CHAPTER THREE: RESEARCH DESIGN AND METHOD

3.1 INTRODUCTION

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

3.2 RESEARCH METHODOLOGY

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

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

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

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

3.2.1 Qualitative methodology

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

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

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

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

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

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

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

3.2.2 Quantitative methodology

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

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

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

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

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

3.3 SURVEY RESEARCH

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

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

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

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

- A needs assessment survey that is used to solicit people's opinion about a problem and possible solutions;

- A marketing survey that is used to evaluate the nature and level of demand for particular products or services; and

- An evaluation survey that is used to learn about the impact of programmes and policies.

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

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

3.3.1 Benefits of survey research

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

Table 3.1: Benefits of survey research method

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

3.3.2 Limitations of survey research

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

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

3.3.3 Survey research in information needs and information-seeking studies

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

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

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

3.4 RESEARCH POPULATION

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

- In-service secondary level geography teachers in Lesotho;

- Prospective secondary level geography teachers who are final-year students in the Faculty of Education at the NUL majoring in geography and therefore studying to be geography teachers; and

- Institutions that are involved in secondary level geography education in Lesotho with regard to teacher training, professional development, curriculum design and development, teaching and learning geography inspection, as well as geography examinations.

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

3.4.1 In-service secondary level geography teachers in Lesotho

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

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

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

Table 3.2: Distribution of schools offering geography in Lesotho

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

3.4.2 Prospective secondary level geography teachers

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

3.4.3 Institutions involved in secondary level geography education in Lesotho

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

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

3.5 SAMPLING PROCEDURES

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

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

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

3.5.1 In-service secondary level geography teachers in Lesotho

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

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

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

Table 3.3: Sample of schools that participated in the study

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

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

Table 3.4: Categories of schools and number of geography teachers

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

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

3.5.2 Prospective geography teachers

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

3.5.3 Institutions involved in secondary level geography education in Lesotho

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

Table 3.5: Sample of institutions that participated in the study

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

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

3.6 DATA COLLECTION

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

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

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

- Focus group discussions with the in-service secondary level geography teachers. (Appendix A)

- Individual interviews with representatives of the institutions involved in secondary level geography education in Lesotho. (Appendix B)

- Partial observations of the school libraries. (Appendix C)

- Questionnaires for the prospective secondary level geography teachers (these are teachers at pre-service stage and therefore still in training). (Appendix D)

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

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

- Doing it gives a far better 'feel' for the data than if a hired interviewer had delivered the data.

- There is an advantage in knowing what was said and how it was said.

- One gains insight into the areas which the respondents found sensitive, and probably even why they felt so.

- Based on the responses, one may be able to judge which items were most salient to respondents.

- Some hired interviewers may not necessarily be interested in the research and may not do their best to solicit as much data as possible. This factor is crucial, given that this research is for study and work purposes.

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

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

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

3.6.1 Focus group discussions

The in-service secondary level geography teachers, who are the primary participants in this study, participated in this study through focus group discussions guided by the schedule that is attached as Appendix A. Marshall and Rossman (2011:149) explain focus groups as a method of interviewing that originates from marketing research. The groups are composed of seven to ten people who are unfamiliar with one another and have been selected because they share certain characteristics relevant to the study questions. Babbie (2007:308) asserts that in focus groups, typically 12 to15 people are brought together in a room to engage in a guided discussion on some topic. The people are selected on the basis of their relevance to the topic under study. Pattuelli (2008:637) reports using 15 to 20 participants in focus groups and Williams and Coles (2007b) report using focus group of three to five participants.

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

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

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

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

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

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

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

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

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

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

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

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

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

3.6.2 Interviews

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

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

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

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

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

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

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

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

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

3.6.3 Observation

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

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

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

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

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

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

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

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

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

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

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

3.6.4 Questionnaires

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.7 TRIANGULATION

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

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

The current study used triangulation in various forms as follows:

- Employing both qualitative and quantitative methodologies.
- Using secondary level geography teachers, prospective teachers and institutions that disseminate information to secondary level geography teachers to constitute the study population.
- Collecting data using different techniques: questionnaires, interviews, focus group discussions and partial observations.
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Although Table 1.2 (in Chapter One) outlined information behaviour studies that use more than one research technique (which is still considered as triangulation), this paragraph highlights more examples of triangulation in research relevant to the current study. For

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

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

3.8 PILOT STUDY

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

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

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

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

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

Table 3.6: Sample of participants in the pilot study

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

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

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

3.9 RELIABILITY AND VALIDITY IN RESEARCH

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

3.9.1 Reliability

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

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

- **Equivalence** – This is a comparison of two measures of the same trait given at about the same time. It involves administering different forms to the same people at about the same time.

- **Equivalence and stability** – This is also a comparison of two measures of the same trait given over time. This is done by administering different forms of questions to the same people over time.

- **Agreement** – This is consistency of ratings or observations. This involves two or more persons carrying out observations and the extent to which they agree on what they have seen, heard or rated.

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

- Clear conceptualisation of constructs by developing an unambiguous, clear theoretical definition for each construct and by making sure that each measure indicates only one specific concept;

- Increasing the level of measurement indicators to a higher or more precise level of measurement;

- Using multiple indicators of a variable, such as two or more indicators to measure each aspect of a variable; and

- Using pre-tests, pilot studies and replications.

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

3.9.2 Validity

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

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

- Face validity – this assesses validity by seeing if the measure is getting the desired result. It is a "face value" check for an instrument. Although it is legitimate, it is not very scientific. It is usually based on consensus among researchers as to whether a measure is doing what it is supposed to be doing.

- Content validity – it is a subjective way of understanding how well a set of items measures the complexity of a variable being studied. It also depends on consensus among researchers evaluating the measures to determine if its content is valid.

- Construct validity – this is based on actual results and is often achieved after data have been collected and analysed. It is an abstract way of measuring validity because it requires constructing numerous ways of measuring an item.

- Criterion validity – this assesses validity for constructs that are not easily measured. It checks if the results from one item or instrument are similar to some external criteria that have been established.

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

- Face and content validity – the judgement of an instrument measuring what it is supposed to measure.

- Predictive validity – this is judged by the degree to which an instrument can forecast an outcome.

- Concurrent validity – it is judged by how well an instrument compares with a second assessment being done concurrently.

- Construct validity – this is determined by ascertaining the contribution of each construct to the total variance observed in a phenomenon.

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

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

- The questions asked in the questionnaire and the focus group discussions were drawn up after studying the Leckie *et al* (1996) model, which forms the theoretical framework for the current study, as well as other information-seeking related models outlined in Chapter Two (section 2.2). As a result, the concepts used in the instruments were drawn from the literature.

- The research instruments were pilot-tested with the aim of increasing validity. The instruments were pilot-tested on a sample similar to the intended study population. The comments from the pilot study were used to refine the final instruments.

- The questions were constructed in a concise manner in order to avoid ambiguity. In addition, an explanation of the research aims was provided to the respondents to give them some information about the study. The intention was to show the relevance and usefulness the study may have.

- All the respondents who participated in the study were assured of confidentiality. The respondents were not asked for their names, so that they could freely respond to the questions without any fear of being identified. This was done to ensure that they did not hold back some information. This is believed to contribute to the true picture of the situation as seen and experienced by the respondents.

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

3.10 DATA ANALYSIS

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

3.10.1 Analysis of quantitative data

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

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

3.10.2 Analysis of qualitative data

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

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

- The first digit stands for the district, in this case 4 is Maseru.

- The second digit stands for the proprietor of the school, (0) is government.

- The third digit (1) means this is the first school for data collection in a district. In this case it is the first school that the researcher collected data from in Maseru district.

- The last part of the code, T1, symbolises teacher 1 in the focus group discussions. In all the focus groups we were sitting in a circle, so T1 is the teacher sitting next to me on my right.

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

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

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

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

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

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

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

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

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

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

3.11 ETHICS IN SURVEY RESEARCH

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

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

- Practically, researchers politely encourage participants to respond but do not put pressure on them in an offensive manner. This requires one to make good judgements based on the situation pertaining to one's survey.

- Researchers have to do their absolute best to ensure confidentiality. This means releasing the results of the survey in such a way that an individual's responses may not be identified.

- Researchers have to obtain permission to enter sites where research will be conducted.

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

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

- Permission to carry out the research was obtained from the Research Ethics Committee in the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria. The said committee scrutinised the instruments to ensure that all the questions adhered to ethical issues for scientific research and were not offensive.

- Permission to carry out the research was obtained from the Ministry of Education and Training in Lesotho to undertake the study in Lesotho schools.

- Permission to carry out the research involving the final-year education students majoring in Geography, who are prospective secondary geography teachers, as explained in section 3.4.2, was obtained from the registrar of the NUL.

- Consent forms were developed for the respondents in the interviews, focus groups and observations, explaining the intentions and ultimate aims of the research. Signed permission to record the proceedings of the discussions and interviews was requested.

- Confidentiality and anonymity were ensured by coding responses.

- An introductory cover letter for the questionnaire was written to explain all the aims of the study.

3.12 CONCLUSION

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

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

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