CHAPTER 5:
RESEARCH DESIGN AND METHODOLOGY

5.1 Introduction

In this chapter the research process, design and methodology will be discussed further by referring to accepted trends and models from the research methodology literature, which was used as a basis to structure a research strategy and plan.

The functional structure of the North-West University will also be discussed, as well as the different campuses and learning models, as well as the institutional plan and its goal related to customer focus and quality. This is necessary to be able to motivate the specific research design and methodology that were designed, as well as the specific research questions that were formulated and needs to be answered in the next chapter.

The details of the selected research process, design and methodology will also be elaborated on, based on the discussed literature review.

5.2 Literature overview of the research design and methodology

In this section the research process, as well as the relevant research design and methodology will be discussed and elaborated on. This is necessary to provide an overview of the different approaches that are used in the research environment, in order to identify and develop the most appropriate and suitable research process, design and methodology for this specific study.

5.2.1 Reasons for undertaking research

It is necessary to first ponder a moment on the reasons why academics, scholars, managers and others conduct research in a wide range of disciplines. Brynard and Hanekom (2006:2) attempt to provide some rationale behind this when stating that research is always undertaken with a specific objective in mind, which should assist in:

- Making rational and factually correct decisions,
- setting detailed goals and plan a schedule according to it,
- ensuring the best possible utilisation of existing resources,
- identifying problem areas in a specific discipline,
- developing possible solutions to these problems, as well as future control mechanisms,
- enhancing the knowledge and insight of a specific trend or discipline,

- developing new theories or modify existing ones to accommodate for changing conditions,
- and determining whether specific theories still apply to specific circumstances.

The purpose or goal of this study was discussed at length in section 1.4, but can be considered to be a combination of the above objectives.

5.2.2 The research process

The different phases of the research process are shown in Figure 5.1, as drawn up by Blumberg *et al.* (2005:57), and also shown in Cooper and Schindler (2008: 82).

5.2.2.1 Stage one: The research question

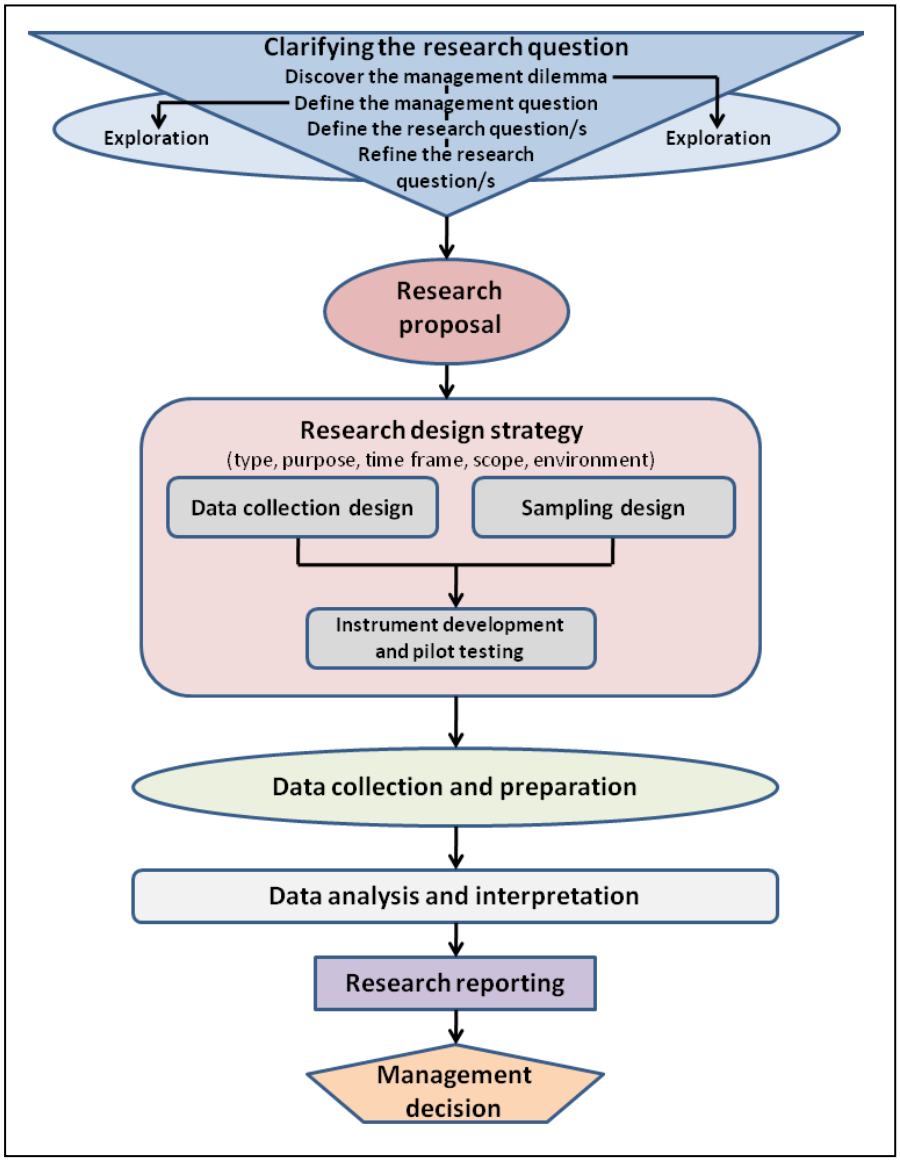
Bryman and Bell (2007:304) argue that the research question must be specified accurately, while Hair *et al.* (2007: 35) state that well-defined research questions will enable researchers to specify their research objectives, determine information needs and determine the suitable research designs.

The research question forms the basis of the research design, data collection and eventually of the data analysis and interpretation.

Easterby-Smith *et al*. (2002: 60) identified several influences on the construction of the research question, which is shown in Figure 5.2. The experience of the researcher should be taken into consideration and the supervisor or promoter should provide the necessary guidance to ensure that the research question is appropriate, relevant and realistic. The specific field of study will also play a role on the nature of the research question, while both corporate and academic stakeholders can also influence the research question's formulation. The supervisor or promoter and researcher should protect the integrity of the research project at all cost and not allow any improper influences on any part of the research project.

This study identified five related research questions, which are shown in section 1.6, and then elaborated on in sections 6.5 to 6.9.

Figure 5.1: The research process

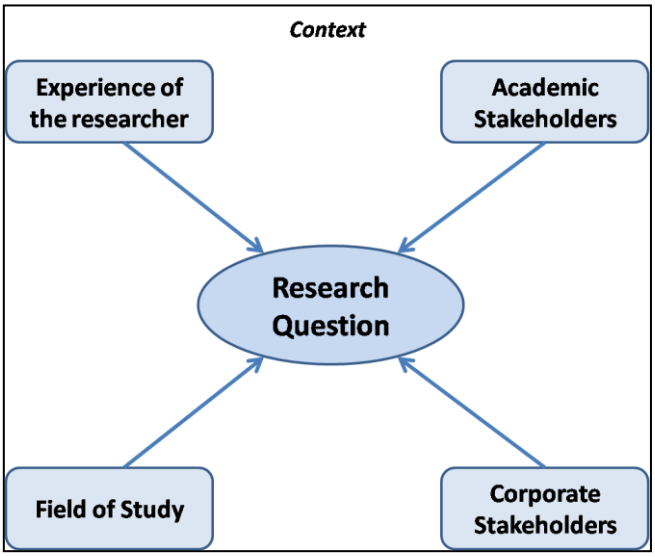


Source: Blumberg *et al.* (2005:57)

5.2.2.2 Stage two: The research proposal

Hair *et al.* (2007:44) define a research proposal as a formal document that clearly define the problem that needs to be researched, indicate how it will be explored, and the expected cost and time frame. Greenfield (2002:53) also refers to the cost element and highlights the importance of drawing up a well presented and clear research proposal with specific reference to how the objectives will be met, in an effort to obtain adequate funding.

Figure 5.2: Influences on the research question



Source: Easterby-Smith *et al.* (2002: 60)

According to Hackley (2003:30) it is also important to motivate the choice of the research topic in the proposal, and to identify a working title. He argues that the title might be modified or altered, but recommends that the field of topic should not be changed once it has been identified.

Not all research projects are commercially driven, and Cooper and Schindler (2008:636) identified three purposes of drawing up a research proposal:

- To introduce the research question to the supervisor, promoter or sponsor, and to indicate its relevance and importance,
- to provide an overview of other related research project and available literature,
- and to recommend what data will be required to test and answer the research question, as well as how the data will be collected, analysed and interpreted.

The initial research proposal of this study was adapted after it was accepted and is shown in chapter one.

5.2.2.3 Stage three: The research design

Cooper and Schindler (2008:140) define research design as “the blueprint for the collection, measurement and analysis of data”, but warn that it is a wide-ranging concept. According to Welman and Kruger (2001:46) the research design is the strategy or plan which is used to acquire participants or subjects, and how to collect what type of data from them, in order to arrive at conclusions about the initial research question.

5.2.2.3.1 Types of research designs

Bryman and Bell (2007:44) identify five types of research designs, namely:

- Experimental design, which is unusual in management research due to the challenge of accomplishing exact control levels when dealing with organizational behaviour.
- Cross-sectional design or social survey design, which involves data collection on several cases during the same time frame in order to collect qualitative or quantitative data related to two or more variables, in an effort to determine associations between the variables after the data has been analysed. This study can therefore be classified as a cross-sectional design, because both qualitative or quantitative data were collected on several variables during the same time .
- Longitudinal design is specifically used to monitor changes over a period of time in the relevant research environment.
- Case study design is an intensive examination of a particular situation or instance.
- Comparative design is where identical or contrasting cases are studied, and the similarities or differences are reported.

The differences between qualitative and quantitative research methodologies also need to be discussed in the next section.

5.2.2.3.2 Qualitative and quantitative research

Hackley (2003:9) claims that most studies are a mixture of both qualitative and quantitative research, as they are not mutually exclusive in research. He states, however, that there is always an emphasis on one or other of the approaches. Gill and Johnson (2010: 148), on the other hand, argue that qualitative research can be defined as an approach which does not use quantitative data.

Holliday (2007:2) warns about oversimplification when trying to distinguish between qualitative and quantitative research, because social research can be a very complex area. Further caution is expressed by Welman and Kruger (2001:8), who state that it would be a mistake to consider qualitative research as an effortless alternative for quantitative research, as it possesses sufficient “checks and balances” to eliminate the risk of reaching groundless conclusions.

Easterby-Smith *et al.* (2002:42) consider quantitative research to be fast, economical and of significant relevance when policy decisions needs to be made, but warn that it might be rigid and artificial due to the structured nature of questionnaires. On the other hand, they indicate that quantitative research might feel “untidy” because it is harder to manage the progress and end points. It can also be considered as “too subjective” by some stakeholders.

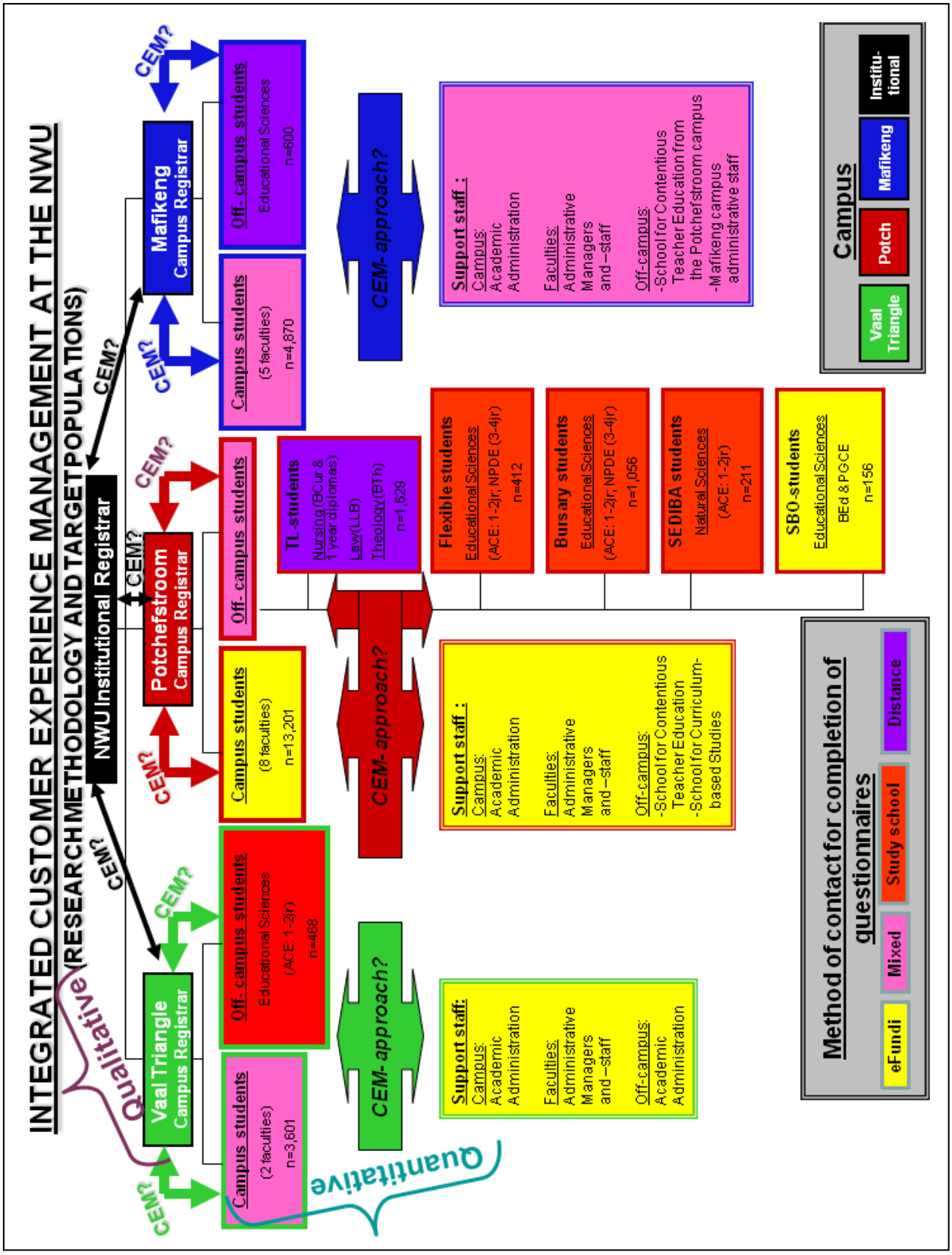
5.2.2.3.3 The research design of this study

This study combined both approaches, as indicated in Figure 5.3 on the next page. Structured (qualitative) interviews were conducted with the registrars, while (quantitative) questionnaires were drawn up for administrative staff members and undergraduate students at the ten different learning models at the three campuses. This included students from all the different faculties and modes of delivery (on- and off-campus students). In this study the majority of the research was therefore quantitative in nature, but some of the questions in the structured (qualitative) interviews with the registrars were aligned with similar questions in the (quantitative) questionnaires for the administrative staff members and undergraduate students. This alignment of these questions is shown in Appendix 3 at the end of this study.

Figure 5.3 also displays the research design, the NWU structure (with the different campuses and modes of delivery) and the target populations. The distribution of questionnaires also depended on this mode of delivery and the different methods of contact with the staff and students are shown in colour codes. The customer experience management approach (CEM) between the specific student populations and the relevant staff members responsible for rendering administrative services to them is also shown with large arrows, as well as the CEM approach the registrars experience that their sub-ordinates render to the students on their campuses.

The NWU research ethics application form was also completed and submitted to the research unit of the faculty, to ensure that the study adheres to the research ethics guidelines of the NWU. An informed consent section were also included in the beginning of the questionnaires for the students and administrative staff members, as well as in the questions asked to the registrars during the structured interviews. This paragraph can be seen in the beginning of the attached questionnaires for students (Appendix 1), administrative staff (Appendix 2) and registrars (Appendices 4-7). The field workers that managed the completion processes of the questionnaires in the class rooms also referred to this section specifically when they briefed the students before completion of the questionnaires. It was also posted in the e-learning environment.

Figure 5.3: Research design and target population



5.2.2.4 Stage four: Data collection

In most research cases it would be impossible, time-consuming and expensive to conduct research on the whole population, and therefore samplings offer a workable solution.

Hackley (2003:25) recommends that researchers must have a criterion for selecting the sample to ensure that the data is collected in a systematic manner, in order to ensure that the collected data set is in line with the research objectives.

5.2.2.4.1 Sampling

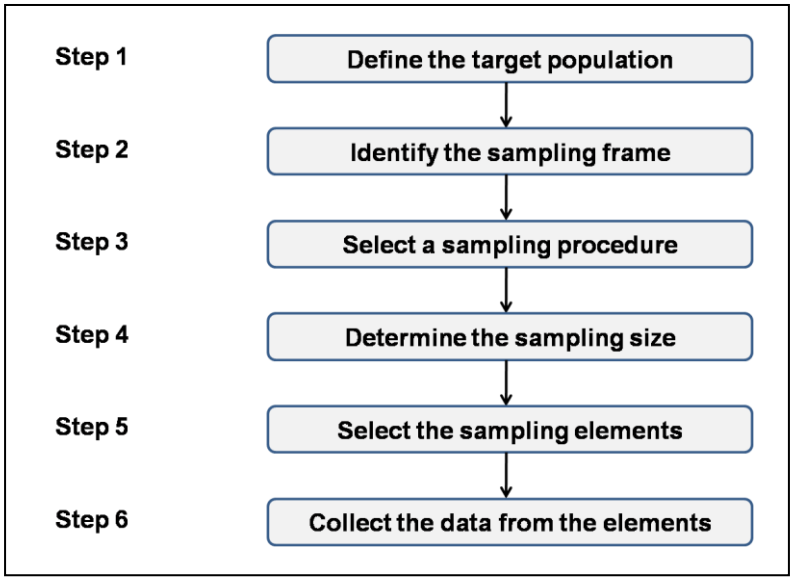
Sampling is therefore an element of data collection, and is defined by Bryman and Bell (2007:182) as the fragment or section of the population that is selected for the research process. Gill and Johnson (2010:123), however, warn that the sample size and selection are major concerns for researchers when designing and planning the research design.

The use of sampling methods offers the following benefits according to Blumberg *et al.* (2005:228):

- Lower costs
- Greater accuracy of results
- Greater speed of data collection
- Availability of population elements.

Iacobucci and Churchill (2005:283) recommend the following model (Figure 5.4) when drawing up a sample.

Figure 5.4: Six step procedure for drawing a sample



Source: Iacobucci and Churchill (2005:283)

The different steps in this model can be further described as follows:

5.2.2.4.1.1 Define the target populations

It is necessary to distinguish between the different types of target populations first. Hair *et al.* (2008:38) state that research in the marketing management environment must ensure an accurate selection of the target population, as marketing related research has to deal with the resolution of specific problems related to their target markets.

In this study the target populations were clearly identifiable:

- Undergraduate students from the different campuses and modes of learning of the NWU whose administrative support is provided by NWU staff only.
- NWU administrative staff members who render administrative support to undergraduate students of the NWU. Temporary staff members were only included if they had been contracted for a minimum term of 12 months. Administrative staff not working directly with students (e.g. the filing or archives staff), or only dealing with post-graduate students or alumni, were not included in this study.
- The registrars of the NWU at the three campuses and the institutional office.

5.2.2.4.1.2 Identify the sampling frame

May (2001:93) describes the sampling frame as the "list" of the population that exists. This was done for each of the populations.

- Ten different strata or groups were identified and their sizes determined using data from the NWU Management Information system and the 2008 annual report of the

North-West University (2009c:31). It was also compared with the student numbers provided by the faculties' administrative managers. There were some discrepancies found, mainly due to the fact that honours degree student numbers are included in the NWU management information statistics as part of the undergraduate statistics. As this study only focused on undergraduate students (excluding honours degree students) the data derived from class lists as provided by the administrative managers were used to determine the final populations in such cases. The number of students per stratum identified to form the sample size is shown in Figure 5.3 and Table 5.2. The ten strata and their sizes were as follows:

  - Mafikeng On-campus: 4,870 students from five different faculties
  - Mafikeng Off-campus : 600 students
  - Potchefstroom On-campus: 13,201 students from eight different faculties
  - Potchefstroom Telematic Learning: 1,629 students
  - Potchefstroom Flexible Learning: 412 students
  - Potchefstroom Bursary students: 1,056 students
  - Potchefstroom SEDIBA-programme: 211 students
  - Potchefstroom School-based programme: 156 students
  - Vaal Triangle On-campus: 4,870 students from five different faculties
  - Vaal Triangle Off-campus: 468 students
  - The students from the two co-operation agreement off-campus programmes of the Potchefstroom Campus with the Open Learning Group, South Africa (OLG) and the Institute for Open Learning, Namibia (IOL) were excluded from this study.

- There were 106 administrative staff members identified on the Potchefstroom Campus, 18 on the Mafikeng Campus and 22 on the Vaal Triangle Campus who render administrative support to undergraduate students of the NWU.
- Each Campus has its own registrar, and the institutional office also has a registrar, bringing the total to four registrars of the NWU.

5.2.2.4.1.3 Select a sampling procedure

There are several probability sampling and non-probability sampling techniques available for the researcher to consider when planning and developing a research plan.

According to Fox and Bayat (2007:54) probability sampling is used when every element of the population has a known and "not-zero" chance of being included in the sample. May

(2001:93) explains that the probability sampling techniques makes it possible to state the mathematical likelihood of sample characteristics being duplicated in the population. It implies that every person

On the other hand, non-probability sampling is considered as a range of techniques where the probability of selection each sampling unit is not known and the selection of sampling units is done according to the researchers' judgement or knowledge. It therefore follows a subjective approach, according to Cooper and Schindler (2006:455). Hair *et al.* (2000:345)

According to Tashakkori and Teddlie (2003:277) pure quantitative studies normally use probability sampling techniques, and qualitative research usually apply purposive or non-probability techniques. They admit, however, that no research tradition can claim a specific technique and that a variety or mix of sampling techniques can be used in an effort to answer the research question.

The use of more than one sampling method is also supported by Easterby-Smith *et al.* (2002:41) and Greenfield (2002:189), who argue that it provides more perspectives on the issue being investigated. In this study elements of both probability and non-probability sampling techniques were thus used, as will be motivated and elaborated on in this section. This was due to the possible smaller response rate at some campuses and learning models (partially due to their large numbers on the one end, and unavailability of internet- and e-Fundi-access on the other hand.

The different sampling techniques for probability sampling and non-probability sampling are shown in Table 5.1, along with the different sources that support it, in order to provide a broad overview. Each of the different sampling techniques will then be discussed in more detail, including whether it was used in this research design or not. The decision on which sampling technique was used, will also be motivated.

Table 5.1: Summary of probability and non-probability sampling techniques

Probability sampling techniques		Non-probability sampling techniques	
Type	**Author/s**	**Type**	**Author/s**
• Simple random sampling	• Hair *et al.* (2000:345) • Tashakkori and Teddlie (2003:278) • Fox and Bayat (2007:55)	• Convenience sampling	• Tashakkori and Teddlie (2003:280) • Welman and Kruger (2001:62) • Hair *et al.* (2007:181)
• Complex probability sampling	• Cooper and Schindler (2006:446)	• Purposive sampling	• Greenfield (2002:189) • Cooper and Schindler (2006:456)
○ Systematic random sampling	• Tashakkori and Teddlie (2003:278) • Fox and Bayat (2007:56)	○ Judgment sampling	• Hair *et al.* (2000:355) • Cooper and Schindler (2006:456)
○ Stratified random sampling	• Welman and Kruger (2001:56) • Shui *et al.* (2009:474)	○ Quota sampling	• Cooper and Schindler (2006:456) • Fox and Bayat (2007:60)
▪ Proportionate stratified sampling	• Tashakkori and Teddlie (2003:279) • Cooper and Schindler (2006:449)	○ Random purpose sampling	• Tashakkori and Teddlie (2003:282)
▪ Disproportionate stratified sampling	• Hair *et al.* (2000:349) • Shui *et al.* (2009:474) • Tashakkori and Teddlie (2003:279)	• Snowball sampling	• Hair *et al.* (2000:356) • Cooper and Schindler (2006:457)
○ Cluster sampling	• Tashakkori and Teddlie (2003:279) • Hair *et al.* (2000:351)	• Extreme/ deviant and typical case sampling	• Tashakkori and Teddlie (2003:280)
○ Multistage cluster sampling	• Tashakkori and Teddlie (2003:279)	• Confirming/ disconfirming cases sampling	• Tashakkori and Teddlie (2003:281)
▪ Area sampling	• Cooper and Schindler (2006:450) • Hair *et al.* (2000:352)	• Homogeneous case sampling	• Tashakkori and Teddlie (2003:282)
▪ *Design* sampling	• Cooper and Schindler (2006:452)	• Accidental sampling	• Fox and Bayat (2007:58)
○ Double sampling	• Cooper and Schindler (2006:453)	• Self-selection sampling	• Fox and Bayat (2007:60)

- **Probability sampling techniques**

  The following probability sampling techniques from the literature study will be discussed, and an indication will be given which of these techniques were suitable for the different strata of the undergraduate student populations.

  - *Simple random sampling* is considered by Hair *et al.* (2000:345) as a sampling procedure that ensures that all sample units in the specific population will have the same, equal, known chance of being selected. Fox and Bayat (2007:56) state that it is not the best method to establish a sample, as it is not necessarily a true reflection of

the population as a whole. Tashakkori and Teddlie (2003:278) suggest that it can be achieved by simple techniques, like drawing names from a hat, to more complex computer-generated random sampling programme. There were more suitable techniques available for this study, as will be argued in this section.

- *Complex probability sampling* is described by Cooper and Schindler (2006:446) as a set of sampling techniques that are more efficient as simple random sampling, as it provides a given precision, also called the standard error of the mean or proportion. They consider the following four sampling techniques as complex probability sampling techniques:

  - *Systematic random sampling* is defined by Tashakkori and Teddlie (2003:278) as sampling techniques by selecting every *n*th unit of the target population from a randomly used list. Fox and Bayat (2007:56) consider it as a popular sampling technique, as it is more cost-effective and practical than most other techniques. In this study this technique was used to select the undergraduate student participants from all the strata. First, second and third year modules were randomly selected from all faculties, and then the researcher obtained permission from the relevant lecturers (for the on campus programmes) to visit the lecture room during a contact session to conduct the research. Every tenth student (as they were seated in the lecture room) was then handed a questionnaire to complete. The programme managers of the off campus programmes were requested to provide a list of all the study centres, facilitators at those centres, as well as the time tables for all the modules. Modules were randomly selected from all off campus programmes and the facilitators were contacted. If they agreed to assist, a parcel with questionnaires, a list with detailed instructions (including the details on how to select every tenth student, as well as details on the completion of the questionnaires), together with a pre-paid return parcel were courier to them. They then assisted with supervising the completion of the questionnaires at these off campus study centres, while the researcher was available by telephone to answer any questions or assist with any problems or uncertainties. Completed questionnaires were then couriered back to the researcher, coded and then analysed together with the questionnaires of the on campus participants.

    After the group of students were briefed about the purpose of the study, and they agreed to participate, hard copy questionnaires were handed out to every tenth student. The researcher answered any questions and addressed any uncertainties, and then collected the completed questionnaires after it were completed.

  - *Stratified random sampling*: Shui *et al.* (2009:474) define it as "a probability sampling technique in which the defined target population is divided into groups". Samples are then collected from all of these groups or strata. According to Welman and Kruger

(2001:56), this technique strives to eliminate the risk of the sample consisting out of members of one group (e.g. a specific campus, learning model, faculty or year group).

- *Proportionate stratified sampling* is applied when the proportion of the units randomly selected from each stratum is the same as the proportion of the population, according to Tashakkori and Teddlie (2003:279). Cooper and Schindler (2006:449) consider it as a popular stratified sampling technique because it has a higher statistical efficiency than simple random sampling and is easier to conduct. It was not practically possible to use this technique in this study (due to the larger size of some campuses and learning models, as well as the differences in internet access).
- *Disproportionate stratified sampling* is used when the same sample size is utilized for each stratum, irrespective of the relative size of the strata when compared with the population size, according to Hair *et al.* (2007:178), Shui *et al.* (2009:474) as well as Tashakkori and Teddlie (2003:279). This technique could have been used if the stratum sizes did not differ much, but given the range of the stratum sizes (from 13,201 down to 156), it would not have been practical to use the same sample sizes for all strata, as a representative sample of the larger stratum would have been more than the total population for a smaller stratum.

- *Cluster sampling* utilizes a natural group in the population and not individuals, according to Tashakkori and Teddlie (2003:279). This group is then called a cluster. According to Hair *et al.* (2000:351) there are similarities with stratified random sampling, but it differs because the sampling units (clusters) are divided into "mutually exclusive and collectively exhaustive subpopulations", and not treated as individuals.
- *Multistage cluster sampling*. Tashakkori and Teddlie (2003:279) define it as reducing the sample further by selecting a random sample from the selected cluster. Two further divisions of this technique is possible:
  - *Area sampling*. Cooper and Schindler (2006:451) describe it as a sampling method used in specific geographical areas and consider it the most significant type of cluster sampling. Hair *et al.* (2000:352) mention that is a popular technique for information and marketing research. This technique was not considered to be appropriate for this study, although some of the strata of this study are situated in specific geographical areas (e.g. the on-campus students).
  - *Design sampling*. According to Cooper and Schindler (2006:452) homogeneous clusters can produce low statistical efficiency. They propose that design sampling can then be constructed by first determining whether the clusters are homogeneous, whether equal-sized or unequal-sized clusters will be used, the

size of the clusters, whether a single-stage or multistage cluster will be used, as well as the size of the actual sample. These factors will then be taken into consideration when designing a specific and suitable sample from the clusters. This technique was not considered for this study.

- *Double sampling*, also called sequential sampling or multiphase sampling, is another technique described by Cooper and Schindler (2006:453). They argue that it might be necessary (due to financial or convenience reasons) to gather information by sampling, and then use the data as basis to select a sub-sample for further study. This technique was not suitable for this study.

- **Non-probability sampling techniques**

Fox and Bayat (2007:59) indicate that, although units of analysis of non-probability sampling do not have an equal chance of being included in the sample, it still is frequently used because of its convenience and inexpensiveness. The following non-probability sampling techniques are the most popular in the literature:

- *Convenience or accessibility sampling*. Tashakkori and Teddlie (2003:280) describe it as a technique where elements of a sample are drawn from a group or sub-population which is readily available. According to Welman and Kruger (2001:62) it is a more opportune method, as the population is more easily accessible to participate in the research. Hair *et al.* (2007:181) caution that it should only be used if other sampling techniques are not effective.

- *Purposive sampling*. Greenfield (2002:189) defines it as the technique where subjective judgements are used to resolutely select groups that the researcher believes will represent the population. There are also elements of *accessibility sampling* (selecting more easily available groups) and *purposive sampling* that are often combined in practice. Cooper and Schindler (2006:456) distinguish between three specific strategies:

  - *Judgment sampling*, according to Hair *et al.* (2000:355), is used when the participants are selected according to a experienced researcher's conviction that they will meet the requirements of the study. Fox and Bayat (2007:59) also refer to the expert opinion of the researchers when defining it. This approach was not used in this study.

  - *Quota sampling* (also called stratified purposive sampling) is used to improve representativeness, according to Cooper and Schindler (2006:456). This is done by using previously known information about the population to divide it into groups, as explained by Fox and Bayat (2007:60). Although the researcher did use previously

known information to determine the different strata, it was not used to determine the members of the strata that formed part of the sample.

- *Random purpose sampling*. Tashakkori and Teddlie (2003:282) describe a third purposive sampling method when stating that the random purpose sampling technique is used by selecting a random sample of units in the purposefully selected target population. They claim that the combination of random and purposive sampling increases improves the validity of the study.

- *Snowball sampling* is used by identifying and selecting a set of initial possible respondents, who then contribute to select more prospective fellow respondents, as explained by Hair *et al.* (2000:356). They also mentioned that it was also known as *referral sampling.* It was a popular technique when researchers found it difficult to identify suitable respondents, according to Cooper and Schindler (2006:457). They explain that this technique was effective because it made use of referral networks of the initially selected respondents. This technique was not supported for this study.

- *Extreme/deviant and typical case sampling* is less known, but similar techniques described by Tashakkori and Teddlie (2003:280). Researchers select the most outstanding cases in order to learn as much as possible from them, or they use the most average cases with the same purpose in mind. This technique is not mentioned by most authors and was not considered for this study.

- *Confirming/disconfirming cases sampling* is another rare technique mentioned by Tashakkori and Teddlie (2003:281). Researchers will attempt to find specific sampling units that already fit into emerging patterns, in order to confirm existing data. Alternatively they can also attempt to identify units that will challenge or reject emerging patterns. This approach would not have been relevant to this study and was not used.

- *Homogeneous case sampling*. Tashakkori and Teddlie (2003:282) state that this technique is used by selecting units from a specific subgroup in order to study in more detail. This can be used for people who have the same qualifications, stay in the same area, or who follow the same professions. The student population of this study was not homogeneous enough to consider this technique.

- *Accidental sampling* is related to convenience or accessibility sampling, according to Fox and Bayat (2007:58) and is used as a last alternative. An example of this approach is to carry out a qualitatively study by conducting interviews with people leaving a shopping centre, which would not have been appropriate for this study.

- *Self-selection sampling* is described by Fox and Bayat (2007:60) as a technique where individuals are allowed to participate in the study after the purpose of the study has

been announced within the target population. It was selected as an additional sampling technique for this study to involve undergraduate students that wanted to voice their opinion about the customer experience levels they experience from administrative staff. It was expected that this would complement the purpose of the study, as it could have been expected that students' experiences on either side of the scale would respond to such an opportunity. Students were informed about this online questionnaire by using several initiatives, which is discussed in section 5.3.4.2.

Table 5.2 shows the response of the students from the different strata that participated in this study. The number of student respondents who selected to complete the online questionnaire was 178 in total, which was 13,77% of the student respondents. The balance (86,23%) were identified by using the systematic random sampling technique described above.

5.2.2.4.1.4 Determine the sampling size

According to Iacobucci and Churchill (2005:285) sample sizes can either be fixed (when they are determined in advance of the study) or sequential (when more data can be collected if the initially collected data does not answer the research question). This study will aim to work with a fixed sample size, as described below.

The sampling frame was determined for each of the populations, based on their sizes and practical considerations.

- Due to the marked difference in size between the different strata (ranging between 156 students for the school-based learning model, up to 13,201 for the on-campus students at Potchefstroom, it was decided to adapt the sample size percentage according to the size of each stratum relative to the total population. For the smaller strata the sample size was determined as ten percent of the population from the different campuses and modes of learning of the NWU whose administrative support is provided by NWU staff only, but for the two largest on-campus strata (Potchefstroom and Mafikeng) the sample size was planned to be four percent of the specific population. The sample size per stratum, as well as the eventual number of participants, is shown in Table 5.2.
- Due to the manageable number of administrative staff members identified on the three campuses, it was decided to include all 146 administrative staff members in this study. The total population will therefore be used for this study, as it is practically possible.
- All four registrars of the NWU were selected to be included in the sample for this study.

Table 5.2: Student population and sample size

Campus/ learning model	Potchefstroom on-campus students	Potchefstroom Telematic Learning students	Potchefstroom flexible learning students	Potchefstroom bursary students	Potchefstroom SEDIBA students	Potchefstroom school based students	Vaal Triangle on-campus students	Vaal Triangle off-campus students	Mafikeng on-campus students	Mafikeng off-campus students	TOTAL POPULATION
Population	13,201	1,629	412	1,056	211	156	3,601	468	4,870	600	**26,204**
Target	1,320	163	40	105	20	16	300	50	480	60	**2,554**
eFundi questionnaires	151	3	1	1	0	15	13	6	2	1	**193**
Hard copy questionnaires	326	146	23	65	25	0	237	46	184	54	**1,106**
TOTAL	**477**	**149**	**24**	**66**	**25**	**15**	**250**	**52**	**186**	**55**	**1,299**
Percentage of population	***3.61%***	***9.15%***	***5.83%***	***6.25%***	***11.85%***	***9.62%***	***6.94%***	***11.11%***	***3.82%***	***9.17%***	***4.2%***

5.2.2.4.1.5 Collect the data

Malhotra and Birks (2006:94) distinguish between primary and secondary data collection and consider between primary data as information collected by the researcher in an effort to address or resolve the specific problem they identified for the research project. They define secondary data as information that have been collected for other purposes. This study will focus on the collection and analysis of primary data, although some secondary data may also become available from the qualitative and quantitative data collection processes.

According to Iacobucci and Churchill (2005:177) the following types of primary data need to be collected in marketing research:

- Demographics and socio-economic characteristics. In this study this data was essential for all groups and was necessary to determine possible differences between the groups bases on their age, gender, campus, year of study, and other related factors (for the students), and age, gender, years of service, campus, qualification level, employment status, and other related factors (for the administrative staff).
- Psychological and lifestyle characteristics. This refers to the typical behavioural patterns that distinguish people from others. In this study the incoming and outgoing communication preferences students prefer, is a good example of what could be established by the data collection effort.
- Attitudes and opinions: An individual's views and preferences can be classified as "attitudes", while opinions are the spoken expressions of those attitudes. This study attempted to collect a great deal of data about the attitudes and opinions of the sample group related to their customer experience levels, as well as their satisfaction and loyalty levels.
- Awareness and knowledge: Unaided recall, aided recall and recognition are all methods used by marketing researchers to determine what respondents know of a specific object. These techniques were not used in this specific study.
- Intentions: This refers to the participant's planned or anticipated behaviour and is very relevant to this study, as it plans to determine the intention of the students to study further, as well as their advocacy intention towards the NWU. The advocacy intention of the administrative staff towards the NWU was also determined.
- Motivation: Marketing researchers need to establish why people act in a certain manner and what motivate and drive them. This can assist them in anticipating and planning conditions which might lead to a more positive experience for the customers. This type of primary data is relevant to this study and was collected from the sample

group. It was tested in specific statements that were drawn up, using a five point Likert scale to rate it.

- Behaviour: Iacobucci and Churchill (2005:184) define it as a "physical activity that takes place in specific circumstances". It occurs at a specific time and usually involves more than one person. This study was particularly interested in the behaviour of administrative staff toward undergraduate students in a service environment, and constructed related questions to both groups in an effort to determine why certain behavioural patterns existed, and how the students or customers experienced it.

Another way to distinguish between different types of data, is proposed by Blumberg *et al.* (2005:440), who used the measurement characteristics of the data as basis, as displayed in the following Table:

Table 5.3: Types of data and their measurement characteristics

Type of data	Characteristics of data	Basic empirical operation	Example
Nominal	Classified, but no order, distance or origin	Determination of equality	Gender (male, female)
Ordinal	Classified, and order, but no distance or unique origin	Determination of greater	Of lesser value, e.g. doneness of meat: well, medium, rare)
Interval	Classified, order and distance , but no unique origin	Determination of equality of intervals or differences	Temperature in degrees
Ratio	Classified, order, distance and unique origin	Determination of equality of ratios	Ages in years

Source: Blumberg *et al.* (2005:440)

When the proposed research design is compared to the above types of data, it can be concluded that this study made use of all the stated types of data to a bigger or lesser degree.

This study used questionnaires for the students and administrative staff, and structured interviews for the registrars to collect the data required. The detail of this research design was discussed and motivated earlier in this chapter (5.2.1.3.2), while the comprehensive methodology will be discussed later in section 5.3.

5.2.2.5 Stage five: Data analysis and interpretation

Cooper and Schindler (2008:93) describe data analysis as the process where collected data is reduced to a more controllable and convenient size, and where the researcher can start to identify trends or patterns, apply statistical techniques and summarise the data. This is necessary to be able to be able to interpret the findings in order to answer the research question. From this certain recommendations were formulated and submitted. Malhotra and Birks (2006:10), on the other hand, describe data analysis as the editing, coding, transcription and verification of data. They further confirm that the same data analysis techniques are used for both qualitative and quantitative techniques, as well as for both primary and secondary data.

The *Statistical Package for the Social Sciences* (or SPSS) is a commercial computer software package that has been used since the early 1960s, according to Bryman and Bell (2007:376) and Rubin (2007:34). They mention that SPSS has undergone several upgrades since then. It was used, together with the *Statistica* programme, to analyse the data once it had been collected. The Statistical Consultation Services of the NWU assisted with the analytical process and interpretation of the results.

The following statistical techniques were used in this study, as supported from the literature.

5.2.2.5.1 Frequency tables

According to Sarantakos (2007:40) frequency tables contain only the data of one variable, summarize its data, as well as how regularly it occurs. McDaniel and Gates (2005:441) describe it as a table showing the number of respondents choosing each answer to a survey question. Greenfield (2002: 223) states that frequency tables can be used for measurements on a continuous range by recording the number of results within a number of non-overlapping randomly selected class-intervals. It is a descriptive tool intended to provide more details about the demographic details of the target groups, as well as the basic results of each question in the questionnaires.

Two-way frequency tables were applied to report on the specific results of two questions compared results, e.g. each student group's response to a certain service encounter. Only the questions with statistically significant results will be reported on.

Rubin (2007:36) proposes that the frequency distribution or table displays the number of cases in each category of a variable, and in percentage of the total format. This approach was also used in this study and the largest and second largest groups were shadowed in the frequency tables and two-way frequency tables to highlight and identify it easier. It was then reported on, while possible explanations were offered.

5.2.2.5.2 Exploratory factor analysis

McDaniel and Gates (2005:540) explain that a *factor* is a linear combination of variables and state that factor analysis procedures construct a number of different outputs. Factor analysis is, according to Rubin (2007:315), a "multivariate statistical technique" to determine which items correlate stronger with each other than with other variables. Rubin (2007:263) defines an exploratory factor analysis as a procedure to examine the way items are correlated with one another and to identify the number of factors and what they have in common. Shui *et al* (2009:730) as well as Malhotra and Birks (2006810) describe it as a type of statistical procedures to reduce the data and help to summarise it more effectively. The factor scores were calculated in all instances. Rubin (2007:263) explains that each row in the table represents a variable, while each column represents a factor (that has been identified in the factor analysis), and each cell indicates the factor loading for a particular variable on a particular factor. This approach was also used for this study to determine the factors underlying customer service levels in ther NWU-Perf model.

5.2.2.5.3 Reliability tests

Shui *et al* (2009:739) claim it is necessary to determine whether the test instruments were consistent and whether the same results are likely to be found should the test be repeated. Hair *et al.* (2007:424) consider a test as reliable when its scale or question consistently measures a concept.

Bryman and Bell (2007:164) and Hair *et al.* (2000:652) describe the *Cronbach-alpha* test as a commonly used test to determine internal reliability. Blumberg *et al.* (2005:458) consider it as very useful for multi-item scales at the interval level of measurements. It was used in this study to determine the internal consistency of the sample groups' results Cronbach alpha ranges and a value of 0,7 or more was considered as an indication of reliability.

5.2.2.5.4 The descriptives of the different factors

According to Welman and Kruger (2001:213) *t-tests* are used as a data analysis tool to establish whether two groups have comparable or different mean scores.

Rubin (2007:158) describes the *t-test* as a parametric test which is used to judge the mean differences between two groups in an ratio-level dependent variable. Gaur and Gaur (2006:52) distinguish between the following three types of t-tests:

- One sample t-test is used when comparing the mean of a single sample with the populations' mean.
- Independent sample t-test is used when a researcher wants to detect differences between the means of two independent groups, as was used in this study. Rubin

(2007:158) confirms that the term *independent* in this context confirms that the two groups being compared are not related or connected.

- Paired or dependent sample t-test is used when the mean values of the same sample needs to be analysed at two different times, or if the groups are related or connected in some way.

Wagner (2007:81) describes the *analysis of variance* (ANOVA) as a statistical test for significance of the differences between the mean scores of more than two groups. This produces the statistic called the *F*-ratio, which is, according to Rubin (2007:176) a reflection of the variation between the means of several groups in relation to the variation within the groups. Gaur and Gaur (2006:67), Malhotra and Birks (2006:493) and Sarantakos (2007:83) confirm that ANOVA is used when comparing the means of more than two populations, as was the case in this study. They recommend that ANOVA should be used to study trends in consumer behaviour, marketing management and social sciences.

Rubin (2007:177) recommends that a *post-hoc test* should be used to determine whether groups differed statistically significant from each other. This study followed this approach to establish and identify these differences with Tukey's HSD tests.

Welman and Kruger (2001:213) further describe the *chi-square analysis* as a method to determine the probability that the relationships association observed between nominal-level variables in the cross-tabulation tables.

5.2.2.5.5 Correlations/associations

A *correlation* between values is the degree to which the values of two variables differ collectively in a consistent manner, according to Rubin (2007:314). Wagner (2007:57) states that information about correlations provide more details on how variables are related to each other. Kerr *et al.* (2002:182) explain that the correlation between any two variables may be due to their common dependence on a third variable, which is called a partial correlation. The influence of such a third variable can also be partialled out to determine the semi-partial correlation between the two original variables. This semi-partial correlation technique is used in multiple regression analysis to provide a measure of the strength between the variables.

The correlations between the different factors or components were also done in detail, as it helped to show a predictive relationship that can be utilised and developed in practice. Rubin (2007:321) describes the *Spearman's rho* as a popular nonparametric formula used to calculate correlation coefficients with variables that are at the ordinal level of measurement or that have a non-normal distribution. The calculated correlation coefficient ranges from -1.0 to 1.0. In this study values equal or bigger than 0.03 was considered to be a visible or medium correlation, while a value of 0.05 or higher indicated a large and meaningful

correlation. This range of values have the same meaning as *Pearson's r*, a commonly used parametric formula to calculate correlation coefficients, according to Hair *et al.* (2000:660).

Rubin (2007:210) also refers to the *phi coefficient*, another regularly method used to measure associations, which was also used in this study. It was used when nominal variables were compared. A value of 1,0 would indicate a perfect relationship between the variables. In this study values between 0.03 and 0.04 was considered to be indicative of a small association; 0,04 to 0,05 as a medium to high association, and values of 0,05 and larger as being of a high association.

5.2.2.5.6 Statistical significance

Sarantakos (2007:63) defines statistical significance as the probability that a test result has occurred by chance. It is then expressed in terms of the level of significance and the researchers work within these levels by computing the p-value. The test value is considered to be significant if a p-value smaller than 0,05 is determined. This was applied in this study. For this study a p-value smaller than 0.05 was considered to be of significance.

5.2.2.6 Stage six: Reporting of results

The last, and arguably one of the most challenging, but also rewarding stage of the research process is the actual writing of the research project report. According to Brynard and Hanekom (2006:69) a research report is "the account of the execution of the research project and of the results obtained". Bryman and Bell (2007:693) argue that it must be done in a structured and convincing manner by being persuasive and constantly referring to the literature study, as well as the research question.

According to Kerr *et al.* (2002:7) one of the most important issues in the report is that conclusions should be drawn up by relating the results back to the literature and the research questions, so that a clear explanation can be offered, as well as recommendations to contribute to the relevant field of discipline.

Iacobucci and Churchill (2005:557) also claim that the research report is one of the most important parts of the entire research project, and the standard by which the entire research project is judged. They further state that the steps in the research process are interrelated and warn that decisions made in one phase can cause implications for other phases. They recommend the following criteria:

- It must be *complete*, in other words, it must supply all the information required to entirely understand it.
- It must be *accurate* and cautious when attempting to offer explanations for the data findings.
- Use *clear and logical thinking* by following an understandable outline.

- Attempt to be *concise* by making maximum use of every phrase or word.

5.3 Research methodology

There were some references made to elements of the research methodology applied for this study, but in this section more emphasis will be placed on the detail of the methodology itself.

5.3.1 Theoretical background for the construction of the questionnaires

The content of the questionnaires for the students and administrative staff, as well as the contents of the structured interviews (for the registrars) was designed to attempt to answer the research questions by collecting sufficient data from all the groups. Therefore it had to contain all the elements identified in the literature review.

According to Gilbert *et al.* (2006:304) customer satisfaction and loyalty measurement instruments are more frequently used by organizations and have become crucial in the competitive business milieu. Hair *et al.* (2007:13) support this notion and emphasize the importance of mutually beneficial long term relationships in the business environment, including customers and own employees.

Frow *et al.* (2007:90) recommend that a consistent score of five out of five on a customer satisfaction survey can be considered as related to the achievement of a superior customer experience. This was used as a guideline when drawing up the questionnaire (by using a five point Likert scale), and also when the results were analysed and conclusions drawn up.

As indicated in previous chapters, this study also focused on the service quality levels provided by administrative staff of the NWU, and how undergraduate students on the different campuses and modes of delivery experienced it. It was therefore important to summarize the different service quality measuring instruments available in the literature and determines which one will be the most appropriate in the higher education environment.

Gerber (2008:38) motivates the need for service quality measuring when he argues that every decision made by the service provider will lead to a subsequent behaviour by the customer and that the economic and resource implications of their behaviour should be monitored. Trask (2008:43) recommends that it is important to continuously measure the actual experience of the customer in order to determine the company's ability to meet and exceed their real needs. She recommends that multiple sources, including satisfaction surveys and real-time feedback, should be used.

According to Gilbert *et al.* (2006:299) there is no agreed and universally-accepted measurement tool to determine customer satisfaction and loyalty levels, and that cannot be considered as an exact science, but rather an investigative and analytic process. They suggest that three approaches can be followed:

- The confirmation-disconfirmation approach judges the actual customer experience against what the customer expected to experience and is a very popular approach.
- Performance-only measurement is used directly after the service has been provided and focuses on functional and technical features directly related to the specific service interaction.
- Overall satisfaction focuses on a more generalized evaluation of the service provider and its services in a broader context.

A combination of the confirmation-disconfirmation and the overall satisfaction approaches were used in this study.

The different SQ models were discussed in section 4.6.1 by referring to several studies and its findings. As reported before, Brochado (2009:181) found that the HedPERF model presents a high level of internal consistency and that its overall score offers a high correlation extent with:

- Overall satisfaction
- Intentions to further studies
- Word-of-mouth referrals.

Earlier, Abdullah (2005:317) found that the HedPERF scale was more suitable for the HEI service settings, as is showed a better reliability, greater criterion and construct validity, as well as greater explained variance than the other SQ models he evaluated.

It was therefore decided that HedPERF would be the most appropriate service quality-model to be used as basis for this study. Given the demarcations of the study, only its administrative factors were used and extended to include more related statements to form a newly proposed service quality model, NWU-PERF.

Gilbert *et al.* (2006:299) observed that the assessment should be as close as possible to the "actual service encounter", as it should lead to a more accurate evaluation of the service quality experienced. This advice seems to be a good indication of the types of questions that should form part of the different questionnaires. It was therefore decided, after consultation with experienced administrative staff to construct questions in such a way that it will not merely measure perceptions, but as close as possible to real measurable experiences. This included:

- Actual waiting times at a customer service desk, office, or on the phone.
- Observations about administrative staffs' conduct during lunch times, tea breaks, peak times and long queues when customers show up.

- Time and number of attempts to get an administrative problem resolved after it has been reported.

5.3.2 Qualitative, structured interviews with Registrars

Structured interviews were conducted with the Institutional registrar of the NWU, as well as with the three Campus registrars to elicit their opinions about the NWU's CEM approach and how their staff applies it in practice, as well as on the existence and application of any policies in this regard. They were also asked to rate certain statements that were adapted from the HedPERF service quality model. These statements were the same as in the questionnaire for administrative staff members and undergraduate students.

The interviews were then transcribed, analysed and the results reported in the next chapter. The full transcriptions are shown in the list of appendices at the end of this document.

5.3.3 Quantitative questionnaires for administrative staff members

Organigrams of all campuses, faculties and academic administration departments were obtained, either by telephonic or e-mail request, or by downloading it from the NWU Intranet. Telephonic enquiries with administrative managers were conducted to determine and identify all administrative staff that was directly involved with undergraduate students' day-to-day administrative issues. It became clear that there were primarily three groups of administrative staff on all three campuses that had to be selected to form part of this study:

5.3.3.1 Academic Administrative Department staff

Administrative staff, ranging from administrative assistants to senior administrative officers at different departments, including temporary, contract and permanent staff, were identified. Temporary staff had a minimum term of 12 months and were not merely staff members helping out on a day-to-day basis. Administrative staff not dealing directly with students (e.g. the filing or archives staff), or only dealing with post-graduate students or alumni, were not included in this study.

The three different offices in these departments were as follows:

- Admissions office
- Student records and registrations office
- Examinations office

5.3.3.2 Administrative staff at faculties

Most of the 15 faculties of the NWU had a faculty administrative manager, as well as some administrative assistants and officials. They were all identified and selected to participate in this study. They were the most senior administrative staff members that formed part of this

study, but the nature of their jobs implied that they were “hands-on” involved in the rendering of administrative services to students.

There were also several administrative assistants employed by the different faculties and they also formed part of this study. The number of administrative assistants varied according to the number of students they has to serve, as well as the type of learning model they applied, as some learning models were more labour intensive than others.

5.3.3.3 Administrative staff on school level

Most schools within the faculties had their own component of administrative staff. In virtually all cases it included the school director’s secretary, who was responsible for certain administrative duties, including uploading of results (assignments, tests and examinations) onto the university’s Varsité student data management system, and dealing with student enquiries. Certain schools that were responsible for off-campus programmes had a larger administrative staff complement. They were all identified and included in this study.

5.3.3.4 Questionnaire for administrative staff

The theories discussed in section 5.1 were used as a basis to draw up the questionnaire that was used to establish the administrative staff’s opinions about the NWU’s CEM approach and how they and their colleagues applied it in practice, as well as their satisfaction and loyalty levels. They were also asked to rate certain statements that were adapted from the HedPERF service quality model. These statements will also be used in the interview with the Registrars. A copy of the questionnaire is shown as Appendix 2 at the end of this thesis.

The questionnaire was also uploaded onto the electronic learning platform, e-Fundi, and the selected staff members were given access rights to this site. They also received an e-mail to inform them about their selection and requested to participate in the study. They were informed that a hard copy version of the questionnaire was available on request. The staff numbers of participants were used to control that they could not complete both electronic and hard copy. The preferred option of participation is reported in the next chapter.

5.3.4 Quantitative questionnaires for undergraduate students

Undergraduate students from all three campuses and involved with all the different modes of delivery were identified to form part of this study. Data from the NWU Management Information was used, as well as 2008 annual report of the North-West University (2009c:31) to determine the student numbers per campus and mode of delivery. It was also compared with the student numbers provided by the faculties’ administrative managers.

5.3.4.1 Contents of the students’ questionnaire

A questionnaire was drawn up (shown as Appendix 1 at the end of this document) to establish the student’s demographic details, including their campus, mode of delivery and

academic status; their communication channel preferences; opinions about the NWU's CEM-approach and how they experience it in practice, as well as their satisfaction and loyalty levels. The theories reported in section 5.1 were also used in the construction of the questionnaire.

The student participants were also asked to rate certain statements that were adapted from the HedPERF service quality model. These statements were also used in the interview with the Registrars and the questionnaires for the administrative staff, as indicated in Appendix 4, where the alignment of the different questionnaires is shown..

Their perceived customer experience encounter levels were measured by:

- Their direct customer experience at the different administrative service departments
- Specific and practical measurable service encounters in different situations and channels.
- Their loyalty levels, value for money perceptions, intentions to study further and advocacy intentions

5.3.4.2 Distribution and collection of the students' questionnaire

First, second and third year modules were randomly selected from all faculties, and then the researcher obtained permission from the relevant lecturers (for the on campus programmes) to visit the lecture room during a contact session to conduct the research. Every tenth student (as they were seated in the lecture room) was then handed a questionnaire to complete. The programme managers of the off campus programmes were requested to provide a list of all the study centres, facilitators at those centres, as well as the time tables for all the modules. Modules were randomly selected from all off campus programmes and the facilitators were contacted. If they agreed to assist, a parcel with questionnaires, a list with detailed instructions (including the details on how to select every tenth student, as well as details on the completion of the questionnaires), together with a pre-paid return parcel were courier to them. They then assisted with supervising the completion of the questionnaires at these off campus study centres, while the researcher was available by telephone to answer any questions or assist with any problems or uncertainties. Completed questionnaires were then couriered back to the researcher, coded and then analysed together with the questionnaires of the on campus participants. A systematic random sample of every tenth student from the school-based education off-campus programme (who all had internet access at their schools) were selected and they were requested by e-mail to complete the online questionnaire. They also received instructions to assist them, and the researcher was available via cellular phone or e-mail in case of any uncertainties.

Because the questionnaire was available in the e-Fundi online environment for the school-based education off-campus programme, it was also made available for undergraduate students on the campuses and learning models where they had access to the internet, by following the self-selecting sampling technique as previously discussed.

Students were made aware of the questionnaire by means of the following initiatives:

- A message was placed on the e-Fundi homepage to inform all users as they sign in (see Appendix 10). Screen shots with directions were posted on the questionnaire home page to instruct students step-by-step how to complete the questionnaire (see Appendix 12).
- A poster was also printed (see Appendix 11) and placed on all strategic notice boards on the campuses.
- A Nokia cellular phone was purchased and offered as a lucky draw prize to encourage more participants. The winner was selected by entering all the student and staff numbers (for both the hard copy and electronic questionnaires received) into a random number selection generator program after all the results were analysed.
- The administrator page on the e-Fundi site was used to monitor the statistics of unique visits, which was an indication of the number of students that have visited the on-line questionnaire (although it did not indicate the number of completed questionnaires). A sample of this page is shown in Appendix 13.
- The different faculties' academic associations' management were contacted by e-mail and requested to inform their members about the availability of the questionnaire.
- The researcher arranged to be interviewed by the NWU student radio station, where he informed listeners about the questionnaire, the purpose of the study, and how to get access to the questionnaire in the e-Fundi environment.

5.3.5 Alignment of the different questionnaires

It was also necessary to ensure that specific questions were asked to all three broader groups of the population, in able to measure the perception or experience from different angles about the same issues or situations. There were however, specific questions for specific populations. Furthermore, it was also necessary to ensure that the questions asked in the hard copy questionnaires and in the e-Fundi online environment were aligned in order to ensure that the analysis of the results would be true and accurate. The summary of this alignment process is shown in Appendix 3 at the end of this study.

5.4 Conclusion

In this chapter a literature overview was provided about the relevant research processes, designs and methodologies, and how that was used to draw up the specific research plan for this study. The functional structure of the North-West University (including more information about the different campuses and learning models) was also discussed in detail in order to motivate the specific research design and methodology, as well as the specific research questions that were formulated and were tested, in order to report the results in the next chapter.