anonymity of my participants.

3.13.1 Video transcriptions

The following format was followed by the researcher as suggested by Saldana (2009), "in order to ensure ease of analysis":

- 1) At the top of the first page of all transcriptions, I entered the code name of the interviewee and the date the interview was conducted.
- 2) I created a two and a half centimetre margin on the left column. I used that space to record codes of events that occurred, for instance, during an ES lesson observation (See 4.3.2).
- 3) I created a five centimetre margin on the right column. I used that space for entering brief notes of important data that contributed in answering some of my research questions.
- 4) I typed the transcript double-spaced.
- 5) I numbered all lines.
- 6) I listened to the video recordings as I read the transcripts. Where I was in doubt, I consulted the participants to verify the issue in question. This is known as member checking. Member checking refers to the process of having your participants review your research report for accuracy and completeness (Leedy, 1997:169). That confirmed the accuracy of the transcripts and gave a deeper sense of the "natural meaning units" of the participants.

3.13.2 Coding of transcripts

In qualitative inquiry, a code is usually “a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data,” (Saldana, 2009:3). Coding in qualitative research data analysis can be defined as the assignment of simple words or short phrases to capture the meaning of a larger portion of the original textual or visual data. Whether supported by computer software or not, the analyst must make the coding decisions for every item, including what to code and how (Yin, 2011:308).

3.14 Trustworthiness

To ensure that the findings of this study were accurate and reliable, I used the following techniques: prolonged engagement, member checking and triangulation.

3.14.1 Prolonged engagement

This refers to the length of time I was immersed in the setting of the research design. I stayed in the field for a period of twelve months. The presumption is that the longer the researcher is engaged, the more trustworthy the data. The more comfortable the participants are with responding to the researcher, the greater degree of trust is developed (Matthews & Kostelis, 2011:65). That was what happened when I observed ES lessons and interviewed teachers and pupils. I observed a total of 192 ES lessons and held 12 in-depth interviews and 12 focus group discussions.

3.14.2 Member checking

I gave my participants a chance to view their transcripts before I analysed them. They were happy with my transcriptions. Nothing was altered by the participants. The data that I had collected during ES lessons and interviews was accurately and appropriately transcribed.

3.14.3 Triangulation

I also provided trustworthiness of my data through triangulation. This is the use of multiple methods of collecting data that measure the same research variable. This checks the validity of the findings (Leedy, 1997:169). Yin (2011:313) defines triangulation as “an analytic technique,

used during fieldwork as well as later during formal analysis, to corroborate a finding with the evidence from two or more different sources.” Validity of the research is assured through the use of a variety of methods to collect data on the same topic, which involves different types of samples. In my data collection, I used the following methods: none-participant observation, face-to-face interviews, focus group discussions and document analysis.

3.15 Summary

In Zimbabwe there is no meaningful language policy (Nhongo, 2013; Makanda, 2011; Shizha, 2007; Viriri, 2003; Chimhundu, 2002 & Thondhlana, 2002). Instead, there is an education Act that was promulgated in 1987. That Act stipulated that from grade 1 up to grade 3, the child’s mother tongue was to be the LoLT for all subjects. From grade 4 onwards, English was to be the LoLT for all subjects, except for indigenous languages which were denigrated by policy makers. That Act was later amended to extend the use of the child’s mother tongue as the LoLT up to grade 7. However, in practice, I have observed that there is no match between policy and practice. English continues to enjoy hegemonic supremacy. For the majority of Zimbabwean primary school learners, English is not their mother tongue but teachers continue to use ESL as the LoLT. Even at ECD level, indigenous languages and English are viciously battling for hegemony. In this study I am investigating the problems that arise as a result of using ESL as the LoLT ES at primary school level in Zimbabwe.

I decided to use the qualitative research design and not the quantitative research design because through the former, I would be able to get an in-depth explanation of what the participants think, feel or do and most importantly why. Also I would be able to get their opinions, feelings and attitudes. Quantitative research designs are unable to express human feelings and emotions (Williams, 2005:85).

Data collection methods that I used were observation, in-depth interviews, FGDs and document analysis. The data was collected at three schools that were selected purposively. The selection criteria were as follows: a rural primary school with a minimum enrolment of 500 pupils; an urban high density primary school with a minimum enrolment of 500 pupils and an urban low density primary school with a minimum enrolment of 500 pupils. I did my pilot study at the fourth school.

To gain access, I spent two weeks getting to know the participants before data collection began. I did that in order to reduce the Hawthorne effect. Issues of confidentiality and anonymity were clearly spelt out to all the participants. I observed grades 4 to 7 teachers teaching ES to their

ESL learners at the three selected schools. I was a non-participant direct observer. My observation was overt. The normal class timetables were adhered to as much as possible and the venues were the participants' usual classrooms. Qualitative researchers collect their data from the natural setting. I tried to be as unobtrusive as possible so as not to bias my observations. I recorded the data through a video camera and written field notes for the events that occurred outside the field of the camera.

I used in-depth interviews to solicit information on the opinion of the participants concerning the medium of instruction during ES lessons. I was the interviewer and the interviewees were 12 teachers and 12 pupils from the three selected schools. All the interviews were face-to-face and unstructured. I used individual interviews in which the interviewer and the interviewee interacted on a one-on-one basis as well as in group interviews, including FGDs. I used a video camera and written field notes to record the interviews.

I also used the FGD method to collect my data. I acted as the moderator during the FGDs. The groups comprised 5 to 8 participants who were purposively selected. I did so in order to get information-rich participants. The discussions were centred around the use of ESL and indigenous languages as the language(s) of instruction during ES lessons.

The last method that I used to collect my data was document analysis. I analysed pupils' ES written exercise books. I also analysed the class teachers' record books. Video clips were transcribed as soon as I got to my office whilst everything was still fresh in my mind. I then coded the transcripts. I did everything myself to safeguard the confidentiality and anonymity of my participants.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

In Zimbabwe, English is usually introduced to the majority of primary school pupils when they start going to school. But, their participation and engagement in learning activities is difficult due to lack of proficiency in the medium of instruction, English (Shumba, 1998:40). For most pupils, this is a second or third language which they only encounter in the school setting and in lessons (Shumba 1999:5). Despite this fact, teachers use this language to teach Environmental Science (ES) and other content subjects at primary school level. In a study by Shumba, Voss and Zilg (1997:86) it was evident that pupils in more than three quarters of the classes observed lacked proficiency in the English language. In this study, I am arguing that these pupils are not yet proficient enough to use this language effectively to learn ES at primary school level. As a result of this practice, there are bound to be a plethora of problems.

In this chapter I am presenting the data that I collected during my fieldwork. My methods of data collection were direct observation, in-depth interviews, focus group discussions (FGDs) and document analysis. The process of using multiple data collection methods is known as triangulation (Leedy,1997:169). I used a video camera to record ES lessons for grades 4 to 7 at selected schools. I was a direct observer and not a participant observer. I made no attempt to conceal my observation. In other words, my observation was overt rather than covert. I also interviewed 12 teachers and 12 pupils in order to elicit their opinion on the use of ESL as a language of learning and teaching (LoLT) ES at primary school level as well as to get their recommendations on what to include when policy makers institute a useful national language policy in Zimbabwe. I also held FGDs with groups of 5 to 8 teachers and pupils. I also analysed pupils' ES written exercise books in order to investigate problems that emanated from the use of ESL as a LoLT during ES lessons. In addition to pupils' exercise books, I also analysed the teachers' documents like their record books and supervision critiques.

4.2 Data presentation and analysis

The data that I collected was in the form of words, phrases, sentences, paragraphs and pages of text. Analysis of these data started as soon as collection of the data had started. I used a video tape recorder to capture the bulk of my data. I stored that data in a computer that was always locked up in my office. The first step that I took in the analysis of this data was to reduce it as

soon as I had collected it to bring order and understanding. I also did that to prevent it from accumulating and becoming too massive and consequently too difficult to handle as more and more data were collected during more lesson observations, interviews, FGDs and document analyses. I reduced my data through the process of data coding.

Saldana (2008:2) defines a code in qualitative research as a word, phrase, sentence, paragraph or even pages of text, which symbolically assigns a summative, salient, essence capturing and or evocative attribute for a portion of language-based or visual data. In this study, the data comprised the following:

- Video transcripts of grades 4 to 7 ES lessons;
- Video transcripts of in-depth interviews of grades 4 to 7 pupils and their teachers;
- Video transcripts of focus group discussions held by grades 4 to 7 pupils and their teachers;
- Photocopies of excerpts from grades 4 to 7 pupils' ES exercise books and typed written exercises that were given to grades 4 to 7 pupils by their teachers; and
- Field notes.

4.2.1 Direct observation

My data analysis started as soon as I had collected my first set of data, which comprised the video-tape recording of an ES lesson [See Appendix 12 (a) for a sample of the video transcriptions of ES lessons observed]. I did all the video-taping myself in order to protect the confidentiality and anonymity of the participants. As soon as I got to my office, I immediately started to transcribe the tapes when everything was still fresh in my mind. It was not an easy task. What made it difficult was the fact that pupils did not speak loud enough to be heard all the time and sometimes their teachers did not encourage them to do so. The other thing was that words were usually mispronounced by both teachers and pupils, for instance, 'saliva' was mispronounced as '*saleeva*' (Line 139); 'digestion' was mispronounced as '*digeshen*' (Line 222); 'man-made' was mispronounced as '*many-made*' (Lines 1104, 1133, 1138); 'lakes' was erroneously pronounced as '*leks*' (Line 1632); 'scale' was mispronounced as '*skel*' (Lines 1758, 1766); and 'paces' was mispronounced as '*peses*' (Line 1974). I had to listen to the tapes over and over again, correcting any errors that I would have made in my first, second, third and sometimes fourth attempt of my transcriptions. At times I had to consult the particular participant involved (Member checking). When I could not find any more errors and the transcriptions were making sense, I was satisfied that my transcriptions were then perfect. I

then started to work on the process of coding my data. After reading through the transcription of each lesson, I assigned codes and categories to my data. The following codes and categories were assigned after transcribing my first ES lesson that I observed at one of the selected schools:

Codes and their meanings

Teacher Categories

TPQ - Posed question
 TRA - Repeated pupil's answer
 TRI - Repeated instruction
 TRQ - Repeated question
 TACA - Accepted chorus answer
 TGE - Made a grammatical error
 TCS - Code-switched to Shona
 TNA - Was not articulate
 TY/NQ - Asked yes/ no question
 TAPhr - Accepted phrase answer
 TEA - Expanded pupil's answer
 TAOQ - Answered own question
 TMW - Misspelt a word
 TCJ - Cracked a joke
 TAMW - Asked for missing word
 TUPM - Used playway method
 TIGE - Ignored grammatical error
 TCGE - Corrected grammatical error
 TPP - Teacher praised pupil

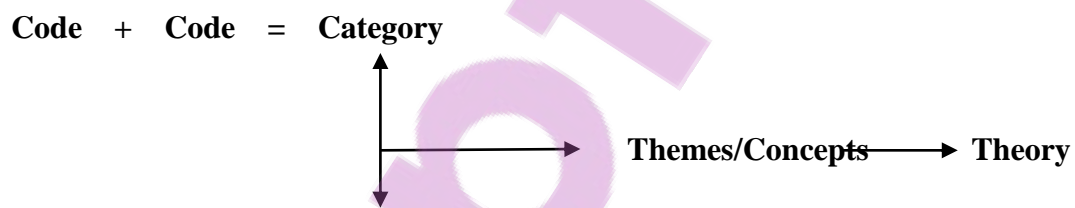
Pupil Categories

PSA - Gave a short answer
 PLA - Gave a long answer
 PS - Remained silent
 PIA - Gave incomplete answer
 PCA - Gave chorus answer
 PGE - Made a grammatical error
 PCS - Code-switched to Shona
 PNA - Was not articulate
 PPQ - Posed a question
 PhrA - Gave a phrase answer
 PMW - Misspelt a word
 PMP - Mispronounced a word
 PWNV - Word not in pupil's vocab
 PWA - Gave a wild answer
 PMW - Gave a missing word
 PHOA - Did a hands-on activity
 PAS - Acted silently
 PPL - Participation was low
 PPH - Participation was high

I used the codes listed above for coding the video transcript of the first ES lesson that I video-taped at one of the selected schools. More and more codes were added as they emerged when more and more ES lessons were observed. Coding resulted in reduction of the data as shown in Appendix 12(b). Examples of the results of coding ES lessons observed are shown in Appendix 12(c). I stopped that exercise when new codes, categories and themes or concepts were no longer emerging from the transcriptions. This is known as the saturation point. This term is variously used in qualitative research to describe arrival at a stage when nothing new is coming up (Richards, 2015:154).

Analysis of lesson 1

Real —————→ **Abstract**



Code + Code = Category

Adapted from: Saldana (2013:11)

4.2.1.7 Categories, themes and concepts derived from all ES lesson observations

4.2.1.7.1 When teachers asked questions in English during ES lessons, usually silence ensued, but when they code-switched to Shona, pupil participation became high and pupils usually gave correct answers in Shona.

4.2.1.7.2 When the pupils were allowed to code-switch to Shona, most of them were very eager to participate in class oral discourse and they gave correct answers.

- 4.2.1.7.3 When pupils attempted to answer their teacher's questions in English, in most cases they gave very short, incomplete answers. They usually answered in a word or two or a short phrase. Teachers ended up expanding the answers given by their pupils.
- 4.2.1.7.4 When pupils tried to give long answers, they were not articulate in most cases. Some teachers too, were at times not articulate when they tried to speak in English without code-switching to Shona.
- 4.2.1.7.5 Both teachers and their pupils sometimes spoke in broken English. For pupils, one of the causes was literal translation of responses from Shona to English.
- 4.2.1.7.6 When answering questions in ES, many wrong answers were given by pupils. The most likely cause for that could have been the pupils' limited English proficiency (LEP). That could also have been the reason why many pupils faced conceptual problems in ES.
- 4.2.1.7.7 Teachers usually ignored the numerous grammatical errors made by their pupils during ES lessons.
- 4.2.1.7.8 Teachers assisted their pupils to answer questions by probing.
- 4.2.1.7.9 Hands-on approaches and media were used by many teachers in ES lessons. Those methods resulted in both teachers and pupils spending less time talking. There was more of doing than talking. Pupils were intrinsically motivated. Pupils tended to grasp the concepts taught.
- 4.2.1.7.10 Only one class was observed singing during an ES lesson. They sang a Shona song that had been composed by their teacher. Language and music are part and parcel of a people's culture. Everyone who was in that classroom enjoyed that melodious piece of music that motivated all the pupils.
- 4.2.1.7.11 Some teachers and pupils did not seem to have any knowledge of long and short vowel sounds in English, hence the mispronunciation of some words. 'Lakes' was mispronounced as 'leks'; 'scale' was mispronounced as 'skel' and 'paces' was mispronounced as 'peses'.
- 4.2.1.7.12 Discussions were held in Shona.

4.2.2 Face-to-face in-depth interviews (See Appendix 14 for video transcripts samples)

To collect more data that could help me answer my research questions, I also interviewed selected pupils and teachers. Twelve teachers and twelve pupils were interviewed. The venues were classrooms and offices suggested by the interviewees and agreed upon by both the interviewee and I. The interviews were held during school hours when all the teachers and

pupils were still at school. I used my video camera to record all the proceedings. After each recording, I immediately transcribed the tapes while everything was still fresh in my mind. Please refer to Appendix 14 for samples of these transcriptions.

After each transcription, I immediately analysed it. I did this by reading the transcriptions three times. After that I read through the text again, but this time I did it slowly, underlining the themes and patterns in the text. I then recorded these themes and patterns. My 'massive' data (entire transcription) had been reduced to a manageable size recorded in 4.2.2.1 to 4.2.2.6 filed under Appendix 14.

4.2.4 Document analysis

I also examined documents belonging to teachers and pupils who were participants in this study. These were the teachers' documents and the pupils' ES exercise books. The teachers' documents comprised scheme-cum-plan books, test record books and supervision critiques by education officials. I asked for permission from the class teachers to examine all the ES exercise books for their classes. When I got them I extracted the written exercises that teachers gave their pupils to write in order to keep a record of what these pupils would have learnt in ES lessons (See 4.3.2.8). I also purposively selected the best, the worst and those in between for all the classes. I asked for permission to photocopy the selected books. When permission was granted I did the photocopying myself (See Appendix 13). I did so in order to safe guard the confidentiality and anonymity of the participants.

A close look at these excerpts is testimony that the authors are not yet proficient in the English language. A good number of them can be classified as semi-illiterate while others can be described as completely illiterate. The teachers' documents yielded something too. The ES scheme-cum-plan was full of grammatical and typographical errors too. The scheme-cum-planning report by the School Head also had grammatical and spelling errors. The Teacher's Documents Supervision Critique also had spelling and grammatical errors. That was consistent with the findings of this study (4.3.2.5) In his report on a teacher, the D.E.O. points out that the teacher should expose children to questions that require construction of answers in full sentences. This is also consistent with the findings of this study (4.3.2.6; 4.3.2.8). Pupils use one-, two-word or short phrase answers to answer the teacher's questions in ES. That is also consistent with findings of studies in existing literature. (See Appedix 13 (b). For instance, in teachers' documents, errors identified are shown in Appendix 13(b).

4.3 Data analysis

My data analysis did not wait until I had collected all the data from lesson observations, interviews, FGDs and document analysis. It started as soon as I had collected my first set of data, which comprised the video-tape recording of an ES lesson at one of the selected schools. Analysis of the data began with data reduction.

4.3.1 Data reduction

The data that I collected during my fieldwork was massive. It had to be reduced to make its analysis manageable. Data reduction was done through coding (See Appendix 12 b).

4.4 Summary

In Zimbabwe, the majority of primary school learners learn ES through the use of ESL. In this study, I am arguing that these pupils are not yet proficient enough in this language to use it as a LoLT ES. Consequently, teachers are finding it difficult to teach efficiently and effectively. Therefore, I am advocating for a multilingual approach when deciding which language(s) to use as the LoLT ES at primary school level.

In this chapter I have presented the data that I collected during my fieldwork. I used four methods to collect my data. These methods were direct observation, in-depth interviews, FGDs and document analysis. My sample comprised grades 4 to 7 teachers and their pupils from one rural primary school, one high density urban primary school and one low density urban primary school, all purposively selected.

I used a video camera to capture ES lessons in progress, in-depth interviews and FGDs. Immediately after video-taping the lessons, interviews and FGDs, I transcribed the video tapes. Data analysis of the transcriptions started as soon as data collection began. My field notes, pupils' ES written exercise books and the teachers' record books were also analysed. I personally recorded the video tapes, did the transcriptions and analysed the data in order to protect the confidentiality and safe guard the anonymity of the participants.

My analysis revealed that many learners had a tendency of remaining silent when the teachers asked questions. When the same questions were posed in the pupils' indigenous language many pupils showed that they were prepared to talk by raising up their hands. When allowed to respond in their indigenous language they gave correct answers. In my opinion, they did not

volunteer to answer questions, not because they were ignorant of the answers, but because the medium of communication, ESL, was a barrier to learning.

In some instances, the teachers did not code-switch to vernacular after posing a question. My presence could have been the cause of that because the in-depth interviews of pupils revealed that teachers always code-switched to Shona when pupils' answers were not forthcoming. The pupils took a much longer time to respond in English. I attributed that long pause to the fact that the pupils needed more time to construct their answers in English and those answers were almost always replete with grammatical errors.

Observation of ES lessons also revealed that many teachers had a mannerism of repeating questions and instructions twice or thrice before pupils had been allowed ample time to think and respond. In-depth interviews with those teachers revealed that most of them were not even aware of it. Some did it to fill up the void created by the deafening silence after a question had been posed. Others said they were just used to it. In my opinion I thought that those teachers were just trying to buy time. They knew that their pupils were not proficient in English. They needed time to construct the answer in their indigenous language first, and then translate it to English. Usually they translated literally. As a result they made grammatical errors such as: "You draw the rectangle with a scale," and "It's chewed inside with teeth." That also proved that pupils were not yet proficient in English.

Group work featured in almost every lesson that I observed. In those groups pupils were required to discuss certain issues and prepare a group report that was later presented to the class in a plenary session. The instructions for group work were usually given verbally by the teacher or they were in written form on task cards. In both cases they were given in English. But when it came to group discussions, these were almost always done in the pupils' indigenous language. Those discussions were usually noisy but when the teacher announced that they should be done in English, the noise usually died down. Many group members would either stop contributing or whisper in Shona. Pupils found it very difficult to discuss in English. The reason – lack of proficiency in the language.

An examination of the pupils' ES exercise books revealed that pupils were not yet proficient in the English language. Their ES exercise books had many grammatical and spelling errors. Video clips of ES lessons also had numerous words which were mispronounced by pupils. That showed that many pupils had limited vocabulary. Examples of such words were saliva (mispronounced as *saleeva*), shiver (mispronounced as *siver*), lakes (mispronounced as *leks*), paces (mispronounced as *peses*), anus (this was said to be in the mouth), an anthill (was said to

be an *angel*) and re-knit (if you knit wool you get a jersey. If you re-knit it you get back the wool).

I also came across a few cases in which some pupils knew some terms that were not in their teacher's vocabulary.

Finally, this study revealed that both primary school pupils and their teachers had mixed feelings about the most suitable language(s) for learning and teaching ES at primary school level. However the majority of them concurred when it came to deciding whether indigenous languages can be used in conjunction with English to explain difficult concepts. This is what is already happening in the classrooms when teachers code-switch from English to the learners' indigenous languages to explain a difficult concept or to express themselves fully where they cannot adequately do so in English. Sometimes they do so because they have failed to find the suitable words to explain the concept.

4.5 Validity and reliability

Lincoln and Guba (1985:290) ask a pertinent question concerning the issue of validity and reliability as follows: "How can researchers persuade their audience that their research findings are worth paying attention to?" Validity and reliability govern the acquisition of data and the skilfulness with which one designs the research structure and create the instruments of measurement as an integral part of it (Leedy, 1997:32). If a measure is valid, it is reliable. However, reliability is a necessary but not a sufficient condition for validity. It is important to distinguish between these two concepts and to keep in mind that a measure may be reliable without being valid (Setati, 2011:116).

4.5.1 Validity

Validity is the extent to which an assessment measures what it is purported to measure (Breakwell, Smith & Wright, 2012:561). There are several types of validity. Leedy (1997:33-4) gives a brief description of the six most common types as follows:

4.5.1.1 Face validity

This type of validity relies on the subjective judgement of the researcher who must answer the following two questions: (a). Is the instrument measuring what it is supposed to measure? (b). Is the sample being measured representative of the behaviour or trait being measured? (p. 33).

4.5.1.2 Criterion validity

This is determined by relating performance on one measure (e.g., a test) to performance on another measure, called a criterion (p. 33).

4.5.1.3 Content validity

It is the accuracy with which an instrument measures the factors or situations under study – that is, the content being studied (p. 33).

4.5.1.4 Construct validity

A construct validity is any concept, such as honesty, that cannot be directly observed or isolated (Kweit & Kweit, 1981:21, 350). It is concerned with the degree to which the construct itself is actually measured (p. 34).

4.5.1.5 Internal validity

This is the freedom from bias in forming conclusions in view of the data. It seeks to ascertain that the changes in the dependent variable are the result of the influence of the independent variable, rather than that of the way the research was designed (p. 34).

4.5.1.6 External validity

This is concerned with generalisability of the conclusions reached through observation of a sample to the universe; or can the conclusion drawn from a sample be generalised to other cases?

There are various “threats to validity” such as reactivity effects in how the researcher’s presence may influence the results. There can also be an “observer drift” whereby some observers may use certain categories more than others, or they come to see what they expect, or there may be a shift through a learning effect, so that there is a greater differentiation between observations later in the research (Breakwell, Smith & Wright, 2012:363).

In inductive, exploratory orientations to observation there are different questions regarding validity and reliability (Creswell & Miller, 2000). These resemble the general questions for qualitative research in which the generation and analysis of data involves an interpretative process. Validity can also be increased by offering an audit trail. This is a clear visible account of the process of the observational research. It should be made clear and visible how the research moves from data collection to subsequent data analysis. Materials to support the analysis can be included. Examples of such materials are field notes, sections of videotape and transcripts of group conversations with annotations indicating non-verbal or paralinguistic features. There can also be use of member validation so that the observation is supported by

accounts from the participants. Finally, validation can be enhanced by employing other sources of data or methods of research. This is known as triangulation (Breakwell, Smith & Wright, 2012: 364).

4.5.2 Reliability

Reliability is the consistency with which a measuring instrument performs (Leedy, 1997:35).

According to Lincoln and Guba (1985:154), for a qualitative study to provide reliable results, the following attributes should be present:

4.5.2.1 Research project is credible

One of the key criteria is that of internal validity which ensures that the study measures/tests what it is actually intended to do. The key question to ask is, “How congruent are the findings with reality?”

4.5.2.2 Research is transferable

Ascertain whether a similar study and methods conducted elsewhere would be of value?

4.5.2.3 Process is dependable

A detailed report is required in order to enable other researchers to repeat the work so that the research design may be seen as a “prototype model”

4.5.2.4 Findings can be confirmed

Ensure that findings are the result of the lived experiences and ideas of the participants and that findings are a result of solid evidence.

In this study I have given a clear description of how data was collected in the natural setting, that is the school setting. During the process of data collection inside the classroom, I tried to be as unobtrusive as I could so as not to upset the natural setting. Because I had been hanging around, talking to teachers and pupils for a period of two weeks before I started to collect my data, “threats to validity” such as reactivity effects in how my presence could influence the results were next to nil. Chances of having an “observer drift” were also minimised by collecting data continuously without a long break, other than weekends, public holidays and school holidays. I have also made it very clear and visible for any reader to follow how my research moves from data collection to subsequent data analysis because my narration is in a simple layman’s language. In this study, materials to support the analysis are available in the appendices section. In this study I utilised the use of the concept of triangulation by collecting

data from a rural school, an urban high-density school and an urban low-density school. I also collected my data using four different methods namely: direct observation, in-depth interviews, FGDs and document analysis. My use of a video camera assured me that I did not miss anything during data collection. For my data analysis I made use of the coding method and the categories, themes/concepts and theories came out of the data that I had collected. The data spoke for itself.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS OF THE STUDY

Introduction

Zimbabwe is a multilingual country where 16 official languages are spoken as the L1 of learners in primary schools (Constitution of Zimbabwe, 2013:17). For the majority of these learners, English is a second language (Shumba, 1999:5); (4.2.2.1.9, 4.2.3.1). Most of these learners have limited proficiency in English (Shumba, Voss & Zilg, 1997); (4.2.2.3.4). Although the 1987 Education Act as amended in 2006 stipulates that the mother tongue of the primary school learners should now be used as the language of learning and teaching (LoLT) from ECD up to grade seven, English continues to dominate as the LoLT (4.2.3.2). Even at ECD and grades one and two levels, English and indigenous languages are viciously battling for hegemony (4.2.2.6.2); (Shizha 2012:786). Unfortunately, it is sad to note that pupils do not follow when they are taught in English (4.2.2.6.5); (Shizha, 2008:307; 2005:65; Shumba, 2000:15; Shumba, Voss & Zilg, 1997:18).

In this study, I am investigating the problems that emanate from the use of ESL to learn ES in Zimbabwean primary schools. In this chapter I am going to draw conclusions by consolidating the results that I have obtained from this empirical study with existing literature. I am also going to proffer plausible solutions to these problems that I will derive from my findings. Finally I will state the limitations of my study.

Conclusions

To what extent is the Education Act of 1987 that represents the language policy in Zimbabwe useful to teachers and learners at primary school level?

My literature review revealed that in Zimbabwe there was no comprehensive language policy that was clear and explicit (Nhongo, 2013: 1211; Makanda, 2011: 2; Shizha, 2007: 302 – 319; Thondhlana, 2002: 30 – 39; Chimhundu, 2002: 7). Instead, there was an Education Act that was promulgated in 1987. That Act stipulated that the learners' mother tongue was to be used as the language of learning and teaching (LoLT) up to grade three level. From grade four upwards,

English was to be used as the LoLT (Education Act, 1987a). The Education Act (1987a) was later amended in 2006 to extend the use of the mother tongue up to grade seven (Education Act, 1987b). That was done in line with UNESCO's recommendations that, "The best medium for teaching a child is his or her mother tongue. He learns more quickly through it than through an unfamiliar linguistic medium" (UNESCO, 1953). However, my findings in this study reveal that primary school teachers were not aware of the existence of the Education Act of 1987. In response to a question asked during a focus group discussion (FGD), asking teachers if they had ever heard of the Education Amendment Act of 2006, all teachers said that they had never heard of it (4.2.3.16.4 – 5). In-depth interviews revealed the same response (4.2.2.5.1). When asked to comment on the Education Act of 1987, teachers said that it was not useful at all because no one was implementing it (4.2.3.17.5 – 9). Teachers were not using the pupils' mother tongue as the languages of instruction at school. Existing literature also supports this: "All school subjects were taught in English (Shumba, 1998:45). The second reason pertains to the difficulty with and lack of proficiency in the language of instruction, English (Shumba, Voss & Zilg, 1997:102). Therefore, the Education Act of 1987, which represents the Zimbabwe language policy, is not useful at all to teachers and learners at primary school level because pupils are not being taught in their mother tongues as stipulated by the Education Act (1987).

Is there a match between the Education Act of 1987 that represents the language policy and classroom practice at primary school level?

The Education Act of 1987 as amended in 2006 stipulates that prior to Form 1, the pupils' mother tongue shall be used as the language of instruction at school. My findings in this study reveal that for the majority of the learners at primary school, English is not their mother tongue (4.2.2.1; 4.2.2.3; 4.2.3.1). Existing literature supports this: For most pupils, English is a second or third language (Shumba, 1999:5). This means that the language of learning and teaching (LoLT) is supposed to be the pupils' indigenous language, such as Shona or Ndebele. Findings of this study reveal that English is the LoLT used during ES (4.2.3.2.1 – 7; 4.2.2.1; 4.2.2.2). If policy stipulates that the mother tongue should be used as the LoLT but in practice, English is used instead, then it means that there is no match between policy and practice. Findings of this study revealed that pupils learn ES using the English language (4.2.2.5.4; 4.2.2.6.3; 4.2.3.16.9 – 14; 4.2.3.17.2 – 3). Teachers are teaching in English from ECD up to grade 7 (4.2.1.7.1). Existing literature also reveals that ES is being taught in English (Shumba, Voss & Zilg, 1997:136; Shumba, 2000:15). That clearly showed that there was no match between what represented government policy (Education Act of 1987) and practice (4.2.2.6.3; 4.3.2.12;

4.2.3.16.10; 4.2.3.17.3). Teachers are not executing this Act and nobody is trying to enforce it. Some teachers were not even aware of the existence of this Education Act (4.2.3.16.5). therefore, one can safely say there is no match between policy and practice.

How do learners use language during ES lessons?

Findings of this study indicate that learners use English as the language of learning ES in class (4.2.3.2.). Primary school learners whose L1 is not English are not proficient in this language. This is also supported by data from existing literature: Shumba, Voss and Zilg, (1997:26); Shumba, (1998:40); Shumba, (1999:5); Shizha, 2007:307; Lupogo, (2014:27). Because pupils find English difficult (4.2.3.3), they code-switch to Shona, an indigenous language, when they fail to express themselves coherently (4.2.3.13). Dube and Cleghorn (1999:10) are in agreement with this statement: When children do not understand what they are taught due to inability to understand the language of instruction, then code-switching provides a valuable resource for promoting understanding. My findings are also supported by Mareva and Mapako (2012:36). Code-switching occurs wherever there are two individuals or two groups of bilinguals who speak the same two languages (Fromkin & Rodman, 1998:544).

My findings in this study also indicate that when teachers asked questions in English, learners were not very keen to respond. But when the teacher code-switched to the learners' mother tongue, Shona, many learners indicated that they were ready to respond by raising up their hands (4.2.1.7.1). Whenever pupils were allowed to speak in their mother tongue, most of them were very eager to participate in class oral discourse and they gave correct answers in most cases (4.2.1.7.2).

When learners were expected to answer questions in English, they gave telegraphic answers in most cases. Learners were mean with their words. They gave one- or two-word or short phrase answers (4.2.1.7.3). Shumba (1999:32) point out that the teachers' poor questioning techniques could be the cause of that. Shumba, Voss & Zilg (1997:15) concur: "The low level questions requiring one word responses or yes and no answers, and often in chorus, did not elicit and/or challenge pupils to think and construct meaning out of the activities." When teachers asked questions that required long answers, learners did not raise up their hands to indicate that they wanted to give an answer. When any one of them attempted to respond, the answer was replete with grammatical errors (4.2.1.7.4). This finding is supported by existing literature: "When questioning is attempted of a high level variety, e.g., why or explain, the majority of the pupils never volunteered to answer" (Shumba, Voss & Zilg 1997:18).

Another finding from my study that concerns the use of language during ES lessons is that group discussions are held in the learners' mother tongue (4.3.2.3). In class, learners use language as a psychological tool that facilitates thinking (Vygotsky, 1978). They also use it as a cultural tool. A cultural tool proposed by Vygotsky is language. Learners use it for regulating behaviour in class and for solving problems. Learners communicate with each other and with their teacher through written language and spoken words.

Language is not just a tool for communication, but expresses our cultural view of the world and our existence. It is a vital component for incorporating indigenous science into the school science curriculum (Shizha, 2007:306). Learners also use language to express their culture. Their knowledge of indigenous systems require the use of language. Scientific concepts and ideas are communicated to learners by their teachers through language. The learners' entire knowledge, skills, principles and concepts in science have been mediated by language.

What makes pupils fail to participate in discussions during Environmental Science lessons?

Findings of this study reveal that when teachers asked questions in English during Environmental Science lessons, in most cases pupils remained silent. But when the same question was asked after code-switching to Shona, many pupils raised up their hands, indicating that they were volunteering to answer the question posed by the teacher (4.2.1.7.1.). When the pupils were allowed to code-switch to Shona, they usually gave correct answers (4.2.1.7.2). This is consistent with existing literature in which the findings of a study done in Zimbabwe reveal that the majority of the learners have difficulty understanding explanations given entirely in English (Shumba, 1998:45). The learners are of the opinion that teachers should explain things and new words in the local languages to make them understand.

In the same study, other findings reveal that learners cannot communicate their thoughts clearly in the medium of English (Shumba, 1998:45). Findings of this study reveal that when a question is posed, pupils fail to respond because they cannot express themselves clearly in English (4.2.2.2.3). Findings of a different study done in Zimbabwe reveal that, "The use of ESL as a LoLT in primary schools is the main factor that is silencing learners in science classes (Shizha, 2008:80). The same author is suggesting that the language of instruction in schools needs to be re-visited so that pupils will be able to participate in lessons (Shizha, 2012:785). Muthwii and Kioko (2004:4) are in support of the idea alluded to above. They maintain that it is a learner's fundamental right to feel secure and confident when learning using a given

language. But, the use of ESL as a LoLT appears to leave most second language learners feeling unsecure of themselves. They are not confident enough to participate in the world of English. As a result, they become passive and silent in class.

Shumba (2000:15) maintain that pupils in most grades lack proficiency in the language of instruction. Consequently, they do not understand explanations given exclusively in English and it affects their frequency of participation and the amount of child talk and verbalisation, and participation in lessons. My study concluded that pupils fail to participate in discussions during ES lessons because most pupils are not proficient in the language of instruction in class.

To what extent are primary school pupils proficient enough to learn Environmental Science using English as a second language?

Durin ES lesson observation in this study, the teachers' questions were met with silence (. That was consistent with existing literature. The findings of a study conducted by Shizha (2008) revealed that the use of ESL as a medium of instruction in primary schools was the factor that silenced learners in science classes (Shizha, 2012:788). But when the teachers code-switched to Shona, the pupils' mother tongue, lively debates ensued (4.2.1.7.1). One can only conclude that these pupils lack proficiency in the English language (4.2.2.3.4; 4.2.3.11.1; 4.2.3.4.10). In a baseline survey of the BEST programme in primary schools and teacher training colleges in Zimbabwe, Shumba, Voss and Zilg (1997), explored the teaching and learning situation in ES through the use of interviews, lesson observation and questionnaires. The findings also indicated that learners lacked proficiency in ESL: "It was evident that pupils in more than three quarters of the classes observed lacked proficiency in the English language and generally had conceptual difficulties on the lesson content," page 86. Shumba (1998:45) also indicated that 'learning of ES appears to be made difficult by lack of proficiency in English language.'

Another study by Qorro (2010) also revealed that students entering Form 1 in Tanzanian secondary schools are not proficient enough in English to use this language as a LoLT. These sentiments are echoed by Pitman, Majhanovich & Brock-Utne (2010) who lament that lack of proficiency in the English language is also observed at university level.

In another study by the ministries responsible for primary education in Kenya and Zimbabwe in collaboration with SACMEC, the findings reveal that over 75% and 66% of grade 6 pupils in Kenya and Zimbabwe respectively, fail to achieve the mastery necessary for successfully using English as the medium of learning in grade 7. The same study also reveals that in Uganda,

Zimbabwe and Kenya, 35%, 54% and 87% of the pupils respectively, were virtually illiterate in English.

When pupils attempted to speak in English, they spoke in broken English (4.2.1.7.3; 4.2.1.7.5). When they tried to give long answers, they were usually not articulate (4.2.1.7.4).

Some pupils did not seem to have any knowledge of long and short vowel sounds in English. As a result, some words were mispronounced. Examples were as follows: ‘Lakes’, ‘scale’ and ‘paces’ were mispronounced as ‘Leks’, ‘skel’ and ‘peses’, respectively (4.2.1.7.11). In class, most pupils did not understand everything said in English by the teacher (4.2.2.1.7). Pupils fail to respond to the teacher’s questions because they could not express themselves in English (4.2.2.2.3; 4.2.2.3.4; 4.2.2.6.11). Most of the pupils speak in broken English (4.2.2.6.12). Their spelling words and pronunciation were poor (4.2.2.6.13). The teachers admitted that the majority of their learners had limited proficiency in English (4.2.2.6.14). Some learners were said to be completely illiterate in English (4.2.2.6.15; Appendix 13). This study concluded that Zimbabwean primary school pupils are not yet proficient enough to use English as a second language as the language of learning Environmental Science.

To what extent can the mother tongue be used as the medium of instruction in Environmental Science lessons?

The best medium for teaching a child is his or her mother tongue. He or she learns more quickly through it than through an unfamiliar linguistic medium (UNESCO, 1953).

Findings of this and other studies conducted in Zimbabwe and elsewhere revealed that teachers and their pupils communicated better in their mother tongue if both are bilinguals who happen to have the same mother tongue (4.2.2.1.9; 4.2.2.4.3; Fromkin and Rodman, 1998:544). This idea is also supported by extant literature: Nomlomo (2007:17) confirms that teachers and learners communicate better in their mother tongue. Learners also show better confidence in lessons conducted through their mother tongue (ibid). In this study, whenever pupils held group discussions, they always spoke in their mother tongue (4.3.2.3). A study by Shumba (2000:14) reveals that learners preferred that their teachers code-switch from English to their indigenous language in the teaching of ES. Shumba (2000:15) also reveals that pupils lack proficiency in the language of instruction. As a result of that, ‘a lot of teachers are employing code-switching to deal with these problems.’ Shumba (1999:48) maintains that, “Pupils find it easier to understand ES when the teacher uses the local language to explain some concepts rather than

when they stick only to the medium of the English language.” Findings of my study also reveal that learners are not proficient in English, the language of instruction in ES (4.2.2.1.7; 4.2.2.2.3; 4.2.2.6.9). as a result of the learners’ lack of proficiency in ESL, they preferred that their teachers code-switch to vernacular from time to time and explain certain things (4.2.1.7.1). Learners’ preference for their mother tongue in class oral discourse as well as code-switching from ESL to their mother tongue during ES lessons is testimony to the fact that they feel more comfortable and more confident to learn ES using their mother tongue as the LoLT.

This study revealed that pupils are more active and intrinsically motivated when the medium of instruction is their mother tongue (4.2.1.7.2). Whenever the mother tongue was used during ES lessons, I observed that the teacher-pupil interactions were very lively. That enabled the learners to develop their critical thinking skills which were transferable to all learning experiences even when the mother tongue ceases to be the LoLT. But when asked during interviews whether their mother tongue could be adopted as the next LoLT in ES lessons, both pupils and teachers scoffed at that idea (4.2.3.6.21; 4.3.2.14). They cited lack of text books as the main reason. Also, some science terms have no equivalent terms in indigenous languages (4.2.3.12.3; 4.2.3.12.5). They suggested that indigenous languages can only be used to make explanations of difficult concepts simpler just like what has been happening (4.2.3.6.25; 4.2.3.13.4). My finding alluded to above was consistent with existing literature. Shumba (1995:276) reveals that teachers are divided on whether indigenous languages should be effectively used to teach science. Findings of my study reveal that both teachers and learners categorically refused to entertain the idea of having an indigenous language such as Shona to be the language of learning and teaching science. Both teachers and learners prefer to have English as the LoLT in ES (4.2.3.6; 4.2.3.8; 4.2.3.10; 4.2.3.13; 4.2.3.18). However, both teachers and learners were in agreement when it came to use of indigenous languages in code-switching from English to clarify certain concepts.

Recommendations

Languages of instruction in class

During ES lessons, pupils use language when observing, describing, defining, comparing, contrasting, grouping, classifying, generalising and so on. If these pupils are to master these basic scientific skills, then they should be proficient in the language in which instruction is to be done. Learners also use language to communicate their thoughts, to learn new English vocabulary and the language of science. Pupil – pupil interaction, teacher – pupil interaction

and acquisition of new knowledge would not be possible without language. Language is the most common medium through which learners and educators interact in the science classroom. Pupils should also be able to show that they have grasped the concepts taught by the teacher.

Learners need fundamental language skills to understand information and express their ideas. The communication process would not be complete if learners are not able to listen, talk, read, write, discuss and argue, narrate, describe and so on. Learners acquire all these and other skills through language. They also use language to develop their scientific knowledge, skills, concepts and attitudes.

To make sense of their world, learners require a language. They use language to ask questions about what they observe. They also use language in their scientific enquiry to answer their own questions, observe changes and patterns, group and classify animate and inanimate objects and conduct simple investigations.

When learners talk, listen, read, write, discuss, argue, narrate, describe, observe, define, compare, contrast, group, sort, classify and so on, they are using language. They also use language to ask questions. When they conduct their simple scientific enquiries in class, language is also at work. Therefore, language and learning are inseparable. There is no learning without language. If language is the most common medium through which pupils and teachers interact in the ES classroom, then it is mandatory that pupils are proficient in that medium of communication for effective learning to take place. Learning becomes a burden if the learners are not familiar with the language of instruction. The use of ESL only as a LoLT militates against the smooth acquisition of knowledge, skills, concepts and attitudes in ES.

ESL only is definitely not the best medium to do so since poor linguistic skills inhibit learning. A bilingual or multilingual approach is called for when deciding the next LoLT in ES. Therefore, I am advocating for the legalisation of code-switching from ESL to the learners' mother tongue, wherever it becomes necessary to do so.

Proper national language policy

This study revealed that in Zimbabwe there is no proper national language policy that is clearly articulated and comprehensive. Instead, there is an Education Act which stipulates that the LoLT at primary school level shall be the pupil's mother tongue. However, this study has also revealed that there is no match between policy and practice. This means that the Education Act representing the language policy currently in use is not useful at all. Indigenous languages are

not being used as the LoLT at all. English continues to dominate as the LoLT even though this study and other studies that have been conducted before it revealed that learners at primary school level are not yet proficient in ESL. Therefore, I am the Zimbabwe government to promulgate a clear and comprehensive language policy that is user friendly to the stake holders. This language policy should explicitly spell out how all the official languages of Zimbabwe will be used. This should also be matched with the provision of various texts in those languages and not in English only.

Narrowing the gap between home culture and the school culture

At the present moment, there is a mismatch between the school curriculum and the cultural experiences primary school learners bring from their homes and their communities into the classroom. The most important aspect that alienates pupils from their home and community culture is language. Communication at home is through the mother tongue. But at school pupils are expected to speak in English, read books written in English, follow instructions given in English and learn ES and other content subjects in English. They are only expected to use their mother tongue when it is time for indigenous languages. Besides the foreign language used in class, stories and examples given by the teacher are from a foreign culture.

I am urging teachers to reduce the gap between home and school cultures. Some pupils do not follow when the teacher speaks in English only. I am therefore recommending the use of indigenous languages alongside ESL to explain difficult concepts. In other words, code-switching to mother tongues should be made official. There is no way ESL can be avoided. All the ES books are written in English. All examinations are taken in English. The world has become a global village. English is one of the few international languages spoken in many parts of the world. Our pupils will therefore have everything to gain if they continue to use it when learning Science. Indigenous languages will be used to simplify explanations. Use of ESL only during ES lessons silences learners in primary school. Allowing them to use both ESL and their mother tongue will make ES lessons more lively, interesting and enjoyable to all learners and not just to a few who are proficient in ESL.

Examples of plants and animals should include those from the pupil's cultural experience. The same should be done when the teacher is teaching about foods in Science. Examples of foods from traditional dishes should also be used by the teacher. For instance, when giving examples of sources of proteins the teacher should also include traditional dishes eaten by his pupils at home. These may include *macimbi*, *madora*, *harati*, *masinini* (edible caterpillars), *makurwe*

(crickets), mbeva (mice), *hove* (fish), *ishwa* (flying ants), etc. For carbohydrates yams, maize, millet, sorghum, sweet potatoes, potatoes and roasted green mealies are some of the traditional foods that can be mentioned. Teachers can also mention traditional medicines and herbs, flora and fauna from their pupils' environment, shelter and habitats of animals, agricultural products and food preservation methods pupils are familiar with. In other words talking about indigenous knowledge systems also helps to bridge the gap.

Reduction of language shock in the classroom

Language shock is the term used to refer to the stress and anxiety language learners feel when they are expected to communicate in a language they are not proficient in. When other pupils in the same class seem to be doing better than them in the foreign language, this feeling is aggravated. It is made worse when others laugh at them when they make grammatical errors or when they mispronounce certain words. In this study, some teachers were observed mocking and laughing at slow learners. This should be avoided. The anxiety that results from language shock may affect the academic performance of the language learners negatively. Therefore teachers are implored to provide a very conducive learning atmosphere that reduces stress and anxiety.

Reduction of cognitive load in the classroom

De Jong (2010: 105) notes that the basic idea of cognitive load theory is that the cognitive capacity in working memory is limited, so that if a learning task requires too much capacity, learning will be hampered. The recommended remedy is to design instructional systems that optimise the use of working memory capacity and avoid cognitive overload.

When teaching ES, teachers should make sure that their learners have the necessary background knowledge that is required to learn new information. When this missing background knowledge is added to difficulties of learning a new language, learners will experience a heavy cognitive load. To reduce this cognitive load, teachers should use teaching methods and give examples that will enable learners to draw on their own experiences and knowledge. Some of these have already been alluded to above under the issue of narrowing the gap between the home and the school cultures. Cognitive load is increased by unnecessary demands on learners. Such demands include unnecessary distractions of a class and the use of unsuitable teaching methods. When the cognitive load is well managed, pupils are able to learn new skills easier than when this load is high.

Reduction of cultural load

Lightening the ‘cultural load’ of learners can make learning a more positive experience for them. Teachers can do this by treating these learners and their cultures with respect. No culture should be denigrated. Teachers should make an effort to include aspects of their pupils’ cultures in the classroom. Teachers should also gather some background information about their pupils so that they will be in a better position to treat each one of them. In some cultures, certain things are taboo and should not be said or done. For instance, looking an adult in the eye by young people is considered as lack of respect and should be avoided in some cultures. So, if teachers have background information about their pupils, they will know why some of them behave as they do and they will know how to treat them. Existing literature supports this: There is need for teachers to come to know their students as individuals and be willing to learn about their background (Wilmot, 2009:27).

Reduction of language load

Learners whose L1 is English face considerable challenges in learning the scientific vocabulary. For learners whose L1 is not English, the challenges become compounded since they have to master the English vocabulary first before tackling the science vocabulary. The unfamiliar words can put a great deal of pressure on ESL learners as they try to make sense of what their teachers say as well as what they read about in science text books. The teacher for these ESL learners can employ a number of tactics to lighten this ‘language load’.

Suggested strategies for teaching ES to ESL learners

Teaching ES to ESL or Limited English Proficiency (LEP) learners can be a daunting task to many teachers. To come up with effective lessons when teaching such pupils, teachers would have to travel an extra mile. This is what should be happening in Zimbabwean primary schools because this study has revealed that the majority of the learners there are not proficient in ESL, which teachers are currently using as the LoLT in ES lessons.

- **Teachers should speak slowly and pronounce words distinctly**

What may seem to be normal speed when someone who is proficient in English speaks can be regarded as talking too fast by some ESL learners. Learners who are hard of hearing also find themselves in the same predicament. To such learners, the teacher is just mumbling something they cannot comprehend. Therefore, teachers are urged to speak slowly and pronounce words distinctly for the sake of such learners. That should be done at all levels of the primary school.

- **Teachers should utilise hands-on approaches**

Hands-on approaches like experimenting, field trips, projects, dramatising, etc and visual representations like pictures, images, graphics, and so on, take a centre stage when it comes to ES teaching.

In this study, when hands-on approaches and media were used by many teachers in ES lessons, pupils were intrinsically motivated and they tended to grasp the concepts taught (4.2.1.7.9). pupils were also motivated by singing (4.2.1.7.10).

- **Teachers should utilise peer instruction**

Teachers can also actively involve other learners in peer instruction, especially those who have no knowledge of the local languages. For instance, they can ask a pupil to explain a concept that was not grasped well by other pupils. If the learners have a common indigenous language, the pupil explaining can code-switch to that indigenous language and explain the difficult concept to his or her colleagues. The next step would be to translate the explanation to English. Although pupils use ESL to learn ES, they learn both ES and ESL simultaneously.

- **Teachers should allow enough wait time after asking a question**

Teachers are often found guilty for guillotining their pupils' thought processes after asking questions in class. They expect learners to raise up their hands as soon as they finish posing their questions. They should make use of the 3Ps as follows:

Pose your question.

Pause to allow pupils time to think and construct their answers (Waite time).

Pounce on someone to give an answer.

One may ask how long is enough wait time? The duration of the wait time differs. It will depend on the type of question asked. Judging from my teaching experience, a simple factual

recall question may require something like ten seconds or less, to allow all pupils to think. An open-ended question requiring pupils to select and apply learned rules, concepts and methods in new and concrete situations may take pupils more time to come up with a complete answer. A minute or so may suffice. But when pupils are expected to analyse (e.g. distinguish, differentiate, infer) or synthesise (e.g. design, devise, modify) or evaluate (e.g. appraise, justify, contrast), pupils may need two to three minutes.

- **Teachers should desist from repeating questions and instructions**

Teachers should desist from repeating questions and instructions, unless it is really necessary. In this study, I have observed teachers repeating a question twice, thrice or even four times, before they allow pupils time to think (wait time). Learners should learn to develop their listening skills and get it the first time a question is asked.

- **Teachers should desist from answering their own questions**

Teachers should also avoid answering their own questions even if they see that pupils are not responding. Instead, they should ask probing questions that will guide pupils to arrive at the correct answer.

- **Teachers should utilise relevant media**

All ES lessons should be accompanied by visuals which illustrate the content. For instance if teachers are teaching about the life cycle of a bean plant, they can use relevant pictures to illustrate the bean seed, expanding bean seed with bursting seed coat, germinating seed, the seed developing a root, stem and leaves, tendrils, flowers and pods with new seeds. These visuals directly relate to what is being taught. They can be sequenced in a logical order by the learners themselves by sticking their pictures or actual specimens on the chalkboard or whiteboard using stick-stuff. The chalkboard or whiteboard can also be extensively used by both teachers and pupils to draw pictures to illustrate what has been discussed.

- **Write key words on board as they are introduced in the lesson**

Key words like seed, seed coat, germinate, root, and so on, are written on the board as they are introduced during the lesson. Pupils can match the real object with the written word. This increases the pupils' English vocabulary as well as their Science vocabulary. Science has a complex vocabulary that is difficult even for speakers whose first language is English. The sum of the complex Science terms, some difficult Science concepts and lack of proficiency in ESL can make ES learning very difficult for many pupils. Teachers can help the situation by writing

the key terms on the chalk board and ask pupils to read them and associate them with the concrete objects, models, pictures, etc., that they are going to use as media during the lessons. By so doing, pupils learn ESL and ES simultaneously. The hearing impaired will also gain through the use of the chalkboard summaries.

- **Summaries of what has been taught**

Summaries of what has been taught can be made from time to time. Teachers should first establish that a concept has been grasped before proceeding to the next. Pupils should be encouraged to ask questions about anything that is not clear to them. Teachers should allow them to pose their questions using their mother tongue if they cannot do it in ESL. It is better for the pupils to ask questions using an indigenous language than to remain silent and keep their ignorance.

Limitations of the study

In qualitative research, the researcher studies the participants in their natural setting. This means that they study things as they are. They do not manipulate the environment. In this study it was not always possible for me to adhere to this principle when collecting data in the field. For instance, if ES for grades 4A, 4B, 4C and 4D at a school was scheduled to be taught on same days of the week at the same time, arrangements would be made to teach them at different times to make it possible for me to observe all the grade 4 ES lessons taught that day. Some lessons had to be rescheduled to be taught late in the afternoon when it was very hot and both teacher and class were tired, instead of teaching them in the morning when it was still cool and both teacher and pupils were still fresh and full of energy to teach and learn, respectively.

Another limitation that could have slightly affected my results was that at times I observed artificial lessons. Teachers knew they would be observed teaching ES several days before those lessons were taught. Consequently, they ended up over preparing for such lessons – Hawthorne Effect was at work. To reduce that bias, I remained in the field for quite some time. Both teachers and pupils got used to my presence and they began to behave more and more naturally. However, the bias could not be completely eliminated since my time in the field had to come to an end at some point.

From my experience as a lecturer, I am aware that many teachers have a tendency of hiding a certain group of their classes. That group includes those pupils who are very slow in everything they do. It also includes those pupils who can hardly construct an English sentence in unbroken

grammar. In my video transcriptions of video-recorded ES lessons, such pupils do not exist. Their mistakes and ignorance could have gone unnoticed in my fieldwork had it not been for the use of triangulation. I was able to detect them through my use of document analysis. Their ES written work and the teachers' record books revealed everything. They failed to completely get away with it.

During the in-depth interviews, social desirability effect could have also caused one of the limitations in this study. This bias arises as a result of participants saying what they feel will please me, their interviewer, rather than saying what they actually believe in. During FGDs, some participants could have answered questions in such a manner that would be viewed by other participants as the right thing to say, which did not portray their own opinion. Participants tend to adhere to socially acceptable responses so that they are viewed in a favourable light. What I did to ensure that I got truthful responses was to assure the participants that there were no right or wrong answers. Maybe that stopped them from worrying about giving a socially acceptable response. To reinforce the fact that there were no acceptable or unacceptable responses, I even told them that in some classes at their school and elsewhere, different responses had been given and none of them was wrong.

The other limitation that could have occurred could have been a result of capturing errors. I could have made some errors in transcribing video recordings. Also, when data is captured manually from transcripts, allowance must also be made for some human error. Triangulation could have helped in reducing the effects of some of the limitations alluded to above.

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APPENDICES

APPENDIX 1

Request to the Ministry of Primary and Secondary Education

Request to the Ministry of Primary and Secondary Education for permission to conduct research at Bondolfi, Mafuba, Shakashe and Victoria Junior Schools in Masvingo District of Masvingo Province in Zimbabwe.

Bondolfi Teachers' College

P. O. Box 300

Masvingo

28 January 2016

The Director: Policy Planning, Research and Development

Ministry of Primary and Secondary Education

P. O. Box CY 121

Causeway

Zimbabwe

Dear Mr E Chinyowa

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT BONDOLFI, MAFUBA, SHAKASHE AND VICTORIA JUNIOR PRIMARY SCHOOLS IN MASVINGO DISTRICT OF MASVINGO PROVINCE.

I, Tembinkosi Dunmore Siwela am doing research with C. P. Loubser, a professor in the Department of Science and Technology Education towards a PHD Degree in Education at the University of South Africa. We are inviting you to participate in a study entitled: English as a second language in learning Environmental Science in Zimbabwean Primary Schools.

The aim of the study is to investigate the problems caused by the use of English as a second language in learning Environmental Science in Zimbabwean Primary Schools and proffer plausible solutions.

These schools have been selected because they satisfy the selection criteria of the researcher. The study will entail observing grades 4 – 7 Environmental Science lessons in progress. The participants will also be interviewed by the researcher. Focus group discussions for pupils and teachers will be conducted. The researcher will also analyse pupils' Environmental Science test and exercise books, teachers' record books and reports on Environmental Science lessons by Education Officials.

When this study is complete, the benefits that will accrue are invaluable. The Government of Zimbabwe is likely to be persuaded to promulgate a national language policy which is non-existent at the moment. A multilingual approach is likely to replace the present set up in which a second language for the majority of the citizens dominates every sphere of their lives. A language policy in education is likely to be instituted. The language policy in education will result in the establishment of languages of learning and teaching which are user friendly as opposed to the use of a second language that the majority of the learners are not proficient in. As a result, grade 7 results in Environmental Science would improve significantly, providing a solid base for future sciences at secondary school and beyond.

There are no known or anticipated risks to the participants in this study since the study will be conducted during normal school hours in the school premises.

A copy of the final research report will be delivered to your office.

Yours sincerely

Tembinkosi Dunmore Siwela.

University of South Africa PhD Student.

APPENDIX 2

Permission to conduct research granted by Ministry of Primary and Secondary education of Zimbabwe.

All communications should be addressed to
"The Secretary for Primary and Secondary
Education"
Telephone: 799914 and 705153
Telegraphic address : "EDUCATION"
Fax: 791923



Reference: C/426/3 Masvingo
Ministry of Primary and
Secondary Education
P.O Box CY 121
Causeway
ZIMBABWE

28 January 2016

Tembinkosi Dunmore Siwela
Bondolfi Teachers College
P. O. Box 300
Masvingo

**RE: PERMISSION TO CARRY OUT RESEARCH IN MASVINGO PROVINCE:
MASVINGO DISTRICT: BONDOLFI; VICTORIA JUNIOR; SHAKASHE AND
MAFUBA PRIMARY SCHOOLS**

Reference is made to your application to carry out a research in the above mentioned schools in Masvingo Province on the research title:

**"ENGLISH AS A SECOND LANGUAGE IN LEARNING ENVIRONMENTAL
SCIENCE IN ZIMBABWEAN PRIMARY SCHOOLS"**

Permission is hereby granted. However, you are required to liaise with the Provincial Education Director Masvingo, who is responsible for the schools which you want to involve in your research.

You are required to provide a copy of your final report to the Secretary for Primary and Secondary Education.

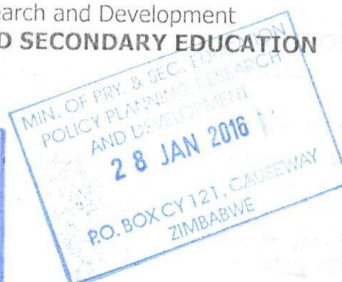
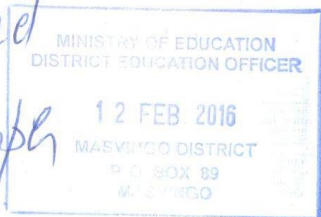
E. Chinyowa

Acting Director: Policy Planning, Research and Development

For: **SECRETARY FOR PRIMARY AND SECONDARY EDUCATION**

cc: PED – Midlands Province

Approved
Shakasha



APPENDIX 3

Permission to conduct research granted by the Provincial Education Director, Masvingo Province and The District Education Officer, Masvingo District.

ALL communications should be addressed to "The Provincial Education Director for Primary and Secondary Education"
Telephone: 263585/264331
Fax: 039-263261



Ref: C/426/3

Ministry of Primary and Secondary Education
P. O Box 89
Masvingo

1 February 2016

Tembinkosi Dunmore Siwela
Bondolfi Teachers College
P. O. Box 300
Masvingo

RE: PERMISSION TO CARRY OUT RESEARCH AT BONDOLFI , VICTORIA JUNIOR, SHAKASHE AND MAFUBA PRIMARY SCHOOLS IN MASVINGO DISTRICT: MASVINGO PROVINCE

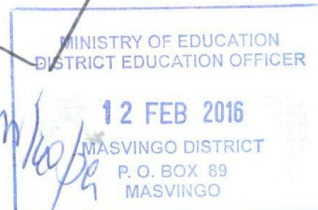
Reference is made to your application to carry out a research in the primary schools mentioned above in Masvingo District on the research title:

'ENGLISH AS A LANGUAGE IN LEARNING ENVIRONMENTAL SCIENCE IN ZIMBABWEAN PRIMARY SCHOOLS'

Please be advised that the Secretary for Primary and Secondary Education has granted permission to carry out your research.

You are also advised to liaise with the District Education Officer who is responsible for the schools which are part of the sample for your research.


Z. M. Chitiga
Provincial Education Director
MASVINGO PROVINCE



Approved

APPENDIX 4

Request to school heads for permission to conduct research at Bondolfi, Mafuba, Shakashe and Victoria Junior Schools.

Bondolfi Teachers' College

P. O. Box 300

Masvingo

28 January 2016

The School Head

Bondolfi Primary School

P. O. Box 300

Masvingo

Zimbabwe

Dear Mrs D Berejena

**RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT BONDOLFI
PRIMARY SCHOOL.**

I, Tembinkosi Dunmore Siwela am doing research with C. P. Loubser, a professor in the Department of Science and Technology Education towards a PHD Degree in Education at the University of South Africa. We are inviting you to participate in a study entitled: English as a second language in learning Environmental Science in Zimbabwean Primary Schools.

The aim of the study is to investigate the problems caused by the use of English as a second language in learning Environmental Science in Zimbabwean Primary Schools and proffer plausible solutions.

Your school has been selected because it satisfies the selection criteria of the researcher. The study will entail observing grades 4 – 7 Environmental Science lessons in progress. The participants will also be interviewed by the researcher. Focus group discussions for pupils and teachers will be conducted. The researcher will also analyse pupils' Environmental Science test and exercise books, teachers' record books and reports on Environmental Science lessons by Education Officials.

When this study is complete, the benefits that will accrue are invaluable. The Government of Zimbabwe is likely to be persuaded to promulgate a national language policy which is non-existent at the moment. A multilingual approach is likely to replace the present set up in which a second language for the majority of the citizens dominates every sphere of their lives. A language policy in education is likely to be instituted. The language policy in education will result in the establishment of languages of learning and teaching which are user friendly as opposed to the use of a second language that the majority of the learners are not proficient in. As a result, grade 7 results in Environmental Science would improve significantly, providing a solid base for future sciences at secondary school and beyond.

There are no known or anticipated risks to the participants in this study since the study will be conducted during normal school hours in the school premises.

Thank you.

Yours sincerely

Tembinkosi Dunmore Siwela.

University of South Africa PhD Student.

APPENDIX 5

Participant information sheet

20 March 2016.

Title: English as a second language in learning Environmental Science in Zimbabwean Primary Schools.

Dear Prospective Participant

My name is Tembinkosi Dunmore Siwela and I am doing research with C.P. Loubser, a professor in the Department of Science and Technology Education towards a PHD in EDUCATION at the University of South Africa. We are inviting you to participate in a study entitled English as a second language in learning Environmental Science in Zimbabwean Primary Schools.

WHAT IS THE PURPOSE OF THE STUDY?

This study is expected to collect important information that could persuade the Zimbabwean Government to promulgate a national language policy that could result in the formulation of a user friendly language of learning and teaching Environmental Science in Zimbabwean Primary Schools.

WHY AM I BEING INVITED TO PARTICIPATE?

You are being invited because you are the right person who can give the required information since you are directly involved in the use of English as a second language in learning and teaching Environmental Science in Zimbabwean Primary Schools. No one can do it better than you. Your school administration has assisted me to identify suitable participants like you. 12 primary school teachers and 36 primary school pupils will be the participants in this study.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The researcher would like to observe grade 4 to 7 pupils learning Environmental Science in their usual classrooms or venues, following their normal school Timetable. The researcher will use a video camera to capture these lessons. Approximately 3 to 5 lessons per class will be observed. After observing each lesson, no questions will be asked by the researcher. He is just interested in seeing how Environmental Science is learnt at grade 4 to 7 level. Besides being observed learning Environmental Science (for pupils) and teaching your pupils (for teachers),

you will also be asked to take part in face-to-face, one-on-one interviews in which you will be asked to air your views on the language of learning and teaching of Environmental Science at primary school level. 3 to 5 interview sessions will be held. Each of these sessions will last about 10 to 20 minutes. Finally, pupils and teachers will be asked to take part in focus group discussions separately, in which the researcher will ask them to discuss short questions on the language of learning and teaching. These will also take about 10 to 20 minutes. In both cases, the researcher shall be the moderator (chairperson). Finally, teachers will also be requested to submit to the researcher any of documents with written exercises, tests, comments as well as their pupils' exercise books and tests for Environmental Science. The lesson observations, interviews and focus group discussions shall be video-taped by the researcher.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participation in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without any reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

There are no tangible benefits for the participants but it may be gratifying just to know that you took part in a very important study that has resulted in the promulgation of a national language policy and the creation of a language policy in education which has resulted in the formulation of an effective and user friendly language of learning and teaching Environmental Science in primary schools in Zimbabwe.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

There will not be any negative consequences for you whatsoever if you participate in this research project. You will not be inconvenienced in any way. The observations will be conducted during the normal learning and teaching hours. It is the researcher who will fit into your normal class timetable. When it comes to the interviews and focus group discussions, choice of the venue and time will be agreed upon by the researcher and the participants. Actually, the researcher will make an effort to fit into your programme. You will not miss any of your lessons at all. The researcher would like to assure you that you will have nothing to lose but everything to gain.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a pseudonym and you will be referred to in this way in the data collected, any publications, or other research reporting methods such as conference proceedings. No transcriber or external coder will be hired. If the need to do so arises in future, then these individuals will have access to the data. In that case, they will be asked to maintain confidentiality by signing a confidentiality agreement.

Your answers may be reviewed by people responsible for making sure that this research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will only be available to the researcher working on the study, unless you give permission for other people to see the records.

Your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

A focus group consists of about 6 to 12 participants who are interviewed together at the same time. The interview is normally semi-structured or unstructured and is guided by a moderator or discussion leader. One advantage of the focus group is that the researcher can obtain a variety of opinions on a certain issue in a short time. However, participants may be influenced by others and may want to conform with them. It may also be difficult to protect a participant's confidentiality.

While every effort will be made by the researcher to ensure that you will not be connected to the information that you share during the focus group, I cannot guarantee that other participants in the focus group will treat information confidentially. I shall, however, encourage all participants to do so. For this reason I advise you not to disclose personally sensitive information in the focus group.

HOW WILL THE RESEARCHER PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked filing cabinet in my bedroom for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. When it is time to

destroy the information, hard copies will be shredded and electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

It is not envisaged that you will receive any payment or reward, financial or otherwise. Any costs incurred by the participant should be explained and justified in adherence with the principle of fair procedures (justice).

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the College of Education, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Tembinkosi Dunmore Siwela on mobile telephone number: +263772414137 or email address: tdsiwela@gmail.com / 50830872@mylife.unisa.ac.za The findings are accessible for 5 years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact the researcher on the telephone number or email address provided above.

Should you have concerns about the way in which the research has been conducted, you may contact Professor C.P. Loubser on telephone number: 0124294614, cell number: 0829605217 or email address: loubscp@unisa.ac.za / loubscp1@telcomsa.net Alternatively, contact the research ethics chairperson of the College of Education Dr. Madaleen Claassens on email address: mcdtc@netactive.co.za.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Tembinkosi Dunmore Siwela.

APPENDIX 6

A letter requesting an adult to participate in an interview

Dear Teacher

This letter is an invitation to consider participating in a study I, Tembinkosi Dunmore Siwela, am conducting as part of my research as a PHD in Education student entitled ‘English as a second language in learning Environmental Science in Zimbabwean Primary Schools’ at the University of South Africa. Permission for the study has been given by Dr Madaleen Claassens and the Ethics Committee of the College of Education, UNISA. I have purposively identified you as a possible participant because of your valuable experience and expertise related to my research topic.

I would like to provide you with more information about this project and what your involvement would entail if you should agree to take part. The importance of ‘English as a second language in learning Environmental Science in Zimbabwean Primary Schools’ in education is substantial and well documented. It is likely to trigger a chain of events when complete. The government of Zimbabwe is likely to be persuaded to promulgate a national language policy which is non-existent at the moment. A multilingual approach is likely to replace the present set up where English dominates every sphere of our lives. Our indigenous languages will not be denigrated any more. A language policy in education is likely to be instituted. The language policy in education will result in the establishment of languages of learning and teaching which are user friendly as opposed to the use of a second language that the majority of the learners are not proficient in. As a result, grade 7 results in Environmental Science would improve significantly, providing a solid base for science subjects at secondary school and beyond. In this interview, I would like to have your views and opinions on this topic. This information can be used to improve the teaching of Environmental Science at primary school level.

Your participation in this study is voluntary. It will involve an interview of approximately 15 – 20 minutes in length to take place at a mutually agreed upon location at a time convenient to you. You may decline to answer any of the interview questions if you so wish. Furthermore you may decide to withdraw from this study at any time without any negative consequences.

With your kind permission, the interview will be video-recorded to facilitate collection of accurate information and later transcribed for analysis. Shortly after the transcription has been

completed, I will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or to clarify any points. All information you provide is considered completely confidential. Your name will not appear in any publication resulting from this study and any identifying information will be omitted from the report. However, with your permission, anonymous quotations may be used. Data collection during this study will be retained on a password protected computer for 5 years in my locked office. There are no known or anticipated risks to you as a participant in this study.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at +263772414137 or by email at tdsiwela@gmail.com.

I look forward to speaking with you very much and thank you in advance for your assistance in this project. If you accept my invitation to participate, I will request you to sign the consent form (Appendix 7).

APPENDIX 7

Consent form

I have read the information presented in the information letter about the study ‘English as a second language in learning Environmental Science in Zimbabwean Primary Schools’ in education. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions and add any additional details I wanted. I am aware that I have the option of allowing my interview to be video-taped to ensure an accurate recording of my responses. I am also aware that excerpts from the interview may be included in publications to come from this research, with the understanding that the quotations will be anonymous. I was informed that I may withdraw my consent at any time without penalty by advising the researcher. With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

Participant’s Name (Please print): _____

Participant’s Signature: _____

Researcher’s Name (Please print): _____

Researcher’s Signature: _____

Date: _____

APPENDIX 8

Focus group/interview consent and confidentiality agreement for an adult

I, _____ grant consent that the information I share during the focus group may be used by Tembinkosi Dunmore Siwela, for research purposes. I am aware that the group discussions will be digitally recorded and grant consent for these recordings, provided that my privacy will be protected. I undertake not to divulge any information that is shared in the group discussions to any person outside the group in order to maintain confidentiality.

Participant's Name (Please print): _____

Participant's Signature: _____

Researcher's Name (Please print): _____

Researcher's Signature: _____

Date: _____

APPENDIX 9

Focus group/interview assent and confidentiality agreement for a minor

I, _____ grant assent that the information I share during the focus group may be used by Tembinkosi Dunmore Siwela, for research purposes. I am aware that the group discussions will be digitally recorded and grant assent for these recordings, provided that my privacy will be protected. I undertake not to divulge any information that is shared in the group discussions to any person outside the group in order to maintain confidentiality.

Participant's Name (Please print): _____

Participant's Signature: _____

Researcher's Name (Please print): _____

Researcher's Signature: _____

Date: _____

APPENDIX 10

Focus group schedules

FOR PUPILS

FIRST INTERVIEW

What is your first language?

In what language do you learn ES here at school?

When your teacher asks a question during ES lessons, do you give a long answer in English or you give a one word answer or a short answer? Why?

During ES lessons, if you want to give a long explanation which is easier for you to do it in Shona or in English? Why? Can you think of an example?

Using any language of your choice, tell us about any ES lesson that you liked most.

SECOND INTERVIEW

What is your opinion on the use of English as the language of learning and teaching ES?

When we use English to learn ES, what problems do we meet?

If the language that we speak at home is used as the language of learning ES, would you like it? Why?

Which language makes it easy for you to ask your teacher ES questions?

What problems would we meet if we use Shona as the language of learning and teaching ES?

FOR TEACHERS

FIRST INTERVIEW

What communication problems do you meet when you teach Environmental Science?

What do you usually do to solve the problems that you mentioned?

What is your opinion on the use of the mother tongue to teach Environmental Science from Early Childhood Development to grade 7?

SECOND INTERVIEW

Do we have a national language policy in Zimbabwe?

What is your reason for code-switching when you are teaching Environmental Science lessons?

What do you know about the official language of learning and teaching Environmental Science at primary school level? Is there a match between policy and practice?

How would you like the language policy in education to be stated?

APPENDIX 11

A letter requesting assent from learners in a primary school to have their documents analysed.

Dear learner,

My name is Teacher Siwela and I would like to ask you if I can come and have a look at your Environmental Science exercise book and test book. I am trying to learn more about what children write in their Environmental Science exercise books and test books.

If you agree to do this, I will come and have a look at what you write in your Environmental Science exercise book and test book. I will not ask you to do anything that might hurt you or that you don't want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you don't want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you didn't think of now, ask me next time when I visit your school.

Please speak to mommy and daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Siwela

Your Name	Yes I will take part	No I don't want to take part
Name of the researcher		
Date		
Witness		

Appendix 12

(a) Sample of video transcriptions of E S lesson observation

School: Old Murapa (Pseudonym)

Class: Grade 4

Lesson 1: Digestive system

Tr: What did we do in our previous ES lesson?

Class: (No response)

Tr: Who can still remember?

Class: (No response)

Tr: (Asks the same question in Shona, the pupils' mother tongue and several pupils raise their hands). Yes Taurai. Can you tell us?

Ppl: *Takaita zvedhaijesisheni* (Shona for we learnt about digestion).

Tr: Good. Now say that in English.

Ppl: (Silence)

Tr: Who can help him?

Class: (Silence).

Tr: Taurai what did you say in Shona?

Ppl: *Takaita zvedhaijesisheni*.

Tr: Rudo say that in English.

Ppl : Digestion takes place in the mouth

Tr: Yes, we looked at digestion.

Now I would like someone to come in front and I am going to ask him or her to do something for us. Who would like to come in front?

Class: No response at first then a hand is raised.

Tr: Do you mean one person only? OK Tafara and Anotida. I would like you to go to the sink over there. Wash your hands. Wash your hands. Wash your hands clean with water. I have something here which I would like you to share. What do we have here boys?

Ppl: Bread

Tr: OK you share and eat.

(Class laughs as the 2 boys eat the bread.)

Tr: Repeat. Lets eat the bread again.

(Class laughs again as the 2 boys eat the bread again).

Tr: Right you can go and sit down. We will continue with the lesson. You will eat sometime.

What was happening here? Can someone tell us? What did you see? What did you see?

(A hand goes up)

Tr: Yes.

Ppl: I saw Tafara and Anotida eating bread.

Tr: Ok. Where did it first, where did digestion first begin? What did they do?

(A hand goes up)

Tr: Yes Nyasha

Ppl: In the mouth

Tr: Right. So digestion first begins in the mouth. In our previous lesson we wrote questions about what happens like I feel food with my tongue and we also drew parts of the digestion. I would like us to look here (Tr shows chart of digestive system)

Tr: This chart shows parts of the digestive system from the top up to the bottom. As a quick recap let's try and name the parts of the digestive system. We are going to take cards from here and show where that part is. Yes, who is going to start?

Ppl: Ini (Shona word for 'me').

Tr: Let's have Promise. Come and pick a card and show us the part of the digestive system. Read the card loudly. Show us the part which is the mouth.

(Pupil picks card and sticks it on the mouth of the digestive system diagram.)

Tr: Who can mark her? Is that correct?

Ppl: Yes .

Tr: Another part.

Tr: Sebia!

(Pupil picks a card written 'anus' and reads it)

Ppl: Anus.

Tr: Show us where that part is on the chart.

Tr: Ok

Tr: Boys where are you? Come on boys Tanatswa.

Ppl: Stomach

Tr: Ok where is the stomach? Which one is the stomach? Who can mark him? Is that correct?

Tr: Nyasha.

Ppl: Yes.

Tr: Not so sure.

Yes, Karabo!

Ppl: So show us which one is the stomach? Point at the part exactly.

Tr: Yes! *zvaitika izvo* (Shona for correct). This part is the stomach. We have another name for stomach. We can say stomach or what?

(pause)

From these words which other phrases *describes* the stomach? Rutendo!

Ppl: Small, small part of gut tube.

Tr: Alright, oh sorry lets leave it like that if the stomach is correct let's leave it like that. Come and show us that part which you are you are saying small part of gut tube. Which one is the small part of gut tube?

Ppl: Shows the small part of the gut tube. (Yes from other pupils)

Tr: Clap hands for her. (clapping hands)

There are still two more cards. Vivian and Tafara you are going to be the last. Read the word Vivian.

Ppl: Gullet.

Tr: (Show us the gullet. Showing)

Is that correct class? Is that the gullet? There are 2 pipes here, this one which goes to the lungs, this is not the *the* gullet. If you look closely we have these long tube-like which comes to the stomach, so of these 2 pipes, which one is the gullet?

Sesta! (The pupil sticks the card on the black pipe on the chart).

Tr: Yes, the black one. This one is the gullet. Now if food passes through this other pipe this is when you get choked you can start coughing “ ochoh-ochoh” something has gone through the wrong way. This is the air or wind-pipe and the other one is the gullet where our food passes through. And finally?

Ppl: The other part of the gut is this one.

Tr: Yes show us. Correct. Clap hands for her.

(All the children clap their hands).

Tr: So these are the parts of the digestive system. When we eat our food it goes from this part up to a time when it finally eh, gets out. We want to talk about this. We said digestion starts or begins where?

Ppl: In the mouth.

Tr: what happens to the food in the mouth? It is broken down by what? Because digestion is the breaking down of food into smaller pieces. Which parts are in the mouth?

Yes, Vimbai.

Ppl: Tongue

Tr: Yes. We have a tongue in the mouth. What else do we have in the mouth?

Ppl: Teeth

Tr: Yes. Another thing or part which is found in the mouth? Check in others mouth. What else can you see? Open your mouth your friend.

Ppl: The lips, the tongue

Tr: OK. Now tell us the process of digestion in the mouth. What goes on as you eat? What goes on? Ok someone.

Ppl: The front teeth the front teeth bite the bread.

Tr: Yes. You saw Anotida biting with his front teeth, then? Someone who can say it all. After biting does it remain there? You have bitten the food ...

Dekeya?

Ppl: It is swallowed.

Tr: Ah after biting you swallow? You will be choked.

Yes can you tell us?

Ppl: Chewed.

Tr: How? With what? Yes.

Ppl: Its chewed inside with teeth.

Tr: Yes.

Tr: There is something else that makes the food wet and soft in the mouth.

Ppl: Tongue

Tr: Yes

Ppl: Saliva (pronounced saleever)

Tr: Who can pronounce the word correctly?

Ppl: Saliva

Tr: Yes. I want someone to tell us what happens in the mouth using the words front teeth, bite, front teeth, chewing, then saliva mixing? Who wants to tell us? Anotida.

Ppl: I bite I bite bread with my front teeth then I chew with my side teeth and and I ---

Tr: Food is mixed with?

Ppl: Food is mixed with saliva.

Tr: Aha.

Ppl: And I... Swallowed it

Tr: Clap hands for him.

(Class claps hands)

Tr: You haven't told us the use of the tongue in the mouth. The tongue also helps to ...?
Calisto

Ppl: To push the food.

Tr: Yes. It helps to push the food down. Now from the mouth where does our food go?
Next step from the mouth? Kudzanai?

Ppl: Food goes from the gullet

Tr: It goes into the?

Ppl: Gullet.

Tr The gullet has thick muscles at its sides. The gullet has thick muscles at its sides. And these muscles they push they help to push the food down. From the gullet where do ... where does the food go? From the gullet Lucia Chamboko?

Ppl: Food goes to the stomach.

Tr: Well done. From the gullet our food comes to the stomach. Again digestion takes place. In the stomach food is broken down into smaller and smaller pieces. In the stomach we also have what we call stomach juices. In the stomach we have what we call stomach juices. The stomach juices these help in breaking down the food. In the stomach we have again muscles which squeeze the food. The muscles squeeze the food into a thick porridge. They squeeze like this and our food becomes watery and soup-like. Eh I would like someone to bring a plastic. We want to show the process that goes on in the stomach. So this is what happens in the stomach.

(Tr demonstrates what happens in the stomach by asking Nyasha to squeeze bread and water in a plastic bag)

Tr: The plastic bag represents the stomach wall. The food has come from the gullet. Nyasha is our stomach muscles. The muscles squeeze the food and it becomes smaller and smaller. So this is what happens in the stomach.

What is the acid for in the stomach? The acid kills germs in the stomach. Now from the stomach where does the food go?

Tafara?

Ppl: It goes to the small part of the gut tube.

Tr: Yes. I have put this part in red. (Referring to the chart of the digestive system) What is the Shona word of the small part of the gut tube?

Ppl *Ura*

Tr: Yes. *Ura utete* (Shona word for small intestines). In the small part of the gut tube useful parts of the food are absorbed. Then from the small part of the gut tube it goes it goes it goes ... where?

Ppl: To the larger part of the gut tube.

Tr: Yes. Again in this larger part of the gut tube, water is absorbed. Then from there food that is not wanted where does it go? Food that is not absorbed where does it go? Or how does it come out? The food that is not wanted has to come out. How does it come out? Yes Epiphania. It comes out through the?

Ppl Anus

Tr: Yes and this is the card

Ppl: It comes out as faeces. (Tr writes wrong spelling of the word on chalk board '*feaces*').

Tr: Yes or what? Zviko?

Ppl: Waste

Tr: Yes. Food that is not absorbed comes out as waste. I think I have done my part. Can someone go over using the diagram go over the digestive system? Anotida you are going to be our teacher today. Please listen carefully.

Ppl: Digeshen, Digestion start from the mouth then I chew the food with my side teeth and I swallowed it through the gullet. From the gullet it goes in the ... into the stomach. From the stomach it goes through it goes through the small part of gut tube. From the small part of gut tube, it goes from the larger part of gut tube. The food that ... that is ... (pause)

Tr: Not wanted.

Ppl: (continues) Not wanted

Tr: Or not absorbed

Ppl: (continues) Not absorbed are comes from the anus here.

Tr: Well done. Now you are going to do it in your groups.

(Teacher gives pupils group task cards)

Tr: Choose a secretary. We want to see if you have understood the process of digestion.

(Plenary session after group tasks)

Secretary number 1. Your question first then your answer.

Group 1: Where does digestion first begin?

Digestion first begin in the mouth.

Group 2: Name parts in the mouth that help in digestion.

Parts in the mouth that help in digestion are teeth and tongue.

Group 3: Name the parts that push the food down so that it can be swallowed.

Name the parts that push the food down so that it can be swallowed – Anus.

(The whole class laughs together with the teacher)

Tr: Do you have an anus in your mouth? (Teacher still laughing)

(The whole class laughs again).

Tr: (Still laughing) Who can correct him? Yes.

Ppl: Tongue.

Group 4: We swallow food through the ----?

We swallow food through the gullet.

Group 5: In the mouth food is mixed with a liquid called ---?
Saliva.

Group 6: The gullet has thick ----- which help to push the food down.
The gullet has thick muscles which help to push the food down.

Group 7: Name the part shown on the diagram.
It is the stomach.

Group 8: Food is broken down in the stomach by -----.
Food is broken down in the stomach by stomach juices and muscles.

Group 9: Name the part of the gut shown.
This is this part of the small gut tube.

Group 10: ----- in the walls of the stomach squeeze the food.
Muscles in the walls of the stomach squeeze the food.

Group 11: Food that is not absorbed comes out as -----.
Food that is not absorbed comes out as waste.

Teacher gives children some written work:

In your exercise books I want you to do this work on digestion. Those who have problems can only write up to number 5. Those who think they have understood can write everything.

Conclusion: Class played a game. Names of gut parts were placed in a container and shuffled. Children sang a song as individual pupils picked the names of the gut parts and placed them on corresponding parts of the gut diagram.

School: Mt. Jenya

Class: Grade 5

Lesson 2: Malaria

Tr: What were we talking about last time? You have forgotten? Yes Daniel.

Ppl: A parasite is a living thing which lives in a living thing.

Tr: OK. Did you get what she said?

Ppls: Yes. (Chorus)

Tr: Yes. What did she say? Did you hear what she said here? Yes sir.

Ppl: A parasite is a living thing that lives in a living thing.

Tr: That's right. That's what we said last time about a parasite. Do you still remember what we were doing when we talked about a parasite? Ha? What were we talking about?

(No response from class).

Tr: You have forgotten. Yes Duncan.

Ppl: parasite lives in people's gut.

Tr: OK. That's correct but then I am saying what were we talking about last time?

We were talking about a certain disease. Ha? Yes Ndhlovu.

Ppl: Bilharzia.

Tr: Yes we were talking about bilharzia and we said if you play in dirty water you are likely going to have this disease bilharzia. So we are saying it can be caused by a parasite that bilharzia. So today boys and girls we are going to see a play that is going to be performed by some of our friends here then I want you to give me the name of that disease that is also going to be spread by a parasite. We are going to come up with the name of the disease that is going to come out in the play that we are going to see then also we want to talk about what we are going to see on the person who is suffering from that disease. So we are going to come up with these two things. Who still remembers what I have said? Firstly what are we going to do? Firstly what are we going to do? Yes Nelson.

Ppl: We see a boy suffering from disease.

Tr: OK. We are going to see a boy suffering from disease. Ok that's ok But then what are we going to do as a class? There is something that I have said we are going to do. Yes sir Benadete.

Ppl: We are going to define this disease.

Tr: To define ok yes but I have said we are going to name the disease that is going to be mentioned.

(Tr writes on chalk board: Name the disease mentioned in the play).

Ok that's right. That's what we are going to do first.

Then secondly what are we going to do?

(Same hand goes up).

Ah let's have someone else.

Yes Rejoice.

Ppl: We wa... We want to see the ... the ... parasite.

Tr: Ok we are not going to see the parasite. It's very difficult for us to see it.

Yes Bernadette.

Ppl: We are going to see signs of this disease.

Tr: Yes. Let us clap hands for her.

(Children clap their hands).

Yes that's right. So we are going to give what we call signs and symptoms of this disease.

(Tr writes on chalk board: Signs and symptoms of the disease).

Tr: What we are simply saying here is this, we want to tell how you feel and what can be seen on someone suffering from this disease.

So these are the two ... eh ... things that we are going to look at. We want to focus on these two. Firstly you are going to name the disease that is going to be mentioned in that play. Secondly let us give the signs and symptoms of this disease that is going to be mentioned. Are you getting it? When we talk about signs and symptoms we are simply saying.. you are going to tell how you feel and what you see on someone suffering from this disease. That's what we want to come up with after we have watched the play.

Our actors let us take our positions.

(A few children dramatise a school boy who fails to go to school because he is suffering from malaria. He goes to the local clinic with his mother where he is treated by a nurse).

(Mother sweeps house singing, then stops and looks at the clock).

Mom: Oh! What is the time now? Six o'clock.

(Mother knocks on son's bedroom door).

Mom: Farai where are you? Farai! You should wake up now. You need to wake up now and bath. You will be late for your lessons.

Son: Mom I am not feeling well. I cannot go to school.

Mom: I know that you want to feel warm by remaining in the.. by remaining in the... blankets in this cold season. How come you are sweating when it is cold?

Son: Mom I am also I told you that I am not well today.

Mom: You better wash yourself so that we can go to our local clinic.

(Son takes a bath and gets ready to go to the clinic with his mother)

Mom: Let us go to the clinic.

(Mother and son go to the clinic where the mother talks to the nurse).

Mom: Good morning Mrs Choto.

Nurse: Good morning. How are you?

Mom: I am very fine. I have brought you my son. He is saying he is not feeling well.

Nurse: Let us... Let us see his problem. It can be cholera since...these..these...these days there is an outbreak in this area. How are you young boy?

Farai: I am fine.

Nurse: Where do you... Where do you live?

Farai: I live in Chamisa Village.

Nurse: In what grade are you?

Farai: I am in grade 5B

Nurse: After using the thermometer his ... his body temperature is ... is ... too high.

(Silence).

(Nurse stammers).

(Mom stammers).

Mom: Take your... take her diseases.

Nurse: I have ruled out cholera. I have ruled out cholera. Your son has malaria.

Mom: Malaria is very dangerous. But you think he will be feel well?

Nurse: I will give you some pills. He takes one in the morning for three days. For...

Do you eat your meals?

Farai: I don't feel like eating. I just drink water. Just make sure he takes his food.

Mom: Thank you Mrs Choto. We will see you later.

Tr: Ok. Let us clap hands for them.

(Class claps hands).

Tr: That's right. Thanks very much. You can take your items. Take them back.

Yes boys and girls you have learnt something from this short play. But now let us go back to the activities that are on the chalkboard. I said we want to come up with the disease that is mentioned in the play. Are you able to mention the disease that has been mentioned in the play? Nelson was suffering from which disease? Yes.

Ppl: Malaria.

Tr: Yes malaria. That's right. So boys and girls we are saying the disease is malaria. So we have answered our first question here. Remember we are saying the disease that we are talking about today is caused by.....What causes this disease? Yes!

Ppl: Parasite.

Tr: Yes by parasite. We are looking at malaria as the disease that can be caused by a parasite. Now when we look at malaria let us tell what to see on a person suffering from malaria and also how the person feels. Farai in the play. Yes he is Nelson but in the play he was Farai. Farai said something to the nurse ... Eh ... Yes! How was he feeling? Yes! Rejoice.

Ppl: He feel weak ... he feel weak.

Tr: Ok he was weak. That's right. Ehe. Remember the other time when we were talking about bilharzia we also said we will be feeling weak. Yes what else? Farai, you don't want to answer yet you are the one who was not well. Yes ... eh .., Leona.

Ppl: He feels ill.

Tr: He?

Ppl: Feels ill.

Tr: Ok. That's right. Yes he was ill. Yes that's correct. Yes ?

Ppl: He feels tired.

Tr: Ok, tired. Yes. That's right. We have just said it's being weak. Very good. Yes eh Chinyemba.

Ppl: He had a headache.

Tr: Very good. He had a headache. He said, "I have got a headache." Yes I have a card here written that when you are suffering from malaria you are also going to have a bad headache. That's right, yes. What else do you still remember? Yes he next did something. Let me guide you. Let me guide you. Can you put down your arms. He next did something. She did something. So she did something. She did this (*illustrating*). Then after doing this she said something. What was said by the nurse? Yes Ivy.

Ppl: This temperature is very high.

Tr: Very good. The nurse said that Netsai had a very high body temperature. So you are going to have a very high body temperature if you have got malaria. Now the normal body temperature of a person who is well is 37 degrees Celsius. So if it goes up it becomes high so you will be having malaria. That's right. So we are going to have a very high body temperature, that's right. What else? What else was happening to Farai when he was not feeling well? Yes, Nyemba.

Ppl: He was sweating.

Tr: Very good. He was sweating. Do you remember earlier what the mother said? She said, "How come you are sweating?" Yes. Farai was sweating. That's right. Yes. Farai was sweating (*sticking a flash card written sweating on the board*). Yes. What else? So we are trying to describe how someone feels when he or she has malaria. Yes Rejoice?

Ppl: You don't like eating.

Tr: Yes very good. You are going to have what we call loss of appetite. So Farai went on to say, "I don't feel like eating but I am drinking a lot of water." Do you still remember he said that? So we are saying you are going to have loss of appetite. You don't feel like eating. As a result you are going to drink a lot of water. Yes I have written here "You are going to drink a lot of water." Yes. Now, why do you think you drink a lot of water? Hmm? Yes. Why? Look at the cards that are there (*on the chalk board*). Your answer will come from the cards that are there. Yes Nelson?

Ppl: Because he was feeling hot.

Tr: Okay he was feeling hot. He was also sweating. Do you remember that? That card there saying sweating. You are sweating. As you sweat you are losing a lot of ? What are you losing when you sweat? Hmm? Have you ever seen sweat? It looks like what? Yes, Ivy?

Pp: Water.

Tr: It looks like water. So when you are sweating you are losing a lot of water. So you need to drink a lot of water if you are not eating and if you losing a lot of water through sweat. That's right. Also, when you have got malaria you are going to shiver. You will be shivering. Now, who can stand up and shiver? Hee? Can you show us that you are shivering? Yes you are correct stand up and show us. Yes show us that you are shivering.

(Pupil goes to the front of the class and starts to shiver)

Yes, he is shivering. Yes, that's right. So, boys and girls, this is what you (*pointing to the work cards written symptoms stuck on the chalk board*) see on a person suffering from malaria. Remember the disease is malaria. Yes. So who can read what we now have here on the chalk board? Who can come up with a sentence describing what we are saying about this disease malaria? There are some who don't want to raise up their hands. Who hasn't said anything ? (*beckoning to a pupil*) Yes. Can you stand up? Yes. What can you say about the words that are on the chalk board? Come up with your own sentence.

(Pupil keeps quiet)

Yes. Let us ask Manesa to help you.

Ppl: Farai was suffering from malaria.

- Tr: Okay. She is talking about this disease malaria. That's right. Yes. Eh ... Rachel.
- Ppl: If you have malaria, you will have a headache, a high body temperature...
- Tr: Yes. Let us just use one word. So she is saying ... What have you said?
- Ppl: If you have malaria you will have a headache.
- Tr: That's fine. So she is saying if you have got malaria you are going to have a headache. That's right. Yes. Who else is going to say something? Yes, Tendayi.
- Ppl: If you have sweating... If you have malaria you will be sweating.
- Tr: Yes. If you have got malaria you will also sweat. You will be sweating. That's what he said. He said sweating. So, if you have got malaria, you will be sweating. Yes, nurse.
- Ppl: If you have malaria you feels weak.
- Tr: Yes, you are going to feel weak. You don't say you feels but you say, you feel weak. That's right. Yes, Tadiwa.
- Ppl: A person with malaria did not eat his or her ... her meals. He drink a lot of water.
- Tr: Okay, so we are saying a person who has malaria will not eat a lot of food but he or she is going to drink a lot of water. That's what you are saying. I have said you are not going to have an appetite. You don't feel like eating and at the same time you will be sweating. As a result you are going to take in some fluids and in our case you are going to drink a lot of water. Yes Rachel.
- Ppl: Farai was sweating but it was a cold day.
- Tr: Yes, did you get that? (*pupils chorus 'yes'*). Yes. Can you come again. Some have not heard what you have said.
- Ppl: Farai was sweating but it was a cold day.
- Tr: Yes. That's right. Remember what the mother said. "You ... you want to remain in the blankets. You want to feel warm because we are in the winter season." It has been mentioned in the play that Farai was feeling cold but he was sweating. Did you get that? (*chorused answer yes*). That's right, what else can you say? Yes Ashwald.
- Ppl: If you have malaria you have a high temperature.

Tr: Okay, if you have malaria you are going to have a high temperature, a high body temperature. We are talking about a body of a person. So we say you are going to have high body temperature. If you have malaria you are going to have high body temperature. That is right. Do you still have something to say? Yes Bernard.

Ppl: A person with malaria will have a headache.

Tr: Okay that's right. Yes, yes, a person with malaria is going to have a headache. That's right. Yes?

Ppl: When you have malaria you feel weak.

Tr: Yes you are going to feel weak if you have got malaria. Remember we had said this person does not have an appetite so if you do not have an appetite you are going to feel weak because you are not eating food so you will be weak, that's right. Yes Ivy.

Ppl: When you have malaria you should drink lots of water.

Tr: Okay. Are you getting what is being said here? If you have got malaria you need to drink a lot of water because remember we said you will be sweating. That's right. Rejoice.

Ppl: If you have malaria you have to siver.

Tr: Okay I didn't get the last word. Did you get the last word from her? Can you say out that word once again Rejoice?

Ppl: Siver.

Tr: Do you say siver? Yes, let us assist her. What do we say? Yes, we don't have to lie. Yes Robert.

Ppl: Shiver.

Tr: Yes. If you have malaria you are going to shiver. Shiver. Shivering. And shivering. I am shivering (*illustrating shivering*) That's right. Yes Rudo.

Ppl: Farai was drinking a lot of water but all water was taken by sweating.

Tr: That's right. By sweat. That's right. That's very good. Yes Rachel then Bernard, you are going to be the last speaker. Fine. Rachel.

Ppl: Malaria is caused by parasites.

Tr: Yeees. Very good. Very good. Yes we had forgotten about that. Malaria is caused by parasites. That's right. Bernard.

Ppl: Malaria is also caused by female mosquitos.

Tr: Yes. She is going ahead. That is what we are going to talk about next week in our next science lesson. We are going to look at the causes of this malaria. We are saying malaria is spread by mosquitos. So boys and girls we have talked of this disease malaria and we have said it is caused by parasites. We have also looked at the signs and symptoms of this disease malaria. What you are going to see on a person suffering from malaria and how you are going to feel if you have malaria? So if you see this happening to you or happening to your friend, happening to your brother or sister you need to tell that person to go to the clinic. That's right. You need to go to the clinic, to the hospital or to visit you nearest doctor, because you will be showing the signs and symptoms of ...?

(Pupils chorus malaria)

That's right. So in our next lesson boys and girls, we are going to look at the type of mosquito that will spread the disease malaria. We are also going to look at the breeding places for malaria where we are...sorry...the breeding places for mosquitos where we are going to see mosquitos. We need to destroy these places. So we also want to look at the breeding places for mosquitos. That's what we want to do in our next lesson but then let us not forget that malaria is caused by a parasite. That's right. Yes that's all boys and girls. Those who were acting can you take this desk back to the next class.

School: Mundenda

Class: Grade 7

Lesson 3: Reversible and Irreversible Changes

Tr Elsie come to the front. (pupil goes to the front of the class) Step to this side. Years ago I was like Elsie and now if you look at me I am an adult. Am I going to go back to this age again? (*pupils chorus no*) We don't want chorus answers. Am I going back to this age again? (*pupils raise hands*) Yes (*gesturing one*).

Ppl No.

Tr *Yes I am not going back to that age. Now you stand up (gesturing a boy). Long ago Mr Siwela was like this boy and now you see he is an adult man. Is he going back? Will he go back to this age again?*

Ppl No.

Tr No. So *(sit down to pupil)*, such changes if one does not go back to that age it is an irreversible change. That change is irreversible. Now we have reversible and irreversible changes. Now we have seen examples of irreversible changes. Now can you think on your own of irreversible changes? Any change which you might think is irreversible. Which is not like the one I have shown you here. Yes Tanaka. Stand up.

Ppl Candle wax.

Tr What about candle wax? Say something. If you just stand up and say candle wax so what? What would have happened for it to be said to be...are you saying it's a reversible change or an irreversible change? What are you saying? You are just giving me an item. Say something about it. Say something. Yes *(nominating another pupil with hand raised up)*

Ppl *A paper is an irreversible change after burning it.*

Tr *Yes a paper is an irreversible change after burning it. A paper is an irreversible change after?*

Ppls Burning it *(chorused answer)*.

Tr Now according to your answer that you have a paper is an irreversible change after burning it, here is a paper and here is a matchstick.

(pupils sets the paper on fire)

Is it burning?

Ppl Yes.

Tr What is being produced there? What is being produced when the paper is burning?

Ppl Smoke and some ashes are being produced.

Tr Yes it has not yet reached to the stage of ashes but we can see smoke. What type of gas do you think it is? What type of gas? Yes.

Ppl Carbon Dioxide.

Tr clap hands for him

Ppl *(pupils clap hands)* Good Evidence.

Tr She has said it is an irreversible change now we have the ashes. Why do we say it is irreversible? Why do we say so? What's the reason of giving our answer as irreversible? What's the reason? David?

Ppl Because it has turned to ashes.

Tr Not quite. Someone else? Yes.

Ppl Because it didn't go back to the way it was before.

Tr Yes, clap hands for the girl.

Ppl *(pupils clap hands)* Good Tapiwa.

Tr We cannot get the paper again. We cannot. It cannot go back to its original state. So this is an?

Ppl *(chorus answer)* Irreversible change.

Tr Another thing? Yes.

Ppl When we burn a candle we get candle wax again. It is a reversible change.

Tr Yes you are saying ...Come forward. We have the candle with us here. You are saying? What are you saying?

(pupil goes to the front of the class and lights a candle)

 So you are saying?

Ppl If you burn a candle it produces candle wax. *(burning candle upside down so wax drops to the floor)*

Tr Do you see the wax?

Ppls Yes.

Tr Explain further.

Ppl We can melt the candle wax to regain a candle.

Tr We can?

Ppl We can melt the candle wax to regain a candle.

Tr Clap hands for him

Ppls (*clapping hands*) Good Evidence.

Tr So what type of change is that? Yes.

Ppl Reversible change.

Tr It is a reversible change. Now let us look at the materials which are here. ...materials which have got these two changes, reversible or irreversible and you explain what would have happened for it to be reversible or for it to be irreversible. Come to the front and use any of these materials which are here. Come to the front, Ashely.

Ppl (*walks to the front of the class and picks up a knitted scarf and some wool*) This is a type of an irreversible change. If you knit it you get a scarf...

Tr What type of change is that?

Ppl Irreversible change.

Tr Irreversible?

Ppl Reversible change.

Tr Yes, go ahead.

Ppl If you knit it you gain a scarf and if we *re-knit it we get the wool again*.

Tr Clap hands for Ashley.

Ppls (*clapping hands*) Good Ashley.

Tr We have finished with these ones. (*Removing the wool and the scarf from the group of materials*) Someone else to use these materials saying whether it is a reversible change or an irreversible change and give reasons to your answer? Yes Upenyu.

Ppl (*comes to the front of the class and picks up a bowl of mealie meal*) This is mealie meal in this bowl. If we cook this mealie meal to make porridge or sadza and we then eat it we cannot gain after eating.

Tr Yes. So it is?

Ppl An irreversible change.

Tr It is an irreversible change. When we cook sadza, normally cooking produces reversible or irreversible change? Cooking, is there food which you have cooked and it goes back to its original state?

Ppl Irreversible.

Tr Yes. Irreversible. Someone else? Someone else. Yes.

Ppl *(pupil walks to the front of the class and picks up a clay pot)* This is an irreversible change. When you break the clay pot, you cannot *gain* the clay pot again.

Tr Yes, you cannot even gain the clay that was used to make this clay pot, handiti? Because it was fired using fire and you cannot get back the square ... the clay, so it is an irreversible change. Anything else, Tapiwa?

Ppl *(pupil walks to the front of the class and picks up an empty plastic bottle)* This bottle is a reversible change because when we heat the plastic it melts and then we cool it it becomes plastic again.

Tr *Handiti ka?* That's very good. Now let me help you with these ones. *(picking up a plastic bottle with salt inside)* What do I have here? What do you think it is? Prosper.

Ppl Salt.

Tr Salt. What can I do for it to be a solution? Is it a solution? Obert.

Ppl You mix it with water.

Tr Come and mix it with water.

(pupil goes to front of the class and pours water into the container with salt and shakes until the salt dissolves)

What name do we give to that solution? What name do we give to the solution? Yes Kandira.

Ppl Salt solution.

Tr It's a salt solution. Now, can I get back my salt? Can I get back my salt? Tariro.

Ppl Yes.

Tr Yes I can get back my salt. How am I going to get back my salt? How? Fadzai.

Ppl By boiling the solution.

- Tr Yes, we boil the solution. After boiling what happens? Somebody say the process up to the end. Say the process up to the end. Masocha.
- Ppl Water evaporates and salt remains
- Tr Clap hands for Mashocha.
- Ppls (*clapping hands*) Good Masocha.
- Tr Water evaporates and salt remains. So what type of a change is it? Gamuchirai.
- Ppl It is a reversible change.
- Tr Clap hands for Gamuchirai.
- Ppls (*clapping hands*) Good Gamuchirai.
- Tr Yes, I also have this brick. Now someone to say something about a brick. When we are talking in terms of reversibility and irreversibility what can you say about this red brick? What can you say about the red brick? Tinotenda.
- Ppl *It is an irreversible change cause when we break it we can't gain it again.*
- Tr Yes, it is an irreversible change. Clap hands for her.
- Ppls (*clapping hands*) Good Tinotenda.
- Tr yes, I also have the last thing here. What do you see here? What is it? Vhudzijena.
- Ppl Maize.
- Tr Maize. *Any statement about maize which will give us reversible or irreversible.* What statement can you give us about maize? What can you say? Tanaka.
- Ppl *It is an irreversible change because when we go to the grinding mill and grind our maize it will make mealie meal and it will not go back to where it was.*
- Tr Clap hands for him.
- Ppl (*clapping Hands*) Good Tanaka.
- Tr So it becomes an irreversible change. Now I have these cards with me here. I want you give me to give me the type of change you are going to read on the statement which is on the card and give the reason for your answer. Give the reasons for your answer. (*passing out work cards to pupils per group*) What type of change are you going to have and give reasons for your answer.

(pupils start working on their work cards in their sitting groups)

Write it in sentence form. Give reasons for your answer. *(After a while)* Are you through? Okay, let's have your statements. The things you were dealing with. Materials you were talking about. Especially with emphasis on reversible and irreversible. If you give your answer as reversible try to give reasons for your answer. Let's start with this group.

Ppl *Wool. Knit. Jersey.*

Tr Do it slowly.

Ppl *Wool. Knit. Jersey. It is a reversible change. If we knit a jersey and re-knit it we will gain the wool again.*

Tr That's correct, clap hands for that group.

Ppls *(clapping hands)* Good.

Ppl *Wood. Burn. Smoke. Heat. Ash. It is an irreversible change because when the wood is burnt we cannot gain the wood again.*

Tr Clap hands for the group.

Ppl *(clapping hands)* Good.

Ppl *Water. Steam. Water. Reversible.* It is a reversible change because if we heat our water it will evaporate and condense and we will gain back our water.

Tr Clap hands for her.

Ppls *(clapping hands)* Good.

Ppl *Clay. Heating. Brick. It is an irreversible change because when we heat the clay we cannot gain the clay again.*

Tr That's very good.

Ppls *(Clapping hands)* Good.

Ppl *Maize. Cook. Sadza. It is an irreversible change because we cannot change sadza back into maize.*

Tr clap hands for that group

Ppls *(Clapping hands)* Good.

Ppl *Glass. Break it. Broken glass.* It is a reversible change because if we melt the broken glass and cool it we will gain the glass again.

Tr Clap hands for the group

Ppls (*clapping hands*) Good.

Ppl *Coal. Burn. Carbon Dioxide. Smoke.* It is an irreversible change because when the coal is burnt we cannot get the coal back again.

Tr Clap hands for the group.

Ppls (*clapping hands*) Good.

Ppl *Salt solution. Heating. Salt.* It is a reversible change because when the salt is heated and water evaporates we get the salt again.

Tr Clap hands for them.

Ppls (*clapping hands*) Good.

Tr So we have seen materials which undergo the two types of change. Some are reversible and some are irreversible. Now from these we also talk about useful reversible changes and useful irreversible changes and some changes which are not useful. Now from all that you have been doing let us have some changes which we say these are useful. Say whether it is a reversible change, how useful it is. What reversible change are you saying is useful? Give us examples of changes which you say are useful. Examples of changes which are useful. What changes are useful? We have been demonstrating some changes here. Now we just want to group these changes under useful and not useful. Now give us useful changes. Give us useful changes. Cite and explain why you say these changes are useful. Yes ...

Ppl *Wool. Knit. Jersey.* If you re-knit the jersey you can knit a scarf and it is a useful reversible change.

Tr It is a useful reversible change. Any other? Any other change which is useful? Think of so many changes which are useful. Not only the ones we have done here. You may think of any other changes you know are useful and you know if it's reversible or irreversible.

Ppl *Salt solution.* When we heat it we get the salt again.

- Tr Yes. Those are examples we have done here. Think of any other you can think of. Yes.
- Ppl *Dry vegetables. When we boil the vegetables and dry in the sun we cannot get the vegetables again.*
- Tr So?
- Ppl It is an irreversible change.
- Tr But it is ... ?
- Ppl Useful.
- Tr Clap hands for her.
- Ppls *(clapping hands)* Good Ashley.
- Tr We spoke about dry vegetables, fresh *vegetables they are boiled* and they are dried, now we cannot get back the fresh vegetables again. That's an irreversible change but it is useful. Think of any other changes. So many times we have the reversible change and irreversible change which is useful. Any other? Things you eat. We have so many things. Yes.
- Ppl Maize. When we grind it we get mealie meal and it is... *mealie meal is a useful irreversible change.*
- Tr Yes mealie meal is useful but it is an irreversible change. *I can give you other examples like we can have jam, fruit jam. It's from fruits.* Now the fruits are processed and we get jam. From the jam can we get the fruits again?
- (Chorused answer No)*
- So what type of change is that? What type of change is that?
- Ppl Irreversible change.
- Tr Yes. Now any other you may think of. Let's discuss in our groups. *Think of reversible change which is useful.*
- (Pupils discussing in groups)*
- Right. What have you found in your groups? Yes Tapiwa.
- Ppl From groundnuts we get peanut butter and we cannot change peanut butter back to groundnuts, but it is a useful irreversible change.

Tr Very good. Clap hands for her.

Ppls (*clapping hands*) Good Tapiwa.

Tr Any other which is useful. Yes.

Ppl (*inaudible*)

Tr it is ... ?

Ppl It is a useful irreversible change.

Tr What you are saying is very fractured, if you speak in low voices we cannot hear what you are saying.

Ppl *A chalk is an irreversible change because when the teacher writes on the board you cannot get the chalk back again.*

Tr Is it useful or useless?

Ppl Useful.

Tr Is it useful? Yes.

Ppl No. it is useless.

Tr it is a useful irreversible change.

Ppls (*chorus correction*) Useless.

Tr anything else?

Ppl Milk is used to make cheese. Cheese cannot be brought back to milk. It is a useful irreversible change.

Tr Okay. Yes.

Ppl When you heat clay and make it into a clay pot it is a useful irreversible change because we cannot gain back the clay again.

Tr Yes. Very good. Now suppose we are looking at this change (*the burnt paper ashes*). What can you say about this change? The change we have done here what can you say? What can you say about this change? Yes.

Ppl It is an irreversible change because the ashes cannot go back to paper.

Tr Now is it useful or useless? This change being an irreversible change. Yes Rejoice.

Ppl It is useless.

Tr It is useless. It becomes useless. Can you use it further? (*chorused answer No*). It becomes useless. *Handiti?* Right let's look at the board. On the board there are some questions for you to answer. Explain the following terms. What do you understand by a reversible change? From what we have been doing what do you understand by an irreversible change? Most irreversible changes are a result of what? Give two materials in which a reversible change is possible. Give two materials which undergo an irreversible change. List two irreversible changes which are useful. Now let's take our ES exercise books and write the exercise.

(pupils take out their books and start writing the exercise)

What do you understand by reversible change and irreversible change?

(Teacher moves around assisting pupils)

(b) Coding video transcriptions of Environmental Science Lessons

The following codes and categories were assigned after transcribing my first ES lesson that I observed at one of the selected schools:

Codes and their meanings

Teacher Categories

TPQ - Posed question

TRA - Repeated pupil's answer

TRI - Repeated instruction

TRQ - Repeated question

TACA - Accepted chorus answer

TGE - Made grammatical error

TCS - Code-switched to Shona

TNA - Was not articulate

TY/NQ - Asked yes/ no question

TAPhr - Accepted phrase answer

Pupil Categories

PSA - Gave short answer

PLA - Gave long answer

PS - Remained silent

PIA - Gave incomplete answer

PCA - Gave chorus answer

PGE - Made grammatical error

PCS - Code-switched to Shona

PNA - Was not articulate

PPQ - Posed question

PhrA - Gave phrase answer

TEA - Expanded pupil's answer

PMW - Misspelt word

TAOQ - Answered own question

PMP - Mispronounced word

TMW - Misspelt word

PWNV- Word not in pupil's vocab

TCJ - Cracked joke

PWA - Gave wild answer

TAMW - Asked for missing word

PMW - Gave missing word

TUPM - Used playway method

PHOA - Did a hands-on activity

TIGE - Ignored grammatical error

PAS - Acted silently

TCGE - Corrected grammatical error

PPL - Participation low

TPP - Teacher praised pupil

PPH - Participation high

Coding video transcripts

ES Lesson Observation

School: Old Murapa

Class: Grade 4

Lesson 1: Digestion

Code	Transcribed raw data	Category
Line1TPQ	Tr: What did we do in our previous ES lesson?	Tr poses question
Line 2 PS	Class: <i>(No response)</i>	Ppls remain silent
Line3TPQ	Tr: Who can still remember?	Tr probes
Line 4 PS	Class: <i>(No response)</i>	Still no ans fr ppls
Line5TCS Line6PPH	Tr: <i>(Repeats question in Shona. Several pupils raise hands)</i> Yes Taurai. Can you tell us?	Code-switches Participation high
Line7PCS	Ppl: <i>Takaita zvedhaijesisheni. (We did digestion)</i>	Code-switches
Line8TPP	Tr: Good. Now say that in English.	Tr praises ppl

Line 9 PS	Ppl: <i>(Silence)</i> .	Ppl remains silent
Line10TPQ	Tr: Who can help him?	Tr poses question
Line 11 PS	Class: <i>(Silence)</i>	Silence after ques
Line12TPQ	Tr: Taurai, what did you say in Shona?	Code-switching
Line13PSA	Ppl: <i>Takaita zvedhaijesisheni</i> (We did digestion).	Code-switches
Line 14	Tr: Rudo, say that in English.	Translate
Line15PSA	Ppl: Digestion takes place in the mouth	Wrong translation
Line16TRA	Tr: Yes, we looked at digestion.	Tr corrects ans

Line 17 TPQ	Now I would like someone to come infront and I am going to ask him or her to do something for us. Who would like to come infront?	Tr challenges ppls to come infront
Line 18 PS	Class: <i>(No response at first then a hand is raised)</i>	Low participation
Line 19 PPL Line 20 TRI Line 21 TPQ	Tr: Do you mean one person only? OK Tafara and Anotida. I would like you to go to the sink over there. <i>Wash your hands. Wash your hand. Wash your hands</i> clean with water. I have something here which I would like you to share. What do we have here boys?	Tr calls on 2 ppls. Tr repeats instructions. Tr poses question
Line 22 PCA	Ppls: Bread <i>(Chorus)</i>	1 word ans fr ppls
Line23TACA	Tr: OK you share and eat.	Tr accepts chorus ans
Line24PHOA	<i>(Class laughs as the 2 boys eat the bread.)</i>	Ppls enjoy prac
Line 25TRI	Tr: Repeat. Let's eat the bread again.	
Line 26 PHOA	<i>(All laugh again as the 2 boys eat the bread)</i>	Ppls enjoy prac
Line 27	Tr: Right you can go and sit down. We will continue with the lesson. You will eat sometime.	

Line 28 TRQ	What was happening here? Can someone tell us? <i>What did you see? What did you see?</i>	Tr repeats question
Line 29PPL	<i>(A hand goes up)</i>	Participation low
Line 30	Tr: Yes.	
Line 31PLA	Ppl: I saw Tafara and Anotida eating bread.	Ppl gives full ans
Line 32TPQ Line 33TNA	Tr: OK. <i>Where did it first, where did digestion first begin? What did they do?</i>	Tr not articulate
Line 34PPL	<i>(A hand goes up)</i>	Participation low
Line 35	Tr: Yes Nyasha	Tr asks ppl to ans
Line 36PhrA	Ppl: In the mouth	Ans is a phrase
Line 37 Line 38 TAPhrA Line 39 TGE	Tr: Right. <i>So digestion first begins in the mouth. In our previous lesson we wrote questions about what happens like I feel food with my tongue and we also drew parts of the digestion. I would like us to look here (Tr shows chart of digestive system)</i>	Tr accepts phrase ans. Tr gives full ans. Tr makes gr error
Line 40 Line 41 TGE Line 42 Line 43	Tr: This chart shows parts of the <i>digestive system from the top up to the bottom</i> . As a quick recap let's try and name the parts of the digestive system. We are going to take cards from here and show where that part is. Yes, who is going to start?	Tr uses media. Tr makes gr error
Line 44 PCS	Ppls: <i>Ini! (Me)</i> .	Ppls speak in Shona
Line 45 Line 46 Line 47TUPM	Tr: Let's have Promise. Come and pick a card and show us the part of the digestive system. Read the card loudly. Show us the part which is the mouth.	

Line48PHOA, PAS	<i>(Ppl picks card and places on the right place.)</i>	Hands on activity Ppl acts silently
Line 49TGE TY/NQ	Tr: <i>Who can mark her? Is that correct?</i>	Tr's gr error Yes/no ques asked
Line 50PSA	Ppl: Yes	PSA (1 word ans)
Line 51	Tr: Another part.	Tr accepts 1 wd ans
Line 52	Tr: Sebia!	Tr pounces on ppl
Line 53PHOA	<i>(Pupil picks card written 'anus' and reads it)</i>	Hands on activity
Line 54	Ppl: Anus.	1 word ans
Line 55 PAS	Tr: Show us where that part is.	Ppl does so quietly
Line 56	Tr: Ok	
Line 57 PPL	Tr: Boys where are you? Come on boys Tana.	Tr challenges boys
Line 58 PSA	Ppl: Stomach	1 word ans
Line 59 TRQ Ln 60; 61TGE	Tr: <i>Ok where is the stomach? Which one is the stomach? Who can mark him? Is that correct?</i>	Tr repeats ques Tr's gr error
Line 62	Tr: Nyasha	Tr pounces on ppl
Line 63 PSA	Ppl: Yes	1 word ans
Line 64	Tr: Not so sure	
Line 65	Yes, Karabo!	Tr pounces on ppl
Line 66; 67 TGE	Ppl: So show us which one is the stomach. <i>Point at the part exactly.</i>	Hands on activity Gr error by tr
Line 68 TCS 69 70 TPQ	Tr: Yes! <i>zvaitika izvo</i> . This part is the stomach. We have another name for stomach. We can say stomach or what?	Code-switches Tr poses ques

Line 71	(<i>pause</i>)	Silence
Line 72 TPQ TGE	Tr: <i>From these words which other phrases describes the stomach?</i> Rutendo!	Tr poses ques Gr error by tr
Line 73, PhrA Line 74	Ppl: Small, small part of gut tube. Tr: Alright. Oh! Sorry. Let's leave it like that if the	Ans is a phrase Tr accepts phrase ans
Line 75 Line 76 TNA Line 78 PAS	stomach is correct let's leave it like that. Come and show us that part which <i>you are you are</i> saying small part of gut tube. Which one is the small part of gut tube? Ppl:(<i>Shows the small part of the gut tube</i>)	Tr not articulate Hands on activity
Line 80	Tr: Clap hands for her. (<i>clapping hands</i>)	Tr praises ppl
Line 81	Tr: There are still two more cards. Vivian and Tafara you are going to be the last. Read the word Vivian.	
Line 82 PSA	Ppl: Gullet.	1 word ans fr ppl
Line 83	Tr: Show us the gullet.	
Line 84 Line 85 Line 86 Line 87 TGE	Is that correct class? Is that the gullet? There are 2 pipes here, this one which goes to the lungs, this is not the the gullet. If you look closely <i>we have these long tube-like which comes to the stomach</i> , so of these 2 pipes which one is the gullet?	Tr not articulate Tr grammatical error
Line 88 PAS	Sesta! (<i>places card on the black pipe</i>)	Hands on activity
Line 89 Line 90 Line 91 Line 92	Tr: Yes, the black one. This one is the gullet. Now if food passes through this other pipe, this is when you get choked. You can start coughing “ ochoh-ochoh.” Something has gone through the wrong way. This is the air or wind-pipe and the other one is the gullet where our food	

Line 93	passes through. And finally?	
Line 96 PHOA	Ppl: The other part of the gut is this one.	Hands on activity
Line 97	Tr: Yes show us. Correct. Clap hands for her.	Tr praises ppl
Line 98	<i>(All the children clap their hands).</i>	
Line 99 Line 100 Line 101 Line 102 TPQ	Tr: So these are the parts of the digestive system. When we eat our food it goes from this part up to a time when it finally eh, gets out. We want to talk about this. We said digestion starts or begins where?	Tr explains fully Tr poses ques
Line 103 PhrA;	Ppl: In the mouth.	Ppl ans is phrase
Line 104 Line 105 Line 106 Line 107	Tr: <i>What happens to the food in the mouth? It is broken down by what? Because digestion is the breaking down of food into smaller pieces. Which parts are in the mouth?</i>	Tr accepts ans Tr poses 3 questions in a row
Line 108	Yes, Vimbai.	Tr pounces on ppl
Line 109 PSA	Ppl: Tongue	1 word ans fr ppl
Line 110 TRA Line 111	Tr: Yes. We have a tongue in the mouth. What else do we have in the mouth?	Tr accepts ans. Tr probs
Line 112	Tr: Ok	
Line 113 Line 114 Line 115 Line 116 Line 117 TGE Line 118 Line 119	Ppl: Teeth Tr: Yes. Another thing or part which is found in the mouth? <i>Check in others mouth. What else can you see? Open your mouth your friend.</i> Ppl: The lips, the tongue Tr: OK. Now tell us the process of digestion in the mouth. <i>What goes on as you eat? What</i>	1 word ans fr ppl Tr accepts ans & pose another ques Tr not articulate Tr gr error 1 word ans fr ppl Tr accepts ans

Line 120 TNA-		<i>goes on? Ok someone</i>	Tr not articulate
Line 121	Ppl:	The front teeth ... the front teeth ...bite the bread.	Ppl stutters
Line 122 Line 123	Tr:	Yes. You saw Anotida biting with his front teeth. Then? <i>Someone who can say it all.</i>	Tr not articulate
Line 124		After biting does it remain there? You have bitten the food	Short ans fr ppl
Line 125			Tr probes
PSA;TNA		Dekeya	1 word ans fr ppl
Line 126	Ppl:	It is swallowed	Double barrelled ques fr tr
Line 127	Tr:	Ah after biting you swallow? You will be choked	Gr error by ppl (literal transl from Shona)
Line 128		Yes can you tell us?	Tr ignores gr error
Line 129			Tr probes.
Line 130	Ppl:	<i>Chewed.</i>	1 word ans
Line 131	Tr:	How? With what? Yes	tr accepts 1 word ans
Line 132	Ppl:	Its chewed <i>inside with teeth</i>	'Saliva' not in ppl's vocab. Pronounc as if its Shona
Line 133	Tr:	Yes.	1 word ans by ppl
Line 134 TPQ TGE	Tr:	There is something else that makes the food wet and soft in the mouth.	tr accepts 1 word ans
Line 135	Ppl:	Tongue	1 word ans by ppl
Line 136 Line 137	Tr:	Yes	tr accepts 1 word ans
Line 138	Ppl:	<i>Saliva (mispronounced saleeva)</i>	1 word ans by ppl
Line 139 PSA	Tr:	Who can pronounce the word correctly?	Tr gives words & phrases to use in long ans
Line 140	Ppl:	Saliva	
Line 141			Ppl still not articulate
Line 142	Tr:	Yes. I want someone to tell us what happens in the mouth using the words front teeth, bite, front teeth, chewing, then saliva	Tr asks ppl to complete
Line 143			

Line 144		mixing? Who wants to tell us? Anotida.	ans she has started
Line 145	Ppl:	<i>I bite I bite bread with my front teeth then I</i>	Ppl still not articulate
Line 146		<i>chew with my side teeth and and I ---</i>	Tr ignores gr error
Line 147	Tr:	Food is mixed with?	
Line 148	Ppl:	Food is mixed with saliva.	
Line 149	Tr:	Aha.	
	Ppl:	And I.... Swallowed it	
	Tr:	Clap hands for him. (Class claps hands)	
Line 150	Tr:	You haven't told us the use of the tongue in	
Line 151		the mouth. The tongue also helps to?	Tr starts sentence
Line 152		Calisto	Completes with phr
Line 153	Ppl	To push the food.	Tr accepts phrase ans
Line 154PhrA	Tr:	Yes. It helps to push the food down. Now	
Line 155 PSA		from the mouth where does our food go?	
Line 156TPQ	Ppl:	Next step from the mouth? Kudzanai?	Gr error by ppl
Line 157	Tr:	<i>Food goes from the gullet</i>	Tr corrects by starting sentence
Line 158	Tr:	It goes into the	Pupil says last word
Line 159	Ppl:	Gullet	Tr not articulate
Line 160 PSA	Tr	The gullet has thick muscles <i>at its sides.</i>	Tr stutters
Line 161		<i>The gullet has thick muscles at its sides.</i>	
Line 162		<i>And these muscles they push they help to</i>	
Line 163		<i>push the food</i> down. From the gullet where	
Line 164 TGE		<i>do ...</i> where does the food go from the	
Line 165		gullet? Lucia Chamboko.	Tr praises ppl & expands ans
	Ppl:	Food goes to the stomach	
	Tr:	Well done. From the gullet our food comes	Tr is not articulate
		to the stomach. Again digestion takes place.	

Line 166	In the stomach food is broken down into	
Line 167 PSA	smaller and smaller pieces. In the stomach	
Line 168 TRA	we also have what we call stomach juices.	
Line 169	In the stomach we have what we call	Statement incomplete
Line 170	stomach juices. The stomach juices <i>these</i>	
Line 171	help in breaking down the food. In the	Tr demonstrates
Line 172	stomach we have again muscles which	
Line 173	squeeze the food. The muscles squeeze the	Hands-on activity
Line 174	food into a thick porridge. They squeeze	
Line 175 Line	like this and our food becomes watery and	Analogous explanation
176	soup-like. Eh I would like someone to bring	given by tr
Line 177	a <i>plastic</i> . We want to show the process that	Gr error by tr
Line 178	goes on in the stomach. So this is what	Tr asks another ques
Line 179	happens in the stomach.	
Line 180	<i>(Tr demonstrates what happens in the</i>	
Line 181	<i>stomach by asking Nyasha to squeeze bread</i>	
Line 182	<i>and water in a plastic bag)</i>	
TEA,TNA	Tr: The plastic bag represents the stomach wall.	
Line 183	The food has come from the gullet. Nyasha	
Line 184	is our stomach muscles. The muscles	
	squeeze the food and <i>it becomes smaller</i>	
	<i>and smaller</i> . So this is what happens in the	
	stomach.	
	What is the acid for in the stomach? The	Code-switches
	acid kills germs in the stomach. Now from	
	the stomach where does the food go?	
	Tafara?	
	Ppl: It goes to the small part of the gut tube.	
	Tr: Yes. I have put this part in red. What is the	
	Shona word of the small part of the gut	
	tube?	

	Ppl <i>Ura (Ileum)</i>	
Line 198 TCS	Tr: Yes. <i>Ura utete</i> . In the small part of the gut tube useful parts of the food are absorbed.	Tr accepts ans
Line 199	Then from the small part of the gut tube it goes it goes it goes, where?	Tr code-switches to Shona
Line 200		Tr asks ques
Line 201	Ppl: To the larger part of the gut tube.	Ppl ans with a phrase
Line 202	Tr: Yes. Again in this larger part of the gut tube, water is absorbed. Then from there	
Line 203	food that is not wanted where does it go?	Tr asks and repeats
Line 204	Food that is not absorbed where does it go?	question
Line 205	Or how does it come out? The food that is	
Line 206	not wanted has to come out. How does it come out? Yes Epiphania. <i>It comes out</i>	
Line 207 PhrA	<i>through the ... ?</i>	
Line 208TAPhr	Ppl Anus	Tr starts ans
Line 209 TNA	Tr: Yes and this is the card	Ppl completes with 1
Line 210	Ppl: It comes out as faeces. (<i>Tr writes on chalk board 'faeces'</i>).	word
Line 211		Tr accepts ans. Tr misspells 'faeces'
Line 212	Tr: Yes or what? Zviko?	
Line 213	Ppl: Waste	
Line 214	Tr: Yes. Food that is not absorbed comes out as waste. I think I have done my part. Can	1 word ans fr ppl
Line 215 PSA	someone go over using the diagram go over	Tr accepts
Line 216	the digestive system? Anotida you are going	
Line 217	to be our teacher today. Please listen	
Line 218	carefully.	
Line 219	Ppl: <i>Digeshen</i> , Digestion <i>start</i> from the mouth	
Line 220	<i>then</i> I chew the food with my side teeth and	Ppl struggles to give
	I <i>swallowed</i> it through the gullet. From the	long answer in English.
	gullet it goes in the into the stomach. From	

Line 221		the stomach it goes through it goes through	Gr error by ppl
Line 222 TPQ		the small part of gut tube. From the small	“Digestion” is
Line 223		part of gut tube, it goes from the larger part	mispronounced as
Line 224	Tr:	of gut tube. The food <i>that that is (pause)</i>	“dijeshen”
Line 225 TMW	Ppl:	Not wanted	Tr assists ppl to
Line 226	Tr:	(<i>continues</i>) Not wanted	complete his answer
Line 227	Tr:	Or not absorbed	Gr error by ppl.
Line 228	Ppl:	(<i>continues</i>) Not absorbed <i>are comes</i> from	
Line 229	Tr:	the anus here.	
Line 230 TNA	Tr:	Well done. Now you are going to do it in	Tr praises ppl. Errors
Line 231		your groups.	not corrected by tr
Line 232		(<i>Pupils are given group task cards</i>)	Gr error by ppl
Line 233	Tr:	Choose a secretary. We want to see if you	Tr ignores error &
Line 234		have understood the process of digestion.	praises ppl
PMP		Secretary number 1. Your question first	Hands-on activities
Line 235 TNA		then your answer.	Gr error by tr
Line 236	Group 1:	Where does digestion <i>first begin</i> ?	Gr error by ppl
		Digestion <i>first begin</i> in the mouth.	
	Group 2:	Name parts in the mouth that help	
		in digestion.	
		Parts in the mouth that help in	
		digestion are teeth and tongue.	
Line 246 TRI	Group 3:	Name the parts that push the food	Tr repeats instruction
Line 247 PWA		down so that it can be swallowed.	‘anus’ not in ppl’s
Line 248 WNV		<i>Name the parts that push the food</i>	vocab
Line 249		<i>down so that it can be swallowed anus.</i>	Class & tr laugh
Line 250		(<i>The whole class laughs</i>)	Tr asks ppl if he has an
	Tr:	Do you have an anus in your mouth?	anus in his mouth

Line 251 TCJ	<i>(The whole class laughs again)</i>	<i>(joking)</i>
Line 252	Tr: Who can correct him? Yes	Group tasks: to provide missing word in given sentences: Gr 1 – mouth Gr 2 – teeth & tongue Gr 3 – tongue Gr 4 – gullet Gr 5 – saliva Gr 6 – muscle Gr 7 - stomach Gr 8 – juices & muscles Gr 9 – small gut tube Gr 10 – muscles Gr 11 – waste Wr work: ppls copy sentences on chalkboard & fill in blank spaces with 1 word or phrase
Line 253 TPQ	Ppl: Tongue.	
Line 254 PSA	Group 4: We swallow food through the ----?	
Line 255	We swallow food through the gullet.	
Ln 256 TAMW	Group 5: In the mouth food is mixed with a liquid called---?	
Line 257	Saliva	
Ln 258 TAMW	Group 6: <i>The gullet has thick ----- which help to push the food down.</i>	
Line 259	The gullet has thick muscles which help to push the food down.	
Line 260	Group 7: Name the part shown.	
Ln 261 TAMW	It is the stomach.	
Line 262	Group 8: <i>Food is broken down in the stomach by -----.</i>	
Line 263	Food is broken down in the stomach by stomach juices and muscles.	
Line 264	Group 9: Name the part of the gut shown.	
Ln 267 TAMW	This is this part of the small gut tube.	
Line 268	Group 10: ----- <i>in the walls of the stomach squeeze the food.</i>	
Line 269	Muscles in the walls of the stomach squeeze the food.	
Ln 272 TAMW	Group 11: <i>Food that is not absorbed comes out as -----.</i>	
Line 273		

Line 274	<p>Food that is not absorbed comes out as waste.</p> <p>Children were given written work:</p> <p>In your exercise books I want you to do this work on digestion. Those who have problems can only write up to number 5. Those who think they have understood can write everything.</p> <p>Conclusion: <i>Class played a game. Names of gut parts were placed in a container and shuffled. Children sang a song as individual pupils picked the names of the gut parts and placed them on corresponding parts of the gut diagram on a chart.</i></p>	Pupils use playway method
Line 275		
Ln 276 TAMW		
Line 277		
Line 278		
Line 279		
Line 280		
Line 281		

School:	Mt Jenya
Class:	Grade 5
Lesson 2:	Malaria

Code	Transcribed raw data	Category
Ln 288 TPQ	Tr What <i>were we talking</i> about last time? You have forgotten? Yes Danai.	Recap of last lesson
Ln 289 TGE		
Ln 290 TQI	Ppl A parasite is a living thing which lives in a living thing.	Tr poses ques.
Ln 291 PLA	Tr Ok. Did you get what she said?	Tr's ques incomplete
Line 292	Ppls Yes	Noone ans
Line 293		
Ln 294 TPQ	Tr Yes. What did she say? Did you hear what she said here? Yes eh	Tr probes

Ln 295 PCA	Ppl	A parasite is a living thing that lives in a living thing	Chorus ans
Line 296			Ppl gives long ans.
Line 296	Tr	That's right. That's what we said last time about a parasite. Do you still remember what we were doing when we talked about a parasite? Ha? What were we talking about?	Tr probes
Line 297			Chorus ans.
Line 298			
Line 299		<i>(No response from class)</i>	Tr accepts chorus ans.
Line 300	Tr	You have forgotten. Yes Duncan.	Tr probes again
Ln 301 PLA	Ppl	<i>Parasite lives in people's gut</i>	Ppl repeats ans
Line 302	Tr	OK That's correct but then I am saying what were we talking about last time?	Ppl's gr error
Line 303		We were talking about a certain disease. Ha? Yes Ndhlovu.	Tr probes more
Line 304			No ans fr ppls
Ln 305PPL	Ppl	Bilharzia	Tr probes again
Line 306	Tr	Yes we were talking about bilharzia and we said if you play in dirty water you are likely going to have this disease bilharzia. <i>So we are saying it can be caused by a parasite that bilharzia.</i> So today boys and girls we are going to see a play that is going to be performed by some of our friends here then I want you to give me the name of that disease that is also going to be spread by a parasite. We are going to come up with the name of the disease that is going to come out in the play that we are going to see. Then also we want to talk about what we are going to see on the person who is suffering from that disease. So we are going to come up with these two things. Who still remembers what I have said?	Silence
Line 307 PS			1 word ans
Ln 308 PPL			
Line 309			Tr accepts ans
Ln 310 PGE			
Ln 311			
Ln 312			1 word ans fr ppl
Ln 313			Tr accepts and expands ans
L 314 TIGE			
Line 315		Firstly what are we going to do? Firstly what are we going to do? Yes Nelson.	

Line 316	Ppl	<i>We see a boy suffering from disease</i>	
Line 317	Tr	OK we are going to see a boy suffering from disease. OK that's OK. But then what are we going to do as a class? There is something that I have said we are going to do. Yes eh Benadete	
Ln 318 PSA			
Line 319			
Line 320	Ppl	We are going to define this disease.	2 ques in a row
Line 321	Tr	To define ok yes but I have said were are going to name the disease that is going to be mentioned	Tr repeats ques
Line 322			
Line 323		<i>(Tr writes on chalk board: Name the disease mentioned in the play)</i>	Ppl's gr error
Line 324		OK that's right. That's what we are going to do first.	
L 325TUPM			
Line 326		Then secondly what are we going to do?	Tr poses ques
Line 327		<i>(Same hand goes up)</i>	Tr repeats ques
Line 328		Ah let's have someone else.	Ppl gives wrong ans
Line 329		Yes Rejoice.	
Line 330	Ppl	We wa.. We want to see the the parasite	Tr poses ques
Line 331	Tr	Ok we are not going to see the parasite. It's very difficult for us to see it.	Tr writes on chalkboard
Line 332			
Line 333		Yes Bernadette	
Line334	Ppl	We are going to see signs of this disease.	
Line 335	Tr	Yes. Let us clap hands for her.	Tr poses ques
Ln 336 TPQ			<i>(Children clap their hands)</i>
Ln 337 TRQ		Yes that's right. So we are going to give what we call signs and symptoms of this disease.	Low participat Tr encourages ppls to particip

Line 338	(Tr writes on chalk board: Signs and symptoms of the disease)	Ppl not articulate
Ln 339 PGE		
Ln340 TIGE	Tr What we are simply saying here is this <i>we want to tell how you feel and what can be seen on someone suffering from this disease.</i>	
Ln 341 TGE		Ppl's corr ans
Line 342	So these are the two eh things that we are going to look at. We want to focus on these two. Firstly you are going to name the disease that is going to be mentioned in that play. Secondly let us give the signs and symptoms of this disease that is going to be mentioned. Are you getting it? When we talk about signs and symptoms we are simply saying.. <i>you are going to tell how you feel and what you see on someone suffering from this disease.</i> That's what we want to come up with after we have watched the play.	Tr praises ppl
Line 343		Tr repeats instruction
Ln 344 TNA		Tr accepts ans
Line 345		Tr writes on board
Line 346		
Line 347		
Line 348		
Line 349		
Line 350	Our actors let us take our positions.	Tr's long explanation
Ln 351 TRI	(A few children dramatise a school boy who fails to go to school because he is suffering from malaria. He goes to the local clinic with his mother where he is treated by a nurse)	
Ln 352 PGE		
Ln353 TIGE		
L 354 TRPE	<i>(Mother sweeps house singing, then stops and looks at the time)</i>	
Line 355	Mom Oh what is the time now? Six oclock.	
Line 356	<i>(Mother knocks on son's room)</i>	
Line 357	Mom Farai where are you? Farai! You should wake up now. You need to wake up now and bath. You will be late for your lessons	
Ln 358 PNA		
Line 359	Son Mom I am not feeling well. I cannot go to school	Tr uses drama-tisation method

Line 360	Mom I know that you want to feel warm by remaining in	
Line 361	the.. by remaining in the... blankets in this cold	
Ln 362 PLA	season. How come you are sweating when it is	
	cold?	
Line 363	Son Mom I am also I told you that I am not well	
Line 364	today	
Line 365	Mom You better wash yourself so that we can go to our	
	local clinic.	
Line 366	<i>(Son takes a bath and gets ready to go to the clinic</i>	
Ln 367 PNA		<i>with his mother)</i>
Line 368	Mom Let us go to the clinic.	
Line 369	<i>(Mother and son go to the clinic where the mother</i>	
Line 370		<i>talks to the nurse)</i>
Line 371	Mom Good morning Mrs Choto	
Line 372	Nurse Good morning. How are you?	
Line 373	Mom I am very fine. I have brought you my son. He is	Ppls dramatise
Line 374	saying he is not feeling well.	
Line 375	Nurse Let us ... Let us see his problem. It can be cholera	
Line 376	since ... these ... these ... these days there is an	
Line 377	outbreak in this area. How are you young boy?	
Line 378	Farai I am fine.	
Line 379	Nurse Where do you ... where do you live?	Hands-on activity
Line 380	Farai I live in Chamisa Village.	
Line 381	Nurse In what grade are you?	
	Farai <i>I am in grade 5B</i>	
	Nurse <i>(After using the thermometer) His ... his body</i>	

Line 382	temperature is ... is ... too high	Ppl not articulate
Line 383	<i>(Silence)</i>	
Line 384	<i>(Nurse stammers)</i>	
Line 385	<i>(Mom stammers)</i>	
Line 386	Mom <i>Take your... take her diseases</i>	
Ln387PHOA	Nurse I have ruled out cholera. I have ruled out cholera. Your son has malaria.	
Line 388		
Line 389	Mom Malaria is very dangerous but you think he will be feel well?	
Line 390	Nurse I will give you some pills. He takes one in the	
Line 391	morning for three days. For...	Ppl not articulate
Line 392	Do you eat your meals?	
Line 393	Farai I don't feel like eating. I just drink water.	
Line 394	NurseJust make sure he takes his food.	
Line 395	Mom Thank you Mrs Choto. We will see you later.	Ppl not articulate
Line 396	Tr OK Let us clap hands for them.	
Line 397	<i>(Class claps hands)</i>	
Line 398	Tr That's right. Thanks very much. You can take your items. Take them back.	Literal translation
Line 399		
Line 400	Yes boys and girls you have learnt something from this short play. But now let us go back to the	
Line 401	activities that are on the chalkboard. I said we want to come up with the disease that is mentioned in the	Literal translation
Line 402	play. Are you able to mention the disease that has	
Line 403	been mentioned in the play? Nelson was suffering from which disease? Yes.	Ppl not articulate

Line 404	Ppl Malaria	
Ln 405 PNA	Tr Yes malaria. That's right. So boys and girls we are saying the disease is malaria. So we have answered our first question here. Remember we are saying the disease that we are talking about today is caused by.....What causes this disease? Yes!	
Line 406		
Line 407		
Line 408		
Line 409		Ppl Parasite
Line 410	Tr Yes by parasite. We are looking at malaria as the disease that can be caused by a parasite. Now when we look at malaria let us tell what to see on a person suffering from malaria and also how the person feels. Farai in the play, yes he is Nelson but in the play he was Farai. Farai said something to the nurse. Eh Yes How was he feeling? Yes Rejoice	
Line 411		
Line 412		
Line 413		
Line 414		
Line 415		Ppl <i>He feel weak he feel weak</i>
Line 416	Tr Ok he was weak. That's right. <i>Ehe</i> . Remember the other time when we were talking about bilharzia we also said we will be feeling weak. Yes what else? Farai you don't want to answer yet you are the one who was not well. Yes eh, Leona.	Ppl stammering
Line 417		
Line 418		1 word ans
Line 419		Ppl He feels ill.
Line 420	Tr He?	
Line 421	Ppl Feels ill.	
Ln 422 PNA	Tr Ok. That's right. Yes he was ill. Yes that's correct. Yes?	Tr poses ques
Line 423		
Line 424	Ppl He feels tired.	One-word ans
Line 425	Tr Ok, tired yes that's right. We have just said its being weak. Very good. Yes eh Chinyemba.	Tr repeats ans

Ln 426 PGE	ppl	He had a headache.			
Line 427	Tr	Very good. He had a headache. He said, "I have got a headache." <i>Yes I have a card here written that when you are suffering from malaria you are also going to have a bad headache.</i> That's right, yes. What else do you still remember? <i>Yes he next did something.</i> Let me guide you. Let me guide you. Can you <i>put down your arms.</i> <i>He next did something.</i> She did something. So she did something. She did this (<i>illustrating</i>). Then after doing this she said something. What was said by the nurse? Yes Lesley.			
Line 428					
Line 429					
Line 430			Tr poses ques		
Ln 431 PGE					
Ln 432 PNA			Ppl's gr error		
Line 433			Tr code-switches		
Ln 434 PGE			Tr is articulate		
Line 435			Ppl	This temperature is very high.	Tr asks
Line 436			Tr	Very good. The nurse said that Netsai had a very high body temperature. So you are going to have a very high body temperature if you have got malaria. Now the normal body temperature of a person who is well is 37 degrees Celsius. So if it goes up it becomes high so you will be having malaria. That's right. So we are going to have a very high body temperature, that's right. What else? What else was happening to Farai when he was not feeling well? Yes, Nxeba.	
Line 437					
Line 438	Corr ans				
Line 439	Tr starts senten				
Line 440	Ppl completes				
Line 441	Tr asks ques				
Line 442					
Line 443	Ppl	He was sweating.			corr ans fr ppl
Line 444	Tr	Very good. He was sweating. <i>Do you remember earlier what the mother said? She said, "how come you are sweating?"</i> yes Farai was sweating. That's right. Yes Farai was sweating (<i>pinning a work card written sweating on the board</i>). Yes what else? So we are trying to describe how someone feels when he or she has malaria. Yes Rejoice?			
Line 445			Tr expands ans		
Line 446			Tr asks ques		
Line 447			Ppl's corr ans		
			Tr accepts ans and expands it		

Line 448	Ppl You don't like eating.	Gr error by tr	
Line 449	Tr Yes very good. You are going to have what we call loss of appetite. So Farai went on to say, "I don't feel like eating but I am drinking a lot of water." Do you still remember he said that? So we are saying you are going to have loss of appetite. You don't feel like eating. As a result you are going to drink a lot of water. Yes I have written here you are going to drink a lot of water. Yes now why do you think you drink a lot of water? Hmmm? Yes why? Look at the cards that are there (on the chalk board). Your answer will come from the cards that are there. Yes Nelson?	Tr repeats	
Line 450		Tr gr error	
Line 451			
Ln 452 TPQ			
Line 453			
Line 454			
Ln 455 PSA		Gr error by ppl	
Ln 456 TRA		Tr ignores gr error by ppl	
Line 457		Ppl Because he was feeling hot.	Tr praises ppl
Line 458		Tr Okay he was feeling hot. He was also sweating. Do you remember that? That card there saying sweating. You are sweating. As you sweat you are losing a lot of ... ? What are you losing when you sweat? Hmm? Have you ever seen sweat? It looks like what? Yes Lesley?	
Line 459			
Ln 460 TPQ			
Line 461			
Ln 462 PSA			
Line 463	Ppl Water.		
Ln 464TEA	Tr It looks like water. So when you are sweating you are losing a lot of water. So you need to drink a lot of water if you are not eating and if you losing a lot of water through sweat. That's right. Also, when you have got malaria you are going to shiver. You will be shivering. Now who can stand up and shiver? Heee? Can you show us that you are shivering? Yes you are correct stand up and show us. Yes show us that you are shivering.		
Line 465			
Ln 466 TGE			
Line 467			
Line 468		Ppl ans again	
Line 469		Tr repeats ans	
	<i>(pupil goes to the front of the class and starts to</i>	Tr ans own ques	

Line 470	<i>shiver)</i>	Tr repeats ans
Ln 471 PGE	Yes, he is shivering. Yes that's right. So, boys and girls, this is what you (pointing to the work cards written symptoms stuck on the chalk board) see on a person suffering from malaria. Remember the disease is malaria. Yes. So who can read what we now have here on the chalk board? Who can come up with a sentence describing what we are saying about this disease malaria? There are some who don't want to raise up their hands. Who hasn't said anything? (beckoning to a pupil) yes can you stand up? Yes what can you say about the words that are on the chalk board? Come up with your own sentence.	
Ln 472 TCS		
Ln473 TIGE		Tr asks
Line 474		Corr ans given
Line 475		Tr praises ppl & expands ans
Line 476		
Line 477		
Line 478		
Line 479		
Line 480		<i>(pupil keeps quiet)</i>
Line 490	Yes let us ask Vanessa to help you.	
Line 491	Ppl Farai was suffering from malaria.	
Line 492	Tr Okay. She is talking about this disease malaria, that's right. Yes eh, Rachel.	
Line 493		
Line 494	Ppl If you have malaria you will have a headache, a high body temperature...	
Line 495	Tr Yes let us just use one word. So she is saying,...	Tr asks
Line 496	what have you said?	Incomplete ans
Line 497	Ppl If you have malaria you will have a headache.	
Line 498	Tr That's fine, so she is saying if you have got malaria you are going to have a headache. That's right. Yes	
Line 499	who else is going to say something? Yes Rodney.	
Line 500	Ppl <i>If you have sweating...if you have malaria you will be sweating.</i>	4 ques in a row

Ln 501 TGE	Tr	Yes, if you have got malaria you will also sweat.	Ppl gives 1 word
Line 502		You will be sweating, that's what he said. He said	ans
Line 503		sweating. So, if you have got malaria you will be	Tr praises &
Line 504	Ppl	<i>If you have malaria you feels weak.</i>	expands ans
Line 505	Tr	Yes, you are going to feel weak. You don't say you	
Line 506		feels but u say, you feel weak. That's right. Yes	
Line 507		Tadiwa.	
Line 508	Ppl	A person with malaria did not eat his or her, her	
Ln 509 TNA	Tr	meals. <i>He drink a lot of water.</i>	
Line 510		Okay, so we are saying a person who has malaria	
Line 511		will not eat a lot of food but he or she is going to	
Line 512		drink a lot of water. That's what you are saying. I	Ppl demonstrat
Line 513		have said you are not going to have an appetite.	
Line 514		You don't feel like eating and at the same time you	Incomplete short
Line 515	Ppl	will be sweating. As a result you are going to take	ans fr ppl
Ln 516 PSA	Tr	in some fluids and in our case you are going to	
Ln 517 TEA		drink a lot of water. Yes Rachel.	Tr completes ans
Line 518	Ppl	Farai was sweating but it was a cold day.	& expand it
Line 519	Tr	Yes, did you get that? (pupils chorus yes). Yes.	
Line 520		Can you come again some have not heard what you	
Line 521		have said.	
Line 522	Ppl	Farai was sweating but it was a cold day.	
	Tr	Yes that's right. Remember what the mother said.	Low participation
		"You, you want to remain in the blankets. You want	
		to feel warm because we are in the winter season."	
		It has been mentioned in the play that Farai was	
		feeling cold but he was sweating. Did you get that?	
	Ppls	Yes (Chorus answer given)	Tr asks

Line 523	Tr	That's right, what else can you say? Yes Ashwald.	
Line 524	Ppl	If you have malaria you have a high temperature.	Silence
Line 525	Tr	Okay, if you have malaria you are going to have a high temperature. A high body temperature. We are talking about a body of a person. So we say you are going to have high body temperature. <i>If you have malaria you are going to have high body temperature.</i> That is right. Do you still have something to say? Yes Bernadette.	
Line 526			Complete ans
Ln 527 PSA			
Ln 528 TRA			
Line 529			Ppl not articulate
Line 530			Ppl
Line 531	Tr	Okay that's right. Yes, yes a person with malaria is going to have a headache. That's right. Yes?	
Line 532	Ppl	When you have malaria you feel weak.	Complete ans
Line 533			
Line 534	Tr	Yes you are going to feel weak if you have got malaria. <i>Remember we had said this person does not have an appetite. So if you do not have an appetite, you are going to feel weak because you are not eating food. So you will be weak. That's right.</i> Yes Lesley.	
Line 535			Tr asks
Ln 536 PSA			Ppl not articulate
Line 537			
Line 538	Ppl	When you have malaria you should drink lots of water.	
Line 539			
Line 540	Tr	Okay are you getting what is being said here? If you have got malaria you need to drink a lot of water because remember we said you will be sweating. That's right. Rejoice.	Ppl gr error
Line 541			Tr ignores gr error
Line 542			
Line 543	Ppl	<i>If you have malaria you have to <u>siver</u>.</i>	
Line 544	Tr	Okay I didn't get the last word. Did you get the last word from her? Can you say out that word once again Rejoice?	Ppl gr error

Line 545	Ppl <i>Siver.</i>	Tr ignores gr error
Line 546	Tr Do you say <i>siver</i> ? Yes let us assist her. What do we say? Yes we don't have to lie. Yes Robson.	
Line 547		
Line 548	Ppl Shiver.	
Line 549	Tr Yes if you have malaria you are going to shiver. Shiver, shivering and shivering. I am shivering (<i>illustrating shivering</i>) That's right. Yes Reduction.	Ppl gives full ans
Ln 550 PIA		
Line 551	Ppl Farai was drinking a lot of water but all water was taken by sweating.	
Line 552		Ppl articulate
Line 553	Tr That's right. By sweat. That's right. That's very good. Yes Rachel then Bernadette you are going to be the last speaker. Fine. Rachel.	Tr asks ppl to repeat a good ans
Line 554		
Line 555	Ppl Malaria is caused by parasites.	
Line 556	Tr Yees, very good. Very good. Yes we had forgotten about that. Malaria is caused by parasites. That's right. Bernadette.	
Line 557		
Line 558	Ppl Malaria is also caused by female mosquitoes.	Tr accepts ans & expands it
Ln 559 PSA	Tr Yes. She is going ahead. That is what we are going to talk about next week in our next science lesson. We are going to look at the causes of this malaria. We are saying malaria is spread by mosquitoes. So boys and girls we have talked of this disease malaria and we have said it is caused by parasites. We have also looked at the signs and symptoms of this disease malaria. What you are going to see on a person suffering from malaria and how you are going to feel if you have malaria. So if you see this happening to you or happening to your friend, happening to your brother or sister you need to tell that person to go to the clinic. That's right. You	Tr is articulate
Line 560		Ppl gives ans
Ln 561 TEA		Tr accepts & expands ans
Line 562		Chorus ans
Line 563		Tr accepts chorus ans
Line 564		
Line 565		
Line 566		Ppl gives ans

Line 567	need to go to the clinic, to the hospital or to visit your nearest doctor, because you will be <i>showing the signs and symptoms of malaria.</i>	Tr repeats ans
Line 568		Ppl gives ans
Line 569	<i>(pupils chorus malaria)</i>	Tr repeats ans again & expands it
Line 570		
Ln 571 PAS	That's right. So in our next lesson boys and girls we are going to look at the type of mosquito that will spread the disease malaria. We are also going to look at the breeding places for malaria where we are...sorry...the breeding places for mosquitoes where we are going to see mosquitoes. We need to destroy these places. So we also want to look at the breeding places for mosquitoes. That's what we want to do in our next lesson but then let us not forget that malaria is caused by a parasite. That's right. Yes that's all boys and girls. Those who were acting can you take this desk back to the next class.	Ppl gives ans
L572 PHOA		Tr repeats ans
Line 573		
Line 574		
Line 575		
Line 576		
Line 577		
Line 578		
Line 579		
Line 580		
Ln 581 PPL		
Line 582		
Line 583		
Line 584		
Line 585		
Ln 586 PS		

APPENDIX 12

(c) Examples of results of coding ES lessons

Name of school: Old Murapa School (pseudonym)

Grade: 4

Lesson 1 topic: Digestion

Line number	Codes
1	Tr posed a question
2	Silence
3	Tr probed
4	Silence
5	Teacher code-switched to Shona
6	Participation was high
7	Pupil gave a correct answer in Shona
8	Teacher praised pupil, asked him to translate answer to Eng
9	Silence
10	Teacher asked other pupils to help
11	Silence
12	Teacher allowed pupil to give ans in Shona
13	Pupil gave correct answer in Shona
14	Teacher asked pupil to translate answer to English
15	Pupil gave incomplete answer
16	Teacher repeated pupil's answer
20	Teacher repeated instructions 3 times
23	Teacher accepted chorus answer
24	Pupils enjoyed a hands-on activity
28	Teacher repeated a question twice
29	Low participation
31	Pupil gave a complete answer

32	Teacher was not articulate
34	Low participation
36	Pupil gave a phrase answer
37	Teacher accepted a phrase answer, gave full answer
40	Teacher used a chart to illustrate the gut
44	Pupil spoke in Shona
48	Hands-on activity
49	Teacher's grammatical error
51	Teacher accepted 1 word answer
54	Pupil gave 1 word answer
55	Pupil gave 1 word answer
59	Teacher repeated question
60	Teacher made a grammatical error
63	Pupil gave 1 word answer
66	Hands-on activity
67	Teacher made a grammatical error
68	Teacher code-switched to Shona
69	Teacher posed a question in English
70	Silence
71	Teacher posed a question in broken English
73	Pupil gave a phrase answer
74	Teacher accepted a phrase answer
78	Hands-on activity
80	Teacher praised a pupil for a correct answer

82	1 word answer
87	Teacher made a grammatical error
88	Hands-on activity
96	Hands-on activity
97	Teacher praised a pupil for a correct answer
103	Pupil gave a phrase answer
104-6	Teacher posed 3 questions in a row
109	1 word answer
113	1 word answer
117	Teacher was not articulate
119	1 word answer
121	Teacher was not articulate
122	Pupil stuttered
125	Teacher was not articulate
128	Pupil gave a short answer
129	Teacher answered own question
130	Teacher ignored pupil's grammatical error
134	Literal translation from Shona to English by pupil.
139	Saliva mispronounced as if it is a Shona word
145	Teacher provided words & phrases to form a long answer
147	Pupil was not articulate
153	Teacher started sentence for pupil to complete
155	Pupil gave a phrase answer
159	Pupil made a grammatical error

160	Teacher asked pupils to complete sentence he constructed
163	Teacher was not articulate
164	Teacher stuttered
168	Pupil gave a correct answer
169	Teacher praised a pupil & expanded his answer
184	Hands-on activity
188	Teacher made a grammatical error
189	Teacher asked & answered her own question
198	Teacher asked for a Shona word
199	Pupil gave a correct answer in Shona
202	Pupil gave a phrase answer
204	Teacher repeated a question
208	Teacher asked pupils to complete his sentence
212	Teacher misspelt 'faeces' as ' <i>feaces</i> '
216	Teacher accepted 1 word answer
222	Pupil struggled to give a long answer in English
222	Pupil mispronounced ' <i>digestion</i> '
224	Pupil made a grammatical error
230	Teacher assisted pupil to complete a long answer
233	Teacher ignored pupil's grammatical error
235	Group hands-on activities
242	Teacher made a grammatical error
246	Teacher repeated instruction
248	Teacher & class laugh at pupil's wrong answer

Name of school: **Mount Jenya School** (Pseudonym)

Grade: **5**

Lesson 2 topic: **Malaria**

Line number	Code
288	Tr made a grammatical error
293	Chorus answer
296	Pupil gave a correct long answer
297	Teacher probed
301	Silence
302	Teacher asked
303	Pupil made a grammatical error
304	Teacher probed
305	Silence
306	Teacher probed
307	Silence
308	Pupil gave 1 word answer
309	Pupil made a grammatical error
310	Teacher ignored a grammatical error
311	Teacher made a grammatical error
312	Teacher expanded answer
322	Teacher asked 2 ques in a row

323 Teacher repeated a question

325 Pupil made a grammatical error

326 Teacher ignored a grammatical error

328 Teacher repeated a question

330 Pupil gave a wrong answer

332 Teacher asked

333 Teacher wrote on chalkboard

337 Teacher asked

338 Low participation, same hand up

339 Teacher was unhappy

341 Pupil was not articulate

344 Teacher asked

345 Pupil gave a correct answer

346 Teacher praised a pupil

347 Pupils clapped their hands

348 Teacher explained

350 Teacher wrote on chalkboard

366 Dramatisation method used

373 Actress was articulate

378 Actor was articulate

393 Actress was articulate

396 Actress was not articulate

407 Actress stammered

408 Actress stammered

409 Literal translation by actress

412 Literal translation again by actress

415 Actress was not articulate

430 Teacher asked

431 1-word answer

432 Teacher repeated answer

435 Teacher asked

437 1-word answer

444 Teacher asked

445 Pupil made a grammatical error

446 Teacher ignored a grammatical error but accepted the answer

446 Teacher code-switched to Shona

447 Teacher was articulate

448 Teacher asked

451 Correct answer in correct grammar was given

452 Teacher gave subject of sentence & asked pupil to complete sentence

453 Ppl completed sentence properly

455 Teacher asked

456 Short correct answer

457 Teacher expanded answer

464 Teacher made a grammatical error

466 Teacher made a grammatical error again

466 Another teacher's grammatical error

469 Teacher asked

471	Pupil made a grammatical error
472	Teacher ignored grammatical error, praises ppl but repeated correct ans
474	Teacher's long explanation
490	Teacher asked
491	Pupil gave a correct answer
492	Teacher praised pupil & repeated answer
493	Teacher asked and answered own question
495	Teacher repeated answer
498	Teacher asked
499	Pupil gave correct answer
500	Teacher praised pupil
501	Teacher expanded answer
511	Teacher asked
512	Incomplete answer
513	Teacher repeated answer
515	Teacher asked 4 ques in a row
519	1-word answer
521	Teacher expanded answer
529	Pupil's demonstration
542	Teacher asked pupils to construct sentence using given words
544	Silence
545	Teacher asked
546	Correct complete answer
548	Teacher asked

549	Correct answer
551	Teacher probed
553	Full answer was given
557	Pupil was not articulate
559	Teacher repeated answer
562	Teacher asked
563	Pupil made a grammatical error
564	Teacher repeated answer
568	Pupil made a grammatical error
569	Teacher ignored grammatical error
570	Teacher gave a long explanation
576	Teacher started a sentence & asked pupils to complete it
577	Pupil completed sentence
581	Teacher corrected grammatical error
586	Pupil gave a full answer
587	Teacher praised a pupil
588	Teacher expanded answer
596	Teacher made a grammatical error

12 (d). Categories, themes and concepts derived from lessons 1 to 6.

Categories, themes and concepts derived from lesson 1

- When the teacher asked a question in English during an ES lesson, silence ensued (lines 2, 4, 9, 11, 70).
- When the teacher code-switched to Shona, pupil participation became higher (lines 5, 68, 198).

- When the teacher code-switched to Shona, participation became higher. More than half the class raised up their hands to show that they wanted to speak. When pupils spoke, they gave correct answers (lines 7, 12, 199).
- When pupils were allowed to code-switch to Shona, they were eager to speak and they gave correct answers (lines 7, 13, 44, 199).
- Pupils usually gave one-word, two-word or short phrase answers when asked in English (lines 36, 51, 54, 55, 63, 73, 82, 103, 109, 113, 119, 128, 155, 202, 216).
- Teacher misspelt an English word (line 212).
- Teacher ignored pupils' grammatical errors (lines 130, 233).
- Teacher repeated questions and/or instructions (lines 20, 28, 59, 204, 246)
- Teacher made a grammatical error (lines 49, 60, 67, 71, 87, 188, 242).
- Teacher was not articulate (lines 32, 33, 117, 121, 125, 163).
- Pupil was not articulate (line 147).
- Teacher stuttered (line 164).
- Pupil stuttered (line 122).
- Pupil mispronounced word (line 139, 222)
- Pupil struggled to give a long answer (lines 222, 230).
- Pupil made a grammatical error (lines 159, 224).
- Literal translation from Shona to English by pupil (Line 134)
- Teacher used a hands-on activity (lines 24, 48, 66, 78, 88, 96, 184, 235).
- Teacher asked and answered his/her own question (lines 129, 189).
- Teacher asked pupils to provide missing words in his sentences (lines 143, 153, 160, 208).

Categories, themes and concepts derived from lesson 2

- The teacher made a grammatical error (lines 288, 311, 464, 466, 596).
- A pupil made a grammatical error (lines 303, 309, 325, 445, 563, 568).
- The teacher ignored a grammatical error (lines 310, 326, 446, 472, 569).
- The teacher corrected a grammatical error (line 451, 581).
- The teacher code-switched to Shona (line 446).
- The teacher expanded an answer (lines 312, 501, 521, 588).
- The teacher repeated an answer (lines 323, 432, 472, 492, 495, 513, 559, 564).
- The teacher praised a pupil (line 346, 472, 587).

- The teacher repeated a question (lines 322, 323, 328).
- The teacher probed (lines 297, 304, 306, 551).
- Silence (lines 301, 305, 307, 544).
- Chorus answer (line 293).
- The teacher asked (lines 302, 332, 337, 344, 430, 435, 444, 448, 452, 455, 469, 490, 498, 511, 542, 545, 548, 562, 576).
- Dramatisation method used by the teacher (line 366).
- Demonstration by a pupil (line 529).
- The teacher wrote on the chalkboard (line 333, 350).
- A pupil gave a correct long answer (lines 296, 546, 553, 586).
- A pupil gave a wrong answer (line 330).
- A pupil gave 1-word answer (lines 308, 345, 431, 437, 456, 491, 499, 519, 549).
- A pupil gave an incomplete answer (line 512).
- Low participation (line 338, 339).
- The teacher asked and answered her own question (line 493).
- The pupil was not articulate (line 341, 396, 415, 557).
- The pupil stammered (line 407, 408).
- Literal translation by pupil from Shona to English (line 409, 412).
- The teacher asked a pupil to complete a sentence (line 452, 542, 577).

Categories, themes and concepts derived from Lesson 3

- Teacher asked (Lines 666, 668, 675, 684, 693, 706, 708, 718, 729, 732, 736, 739, 743, 752, 766, 779, 794, 812, 814, 829, 947, 1008).
- Teacher asked a yes/no question (Lines 707, 827).
- Pupil gave 1-word, phrase & incomplete answers (Lines 671, 677, 688, 701, 714, 722, 724, 731, 753, 767, 769, 787, 793, 813, 834, 882, 1009).
- Teacher probed (Lines 689, 723, 740, 745, 747, 768, 786, 790).
- Teacher code-switched to Shona from English (Lines 801, 809, 1034).
- Teacher used media (Line 633).
- Pupils gave chorus answers (Lines 667, 701, 731, 734, 744).
- Teacher accepted chorus answer (Line 7010).
- Teacher rejected chorus answer (Line 668).
- Teacher made grammatical errors (Lines 672, 860).

- Pupils made grammatical errors (Lines 781, 785, 896, 900, 955).
- Teacher was articulate (Lines 676, 678).
- Teacher repeated pupils' answers (Lines 678, 814, 825, 828, 831, 837).
- Pupil gave a long answer (Line 697).
- Pupils gave correct complete answers (Lines 710, 733, 797, 839).
- Hands-on activities were used (Lines 705, 738, 741, 757, 817).
- Pupils discussed in Shona (Line 989).
- Wrong answers given by pupils (746, 748, 771, 773, 848, 858, 885, 921).
- Wrong answers accepted by the teacher (Lines 887, 973).
- Literal translation by pupils (Line 846).
- Teacher praised pupils (Lines 715, 726, 773, 782, 840, 848, 902, 923).
- Teacher repeated questions (Lines 712, 721, 814, 821, 845).
- Teacher expanded answers (Lines 788, 800).
- Pupil provided missing word (Line 699).

Categories, themes and concepts derived from lesson4

- Teacher asked (Lines 1053,1101, 1109, 1112, 1125, 1141, 1152, 1147, 1133, 1121, 1117, 1150, 1165, 1176, 1200, 1067, 1074, 1085).
- Pupils gave 1- word, 2- word and phrase-answers (Lines 1055, 1057, 1058, 1060, 1062, 1075, 1105, 1110, 1114, 1116, 1118, 1120, 1122, 1126, 1128, 1130, 1142, 1144, 1146, 1149, 1151, 1153, 1155, 1159, 1166, 1178, 1138, 1243, 1245).
- Teacher repeated answer (Lines 1056, 1061, 1067, 1096, 1115, 1117, 1050, 1152, 1239, 1241).
- Tr urged pupil to speak up (Line 1065).
- Teacher code-switched to Shona (Lines 1076, 1192, 1212, 1072).
- Pupil code-switched to Shona (Line1071).
- Pupil made a grammatical error (Line 1086).
- Teacher ignored grammatical error (Line 1088).
- Teacher made a grammatical error (Lines 1111, 1156, 1179).
- Teacher asked pupil to complete sentence (Lines 1248, 1096).
- Teacher probed (Lines 1091, 1145).
- Teacher asked for chorus answer (Lines 1097, 1099).
- Pupils gave a chorus answer (Lines 1098, 1100, 1136, 1158).

- Literal translation from Shona to English (Line 1163).
- Pupils discussed in Shona (Lines 1215, 1221, 1236).
- Wrong pronunciation (Lines 1104, 1133, 1138).
- Silence (Line 1134).
- Pupil gave a complete answer (Lines 1089, 1094, 1201).

Categories, themes and concepts derived from lesson 5

- Teacher asked a question (Lines 1279, 1281, 1283, 1288, 1294, 1306, 1311, 1334, 1336, 1354, 1368, 1385, 1389, 1396, 1403, 1409, 1415, 1422, 1424, 1429, 1441, 1446, 1456, 1470, 1483, 1491, 1498, 1512, 1533, 1542, 1547, 1554, 1565, 1573, 1585, 1587, 1591).
- Pupils gave 1- word, 2- word, phrase- answers (Lines 1335, 1344, 1346, 1348, 1350, 1352, 1355, 1357, 1363, 1366, 1369, 1388, 1390, 1392, 1394, 1401, 1404, 1410, 1416, 1423, 1426, 1431, 1442, 1447, 1457, 1471, 1492, 1499, 1501, 1513, 1543, 1548, 1567, 1592).
- Pupils gave incomplete answers (Lines 1282, 1284, 1293, 1484, 1567, 1586, 1589, 1605).
- Teacher utilised activity-based approaches (Lines 1402, 1461, 1475, 1495, 1525, 1552, 1596).
- Teacher code-switched to Shona (Lines 1300, 1322, 1360).
- Pupils discussed in Shona (Lines 1557, 1571).
- Pupils sang a song in Shona (Lines 1302, 1304).
- Pupils made grammatical errors (Lines 1291, 1318, 1561).
- Teacher made grammatical errors (Lines 1481, 1559, 1579, 1297, 1288).
- Teacher repeated answers (Lines 1292, 1321, 1345, 1347, 1349, 1351, 1353, 1356, 1358, 1364, 1367, 1391, 1393, 1395, 1443, 1448, 1500, 1502, 1514, 1593).

Categories, themes and concepts derived from lesson 6

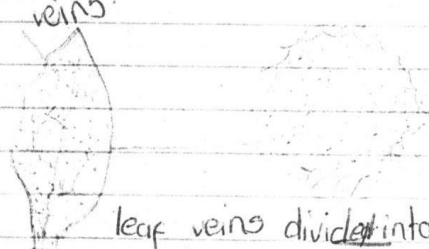
- Teacher asked (Lines 1619, 1623, 1625, 1627, 1631, 1633, 1638, 1641, 1645, 1649, 1651, 1657, 1662, 1665, 1670, 1678, 1691, 1705, 1713, 1715, 1719, 1739, 1745, 1750, 1753, 1791, 1815, 1864, 1867, 1890, 1896, 1903, 1913, 1915, 1919, 1924, 1929, 1937, 1962, 1970, 1997, 2002).

- I- word answers (Lines 1620, 1622, 1624, 1626, 1628, 1630, 1634, 1914, 1636, 1647, 1696, 1708, 1916, 1996, 1998, 2004).
- Teacher repeated answers (Lines 1621, 1685, 1724, 1741,).
- Teacher repeated questions (Lines 1638, 1671, 1716, 1746, 1963).
- Teacher code-switched to Shona (Lines 1629, 1635, 1971, 2005, 2010, 1994, 2027, 2043, 2066, 2078).
- Mispronounced words (Lines 1632, 1758, 1975).
- Complete answers given (Lines 1640, 1642, 1650, 1656, 1660, 1664, 1673, 1679, 1683, 1720, 1723, 1740, 1792, 1817, 1820, 1826, 1866, 1868, 1891, 1938).
- Teacher made grammatical errors (Lines 1701, 1728, 1729, 1730, 1749, 1790, 1797, 1832, 1865, 1878, 1895, 1939).
- Pupils made grammatical errors (Lines 1667, 1718, 1755, 1839).
- Discussions were held in Shona (Lines 2019, 2051, 2036).
- Literal translation by pupil (Line 1935).
- Teacher asked pupil to give complete answer (Line 1648).
- Teacher accepted incomplete answer (Line 1697).
- Silence after the teacher's question (Line 1923).

APPENDIX 13

(a). Pupils' ES written work samples

Wednesday 2.5 October 2016
E15 - Trees breathe ✓

1. During respiration (breathing) carbon dioxide passes into the leaves and oxygen gas passes out of the leaves.
2. Human beings breathe in oxygen and animals.
3. Human beings and animals breathe out carbon dioxide.
4. Carbon dioxide passes into the leaves. ✓
- 2/5 Oxygen passes out of the leaves. ✓
- 7/6. Gases pass in and out of the leaves because of respiration.
7. When trees breathe, oxygen gas passes into the leaves through tiny pores and carbon dioxide gas passes out.
8.  very tiny veins.

leaf veins divided into smaller veins
Improve handwriting

Strength, Stamina and Flexibility.

9. Any two games children play during their spare time are:

(i) Hockey.

(ii) Chess.

10. Leisure is when we do something for fun.

Connections

4. Gardening is leisure.

Friday 20 October 2016

Environmental Science

Landform processes

- Appicant Landforms:

1. Water flows from high places to low places.

2. All rivers flow back to the sea down hill.

3. A delta is a low flat fertile land which discharge

^{6.4}₁₄ into ~~two three~~ three A plateau is a fairly flat area that is usually high in altitude.

5. Low lands or basins is in the Ganga basin.

6. Five important features of a map are:

(i) Key.

(ii) Compass.

(iii) Scale.

(iv) Title.

(v) Border.

7. The 0° line of altitude is the equator. It divides the globe into two hemispheres.

8. The biggest river in Africa is the Niger. The biggest dam in Africa is a dam Mosi-oa-Tunya.

Tuesday

1 November 2016

Environmental Science

Landforms and Maps

1. Big areas are represented on a paper by using a scale.
2. Maps are drawn to scales.
3. Area p
3. Aerial photographs are pictures taken from a high place or atmosphere.
4. When a scale is written as ratio unit are removed and is always in mm.
5. A scale is usually written in millimetres.
6. The scale 1:1000000 means (1mm) on a paper represents the area 2mm on the ground.
7. Mount Kilimanjaro is a volcanic mountain.
8. Inyangani mount is the biggest mountain in Zimbabwe.
9. Mount Kilimanjaro is the biggest mountain in Africa.
10. The biggest desert in the world is Sahara.
11. The highest mountain in the world is mount Everest.

Put more effort

Wednesday 4 November 2016 ✓

Environmental Science ✓

1. A drawing ~~with~~ shows an area ~~in~~ map.
2. Symbols which show place features on a map are called symbols.
3. Natural features on a map are called keys.
4. The main direction shown on the map is North ✓
5. The part which explains what ~~is~~ symbols on a map stand for is the land forms.
6. Bridges and buildings are man-made features that we can show on a map ✓

Corrections ✓

A drawing which shows an area ~~together with~~ with the features found ~~on~~ map

- 1 A ^drawing shows an Area ✓
is a map
 - 2 Signs which show places
on a map are called symbols ✓
 - 3 Natural features on a map
are landforms
 - 4 The main directions shown
on a map is North ✓
 - 2/6 5 The part which explains
what symbols on a map
stand for is called the key ✓
 - 6 Bridges and buildings
are manmade features that
we can show on a map
-

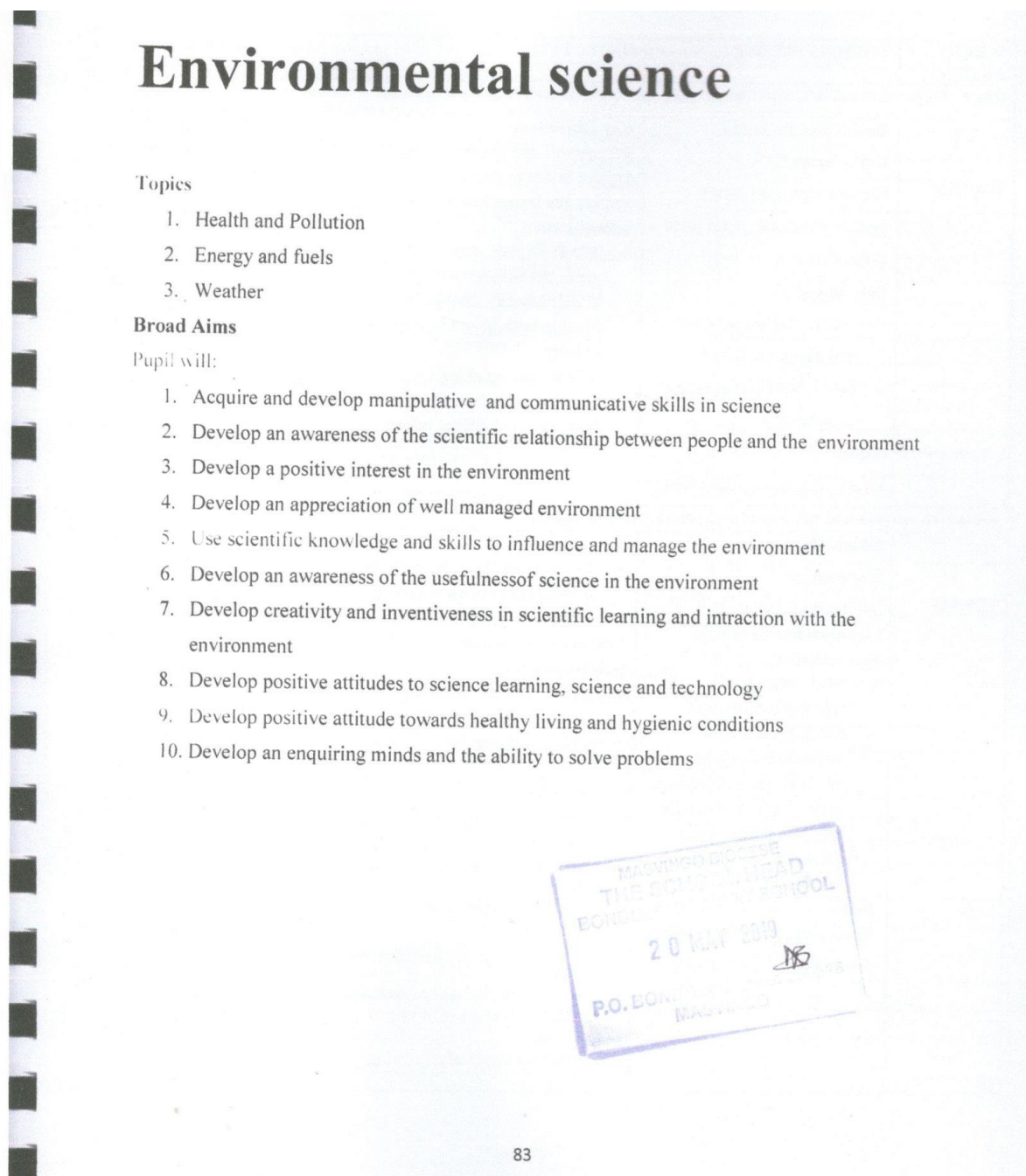
corrections ✓

1 A

- 1 A drawing shows an area for
places is a map ✓
 - 2 Signs which shows places
on a map are called symbols ✓
 - 3 Natural features on a map
are landforms
 - 4 Bridges and buildings are made
shown on a map
-

(b). Teachers' documents samples

i. ES Scheme – Cum – Plan



WEEK ENDING	TOPIC/CONTENT	OBJECTIVES	ASSUMED	S.O.M
1 10/05/19	Health and Pollution Key concept Humans reproduce when mother's egg and sperm joins in the womb Sub concepts S.C 1: Our bodies grow and change with age S.C 2: Boys and girls age at puberty Skills Identifying, listing, describing	Key Objectives: learners will use information to explain that humans reproduce During the lesson learners will: Sub-objective S.O 1: Explain how our bodies grow and change with age S.O 2: Identify changes that take place in both boys and girls at puberty S.O 3: Answer at least 6 questions about the changes in both boys and girls at puberty	Learners are aware that bodies change with age	Ministry of Primary and Secondary Education E.S. Syllabus Grade 1-7 page 12-13 Step in E.S Tr's book page 43-45 Step in E.S pupil's book page 63-64
2 17/05/19	HEALTH Key concept Humans have reproductive organs Sub concepts SC 1: Male have reproductive organs SC 2: Female have reproductive organs SC 3: Humans reproduce male sperms and female egg join in the womb SC 4: The baby develops in the womb Skills Explaining, drawing, labeling, describing	Key objective: - Learners will use diagrams to describe the male and female reproductive organs Learners will be able to: Sub Objectives - S.O 1: Identify the male reproductive organs - Name and identify the male parts - S.O 2: Draw female reproductive organs - Describe the female reproductive organs in simple terms - S.O 3: Explain what fertilization is - Describe how fertilization takes place - S.O4: Describe and explain how a baby develops in mother's womb - State the needs of a growing baby	Learners are aware of male and female body parts	E.S. Syllabus Grade 1-7 page 13-13 Step in E.S Tr's book page 43-45 Step in E.S pupil's book page 63-66

MEDIA	METHODS AND ACTIVITIES	Competencies	EVALUATION
Chart with male anatomy Work on chalkboard	Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: The teacher displays anatomical pictures on page 63 of their pupil book 1. learners discuss how learners grow from babies to adults 2. In groups learners discuss the changes that occur CONC: Individual written work Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: Recap of previous lesson 1. Discussing the changes that occur at puberty 2. Answering of questions in groups 3. Groups report back CONC: Learners answer oral questions Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: Teacher and learners discuss work covered 2.1 learners write work in their books CONC: Revision Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: learners study a chart with male reproductive system 1. Naming parts 2. Discussing the function of each part as a class 3. Answering questions in group 4. Report back CONC: Written work	Self management Decision making Problem solving Drawing	
Chart with male anatomy Work on chalkboard	Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: Recap of previous lesson 1. Teacher explain female reproductive organ 2. Pupils name the parts 3. Discussing and describing the system CONC: Answering questions as a class Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: Defining fertilisation 1. Teacher explain that the sperm cell and the egg cell should join for fertilisation to take place 2. Discussing how fertilisation take place CONC: Answering oral questions Methodologies: illustration, group work, describing, discussion, demonstration, poems INTRO: Recap of previous lesson 2. Teacher explain and describes using a diagram how a baby develops in a mother's womb 3. Teacher answer question in groups 4. Report back CONC: Written work	Self management Decision making Problem solving Drawing Describing	

ii. Report on Scheme – Cum – Plan by School Head

~~PONDICHERY~~ PRIMARY SCHOOL

SCHEME CUM PLANNING REPORT

NAME OF TEACHER: ~~XXXXXXXXXXXX~~ EC No. ~~XXXXXXXXXX~~ GRADE: 6 ~~XXXXXX~~

WEEKENDING DATES:

Scheme - Cum - Planning was completed on time which is commendable. Put weekending dates instead of numbering the weeks.

TOPIC/CONTENT:

Both these two were clearly outlined with the topic at the top then the content to be covered below. This is good.

OBJECTIVES:

Whilst measurable objectives have been listed these should cover the three domains mostly i.e. the affective, the cognitive and the psychomotor. There is room to improve.

ASSUMED KNOWLEDGE:

Well stated and included in each subject area

METHODOLOGY/ACTIVITIES:

First to be stated are methodologies then activities follow which is good but not all methods are listed especially reporting and writing work were left on conclusion to lessons are not clear and some are left out as written work is the last activity written.

COMPETENCIES (SKILLS):

The teacher should record as many as more than one competence depending on the activities of the lesson e.g. RME with lesson 1 - identifying, describing, explaining, discussing

REFERENCES/SOM:

According to recommendation on referencing it should be fully copied as it is e.g. Ministry of Primary and Secondary Education, Primary School Environmental Science Syllabus Grade 1-7, p.45.

MEDIA/RESOURCES:

Various media has been listed per lesson which is good. However, quantify some of it e.g. 10 task cards, 3 buckets etc.

EVALUATION:

The space for evaluation of lessons is too small, using a separate book is strongly recommended with Yeager, groups or fractions and way forward outlined in the evaluations of individual lessons.

CONCLUSION/RECOMMENDATIONS:

The teachers are complimented for drawing up Scheme Cum Plans on time. Editing some of the recommendations is permissible where possible e.g. on skills and weekending dates. Other typographic errors can be edited as well.

SUPERVISOR: BEREJENA D.N.

TEACHER'S SIGNATURE: _____

DESIGNATION: HEAD

DATE: 11/01/18

BERENGO DIOCESE
SCHOOL HEAD

iii. Report on ES Lesson Observation by School Head

KONDOLU PRIMARY SCHOOL

LESSON OBSERVATION REPORT

1. NAME OF TEACHER..... ~~XXXXXXXXXX~~ *
2. E.C.No..... ~~XXXXXXXXXX~~
3. CLASS TAUGHT..... ~~XXXXXXXXXX~~
4. NUMBER OF PUPILS..... 26
5. DATE OF VISIT..... 19/06/18
6. LESSON OBSERVED..... E.S. Science: Global warming
7. LESSON PREPARATION..... The teacher had a chart, strips with facts on effects of global warming and blank cards which were effectively used during the lesson
8. LESSON PRESENTATION
 - A. INTRODUCTION..... Learners were asked to define 'global warming' which was done and a revision of work covered previously was used as a recap to the lesson
 - B. CONDUCT OF LESSON..... In groups learners listed causes of global warming. A collection of some of the causes of global warming was necessary as a lot of theory was done. The teacher had to do some explanations to make learners understand the day's lesson purpose
 - C. WRITTEN WORK..... Important facts about global warming were written on strips for learners to read before understanding written work was assigned
 9. CONCLUSION..... Learners stated facts they had learned about global warming. The remaining of the lesson will be an concluded the lesson
 10. ORGANISATION..... The classroom was found neat with charts displayed according to subject areas. Children's work is current
 11. PERSONAL..... The teacher is cooperative and mixes well with colleagues and superiors
 12. CONCLUSION AND RECOMMENDATIONS..... The teacher's preparations before lesson delivery was good though there was need to collect pictures of effects of global warming. Putting important facts on chalkboard should always be done to reinforce on important facts

SIGNATURE..... ~~XXXXXXXXXX~~
DESIGNATION..... Head
SIGNATURE OF TEACHER..... ~~XXXXXXXXXX~~



iv. Report on Documents Supervision by School Head

BONDOLFI PRIMARY SCHOOL
TEACHER'S DOCUMENTS SUPERVISION

1. Name of teacher: Ms Munie M. EC No: 07106228
3. Class taught: 2 Class No. of documents seen: 8
5. Date of supervision: 17/11/17
6. General condition:

Neatly covered and uniformly labelled with the necessary information.

7. ATTENDANCE REGISTER:

Names of learners are neatly written and information is recorded. Record up to date.

8. SCHEME CUM-PLAN:

All the subjects are planned with well laid and achievable objectives. However activities needs needs to improve, they need to be more and clearer.

9. TESTS RECORD:

All subjects are tested per fortnight and content is of grade level.

10. INDIVIDUAL RECORD:

Very informative and marks show progress.

11. READING RECORD BOOK: Needs to be up dated. but progress is shown.

12. IN CLASS REMEDIATION

The teacher is assisting learner that grasp concepts slowly. There is progress to those who are being assisted.

13. EXTENSION RECORD

Gifted learners are given challenging work and evidence is shown in learners' exercise books.

14. LEVY PAYMENT RECORD.

Neatly recorded amounts and receipt numbers.

15. RECOMMENDATIONS:

The teacher is commended for keeping her records up to date however there is need plan more specific activities.

SIGNATURE: Masa R.
SIGNATURE: Munie

DESIGNATION: _____
DATE: 12.01.2017

MASVINGO DIOCESE
THE TEACHER IN CHARGE
BONDOLFI PRIMARY SCHOOL
P.O. BONDOLFI
TELEPHONE: 266916
MASVINGO

v. Report on Book Supervision by School Head

2. E.C NUMBER: 0500044 IS
 3. CLASS 6 BLUE
 4. DATE OF INSPECTION 16/11/17

5. CONDITION OF BOOKS
Very good care of the exercise books which were uniformly labelled and plastic backed was noted. Keep it up!

6. NUMBER OF EXERCISES PER SUBJECT

WEEK COVERED	MATHS	ENGLISH	SHONA	S/STUDIES	R.M.E.	E/S	HIV&LIFE SKILLS	H/E	AGRIC
10	33	40	29	6	8	6	-	-	-

7. AMOUNT AND FREQUENCY OF WORK

The range of items show that adequate practice is given to the learners but the frequency in all subject areas except English leaves a lot desired.

8. QUALITY OF WORK

The exercises are of very good quality in Muzenda and Gudhuni's books however more is need to continue to monitor learners way of shaping letters like g, p, Kate.

9. NEATNESS

Generally, the majority of learners' work is neatly presented. (See Muzha, Muzindi, Chinlonde books etc. A few learners like Musingarira and Rejone can improve.)

10. MARKING

The teacher is commended for marking all daily exercises of the learners. It is however expected that marking to start from the date and check on accuracy before committing a tick.

11. OBSERVATIONS ON INDIVIDUAL PUPILS

Nhweke, Beimba etc need to be assisted in proper letter shaping. A number of corrections were found unmarked (See Muzha, Muzi, Rejone etc). Forhate's E/S exercise not completed.

12. CONCLUSION AND RECOMMENDATIONS

The teacher is commended for emphasising on proper care of the books and giving her class quality written work. She is however required to (i) give adequate number of exercises as per blue print (ii) check on the accuracy of learners proper shaping of letters and (iii) give weekly compositions.

Signature Bergesa Date 16/11/17

Designation Head

Signature of teacher Shworese Date 16/11/17

P.O. BONDOLFI, TEL: 2609
 MASVINGO

vi. Report on a Teacher by District Education Officer

all communications should be addressed to
 "The Provincial Education Director for
 Education, Sport and Culture"
 Telephone: 263585/263542
 Fax: 039-263261



REF: ~~WOKOMONDO/CA~~
 E.C No.: ~~0942442~~
 Ministry of Primary and
 Secondary Education
 Box 89 Masvingo

DISTRIBUTION

H/O -1
 P/O -1
 D/O -1
 HEAD -1
 TEACHER-1

CONFIDENTIAL

SECTION A	PERSONAL DETAILS
NAME OF TEACHER	XXXXXXXXXXXXXXXXXXXX
E.C NUMBER	XXXXXXXXXX
QUALIFICATIONS	
ACADEMIC	O LEVEL
Where and when obtained	SERIMA HIGH SCHOOL 1996
PROFESSIONAL	DIPLOMA IN EDUCATION
Where and when obtained	BONDOLFI TEACHERS COLLEGE 2003
TYPE OF APPOINTMENT	PERMANENT
DATE OF JOINING SERVICE	01-01-2004
LENGTH OF EXPERIENCE	10 YEARS
EXPERIENCE AT PRESENT STATION	4 YEARS
NAME OF SCHOOL	BONDOLFI CENTRAL PRIMARY SCHOOL
REGISTRATION NUMBER	0079
Dept/ stn code	3430/0710
RESPONSIBLE AUTHORITY	ROMAN CATHOLIC
REGION	MASVINGO
DISTRICT	MASVINGO
DATE OF LAST ASSESSMENT	NIL
DATE OF CURRENT VISIT	02/06/2014
TIME	1100.....1130
CLASS TAUGHT	GRADE 6A
SUBJECT / LESSON OBSERVED	ENGLISH Reading for fluency
PURPOSE OF ASSESSMENT	1. To assess member's teaching skills. 2. To assess member's teaching skills 3. To assess quantity and quality of work

DISTRIBUTION

H/O -1
 P/O -1
 D/O -1
 HEAD -1
 TEACHER-1

CONFIDENTIAL

SECTION A	PERSONAL DETAILS
NAME OF TEACHER	MUKOMONDO CALISTO
E.C NUMBER	0942842C
QUALIFICATIONS	
ACADEMIC	O LEVEL
Where and when obtained	SERIMA HIGH SCHOOL 1996
PROFESSIONAL	DIPLOMA IN EDUCATION
Where and when obtained	BONDOLFI TEACHERS COLLEGE 2003
TYPE OF APPOINTMENT	PERMANENT
DATE OF JOINING SERVICE	01-01-2004
LENGTH OF EXPERIENCE	10 YEARS
EXPERIENCE AT PRESENT STATION	4 YEARS
NAME OF SCHOOL	BONDOLFI CENTRAL PRIMARY SCHOOL
REGISTRATION NUMBER	0079
Dept/ stn code	3430/0710
RESPONSIBLE AUTHORITY	ROMAN CATHOLIC
REGION	MASVINGO
DISTRICT	MASVINGO
DATE OF LAST ASSESSMENT	NIL
DATE OF CURRENT VISIT	02/06/2014
TIME	1100.....1130
CLASS TAUGHT	GRADE 6A
SUBJECT / LESSON OBSERVED	ENGLISH Reading for fluency
PURPOSE OF ASSESSMENT	1. To assess member's teaching skills.
	2. To assess member's teaching skills
	3. To assess quantity and quality of work

SECTION B

ASSIGNMENTS AND RESPONSIBILITIES

TEACHING ASSIGNMENT

The member was teaching Grade 6a on the day of visit. The gender composition of his class was as follows; 24 boys and 21 girls. Only one pupil namely, Ndlovu Lungile was absent. In fact the pupil had not returned since schools opened for term two.

POST OF SPECIAL RESPONSIBILITIES

NIL

SPORT

The member trains soccer and athletics.

SCHEME-CUM-PLAN

The member's schemes of work were scrutinized and the following observations were made.....

- 1 Most subjects had broad aims and topics to be covered in place.
- 2 Do not combine weeks for the sake of it e.g. weeks 11&12 in your schemes.
- 3 Topics in mathematics are not properly stated as they are in the syllabus.
- 4 In R M E you need to vary the formulation of your objectives. There is too much of '.....children should be able to retell the story.....'
- 5 Environmental Science was schemed following the B E S T format which is proper but lessons should be properly separated by lines.
- 6 In Shona some of your objectives are not numbered plus in some weeks objectives are fewer than the number of lessons.
- 7 Your evaluation is generally skeletal. Beef it up by stating strengths and weaknesses.

INDIVIDUAL AND TESTS RECORD BOOK

Both record books were available and the member makes use of them. All tests administered so far were recorded. You should however critically evaluate all the tests in the tests record book.

REMEDIAL AND EXTENSION

Both record books were available and there was evidence to show that the record books are used effectively by the member to the benefit of children especially the sections on the child's personal information.

CLASS REGISTER

It was available and being marked and totaled daily. All the sections were properly completed.

CHILDREN'BOOKS

All exercise books seen looked quite presentable. They are all covered in khaki and plastic. As for written work the following statistics were obtained.....

1. Compositions -4 written exercises. See books for Thomas, Roderick and Blessing.
2. Mathematics -14 written exercises see books for Hazvinei, Panashe and Ebenezer.
3. Content- 10 written exercises see books for Bernard, Tawedzerwa and Blessing.
4. English Language-8 written exercises. See books for Moses, Patience and Rejoice.
5. Shona-9 written exercises. See books for Roderick, Rejoice and others.
6. On the whole children are given written in all subjects but however, it is not enough in all subjects. You should also monitor pupils like Hazvinei, Moses, Talent and others to do their work in a neat and orderly manner.

LESSON PRESENTATION

1 The member presented an English lesson on Reading for fluency. The member initially dealt with unfamiliar words or words he thought were difficult to the children. Each word was defined and in some cases used in sentences as a way of trying to make children understand. Very few children were able to give meanings of words. The member then asked children to read the passage in turns.

2 In the second step the member gave children some questions to work on in their groups. It was really difficult and a bit confusing to tell what exactly the member wanted to teach about. The member was advised to avoid dealing with too many concepts at the same time or in one lesson. Reading for fluency has nothing to do with meanings of words and how to use them in sentences. Fluency is mainly about barking at print and the member should have only concentrated on this and avoid all the other aspects which he dealt with in that lesson. Therefore the lesson was not all that successful.

CLASSROOM APPEARANCE

The classroom environment looks very conducive to learning. There are charts of variety and colour. The majority of them are of good quality. However, there are some which are old and torn especially those which are on the bottom part of the classroom walls. The science corner is available but there is nothing much to write home about. You need to work on it or to spruce it up so that children in your class can benefit. You should also do away with all the charts that have dog ears. They are no longer of any benefit to the children. Actually, they are an eyesore. Children's work is on display but you should write comments horizontally.

SUGGESTIONS AND RECOMMENDATIONS

By and large positive progress was noted in Grade6A taught by Mukomondo C at Bondolfi Central Primary school. There is clear evidence to show that the member is doing his best to

assist children under his care. However, he can still further improve his performance by implementing the following suggestions.....

- Do not combine weeks unnecessarily when scheming.
- Separate lessons in all subjects by ruling off lines.
- In all subjects frequency of written work per week should be improved and you should also expose children to questions that require construction of answers in full sentences.
- In RME, some of your objectives should state clearly the moral lessons that we learn from the biblical stories that are taught and also, you should vary the formulation of these objectives. You seem to dwell much on the aspect of retelling the story.
- Your evaluation should always state strengths and weaknesses

NAME OF REPORTING OFFICE- ~~TADANNGO FAN~~

DESIGNATION

EDUCATION INSPECTOR

NAME OF SUPERVISEE

~~MUKWONGO GANSTO~~

SIGNATURE OF SUPERVISOR.....



Analysis of documents

ENVIRONMENTAL SCIENCE SCHEME-CUM-PLANS

6. Develop an awareness of the usefulness of science in the environment
7. develop creativity and inventiveness in scientific learning and intraaction with the environment
10. develop an enquiring minds and the ability to solve problems

More errors in the scheme-cum-plans are as follows:

In week 1 under Health and Pollution:

Humans reproduce when mother's egg and sperm joins in the womb

Male have reproductive organs

Female have reproductive organs

Learners will use information to explain that humans reproduce

Identify the male reproductive organe

INTRO: The teacher directdirectslearnersto pictures on page 63 of their pupil book

INTRO: Teacher andlearnersdiscuss work covered

1. Teacher show female reproductive organ
2. Teacher explain and describes using a diagram how a baby develops in a mother's womb
3. Teacher answer question in groups

SCHEME-CUM-PLANNING REPORT

The School Head's comments on these scheme-cum-plans dated 11/01/18 read:

All subjects are tested per fortnight and content is of grade level.

CONCLUSION/RECOMMENDATIONS:

“The teachers are complemented for drawing up Scheme-cum-plans on time. Editing some of the recommendations is permissible where possible e.g. on skills and weekending dates. Other typographic errors can be edited as well.”

TEACHER’S DOCUMENTS SUPERVISION

In this section, there are grammatical errors as indicated below:

8. SCHEME-CUM-PLAN:

All the subjects are planned with well laid and achievable objectives. However activities needs needs to improve, they need to be more and clearer.

9. TESTS RECORD:

12. IN CLASS REMEDIATION

The teacher is assisting learner that grasp concepts slowly. There is progress to those who are being assisted.

15. RECOMMENDATIONS: The teacher is complemented for keeping her records up to date however there is need plan more specific activities.

REPORT ON A TEACHER BY THE D.E.O.

SUGGESTIONS AND RECOMMENDATIONS

- In all subjects frequency of written work per week should be improved and you should also expose children to questions that require construction of answers in full sentences.

APPENDIX 14

4.2.2.1 First face-to-face in-depth interview with Kuda Dzidzo (Pseudonym)

- 4.2.2.1.1 Kuda is a 12 year village boy.
- 4.2.2.1.2 His parents are peasant farmers residing in rural Zimbabwe.
- 4.2.2.1.3 He likes ES.
- 4.2.2.1.4 He finds it difficult.
- 4.2.2.1.5 He has high hopes – wants to be a pilot.
- 4.2.2.1.6 His teacher teaches ES in English.
- 4.2.2.1.7 Kuda does not understand everything said by his teacher in English.
- 4.2.2.1.8 He only responds to questions asked in Shona.
- 4.2.2.1.9 Language spoken at home is Shona.
- 4.2.2.1.10 No TV set at home.
- 4.2.2.1.11 No radio at home.

4.2.2.2 Second face-to-face in-depth interview with Kuda Dzidzo

- 4.2.2.2.1 His teacher code-switches to Shona if pupils are not following.
- 4.2.2.2.2 When asked by the teacher, he gives a one-word answer.
- 4.2.2.2.3 When a question is asked, pupils fail to respond because they cannot express themselves in English.
- 4.2.2.2.4 He finds English difficult.

4.2.2.3 Third face-to-face in-depth interview with Kuda Dzidzo

- 4.2.2.3.1 Kuda thinks ECD should be taught in Shona.
- 4.2.2.3.2 If they are taught in English, they will not understand.
- 4.2.2.3.3 Grades four to seven should be taught in English.
- 4.2.2.3.4 Pupils do not understand everything said in English by the teacher.
- 4.2.2.3.5 Teachers should explain in Shona.

4.2.2.4 First face-to-face interview with Tendai Chiremba (pseudonym)

- 4.2.2.4.1 Tendai Chiremba is a grade six teacher.
- 4.2.2.4.2 His teaching experience spans 15 years.
- 4.2.2.4.3 His mother tongue is Shona.
- 4.2.2.4.4 He teaches ES in English.

4.2.2.4.5 He is not aware of government policy on the LoLT.

4.2.2.5 Second face-to-face interview with Tendai Chiremba

4.2.2.5.1 Tendai Chiremba is not aware of the Education Act of 1987.

4.2.2.5.2 Also not aware of the Education Act Amendment of 2006.

4.2.2.5.3 Teachers are not aware of the Education Act and the Amendment of 2006.

4.2.2.5.4 Teachers were not following policy.

4.2.2.5.5 Therefore, policy was not useful.

4.2.2.5.6 A new useful policy was needed.

4.2.2.6 Third face-to-face interview with Tendai Chiremba

4.2.2.6.1 Teacher now aware of Education Act of 1987 and Amendment Act of 2006.

4.2.2.6.2 Teachers are using English to teach ECD, grades two and three, Junior and Upper primary school levels.

4.2.2.6.3 There is no match between policy and practice.

4.2.2.6.4 Teachers should continue using English as LoLT.

4.2.2.6.5 Pupils do not follow when taught in English.

4.2.2.6.6 Continue teaching in English, but explain in Shona.

4.2.2.6.7 Pupils are unwilling to participate in class oral discourse or answer questions.

4.2.2.6.8 Very short answers – one word or short phrase.

4.2.2.6.9 Caused by pupils' limited English proficiency.

4.2.2.6.10 Pupils lack confidence to speak in English.

4.2.2.6.11 Reason: they know they have not mastered enough English to enable them to express themselves in English.

4.2.2.6.12 Pupils speak in broken English.

4.2.2.6.13 Spelling words and pronunciation are poor.

4.2.2.6.14 Learners have limited proficiency in English.

4.2.2.6.15 Some learners are completely illiterate in English.

4.2.2.6.16 Teachers assist learners to improve their proficiency in English and learn some science through the following ways:

4.2.2.6.16.1 Boosting their morale:

4.2.2.6.16.1.1 Do not correct all their grammatical errors because it causes them to despair.

4.2.2.6.16.1.2 They should not feel hopeless.

4.2.2.6.16.1.3 There is a danger of converting an ES lesson to an English grammar lesson.

4.2.2.6.16.1.4 There is need to correct some grammatical mistakes.

4.2.2.6.16.2 One-word and short-phrase answers

4.2.2.6.16.2.1 Accept them if they answer the question asked because pupils are poor at sentence construction.

4.2.2.6.16.2.2 Therefore the teacher should construct the sentence for pupils who will remain with one task of learning the science concepts.

4.2.2.6.16.2.3 Teachers should focus on the science concepts that pupils are learning.

4.2.2.6.16.2.4 Concepts should be explained again in Shona.

4.2.2.6.16.3 Open-ended questions

4.2.2.6.16.3.1 Accept answers in Shona because pupils cannot express themselves in English.

4.2.2.6.16.3.2 Pupils seldom asked questions in class because they cannot construct the questions in English.

4.2.3 Focus Group Discussions

First group discussion for pupils

4.2.3.1 What is your first language?

4.2.3.1.1 Ppl 1: Shona

4.2.3.1.2 Ppl 2: Shona

4.2.3.1.3 Ppl 3: Shona

4.2.3.1.4 Ppl 4: Shona

4.2.3.1.5 Ppl 5: Shona

4.2.3.1.6 Ppl 6: Shona

4.2.3.1.7 Ppl 7: Shona

4.2.3.2 In what language do you learn ES here at school?

4.2.3.2.1 Ppl 1: English

4.2.3.2.2 Ppl 2: English

4.2.3.2.3 Ppl 3: English

4.2.3.2.4 Ppl 4: English

4.2.3.2.5 Ppl 5: English

4.2.3.2.6 Ppl 6: English

4.2.3.2.7 Ppl 7: English

4.2.3.3 When your teacher asks a question during ES lessons, do you give a long answer in English or you give a one word answer or a short answer? Why?

4.2.3.3.1 Ppl 1: One word.

4.2.3.3.2 Moderator: Why?

4.2.3.3.3 Ppl 1: (*Silence*).

4.2.3.3.4 Moderator: Let us hear from someone.

4.2.3.3.5 Ppl 2: One word.

4.2.3.3.6 Moderator: Can you explain why?

4.2.3.3.7 Ppl 2: (*Silence*).

4.2.3.3.8 Moderator: Can someone give us a full answer?

4.2.3.3.9 Ppl 3: I say it in one word or short answer because English is *difficult*.

4.2.3.3.10 Moderator: Can you pronounce the last word correctly?

4.2.3.3.11 Ppl 3: (*Silence*).

4.2.3.3.12 Moderator: Who can pronounce the last word correctly?

4.2.3.3.13 (*Silence*).

4.2.3.3.14 Moderator: Say English is difficult.

4.2.3.3.15 Ppl 3: English is difficult.

4.2.3.3.16 Moderator: That is correct. Next one?

4.2.3.3.17 Ppl 4: One word because English is *difficult* . . . difficult.

4.2.3.3.18 Ppl 5: One word because English is difficult.

4.2.3.3.19 Ppl 6: One word because English is difficult.

4.2.3.3.20 Ppl 7: One word or short answer because English is difficult.

4.2.3.4 During ES lessons, if you want to give a long explanation which is easier for you to do it in Shona or in English? Why? Can you think of an example?

4.2.3.4.1 Ppl 1: Shona

4.2.3.4.2 Ppl 2: Shona

4.2.3.4.3 Ppl 3: Shona

4.2.3.4.4 Ppl 4: Shona

4.2.3.4.5 Ppl 5: Shona

4.2.3.4.6 Ppl 6: Shona

4.2.3.4.7 Ppl 7: Shona

4.2.3.4.8 Moderator: You all said you find it easier to explain in Shona. Can someone tell us why?

4.2.3.4.9 Ppl 6: I cannot say it in English.

4.2.3.4.10 Ppl 2: Sometimes it is *difficult* to say it in English.

4.2.3.4.11 Ppl 5: It is easy to say it in Shona but not in English.

4.2.3.4.12 Moderator: Who can give us an example?

4.2.3.4.13 (*Silence*).

4.2.3.4.14 Moderator: (*Code-switched to Shona and asked the same question*).

More than half the group raised up their hands to indicate that they wanted to respond.

Several pupils explained the following in Shona with enthusiasm:

4.2.3.4.15 Ppl 4: It is very easy to explain anything in Shona, e.g. describing the water cycle. But it is not easy to put it into English.

4.2.3.4.16 Ppl 1: When we are in groups sometimes we do not understand the instructions given in English by our teacher and we waste time doing nothing or doing the wrong thing.

4.2.3.4.17 Ppl 3: Usually, my major challenge is in expressing myself in English even when I know the answer, e.g. explaining the causes of soil erosion.

4.2.3.5 Using any language of your choice, tell us about any ES lessons that you liked most.

4.2.3.5.1 Ppl 1: I enjoyed lessons with hands-on activities (*Narrated in Shona*).

4.2.3.5.2 Ppl 2: I liked the lesson in which we had a field trip on animal habitats (*Narrated in Shona*).

4.2.3.5.3 Ppl 3: I liked lessons in which we conducted simple investigations e.g. on energy and fuels (*Narrated in Shona*).

(All the pupils who answered chose to speak in Shona. Science terms like 'energy', 'fuels', 'habitats' and others, were not translated to Shona).

4.2.3.5.4 Moderator: Can you please explain to me why you chose to speak in Shona and not in English? (*That question was asked in Shona*).

(Silence)

4.2.3.5.5 Moderator: Can somebody answer for these three pupils?

4.2.3.5.6 Ppl 4: It is difficult to explain all that in English. It is much easier to do so in Shona (*Said in Shona*).

Second interview for pupils:

4.2.3.6 What is your opinion on the use of English as the language of learning and teaching ES?

(Silence)

4.2.3.6.1 Moderator: If you were asked to choose the language of instruction in an ES lesson, would you choose English or Shona?

4.2.3.6.2 Ppl 1: English

4.2.3.6.3 Moderator: If your teachers teach you ES in English, do you understand everything they say?

4.2.3.6.4 Ppl 2: No sir.

4.2.3.6.5 Moderator: If your teachers teach you ES in Shona, do you understand everything they say?

4.2.3.6.6 Ppl 1: Yes.

4.2.3.6.7 Ppl 2: Yes.

4.2.3.6.8 Ppl 3: Yes.

4.2.3.6.9 Moderator: Is there anyone who says no?

(Silence).

4.2.3.6.10 Moderator: So it means if you are taught in Shona, everyone understands everything said by the teacher? Is that so?

4.2.3.6.11 All ppls: Yes (*chorus*).

4.2.3.6.12 Moderator: So why do you prefer English to Shona?

(Silence).

4.2.3.6.13 Moderator: (*Code-switches to Shona and asks the same question*).

(Ppls mumble something).

4.2.3.6.14 Moderator: Please try not to mumble so that I can hear you better. Let me hear one person.

4.2.3.6.15 Ppl 4: Shona will not do (*Contribution in Shona*).

4.2.3.6.16 Moderator: Why do you say Shona will not do? (*Said in English*).

4.2.3.6.17 Ppl 5: I also think that Shona will not do (*Contribution in Shona*).

4.2.3.6.18 Moderator: But why? (*in English*).

4.2.3.6.19 Ppl 6: It is not proper (*in Shona*).

4.2.3.6.20 Moderator: In what way? Let us get to the bottom of the matter. (*in English*).

4.2.3.6.21 Ppl 7: There is no meaningful learning if we learn in Shona.

4.2.3.6.22 Moderator: Do you agree with the previous speaker?

4.2.3.6.23 Ppls: Yes (*chorus*).

4.2.3.6.24 Moderator: Is there anyone with something else to say? (*in Shona*).

4.2.3.6.25 Ppl 7: Shona can be used to explain difficult concepts only and we can also use it when we fail to speak in English (*Everything said in Shona*).

4.2.3.6.26 Moderator: Do you agree? (*Said in English*).

4.2.3.6.27 Ppls: Yes (*chorus*).

4.2.3.7 When we use English to learn ES, what problems do we meet?

4.2.3.7.1 Ppls: (*Silence*).

4.2.3.7.2 Moderator: Be free to say it in any language.

4.2.3.7.3 Ppl 1: We do not understand everything said by the teacher (*said in Shona*).

4.2.3.7.4 Moderator: Yes. Another speaker?

4.2.3.7.5 Ppl 2: We do not understand everything we read (*said in Shona*).

4.2.3.7.6 Moderator: Yes. Next.

4.2.3.7.7 Ppl 3: Sometimes we understand what the teacher says and what we read about but we are not able to express ourselves in English when we are asked a question even if we know the answer (*Everything said in Shona*).

4.2.3.8 If the language that we speak at home is used as the language of learning ES, would you like it? Why?

(Silence)

4.2.3.8.1 Moderator: You can answer in Shona if that is what you prefer.

4.2.3.8.2 Ppl 1: At home we use Shona. It is not good to learn ES using Shona only because if you go out of Zimbabwe, let us say to Zambia, Botswana, South Africa or Moza, they do not speak Shona there (*Said in Shona*).

4.2.3.8.3 Ppl 2: If you end up at University of Zimbabwe, you cannot get a degree in science using Shona (*Said in Shona*).

4.2.3.8.4 Ppl 3: We should be allowed to use Shona if we are not able to say what we want to say in English (*Said in Shona*).

4.2.3.9 Which language makes it easy for you to ask your teacher ES questions?

(Silence as usual).

4.2.3.9.1 Moderator: (*asked the same question in Shona*)

4.2.3.9.2 Ppl 4: Shona

4.2.3.9.3 Moderator: Is there anyone who says English?

(Silence)

4.2.3.9.4 Moderator: Does your silence mean that you find asking questions in ES using Shona easier than asking them in English?

4.2.3.9.5 Ppls: Yes.(*chorus*)

4.2.3.10 What problems would we meet if we use Shona as the language of learning and teaching ES?

(*Silence as usual*).

4.2.3.10.1 Moderator: Be free to speak in any language.

4.2.3.10.2 Ppl 4: Our grade 7 examination is written in English. Will they let us write it in Shona? (*Said in Shona*).

4.2.3.10.3 Ppl 5: Our ES text books are written in English. Will they rewrite them in Shona? (*Said in Shona*).

4.2.3.10.4 Ppl 6: If we learn ES and other content subjects in Shona, we will not learn to speak good English. (*Said in Shona*).

First interview for teachers

4.2.3.11 What communication problems do you meet when you teach Environmental Science?

4.2.3.11.1 Tr 1: Our pupils have limited proficiency in English. Because of that, they seldom take part in class discussions. They speak in broken English. If you ask a question, they find it very difficult to express themselves.

4.2.3.11.2 Moderator: Thanks. Is there anyone who wants to add anything?

4.2.3.11.3 Tr 2: If you ask a question, they take too long to respond.

4.2.3.11.4 Moderator: Thanks. But why do they delay to respond?

4.2.3.11.5 Tr 3: I think it is because they need time to think of the answer first, then they construct the answer in English.

4.2.3.11.6 Tr 4: They construct the answer in Shona first, then they translate it to English. Sometimes the translation is done literally.

4.2.3.11.7 Moderator: Can you give us an example of what you are saying?

4.2.3.11.8 Tr 5: I walked to school with feet, instead of I walked to school or I went to school on foot.

4.2.3.11.9 Moderator: Are there any other problems?

4.2.3.11.10 Tr 6: They make too many grammatical and spelling errors.

4.2.3.11.11 Moderator: Is there anything else?

4.2.3.11.12 Tr 7: When pronouncing words, they do not know that there are long and short vowel sounds. As a result, words like pen, pan, pane and pain are all pronounced as 'pen'. The other thing is that there is no Shona word with the letters 'l', 'x' and 'q'. In English, they are present in words like ball, box and queen. That tends to confuse pupils. Sometimes the letter 'l' in an English word is erroneously pronounced as 'r'. Even adults too, make the same mistake. One vice president of a certain African country is always making people laugh when he means to say "Elections have come and gone," he says "*Erections* have come and gone."

(Everyone in the group laughs).

4.2.3.12 What do you usually do to solve the problems that you mentioned?

4.2.3.12.1 Tr 1: In most cases I ignore grammatical errors because if I try to correct these errors, the ES lesson may be turned into an English grammar lesson and the pupils will end up not learning anything in ES.

4.2.3.12.2 Tr 2: If I ask a question and they remain silent, I give them time to think. If the silence continues, I paraphrase my question and give them time to think. If the silence continues, I ask probing questions, which usually lead to the answer. If all this fails to work, my last resort is to code-switch to Shona. Many hands will go up and I will accept answers in Shona and those that are incomplete.

4.2.3.12.3 Tr 3: When correct answers are finally given in Shona, I ask the class to translate those answers to English. English is the language of Science. Pupils cannot learn much without this language. Pupils need to learn the proper language of Science. Some terms cannot be substituted with Shona terms.

4.2.3.12.4 Moderator: Can you please give us some examples of such terms?

4.2.3.12.5 Tr 3: I can give examples like energy, photosynthesis, power and bases.

4.2.3.12.6 Moderator: Do we agree that grammatical errors must be corrected when we teach ES?

4.2.3.12.7 Trs: Yes. (*chorus*).

4.2.3.13 What is your opinion on the use of the mother tongue to teach Environmental Science from Early Childhood Development to grade 7?

4.2.3.13.1 Tr 1: I do not think there is anything wrong with teaching ECD using the learners' mother tongue. The same thing applies to grades one and two. But in grade three English should be introduced. So both Shona and English should be used as the media of instruction. From grade four up to grade seven, English should be used as the medium of instruction at school.

4.2.3.13.2 Tr 2: I concur with you when you say at ECD and grades 1 and 2 levels the learners' mother tongue should be used as the medium of instruction but for grades four up to seven using English is giving us problems. Our pupils have not yet mastered enough English to use it as the medium of instruction.

4.2.3.13.3 Moderator: So what do you suggest?

4.2.3.13.4 Tr 2: Right now we use Shona to explain difficult concepts. Our learners also use it where they cannot express themselves in English.

4.2.3.13.5 Tr 3: But that is not official.

4.2.3.13.6 Tr 2: No it is not official, but that is what is working in our classrooms. All of us here.

4.2.3.13.7 Tr 4: I think English is important. Our pupils should start using English to learn science at primary school level. When they get to higher levels like high school, college and university, they will be used to its use.

4.2.3.13.8 Tr 5: I concur with the previous speaker. Using the mother tongue as the medium of instruction up to grade seven is not a very good idea. Our pupils need to get used to English before they leave primary school.

4.2.3.13.9 Moderator: Are you familiar with the Education Act of 1987 as amended in 2006?

All trs: No! (*chorus*)

4.2.3.13.10 Tr 6: What does it say?

4.2.3.13.11 Moderator: We will look at that when we meet next time.

Second interview for teachers

4.2.3.14 Do we have a national language policy in Zimbabwe?

(Silence)

4.2.3.14.1 Moderator: *(Repeats question)*.

(Silence)

4.2.3.14.2 Moderator: Can someone say something please?

4.2.3.14.3 Tr 1: I have never heard of a national language policy.

4.2.3.14.4 Moderator: Is there anyone of you who has heard of a national language policy?

(Silence)

4.2.3.14.5 Moderator: Can you please raise up your hand if you have heard of a national language policy.

(No response).

4.2.3.14.6 Moderator: So should I take this to mean that we have never heard of this policy?

All trs: No we have never heard of it. *(chorus)*.

4.2.3.15 What is your reason for code-switching when you are teaching Environmental Science lessons?

4.2.3.15.1 Tr 1: If I find that my pupils are not grasping what I am trying to explain to them I repeat it in Shona because I know that all of them understand Shona better than they do English.

4.2.3.15.2 Tr 2: Sometimes it is like a reflex. You just find yourself switching over to Shona when you cannot find the most appropriate term to use.

4.2.3.15.3 Tr 3: Yes, I also do so. There are times when you fail to find the right English term to use at the right time, but you will never fail to find the right Shona term to use at any time.

4.2.3.15.4 Tr 4: Sometimes I code-switch to Shona in order to emphasise a point.

4.2.3.15.5 Tr 5: I think we all do that. May I also add that I sometimes code-switch to Shona in order to crack a joke. Some jokes are better said in Shona. They lose value when you try to translate them to English.

4.2.3.15.6 Tr 6: The same thing happens with proverbs. They lose their essence when they are translated to another language.

4.2.3.15.7 Tr 7: I think it has something to do with culture. Certain things exist in some cultures, but not in others. My own contribution on why we code-switch is that sometimes we do so in order to draw the attention of the pupils. Usually a change in whatever we do draws the attention of those involved.

4.2.3.16 What do you know about the official language of learning and teaching Environmental Science at primary school level? Is there a match between policy and practice?

4.2.3.16.1 Tr 1: I think the official language of teaching ES and other subjects, except indigenous languages, is English. Our administrators here and the Education Officers expect to see me teaching in English if they pay me a visit. They will criticise me if they find me teaching in any language other than English.

4.2.3.16.2 All trs: Yes. (*chorus*)

Moderator: Are we saying English is the official language of teaching from grade four up to grade seven?

4.2.3.16.3 All trs: Yes (*chorus*)

4.2.3.16.4 Moderator: Have you heard of the Education Amendment Act of 2006?

4.2.3.16.5 All trs: No (*chorus*)

4.2.3.16.6 Tr 2: What does it say?

4.2.3.16.7 Moderator: It stipulates that the mother tongue should be used as the language of learning and teaching from Early Childhood Development level up to grade seven level. Is this happening? Is this what you teachers are doing?

4.2.3.16.8 All trs: No (*chorus*)

4.2.3.16.9 Moderator: So, is there a match between policy and practice?

4.2.3.16.10 Tr 3: Not at all.

4.2.3.16.11 Tr 4: There is nothing like that.

4.2.3.16.12 Tr 5: There has never been any.

4.2.3.16.13 Tr 6: I concur with the previous speakers.

4.2.3.16.14 Tr 7: I also concur with my colleagues.

4.2.3.17 What would you say about the Education Act of 1987 that represents the language policy in education?

(Silence)

4.2.3.17.1 Moderator: Just tell us anything about this Education Act of 1987 that was amended in 2006.

4.2.3.17.2 Tr 1: We have just said that there is no match between policy and practice.

4.2.3.17.3 Tr 2: Yes. As teachers we are not following that policy. Teachers are teaching in English from ECD to grade seven. The L1 of those ECD kids in rural schools is definitely not English, yet some teachers are teaching them in English.

4.2.3.17.4 Moderator: That is a good observation. I also observed that in some rural schools. So, is this Education Act of 1987 useful at all?

4.2.3.17.5 Tr 3: It is very clear that this Education Act is not at all useful.

4.2.3.17.6 Tr 4: I concur with the previous speakers.

4.2.3.17.7 Tr 5: So do I.

4.2.3.17.8 Tr 6: I concur with every speaker.

4.2.3.17.9 Tr 7: I also concur.

4.2.3.18 How would you like the language of learning and teaching to be stated?

4.2.3.18.1 Tr 4: I think children in ECD A and ECD B should be taught in their mother tongue. Very few words in English can be introduced. I mean words like ‘boy’, ‘girl’, ‘mother’, ‘father’, ‘good morning’ and ‘good afternoon’. For the medium of instruction, English should never be used. For grades 1 and 2, the mother tongue should continue to be the medium of instruction. In grade three a mixture of the mother tongue and English can be used as the languages of learning. But English should be introduced slowly. From grade four up to grade seven, English can be used as the medium of instruction, but the mother tongue can be used when pupils are stuck.

4.2.3.18.2 Moderator: You have given quite a good account of how you want it done. What do your colleagues say?

4.2.3.18.3 Tr 5: I concur with the previous speaker, but from grade four up to grade 7, I think it is safer to say both English and the majority of the pupils' mother tongue should be used.

4.2.3.18.4 Tr 6: In other words, code-switching should be made official. At the present moment it is not. That is the reason why education officials and college lecturers criticise teachers and student teachers respectively, for 'teaching in vernacular'.

4.2.3.18.5 Moderator: So what is our general consensus?

4.2.3.18.6 Tr 7: We are saying that ECD A, ECD B and grades 1 and 2 should be taught using the learners mother tongue. Very few English words are introduced when it is time to learn English on the timetable. Grade three is the transition point. Children are taught using both mother tongue and English. From grade four up to grade seven, English becomes the medium of instruction, with code-switching to mother tongue when necessary.

4.2.3.18.7 Moderator: Is that so?

4.2.3.18.8 Trs: Agreed. (*chorus*).

4.2.3.18.9 Moderator: We have now come to the end of our series of interviews. Let me take this opportunity to thank you very much for taking part in these interviews. Thank you for your immense and invaluable contribution. Our ideas are likely to go a long way in advocating for a multilingual approach when policy makers promulgate a new language of learning and teaching, which is useful and user friendly.

Analyses of transcripts

4.2.2 Face-to-face in-depth interviews

4.2.2.1 First interview with a pupil, Kuda Dzidzo.

Interviewer: My name is Tembinkosi Dunmore Siwela. I am doing research with Professor C. P. Loubser in the Department of Science and Technology Education towards a PhD in Education at the University of South Africa. We are inviting you to participate in a study entitled "English as a second language in learning Environmental Science in Zimbabwean Primary Schools." This study is expected to collect important information that could persuade the Zimbabwean Government to promulgate a national language policy that could result in the formulation of a user friendly language of learning and

teaching Environmental Science in Zimbabwean Primary Schools. You are being invited because you are the right person who can give the required information since you are directly involved in the use of English as a second language in learning and teaching Environmental Science in Zimbabwean primary schools. No one can do it better than you. Your school administration has assisted me to identify suitable participants like you. 12 primary school teachers and 36 primary school pupils will be the participants in this study. Now, let me give you the opportunity to tell me a few things about yourself. Let us start by knowing each other. I have already told you my name. Can you please tell me yours?

Interviewee: Kuda Dzidzo (*Pseudonym*)

Interviewer: Where do you come from Kuda?

Interviewee: Old Murapa Village.

Interviewer: How old are you Kuda?

Interviewee: 12 years.

Interviewer: In what grade are you?

Interviewee: Six.

Interviewer: That is fine Kuda. But before we proceed, there are a few issues that we need to sort out. The first one concerns a letter requesting parental consent for minors to participate in this research project. I have already sent this letter to your parents and the good news is that they have allowed you to participate in this study and they have already signed the necessary forms. The next step is that I am now asking you to take part in a one on one face-to-face interview. I am also asking you to take part in a group interview (focus group discussion) and video recordings of Environmental Science lessons. I shall also ask for permission to inspect your ES exercise books when the time comes. If you agree, I shall ask you to complete and sign the Focus group/Interview assent and confidentiality agreement for a minor. Do you agree?

(Silence)

(Interviewer code-switches to Shona to make sure the interviewee has understood the message).

Interviewee: Yes.

Interviewer: So, let us complete and sign the assent and confidentiality agreement forms.

The interviewee completes and signs the form (Appendix 9)

Interviewer: Thank you. Now we can proceed.

Interviewee: *(Silence)*.

Interviewer: You have told me that you stay in Old Murapa Village, whom do you stay with?

Interviewee: My father, mother, brothers and sisters.

Interviewer: Can you tell me more about your family?

Interviewee: My father and mother they don't work. They have big fields. They grow maize in fields and vegetables in garden. My big sister was married. My small sister is in grade four. My small brother is in grade two.

Interviewer: Tell me Kuda, what would you like to do when you grow up?

Interviewee: Pilot.

Interviewer: A pilot! That is good. Tell me. What does a pilot do?

Interviewee: He drive aeroplanes.

Interviewer: Yes. A pilot drives aeroplanes. What subjects must you pass at school for you to be able to do that?

(Silence)

Interviewer: You do not know? You will know when you go to high school. There are subjects that you must do well at school. One of them is Science. Here at this school you do Environmental Science. Am I right?

Interviewee: Yes.

Interviewer: Do you like Environmental Science?

Interviewee: Yes.

Interviewer: Can you tell me anything that you have done in this subject?

(Silence)

Interviewer: Do you find ES easy or difficult?

Interviewee: Difficult.

Interviewer: When your teacher teaches you Environmental Science, what language does he use?

(Silence)

Interviewer: Does your teacher teach you ES in Shona or English? *(Speaks very slowly)*

Interviewee: English.

Interviewer: Do you understand everything he says when he speaks in English?

Interviewee: No

Interviewer: If your teacher says something in English that you do not understand, what do you do?

(Silence)

(Interviewer code-switches to Shona and asks the same question).

Interviewee: Nothing *(Answers in Shona)*

Interviewer: What language do you speak at home?

Interviewee: Shona.

Interviewer: Do you spend any time watching some TV programmes or listening to the radio?

(Silence)

(Interviewer code-switches to Shona and asks the same question).

Interviewee: There is no TV at home *(Answers in Shona).*

Interviewer: What about a radio?

Interviewee: We have no radio at home *(Answers in Shona).*

Interviewer: You do not need to worry about that. Most Black people do not have TVs or radios at home. When I grew up at our rural home we did not have those things too. When you become a pilot you will be able to have them in your house. We will end here today. Can you suggest when we can meet again?

(Silence)

(Interviewer code-switches to Shona and repeats what he has just said).

(Interviewer and interviewee agree on a day to resume their interview).

(Interviewer thanks the interviewee and they depart)

4.2.2.2 Second interview with a pupil

Interviewer: Good afternoon Kuda

Interviewee: Good afternoon sir.

Interviewer: Today we are going to continue from where we left off last time. In our last interview, you said that your teacher teaches you ES in English. Am I right?

Interviewee: Yes.

Interviewer: Do you understand everything he says when he speaks in English?

Interviewee: No.

Interviewer: If your teacher discovers that you are not following, what does he do?

(Silence)

(Interviewer code-switches to Shona and repeats his question)

Interviewee: He code-switches to Shona and repeats what he has said *(Answers in Shona)*.

Interviewer: What are the three states of water?

Interviewee: solid, liquid, gas. *(One-word answers)*

Interviewer: Good. Now, how do you change water in the solid state to the liquid state?

Interviewee: Heat. *(One-word answer)*

Interviewer: How do you change water vapour to liquid water?

Interviewee: Cool. *(One-word answer)*

Interviewer: You always give one word answers. Can you please explain why?

(Silence)

(Interviewer code-switches to Shona and repeats his question).

Interviewee: It is difficult to give a long winding answer in English *(Answer given in Shona)*.

Interviewer: You saw me in your classroom during your ES lessons. I observed that most of you are not eager to take part in class discussions. Can you please explain why?

(Silence).

Interviewer: I am saying most of you do not raise up your hands to take part in class discussions. Why is that so? Is it because you do not know anything?

(Silence)

(Interviewer code-switches to Shona and repeats what he has just said).

Interviewee: In most cases the answer is known. The problem lies in expressing ourselves in English *(Answer given in Shona)*.

(Interviewer thanks the participant and the two agree on the venue and time for the next interview).

4.2.2.3 Third interview with a pupil

Interviewer: Good afternoon Kuda.

Interviewee: Good afternoon sir.

Interviewer: We are continuing from where we left off in our last interview. In your opinion, what language should be used for teaching Science at ECD and grade 2 and 3 levels? Can you please explain why?

(Silence).

(Interviewer code-switches to Shona and repeats what he has just said).

Interviewer: Just tell me what you think. There is no answer that is wrong because that is what you think.

Interviewee: Shona.

Interviewer: Why do you think so?

Interviewee: Because they will not hear you if you speak in English. *(Literal translation from Shona)*.

Interviewer: Do you mean to say the young pupils will not understand English?

Interviewee: Yes.

Interviewer: Why do you think they will understand Shona?

(Silence).

(Interviewer tells her to explain in Shona)

Interviewee: Shona is their indigenous language. They cannot fail to understand it (*Said in Shona*).

Interviewer: In your opinion, what language should be used for teaching ES from grade four up to grade seven? Can you please explain why?

Interviewee: English. Because ... because ... because ...

Interviewer: You can explain in Shona. (*Code-switch to explain*)

Interviewee: By the time they get to high school, they will be speaking very good English. Besides that, there are some words that cannot be pronounced in Shona because it is not allowed in our culture. It is taboo to do so. In English you can say any word even when learning about reproduction (*Everything said in Shona*).

Interviewer: Kuda, you are talking about English proficiency in high school, what about now when you are still in primary school? Can we say primary school pupils have acquired enough English to enable them to use it to learn ES? (*Interviewer repeats this in Shona*).

Interviewee: Sir, to tell the truth, the answer is no. That is why the teacher must code-switch to Shona from time to time.

Interviewer: What would happen if teachers used English only to teach ES at primary school? (*Interviewer repeated same question in Shona*).

Interviewee: I think pupils would not learn anything at all. Teachers should mix English and Shona for pupils to understand what they are saying (*Said in Shona*).

Interviewer: If you were asked by policy makers to suggest the language of learning and teaching in ES from grade four to grade seven, what would you tell them? (*Question was repeated in Shona*).

Interviewee: I would tell them to use English as the main language of learning and teaching ES. Shona would be used to explain concepts that we have failed to grasp. If we cannot express ourselves in English we can also do it in Shona (*Answer given in Shona*).

Interviewer thanks the interviewee before they leave.

4.2.2.4 First interview with a teacher

Interviewer: My name is Tembinkosi Dunmore Siwela. I am doing research with Professor C. P. Loubser in the Department of Science and Technology Education towards a PhD in Education at the University of South Africa. We are inviting you to participate in a study entitled “English as a second language in learning Environmental Science in Zimbabwean Primary Schools.” This study is expected to collect important information that could persuade the Zimbabwean Government to promulgate a national language policy that could result in the formulation of a user friendly language of learning and teaching Environmental Science in Zimbabwean Primary Schools. You are being invited because you are the right person who can give the required information since you are directly involved in the use of English as a second language in learning and teaching Environmental Science in Zimbabwean Primary Schools. No one can do it better than you. Your school administration has assisted me to identify suitable participants like you. 12 primary school teachers and 36 primary school pupils will be the participants in this study. Now, let me give you the opportunity to tell me a few things about yourself. Let us start by knowing each other. I have already told you my name. Can you please tell me yours?

Interviewee: My name is Tendai Chiremba. I teach one of the grade six classes here at this school.

Interviewer: I am glad to meet you sir. For how long have you been teaching here?

Interviewee: I have been teaching here for close to 15 years.

Interviewer: Oh! I am going to work with a very experienced teacher. Before we proceed with our interview, there are a few things we need to sort out as a matter of procedure. I am sure you have already read my Participant Information Sheet. May I know if you have also completed and signed the Consent To Participate In This Study (Return slip)? May I please have the return slip when you are through. The next thing is A Letter Requesting An Adult To Participate In An Interview. I am sure you have gone through that letter. Last but not least, could you please complete and sign the Consent Form. Finally, could you please complete and sign the Focus Group/Interview Consent And Confidentiality Agreement For An Adult? Now we can proceed with our business of the day. Would you have any questions before we start?

Interviewee: Not now sir.

Interviewer: Thanks. What is your mother tongue?

Interviewee: My mother tongue is Shona.

Interviewer: Do you speak any other language besides Shona and English?

Interviewee: No sir. These are the only languages that I speak.

Interviewer: When you teach ES in class, which language of instruction do you use and why?

Interviewee: I use English because that is the language that I am expected to use.

Interviewer: Who expects you to use English when teaching ES?

Interviewee: Administrators of course and it is not just ES but all subjects, except our indigenous languages. If the school head or the deputy school head comes to my classroom, he expects to find me teaching in English. The same thing applies if the Provincial Education Director or PED in short, the Deputy Provincial Education Director or DPED in short, the District Education Officer or DEO in short, Education Officers or Eos in short and School Inspectors pay me a visit when I am teaching, they expect to see me teaching in English. But if I am teaching Shona, then they would expect to find me teaching in Shona.

Interviewer: Mr Chiremba thank you very much for that explanation. But is it government policy that all subjects should be taught in English, except indigenous languages?

Interviewee: Mr Siwela, if the whole chain from the Deputy School Head up to the Provincial Education Director wants us to deliver our lessons in English, then it goes without saying that it is government policy that all subjects, except indigenous languages, should be taught in English. Even at colleges of education, lecturers expect to find their students teaching in English if they are teaching any subject other than an indigenous language. I have a student teacher in my classroom. She was once penalised by her college science lecturer for “too much use of Shona in an ES lesson” that she was observed teaching. She almost failed. She was lucky to get a borderline pass. I also concurred with that science lecturer.

(Interviewer and interviewee shake hands as they laughed it off).

Interviewer: This is quite interesting.

Interviewee: Mr Siwela, you are also a college science lecturer even though you are from a different teachers' college, how would you have handled my student teacher's case?

Interviewer: This case takes us back to the issue of government policy on the language of instruction in class. Unfortunately, our time is up. Can I ask you to go and consult your colleagues about government policy on the language of learning and teaching at school. When we meet again next time can I ask you to begin by giving me your short report, then I will tell you my opinion on your student teacher's case.

Interviewee: It is OK sir. I am going to consult as many of my colleagues as possible.

(Interviewer thanks the interviewee and both agree on a venue, date and time for the next interview).

4.2.2.5 Second interview with a teacher

Interviewer: Good afternoon Mr Chiremba.

Interviewee: Good afternoon Mr Siwela. How are you sir?

Interviewer: I am fine. Thanks and how are you?

Interviewee: I am fine. Let me begin by giving my short report on my findings concerning the government policy on the language of learning and teaching at primary school level.

Interviewer: Yes. Go ahead sir. What were your findings?

Interviewee: All of us agreed that English is the official language of learning and teaching at primary school level. But at ECD and infants level, local indigenous languages can be used. You cannot expect a four-year old child from a rural area to speak in English.

Interviewer: Yes, Mr Chiremba. There is a lot of sense in what you are saying, but policy is policy. There is no room for common sense. Kaplan and Lewis (2013) define 'policy' as the rules, laws and principles that guide the practices of individuals, groups and institutions on various issues, e.g. inclusive education. In Zimbabwe, there is no national language policy. Instead, there is an Education Act that was promulgated in 1987. This Act states that English shall be the language of instruction at school from grade four to university. Below grade four, the child's mother tongue shall be the language of instruction. In 2006, this Act was amended to extend the use of the mother tongue to grade seven.

Interviewee: Mr Siwela, are you saying we should be teaching all content subjects, including Science and Mathematics in Shona? Is this the correct interpretation of this language of learning and teaching policy that you are talking of?

Interviewer: You can read for yourself the Education Amendment Act, 2006. It says exactly what I have just said. The Education Act of 1987 was amended to extend the mother tongue use as a language of learning and teaching prior to form one. Now tell me Mr Chiremba, are you following government policy when you teach ES and other subjects using English?

Interviewee: No, but ... but you are telling me something new. So, what this means is that nobody is following the policy. All of us are not following it.

Interviewer: If nobody is following this policy, is it useful then?

Interviewee: No! It is not useful.

Interviewer: What do you do with things that are not useful to you?

Interviewee: I throw them into the dustbin.

Interviewer: If they are shoes?

Interviewee: I throw them away.

Interviewer: And?

Interviewee: Purchase new ones.

Interviewer: What if it is a policy that is not useful?

Interviewee: We need a new one that is useful.

Interviewer: Quite right. We have covered a lot of ground today. Let us end here.

(Interviewer thanks the interviewee. They agree on the venue, day and time of the next interview)

4.2.2.6 Third interview with a teacher

Interviewer: Good afternoon sir.

Interviewee: Good afternoon.

Interviewer: Can we have a recapitulation of what transpired in our last interview?

Interviewee: In our last interview, I discovered that in Zimbabwe we have a policy on the language of learning and teaching in the form of an Education Act as amended in 2006. This amendment stipulates that prior to Form One, the child's mother tongue should be used as the language of learning and teaching. However, this policy is not being

implemented. Teachers are using English as the language of learning and teaching at primary school level. This is happening even at ECD and Infants levels.

Interviewer: That is very correct. So is there a match between policy and practice?

Interviewee: Certainly not at all. There is no match between policy and practice.

Interviewer: Can you please suggest the way forward?

Interviewee: I suggest that we continue doing as we are doing now.

Interviewer: Could you please explain what you mean?

Interviewee: I am suggesting that we continue teaching ES and all the other subjects, except our indigenous languages, using English as the language of learning and teaching.

Interviewer: Right now, when you speak in English, do your pupils understand everything you say?

Interviewee: No. That is the challenge. Sometimes they do not understand what I say in English.

Interviewer: So, how can that be remedied?

Interviewee: I think it is simple sir. We just continue doing as we have been doing all along. The teacher will explain in Shona. Simple!

Interviewer: When I observed grade four to grade seven teachers teaching ES here and elsewhere, I noticed that many learners were unwilling to participate in class oral discourse or to answer the teacher's questions. When they attempted to do so, their contribution was usually one word or a short phrase. They always avoided answering open-ended questions that demanded lengthy responses. I also noticed that teachers rarely asked such questions. Can you please explain why?

Interviewee: Your observation was accurate sir. That is exactly what our pupils do and it is caused by their limited English proficiency. They are not confident to speak in class because they know that they have not yet mastered enough English to enable them to express themselves adequately. I am sure you also noticed that when they finally speak they do it in broken English. They are also poor in spelling and pronouncing words.

Interviewer: What do teachers do to help improve the situation? Can you explain with examples?

Interviewee: Our learners have limited proficiency in the English language. Some of them are completely illiterate in this language. There are quite a good number of things we do to assist our pupils to improve their proficiency in this language as well as to help them learn some science. The first one is to boost their morale. We do not correct all the grammatical errors they make. If we do, it may cause them to despair. We do not want them to feel they are hopeless. There is also a danger of converting the ES lesson into an English grammar lesson. But we do not ignore all the errors made. We correct some. Then there is the issue of one-word or short phrase answers. We accept them as long as they are answering the question asked. When it comes to the issue of sentence construction, you will find that our pupils are not good at that. We try to assist them in this regard and leave them with only one task of learning their science. We construct the sentence for them and they learn the science concept or key term. For instance we could say “The green colouring matter in leaves is called” The expected answer is *chlorophyll*. Here, they stop worrying about the grammar part of it and focus on the Science concept they are learning. The other thing is that if we suspect that pupils have not grasped what we have taught, we explain it again in Shona. If pupils fail to answer questions, we explain the concept again in Shona. When it is necessary to ask open-ended questions, we will ask them but we will also expect to get the answers in Shona because our pupils cannot express themselves in English.

Interviewer: Can you explain why your pupils seldom ask questions in class?

Interviewee: If pupils have questions to ask, they have to construct the questions on their own because we cannot guess what they want to ask and assist them like in the example on *chlorophyll* above. If they fail to construct their questions in English, they remain silent unless the teacher urges them to ask in Shona.

Interviewer: Let me take this opportunity to thank you very much for the fruitful time we had together. Our discussions revealed a lot of vital information that is going to be very useful in this study.

Interviewee: You are welcome sir. My colleagues and I also benefitted from these discussions. We learned a lot of things. For instance I was not aware of the mother tongue use in the latest policy on the language of learning and teaching at primary school.

4.3.2 Observation

4.3.2.1 Teacher's questions were followed by silence

The first one that I observed was that on many occasions, the teacher asked a question but all the pupils remained silent. That happened even when it was obvious that most of the pupils knew the answer. When the teacher code-switched to Shona, many hands were raised up. If the teacher did not code-switch after posing a question, it took the pupils a considerably long time for a few pupils to raise up their hands. The teacher had to pause for a longer duration of time. Pupils needed more time to construct their responses in English and it was almost always given in broken English. Where the teacher code-switched to Shona, pupils' answers were readily available. The teacher did not need to pause for a long duration after posing a question. That proved that the stumbling block was the medium of communication. That observation was made at all the three schools that I had sampled.

4.3.2.2 Teachers repeated the same questions/ instructions several times

In the majority of the lessons that I observed, teachers had a tendency of repeating instructions and questions. For instance in a lesson in which the teacher wanted two of her pupils to demonstrate what happens during the beginning of the process of digestion, she asked the pupils to wash their hands before eating slices of bread that she provided. She gave the same instruction three times: "Wash your hands. Wash your hands. Wash your hands." In another lesson, the teacher had finished delivering his lesson and he wanted to find out if his pupils had questions to ask him. He asked them the same question twice: "Can I have some questions from you? Can I have some questions from you?" In another lesson in which the teacher was teaching about landforms, she asked the same question twice before she paused to give her pupils time to think: "Where in Zimbabwe do we have a gorge? Where in Zimbabwe do we have a gorge?" When asked during an interview why they repeat questions and instructions, some of them said that they were not even aware of it. One teacher said, "The pause would be too long to bear. Repeating the question reduces the duration of the deafening silence." Another teacher said, "No one will be coming up with an answer. So it's like I will be trying to close up that gap."

I agree with these teachers but I still think that this issue of repeating questions and instructions had something to do with two factors. The first one was that some teachers were not aware of the 3P's (PPP). The first P stands for 'Pose', the second one stands for 'pause' and the last one

stands for ‘**pounce**’. When teachers pose a question to their pupils, they must pause to allow them time to think before they pounce on someone to answer. In most cases this is not what they do. Most of the teachers observed teaching ES expected pupils to respond there and then. The second factor was that the majority of these teachers were aware that their pupils were not proficient in the medium of instruction (4.2.3.11). So these repetitions allowed them to buy time for the pupils to slowly construct their answers in a language they were not proficient in.

4.3.2.3 Group discussions were held in Shona

Almost all the ES lessons that I observed involved some group work in which pupils were asked to discuss one or two issues. The instructions to conduct the discussions were given by the teacher in English but the actual discussions were held in Shona, an indigenous language. Almost every member of the group would be a vibrant speaker. If the pupils were expected to present a group report at the end of their discussion, it was always available in English, even though it was replete with grammatical errors. If the teacher visited the group with the intention of checking to see if its members needed any assistance, the group members would immediately code-switch from Shona to English. However, the majority of the group members would be silenced. They suddenly found themselves unable to express themselves freely any more. The reason was not because they suddenly had nothing to contribute any more but it was because they had become linguistically handicapped.

In a lesson on “Materials and technology” pupils were given group work in which they were supposed to discuss and record properties and uses of given tools. The pupils were discussing in Shona and making a lot of noise. The teacher said, “You are making noise. You are not discussing. People who discuss do not make noise.” Those pupils were happy to be discussing in their mother tongue. Everybody had something to contribute. The barrier to learning had been temporarily removed. The teacher had heard them speaking in Shona but she did not try to stop them from doing so because she probably knew that it would kill the enthusiasm and the lively discussions altogether. Such incidences were quite prevalent in all the classes that I observed. I did not observe any group members discussing in English in the absence of the teacher. Pupils preferred to learn ES in their mother tongue rather than in ESL.

In another lesson, the teacher was teaching about location of places on a map using grid references. She gave her pupils some group work to do. When the group discussions started, she made the following announcement to the whole class: “We talk in English, not Shona. Discuss in English.” She had heard the pupils discussing in Shona. To my surprise, they continued to discuss in Shona. The teacher did not attempt to enforce her earlier instruction.

Probably she knew that she was not going to win. Objectives of that lesson were achieved despite the fact that pupils were mixing Shona and English.

4.3.2.4 Pupils made numerous grammatical errors

I witnessed many instances in which pupils made grammatical errors when trying to answer the teachers' questions. In a lesson on digestion, the teacher asked what happened to food in the mouth just before it is swallowed. One pupil's response was, "It's chewed inside with teeth." The teacher accepted that answer and made no attempt to correct the grammatical error. In the same lesson, another pupil was trying to explain what happens to indigestible food in the gut. His words were, "Not absorbed are comes from the anus." In both cases I have just alluded to above, both pupils constructed their answers in their indigenous language, Shona, and then they translated them literally to English. Examples of other grammatical errors that I observed were as follows:

"Food goes from the gullet."

"If you have sweating ... If you have malaria you will be sweating."

"If you have malaria you feels weak."

"He drink a lot of water."

"We see a boy suffering from disease."

"Take her diseases." (Heal her)

"He will be feel well."

"If you have malaria you have to siver."

"If we cook this mealie meal to make porridge or sadza and we then eat it we cannot gain after eating." (Example of an irreversible change).

"This bottle is a reversible change because when we heat the plastic it melts and then we cool it, it becomes plastic again."

"It is an irreversible change because when we go to the grinding mill and grind our maize it will make mealie meal and it will not go back to where it was."

"Object which make work easy."

"It can be seen through." (Transparent).

“You draw the rectangle with a scale.”

“Landforms are physical feature.”

“Natural feature are things that are created by God.”

“A mechanic use tools like spanners.”

The errors listed above show that some pupils have not yet mastered some basic rules of the English language grammar, e.g. One mechanic uses tools. Two mechanics use tools. There is also the problem of literal translation from Shona to English. They construct their answers internally in their indigenous language, then translate them literally to English. The result is that pupils end up making grammatical errors like “You draw the rectangle with a scale” and “Take her diseases.”

4.3.2.5 Teachers’ numerous grammatical errors

Teachers made more grammatical errors than their pupils. This should not be surprising because teachers were the ones who were talking most of the time during the ES lessons. Usually pupils only talked to answer the teachers’ questions. When they did so they only gave one-word or short phrase answers. They made sure they gave the shortest possible answers. The teachers even went to the extent of constructing the answer and leave a one-word gap to be completed by pupils. So pupils had very little room for making grammatical errors. I shall discuss this fully and cite examples later in this chapter. Now let me turn to examples of grammatical errors made by the teachers as they were delivering their ES lessons.

“Where did digestion first begin?”

“This chart shows parts of the digestive system from the top up to the bottom.”

“From these words which other phrases describes the stomach?”

“If you look closely we have these long tube-like which comes to the stomach.”

“Open your mouth your friend.”

“The stomach juices these help in breaking down the food.”

“I would like someone to bring a plastic.”

“What were we talking about last time?”

“So we are saying it can be caused by a parasite that bilharzia.”

“Yes he next did something.”

“A tool is an object that make work easy.”

“Let someone be the secretary there in your groups to write.”

“So I think in your thinking you are already thinking of the natural and the artificial.”

“A car is it a landform?”

“Yes mountains they are natural.”

“It means that most of the landforms are not many-made because most of them are natural.”

“I want to teach you a very small song.”

“Machines they are made for specific what?”

“The boys they know it.”

“How can big items drawn on a small piece of paper?”

“Just give me a simple explanation you can give to a scale.”

“This is what it simply mean.”

“How long is the length of that rectangle?”

“How long is the width?”

“So these mountains they ensure that this area it receives high rainfall.”

“The altitude ranges between 900 to 1200 metres in altitude.”

“Is there anyone who want to add on that?”

“Does it shows us direction?”

The teachers who made the mistakes that I have just alluded to above were trained teachers. Some of them had teaching experiences that ranged from 5 to 20 years. Others had Bachelors' Degrees in Education. A few had Masters in Education. These teachers went through the same system of education in which ESL was used as the LoLT. If up to now they are still grappling with the basics of the English Language grammar rules what can we expect from the young primary school pupils?

When asked if the teachers were aware of the fact that they made numerous grammatical errors when they teach, some of their responses were as follows: “*Chakauya nengaravaka ichi,*” (English was introduced to Africa by White settlers who came by ship. In other words, English is not our mother tongue) said one teacher. “A slip of the tongue is inevitable when you talk and talk and talk in a foreign language,” said another. Other responses given were: “We all make mistakes;” “Even university lecturers make mistakes too;” and “Only God doesn’t make mistakes.”

4.3.2.6 Pupils’ reluctance to talk in class

In this study I observed that the majority of the pupils made an effort to try and avoid talking in class. They neither asked questions nor volunteered to tackle the teacher’s oral questions. When asked to do so, they were very stingy with their words. They used a single word or a phrase to answer the teacher’s question. Sometimes they would just remain silent. In the following excerpt the class remained silent after the teacher had asked a question. Those who attempted to answer gave one-word answers or the shortest possible answers.

Tr: What did we do in our last ES lesson?

Class: *(No response)*

Tr: Who can still remember?

Class: *(No response)*

Tr: Anyway - - - Oh there is a hand up now. Yes, can you tell us?

Ppl: Digestion takes place in the mouth.

Tr: Yes. We looked at digestion. We said digestion starts or begins where?

Ppl: In the mouth.

Tr: Which parts are in the mouth? Vimbai.

Ppl: Tongue

Tr: Yes we have a tongue in the mouth. What else do we have in the mouth?

Ppl: Teeth.

Tr: There is something else that makes the food wet and soft in the mouth.

Ppl: Saliva *(pronounced as saleeva)*

Tr: Now tell us the process of digestion in the mouth.

Ppl: The front teeth bite the food.

Tr: Then? After biting does it remain there?

Ppl: It is swallowed.

Tr: Ah! After biting you swallow? You will be choked!

Ppl: Chewed.

Tr: How? With what? Yes.

Ppl: It's chewed inside with teeth.

Tr: Yes. I want someone to tell us what happens in the mouth using the words on the chart: front teeth, bite, side teeth, chewing, then saliva mixing. Who wants to tell us?

During in-depth interviews, many teachers made the following revelations: Teachers are aware that their pupils lack proficiency in the medium of instruction (4.2.2.6.11). So they try all they can to assist them to construct their answers in English. In the above excerpt the teacher assisted pupils to come up with a summary of digestion in the mouth by providing the key words and phrases to use in the construction of the long descriptive answer.

4.3.2.7 Teachers did not correct pupils' grammatical errors

In response to the question of why teachers ignored grammatical errors committed by pupils during ES lessons, the teachers said that if the scientific concepts being taught were grasped, there was no need to worry about grammatical errors as this was likely to turn the ES lesson into an English lesson, thereby departing from the objectives of the lesson. On the contrary, I think it was necessary for teachers to correct both factual and grammatical errors. We learn a language by using it correctly. However there is need to keep the objectives of the lesson in mind. Care should be taken to avoid turning the ES lesson into an English lesson.

4.3.2.8 Dearth of open-ended questions from teachers

In written exercises the teachers constructed the sentences and omitted key terms for the pupils to complete. Pupils had to provide the missing one-word answers and copied the rest of the sentence constructed by the teacher. At times it was two to four words or a short phrase. That way, grammatical errors by pupils were minimised and only the facts were emphasised. I

illustrated that in the following excerpts that I extracted from pupils' ES exercise books during document analysis:

Tuesday

11 October 2016

Tools and Machines

Fill in the missing words to complete the following sentences:

1. _____ are things that help you to do a job easily.
2. Tools are made of different materials like _____, _____ and _____.
3. A mechanic uses tools like _____, _____ and _____.
4. A farmer uses ploughs, _____ and _____.
5. Tools are simple _____.
6. A tool that is designed for cutting finger nails is a _____ - _____.
7. A bottle opener is a simple _____
8. Bottle openers are not made of plastic because _____.

Wednesday

12 October 2016

Environmental Science

Seasons

Fill in the missing words to complete the following sentences:

1. There are _____ seasons in Zimbabwe.
2. The four seasons are _____, _____, _____ and _____.
3. The cool dry season or winter begins from mid May to mid _____.
4. Middle August to early November is the _____ season or spring.
5. Early November to middle March is the summer or _____ season.
6. Middle March to middle May is the autumn or the _____ season.
7. _____ is the coldest season.
8. _____ is the warmest season.
9. Deciduous trees lose their leaves in the _____ season.
10. In the _____ season it is the rainy season.
11. We are in the _____ season.

Tuesday

25 October 2016

Environmental Science

Landforms and Maps

Fill in the missing words to complete the following sentences:

1. A _____ is a list of symbols used on a map to locate landforms.
2. A _____ is a flat diagram of an area showing landforms.
3. _____ are high land masses which have been pushed up by the earth's crust.
4. A _____ is a fairly flat area that is usually high in altitude.
5. A _____ is the narrowest part of a valley with steep sides.
6. A _____ is an area with high temperature, little vegetation and receives little rainfall.
7. A big dam is known as a _____.
8. A _____ is a large body of water usually fed by a river and surrounded by land.
9. A _____ is the channel where water flows or used to flow slowly or quickly downhill.
10. A _____ is a low place where a river divides up into many fingers as it leads into the sea.

Tuesday

01 November 2016

Environmental Science

Landforms and Maps

Fill in the missing words to complete the following sentences:

1. Big areas are represented on a paper by using a _____.
2. Maps are drawn to _____.
3. Aerial photographs are pictures taken from a high place or _____.
4. When a scale is written as ratio _____ are removed and is always in _____.
5. A scale is usually written in _____.
6. The scale 1: 1 000 000 means 1 mm on a paper represents _____ mm on the ground.
7. Mount _____ is a volcanic mountain.
8. The biggest mountain in Zimbabwe is Mount _____.
9. The biggest mountain in Africa is called Mount _____.
10. The biggest desert in the world is _____ Desert.

Wednesday

09 November 2016

Environmental Science

Fill in the missing words to complete the following sentences:

1. A drawing which shows an area together with the features found on it is a _____.
2. Signs which show places or features on a map are called _____.
3. Natural features on a map are called _____.
4. The main direction shown on a map is _____.
5. The part which explains what the symbols on a map stand for is called the _____.
6. Bridges and buildings are _____ man-made features that we can show on a map.

During my fieldwork I observed that teachers rarely asked their pupils open-ended questions during ES lessons. Those teachers were quite aware that their pupils lacked proficiency in the English language. It would be very difficult for the primary school pupils to construct a long answer without their teacher's assistance. As a result, teachers were satisfied with their one-word and short phrase answers as already alluded to above.

4.3.2.9 Pupils' limited vocabulary

Some of the pupils' work in ES exercise books was replete with grammatical errors, spelling errors and in general made nonsense. Video transcriptions of ES lessons also revealed numerous words which were mispronounced by pupils. That also showed that those words were not in the vocabulary of some of the pupils. Examples of such words were saliva (mispronounced as *saleeva*), shiver (mispronounced as *siver*), lakes (mispronounced as *leks*), paces (mispronounced as *peses*), anus (this was said to be in the mouth – probably they were referring to the tongue), an anthill (was said to be an *angel*) and re-knit (if you knit wool you get a jersey. If you re-knit it you get back the wool). Mispronunciation of some of the words could have been influenced by the way words are pronounced in the learners' indigenous language.

4.3.2.10 Teachers' limited vocabulary

I also came across a few cases in which some pupils knew some terms that were not in their teacher's vocabulary. One of these cases is illustrated in the following lesson excerpt:

Ppl: A mechanic uses *tool* like spanners.

Tr: *Uhu* spanners, what else? A mechanic uses spanners. What else?

Ppl: Scew drivers.

Tr: Yes, screw drivers. What else?

Ppl: Hammers.

Tr: Hammers, yes you might need a hammer. Aha. Peter.

Ppl: Wrenches

Tr: Hah?

Ppl: Wrenches.

Tr: Come again.

Ppl: Wrenches

Tr: Wrenches? What's that? I am sorry I am not aware of what you are saying. Someone else. Yes Tendai.

Ppl: Allen keys

Tr: Hah?

Ppl: Allen keys

Tr: Alright. There are so many. Now you can all sit down.

It is clear that 'wrenches' and 'allen keys' were not in the teacher's vocabulary but her pupils knew those tools. Maybe at the pupils' home there was a mechanic.

4.3.2.11 Code-switching during ES lessons

Incidences of code-switching were very prevalent during ES lessons. Code-switching from English to indigenous languages was very prevalent at all primary schools and at all levels. Code-switching was mainly used to facilitate communication between the teacher and pupils. In all the cases observed, the teachers and their pupils spoke the same indigenous language, Shona. So it was easy for the teacher or the pupil to switch over from English to Shona or vice versa, when they failed to find suitable words to express themselves coherently. But sometimes code-switching from English to Shona was practised by the teacher as a slogan to attract attention from the pupils who might be losing interest in what was happening in class. In this case, examples cited were as follows:

Ppl: (Holding a clay pot the teacher had brought to class as part of media) This is an irreversible change. When you break the clay pot you cannot get the clay pot again.

Tr: Yes you cannot even get the clay that was used to make this clay pot. *Handiti?* (Shona word for 'Isn't that so?')

Ppl: (Holding an empty plastic bottle that was part of the teacher's media) This bottle is a reversible change because when we heat the plastic it melts and then we cool it. It becomes plastic again.

Tr: *Handitika?* (Isn't that so?) That's very good.

Ppl: *Churu* in Shona.

Tr: *Hoo.* (I see). *Yaa.* (Yes). *Handiti mazvinzwa?* (You have heard him. Isn't that so?) What do we call *churu* in English? Yes Judy.

Ppl: An anthill.

Tr: An anthill. *Handiti?* (Isn't that so?) Yes, an anthill.

Ppl: A pencil. Made up of wood.

Tr: *Uhu* (That is correct).

Ppl: Does not rust.

Tr: *Uhu.*

Ppl: used for writing.

Tr: *Uhu.*

Ppl: Tool – knife.

Tr: *Uhu.*

Ppl: Material – iron.

Tr: *Uhu.*

Ppl: Properties – hard.

Tr: *Uhu.*

Ppl: Used for cutting.

Tr: *Uhu.*

In the excerpts alluded to above, the teachers did not code-switch to Shona in order to simplify what they were saying. Actually, there was nothing to explain because what had been said could not be made simpler than that. Rather, it was done in order to encourage pupils to be attentive all the time. On the other hand, it can also be explained as the teachers' mannerisms that served no purpose in switching from English to the pupils' mother tongue.

The use of code-switching by the teachers from English to Shona to explain a difficult concept was prevalent. Whenever teachers found it difficult to give a clear explanation of a concept in English, they reverted to Shona. That had two advantages. The first one was that it was simpler for the teacher to explain himself in Shona than it was for him to explain himself in English. The second one was that it was easier for pupils to grasp a concept taught in Shona than it was for them when the medium of instruction was English. During in-depth interviews and FGDs, many teachers supported the idea of using the pupils' indigenous languages. One was quoted as saying, "Teaching in a language that learners do not speak makes both learning and teaching of young children extremely difficult, particularly when the language of instruction is also foreign to the teacher." This is usually the case in the majority of our primary schools in Zimbabwe.

4.3.2.12 Any match between policy and practice?

The policy has always stipulated that Early Childhood Development (ECD) pupils, grades 1 and 2 should be taught in their indigenous languages. This policy has now been extended to include all primary school grades. The question to ask now is whether this is being implemented. What is happening on the ground? English as a second language (ESL) is being used as the LoLT in Science lessons and other content subjects from ECD to grade 7 despite all the challenges I have already alluded to. There is no match between policy and practice.

4.3.2.13 Pupils' preferred LoLT in ES lessons

Many pupils agreed that the use of English only as the language of learning and teaching (LoLT) ES at primary school level was not a good idea. They said that if teachers spoke in English only, sometimes they did not understand what they said. They said they should continue to do what they were doing then. When asked to explain what they meant by 'what they were doing then', they replied that they were teaching in English but they usually explained what they had said in Shona. In other words if they said something in English they would repeat it in Shona to make sure that the pupils have understood. When asked about the use of English in text books they replied that it was the duty of their teachers to explain to them in such a way that they will understand what is written in the text books. When asked if the same ES text books could be translated to Shona, they were divided but the majority wanted the

status quo to be maintained, that is, they wanted to continue using the ES text books which were written in English, that they were currently using. A few wanted the same text books they were using to be translated to their indigenous languages. I concur with the majority who are proposing that the ES textbooks written in English should be maintained because English is a universal language. A scientist from Zimbabwe should be able to communicate with other scientists from any part of the world through the use of this universal language. Indigenous languages are important and they should never be denigrated but we need to bear in mind that they are not used officially outside the boundaries of Zimbabwe.

4.3.2.14 Teachers' preferred LoLT in ES lessons at primary school level

Many teachers scoffed at the idea of teaching Science using their indigenous language as the language of learning and teaching (LoLT). They argued that some scientific terms cannot be translated to indigenous languages because they did not exist in our culture. Examples given were terms like photosynthesis, chlorophyll, respiration, digestion, absorption and energy. Here my argument is that such terms will be taken as they are. Photosynthesis will remain photosynthesis. It will be its explanation that will be given in both English and the pupils' indigenous languages.

They also said it was taboo to talk about sex and reproduction in humans in certain cultures. That mentality has to change. However, words like penis, testis, vagina, copulation and orgasm do not have to be pronounced in indigenous languages where it is taboo to do so. But they can still be taught in English, with the teacher code-switching to the pupils' indigenous language frequently to simplify their explanations.

When asked why they always code-switched from English to Shona during ES lessons, their response was that it was necessary to help explain difficult concepts. But when challenged during in-depth interviews about code-switching even when there was no difficult concept to explain they said sometimes it just happened automatically because we always use our indigenous languages whenever we are not teaching in the classroom. When asked if code-switching from English to an indigenous language should be legalised, the majority of the teachers said that it was a great idea because "some concepts are better understood in English and others in our mother tongue," said one teacher.

The following are some excerpts from transcriptions of in-depth interviews and FDGs concerning the teachers' views on the most suitable LoLT in ES lessons:

“ES is a very fascinating subject to learn but the language is so challenging to understand. I think it is much better for it to be taught in both English and Shona.”

“ES is a foreign language and it really needs to be taught in Shona because the language is pretty difficult.”

“ES subject should be taught both in English and Shona as it is easy for learners to grasp the concept when using mother language in some cases where necessary.”

“ES subject should be taught in English and strictly English and where further elaboration is needed simplify possibly using an English Science Dictionary.”

“It should be taught in both English and Shona because it is one of the most difficult subjects but very important. For learners to understand the concepts it should be taught with their local language.”

“ES should be taught in both English and Shona. This may help in better understanding of Zimbabwean learners.”

“Mother tongue is an important factor which influences quality basic education.”

“Teaching in a language that learners do not speak makes both learning and teaching of young children extremely difficult particularly when the language of instruction is also foreign to the teacher.”

“To support my view of saying Science must be taught in Shona, Educationalist and senior lecturer in the Department of Teacher Education at the University of Zimbabwe, Dr Peter Kwaira supported the policy saying the use of learners’ home language in the classroom promotes a smooth transition between home and school.”

“The policy of teaching children in different languages allows pupils to get more involved in the learning process and speed up the development of basic literacy skills and also creates emotional stability which translates to cognitive stability.”

“A child can grasp concepts/ main points more when taught using his or her indigenous language (Shona) because psychologically the cognitive system in his mind works automatically for expression and understanding.”

“Some learners are fluent in Shona because it is their mother tongue. So for them to understand English terms in Science we should teach them in Shona.”

“Socially and educationally, the child learns faster through Shona than through an unfamiliar language.”

“Children learn and understand Science when using vernacular language.”

From the excerpts alluded to above, the majority of teachers in the selected primary schools in this study would support a multilingual approach if they are consulted by policy makers when deciding the language(s) to use as the LoLT ES at primary school level.

APPENDIX 15

COLLEGE OF EDUCATION RESEARCH ETHICS REVIEW COMMITTEE

13 April 2016

Ref : 2016/04/13/50830872/34/MC

Student : Mr TD Siwela

Student Number : 50830872

Dear Mr Siwela

Decision: Ethics Approval

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Proposal: English as a second language in learning Environmental Science in Zimbabwean primary schools

Qualification: D Ed in Environmental Education

Thank you for the application for research ethics clearance by the College of Education Research Ethics Review Committee for the above mentioned research. Final approval is granted for the duration of the research.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the College of Education Research Ethics Review Committee on 13 April 2016.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
 - 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the College of Education Ethics Review Committee.*
- An amended application could be requested if there are substantial changes from the*



existing proposal, especially if those changes affect any of the study-related risks for the research participants.

- 3) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

Note:

The reference number **2016/04/13/50830872/34/MC** should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the College of Education RERC.

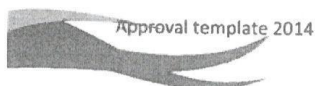
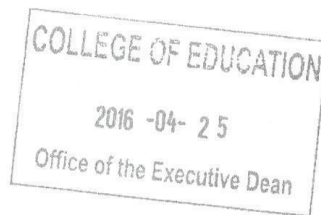
Kind regards,



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