

**FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH
IN FINAL YEAR OPTOMETRY STUDENTS AT THE UNIVERSITY OF THE FREE
STATE**

by

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DECLARATION

I, Lauren Shelley Coetzee declare that the Master's research dissertation that I herewith submit at the University of the Free State, is my independent work and that I have not previously submitted it for a qualification at another institution of higher education.

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DEDICATION

I would like to dedicate this dissertation to my parents, Hugh and Glynis Rademan, who instilled in me a love of reading and the values I live by; and to my husband, Louw Johan who has supported me throughout all my academic efforts.

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LIST OF ACRONYMS

CLC404	:	Contact lenses and practise (4th year module)
COT409	:	Clinical optometry (4th year module)
CPD	:	Continuing professional development
CSL	:	Community service learning
DoE	:	Department of Education
DHET	:	Department of Higher Education and Training
DoO	:	Department of Optometry
ESI	:	Essential science indicator
FACT	:	Functional acuity contrast test
HPCSA	:	Health Professions Council of South Africa
MCM	:	Metacognitive model
MODE	:	Motivation and opportunity as determinants of attitude-behaviour
MoE	:	Ministry of Education
NGT	:	Nominal group technique
NHI	:	National health insurance
NQF	:	National qualification framework
NRF	:	National research foundation
OD	:	Doctor of optometry (USA Qualification)
ORE304	:	Optometry research skills (3rd year module)
ORES4802	:	Optometry research skills (4th year module)
PhD	:	Philosophiae Doctor
SAHP	:	School for Allied Health Professions
SAOA	:	South African Optometric Association
UFS	:	University of the Free State
UNISA	:	University of South Africa

SUMMARY

Key terms: undergraduate, research, attitude, Optometry, qualitative, Nominal Group Technique, qualitative

This study was carried out in order to determine the factors which contribute to the attitudes towards research in the final year optometry students at the University of Free State. Research attitude at an undergraduate level can influence the likelihood of further postgraduate study, and continued life-long learning in a professional capacity. The importance of the research at undergraduate level is noted by the skills which develop: time management, team work, critical thinking and many more. These skills are sought in the workplace and provide for adaptable individuals able to take independent decisions and enhance patient care through rich information gathering. Research is important to the profession of Optometry within the framework of finding African solutions to African problems and sustainability in an ever-increasing diversified patient base.

An extensive literature control was undertaken during the length of the study to inform the researcher of aspects of the theory of attitude and the impact an undergraduate research project has to students' development of an attitude to research. The mandates of the educational framework of government and the University were examined.

The method of investigation was the nominal group technique (NGT). The NGT was completed with the informed consent of 22 participants, over a period of seven weeks, in three sessions at a neutral venue. An expert facilitator managed the sessions, and the researcher was present as an observer. Unplanned open discussions occurred after the sessions, which enriched the data collection process.

Each statement was taken as an individual code, and the qualitative groupings of codes compiled into themes. Under iterative analysis the themes were then allocated a category. Twelve categories were compiled from the data, with both positive and negative aspects, and categories which carried also mixed (positive and negative) experiences. This reflected the integrative nature of the experiences relating to research that the students identified with; and the importance of interpersonal interaction. The findings highlighted facets which are within the scope of power of the Department of Optometry (DoO) to improve upon. Also, experiences from which students gain

satisfaction the DoO can cultivate and formalise in policies relating to the undergraduate research project.

Recommendations of the study relate prominently to administrative factors and the future implementation of defined communication channels, guidelines for ethical approval and improved module guides. Not all negative experiences could realistically be eliminated due to the nature of external factors and University guidelines that are currently in place. The findings can lead supervisors to identify shortcomings within their approach to students' research projects and allow for personal development in this area for each lecturer.

The study originated from the limited research experience in undergraduate and postgraduate publications in the DoO and a gap in the knowledge of this topic in the optometric health profession within South Africa. The knowledge gained by the study provides a platform for the growth of the undergraduate research module and an improved output rate of student research publications.

The sound research methodology ensured the trustworthiness of the data and findings. Recordings of the original scripts are available to interested readers. This study can serve as the basis for further research undertakings in this field.

OPSOMMING

Sleuteltermes: voorgraads, navorsing, houding, Optometrie, Nominale Groeptegniek, drieledige houdingsmodel

Hierdie studie is onderneem om vas te stel watter faktore bydra tot die finale jaar optometrie studente aan die Universiteit van die Vrystaat se houding jeens navorsing. Die waarskynlikheid van verdere nagraadse studie en voortgesette, lewenslange leer in 'n professionele hoedanigheid kan deur navorsingshouding op voorgraadse vlak beïnvloed word. Dit is veral vaardighede soos tydsbestuur, spanwerk en kritiese denke wat ontwikkel wat 'n aanduiding bied van die belangrikheid van navorsing op voorgraadse vlak. Dit is gesogte vaardighede in die werkplek wat aanpasbare individue kenmerk wat onafhanklik kan besluit en pasiëntsorg deur ryk inligtingsinsameling kan verbeter. Navorsing is vir die Optometrie professie van belang binne die raamwerk daarvan om Afrika-oplossings vir Afrika probleme en volhoubaarheid in 'n toenemend gediversifiseerde kliëntebasis te vind.

'n Uitvoerige literatuurkontrole is tydens die duur van die studie onderneem om die navorser oor aspekte rakende houdingsteorie en die impak van 'n voorgraadse navorsingsprojek op studente se houdingsontwikkeling jeens navorsing in te lig. Die mandate van die onderwysraamwerk van die regering en van die Universiteit is ondersoek.

Die Nominale Groeptegniek (NGT) is as ondersoekmetode gekies. Die NGT is met die ingeligte toestemming van 22 deelnemers oor 'n tydperk van sewe weke, tydens drie sessies in 'n neutrale lokaal voltooi. 'n Deskundige fasiliteerder het die sessies hanteer en die navorser was as waarnemer teenwoordig. Onbeplande oop besprekings het na die sessies plaasgevind, wat die data-insamelingsproses verryk het.

Elke stelling is as 'n kode beskou, en die kwalitatiewe groepering van kodes tot temas saamgevoeg. Die temas is dan ingevolge iteratiewe groeperings aan 'n kategorie toegeken. Twaalf kategorieë is uit die data saamgestel, met negatiewe sowel as positiewe aspekte, asook kategorieë wat gemengde (positiewe en negatiewe) ervarings bevat het. Dit het die saamgestelde aard van die navorsingservarings waarmee die studente kon identifiseer, reflekteer - asook die belangrikheid van interpersoonlike interaksie. Die bevindinge belig fasette wat binne die bemaatigingswydte van die

Optometrie Departement verbeter kan word, asook ervarings waaruit studente bevrediging put en hierdie departement kan koester en in hul beleid oor die voorgraadse navorsingsprojek kan formaliseer.

Aanbevelings wat uit die studie spruit verleen prominensie aan administratiewe faktore en die toekomstige implementering van gedefinieerde kommunikasiekanale, riglyne vir etiese goedkeuring en verbeterde modulegidse. Nie alle negatiewe ervarings kon realistiesgesproke elimineer word nie weens die aard van eksterne faktore en Universiteitsriglyne wat tans geld. Die bevindinge kan studieleiers help om tekortkominge in hulle benadering tot studente se navorsingsprojekte te identifiseer en sodoende persoonlike ontwikkeling op hierdie gebied bemoontlik.

Die studie het sy oorsprong in die beperkte navorsingservaring in voorgraadse en nagraadse publikasies in die Optometrie Departement en 'n kennisgaping oor hierdie onderwerp in die Optometrie gesondheidsprofessie in Suid-Afrika. Die kennis wat deur die studie ingewin is, skep 'n platform vir groei in die voorgraadse navorsingsmodule en 'n toename in navorsingspublikasies onder studente.

Die grondige navorsingsmetodologie het die betroubaarheid van die data en bevindinge verseker. Opnames van die oorspronklike dokumente kan aan geïnteresseerde lesers beskikbaar gestel word. Hierdie studie kan as basis dien vir verdere navorsingsondernemings op hierdie gebied.

FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS AT THE UNIVERSITY OF THE FREE STATE

CHAPTER 1

ORIENTATION TO THE STUDY

"Intellectual death is endemic in areas where people are not prepared to gain new information for development. Learning is the intervention!"

-Isrealmore Ayivor

1.1 INTRODUCTION

In this research project, a study was undertaken to identify the factors that contribute towards the final year (4th) Optometry students' attitudes to research. By determining these factors, future changes to the Department of Optometry's course on research can be implemented, fostering a more conducive environment to encourage more confident and quality research by the upcoming undergraduates.

The Department of Health and a higher education institution in the Free State in a joint venture manage the Department of Optometry (DoO). Both these stakeholders, as well as the community at large, would benefit from students who could continue after graduation with enhanced critical thinking skills and an interest in reading and performing research, to better perform their professional skills and be life-long learners.

Nominal group techniques allow the identification of important influencing factors relevant to participants' experience of research. By means of nominal group discussions with the final year optometry students, the factors were identified that the students regarded as attributing towards their experiences within the context of research.

The development of theories of attitude has evolved over decades. Attitude has been classified by Katz (1960:163) into four functional groups:

- **Utilitarian** attitude provides people with general approach or avoidance predispositions
- **Knowledge** helps people categorise and interpret new information
- **Ego-defensive** attitudes may help people shield their self-esteem

- **Value-expressive** attitudes are used to express a person's central values or principles. The classic, tripartite view offered by McGuire (1969:136-314) is that an attitude contains cognitive, affective, and behavioural components; as considerable research has been done in this field, much is already known about some of the factors that contribute towards attitude.

An attitude is defined by Eagly and Chaiken (1995:413) as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour". In 2007, the same authors purported that this definition was still relevant as an umbrella term and as an abstract definition of attitude that exhibits three features: evaluation, attitude object and tendency. Eagly and Chaiken (2007:583) state that evaluation includes aspects of beliefs, thoughts, emotions, intentions as well as overt behaviour. This evaluative response is aimed at an object or entity, known as the attitude object. The term tendency is appropriate as it neither implies permanence or transience, but merely indicates that past experiences can form an inclination to respond toward the attitude object with a degree of positivity or negativity (Eagly & Chaiken 2007:585).

Commonly identified factors that relate to research (Halabi & Hamdan-Mansour 2010:2; Hollingsworth & Fassinger 2002:325; Jerabek, Meyer & Kordinak 2001:278-279, Onwuegbuzwie 1997:6) are research anxiety, which pertains to statistical anxiety and writing anxiety; fear of failure, lack of interest, interpersonal relationships with mentors and relevance to their careers. This study aims to determine whether these factors are also applicable to the attitudes of the Optometry students at the University of the Free State (UFS). Also, there may be factors that are unique, or as of yet not identified, that may be pertinent.

This study thus served as a guide to implement changes in the course work content and teaching style to alleviate factors that may have impacted negatively on the attitude to research.

The research design is qualitative, and will utilise a nominal group technique to identify all the factors that the students relate to their experiences with regard to research, which contribute to their overall attitude toward research.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

The crux of research is well summated by Gibbs (2009:online):

“Knowledge generated by research is the basis of sustainable development, which requires that knowledge placed at the service of development, be converted to applications, and be shared to ensure widespread benefits.”

The overview of the interactivity of the importance of research and how it can be strategically measured is represented in Figure 1.1 below. Each pillar represents a section that will be expanded upon.

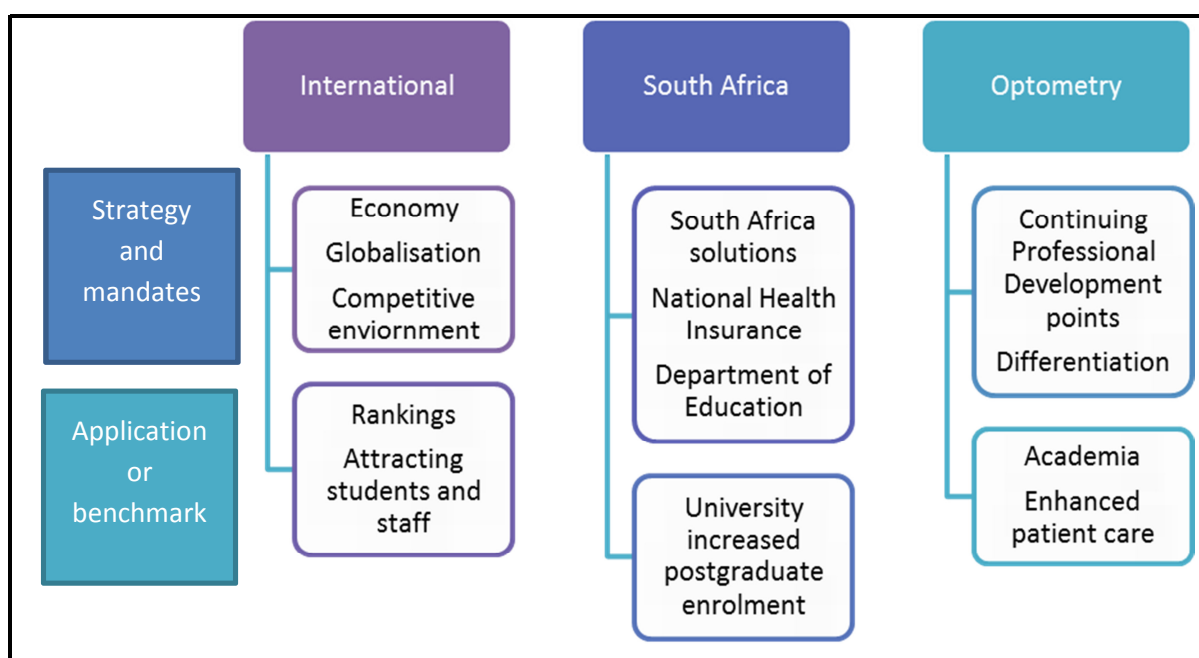


FIGURE 1.1: OVERVIEW TO THE BACKGROUND

The following serves as a summation of the background to the relevance of research:

- Increasing economic growth and sustaining commercial competitiveness.
- Reputation of academics and institutions internationally.
- Local ranking of academic institutions and attracting staff and students.
- Finding African solutions for African problems, including efficient implementation of the National Health Insurance (NHI).
- Maintaining professional development and continuance of the optometric profession.
- Better patient care by detection and management.

1.2.1 International context

In the past decade, emphasis has been placed on the research of research, as higher education and innovation accomplishments have integrated to become strategically interwoven. Countries need to recognise that social change can occur by utilising the findings of research; not only for social change, but for reasons of competition, countries are facing growing demands in their capacity for knowledge production (Gibbs 2009:online) and continue to put pressure on higher education (Engelbrecht 2012:39).

South Africa is an emerging market, and along with commercial growth, investment in research is required to maintain growth sustainably (Den Hartigh 2012:online). Diversity is seen not only culturally, politically and socio-economically, but also in the capacity to fulfil these needs, and it is for this reason that African researchers need to find African solutions (Grossman & Naidoo 2009:1307). The International Research Plan of 2007 directs that research should develop knowledge, skills and values necessary for development of the African continent (Schulze 2008:653).

1.2.2 South African educational context

The Education White Paper 3 (DoE 2007:online), as well as the National Plan for Higher Education (MoE 2001:online), emphasises the key role that research plays in the production, acquisition and utilisation of knowledge towards national development, competitiveness and improvement.

Rankings of institutions are important for students looking for a university to study at, and also as a place of employment for academics - as a marketing tool and assessment benchmark (Pouris & Pouris 2010:515).

Although much has been said about the limited quality output by South Africa, Pouris and Pouris (2010:517) compiled a ranking system of South African universities using the Essential Science Indicator (ESI) database. The UFS has reached the publication and citation threshold in the field of Plant and Animal Science, where the threshold is to be a presence of the world's top 1% of institutions in the particular discipline. Seven of the 23 South African universities manage the relevant threshold in at least one field.

1.2.3 Optometry research

A unique study by Faucher (2011:218-219) investigated the development of expertise in optometry, and found that the chief source of new knowledge was from reading scientific and clinical journals, the internet and specifically PubMed and Medscape as well as from books.

Research in the field of optometry will contribute to the advancement of optometric knowledge, which can translate to better skills in practice and be beneficial for patients and professionals alike. So it can be seen from this discussion that there is significance to determine the attitude towards research at an undergraduate level, in order to challenge and encourage students' paradigms on research with a view to future sustainability of the profession, the community and the country at large.

1.2.4 Research exposure for undergraduates

Student assignments that relate to research skills and topics are usually given in a semester module or year course that covers the basics of research methodology and requires the understanding of research design. These components are conceptualising a research problem, conducting a literature control, collecting and analysing data, and writing and interpreting results. These projects are usually completed in groups, on a topic of their choice, and orientated toward a relevant academic issue (Papanastasiou 2005:18).

In the undergraduate programme of the DoO at the UFS, the students complete a module on research methodology and compile a protocol in their third year (Module ORE304). This is then continued until completion of the approved research project in the final year; this is a requirement for the completion of the degree. The fourth year contact lens module (CLC404) also contains a formal literature study, which is completed in groups and presented before a panel of external adjudicators from the industry. These two items are the only formal tasks that are completed by the students with regard to research. Other continuous assignments may require referencing and some peer-reviewed reading, but do not require any original composition on the part of the student. Topics such as ethics are included from first-year level; however, these are related to patient care and the guidelines given by the Health Professions Council of South Africa (HPCSA). Concepts like plagiarism are mentioned for small continuous assessment tasks, but are not assessed stringently.

1.2.5 Previous Optometry studies in attitude towards research

No study has been found in the initial exploratory document search that directly relates to the attitudes towards research of optometry students. However, an editorial in *Ophthalmic and Physiological Optics* (2012:81-82) did elucidate on the methods recommended for research for optometrists.

Elliott (2012:81) mentions that universities are adapting optometry curriculums to more evidence-based approaches and that this enables practitioners to review the literature and better interpret the findings. He also notes that practitioners are well placed to assist with research, with good clinical skills, and extensive clinical data that could be used for longitudinal and retrospective studies.

1.3 RESEARCH PARADIGM

The researcher holds an interpretative relativist constructionist ontological view. This is interpreted by the researcher as that every person has his/her own exposure to various experiences through his/her unique environment and this will create meaning for him/her, which may not be the same meaning for each person to which a particular event occurred. This results in individualistic insights and perceptions, and is a reflection of their own personal truth. Thus, there are multiple realities and truths for any particular event (*cf.* 3.1.1).

1.4 PROBLEM STATEMENT AND RESEARCH QUESTION

The problem that was addressed was that there is currently no information relating to the attitude towards research in the Optometry students within South Africa, and specifically final year Optometry students at UFS. Attitude contains aspects of emotion, behaviour and cognition; these aspects may be positive or negative, and combine to create an overall attitude toward research (*cf.* 2.2.3.1).

The significance of the research is that, to my knowledge, these factors have not yet been identified in any of the Optometric departments in South Africa. By fostering confidence in research in the undergraduate programme, the culture of reading research and continuous professional development through research articles will be inculcated. The possibility is that

a more positive attitude at undergraduate level might ensue in students seeking to independently do research at a higher academic level.

Allied health professionals, such as optometrists, are often at the forefront of detection of illnesses and preventable conditions. Developments in patient care, treatment and detection are published in scientific journals and are the key source of new information for qualified professionals, as mentioned by Elliott (2012:81-82) and health research assists in meeting the health care needs of the community (Mostafa, Khashab, Fouaad, Abdel Baky & Waly 2006:99). The students of today will become the backbone of the profession in future. There is a need for new researchers to carry the torch, and to inform their colleagues of these findings.

Given that South Africa is an emerging market, with the future implementation of the NHI, there will be even more opportunities for optometrists and dispensing opticians to assist a greater population. The implementation of the NHI programme will require sound research into the statistics of prevalent conditions and may require new methods in management, patient care and follow up, to be able to cope with this shift. In the private sector, competition is high and the market is dominated by franchises; for the individual to maintain a profitable, independent practice, optometrists need to differentiate themselves - being up to date with research is one key method to achieve this.

From all forefronts, private or public care, the community would benefit from graduates who are interested in developments published by research efforts and able to assist the Government in the collection of data to better serve the country at large.

To address the problem stated, the following research question was addressed:

- i) What are the factors that contribute to the attitude towards research of final year optometry students?

The research was conducted and completed based on this research question.

1.5 PURPOSE, AIM AND OBJECTIVES OF THE STUDY

The purpose, aim and objectives of the study will be outlined below.

1.5.1 Purpose of the study

The overall purpose of the study was to find a way to ensure that optometrists will go on to be life-long learners and researchers after completing their formal undergraduate studies.

Future changes may be implemented by the DoO to strengthen the research culture within the department and to inform staff members who are supervisors of research projects; these changes might be aligned with the findings of this study. The results may be implemented in the organisation and management of the research module to enhance the experience of the students.

1.5.2 Aim of the study

The aim of the study was to identify the contributing factors to the attitude of the final year students towards research within the DoO at the UFS.

1.5.3 Objective of the study

To achieve the aim, the following objective was pursued:

- i) To identify the factors which contribute to the attitude of final year optometry students towards research.

By achieving this objective, it was hoped to find an answer to the stated research question. Data were collected by means of a Nominal Group Technique.

1.6 CONCEPT CLARIFICATION

Concepts that relate to the study are defined below. These concepts are not all-inclusive, but merely provide a guideline as to the perceptions of these factors to the researcher.

1.6.1 Factors

The researcher defines a factor as an element within the students' environment that has a bearing or impact on the attitude towards research; be it positively, negatively, and

incrementally or in conjunction with other factors. They can be grouped according to academic, personal, socio-economic, emotional and administrative, and also moral or value factors.

1.6.2 Attitude toward research

An attitude includes components of belief, emotion, thoughts and experiences, overt behaviours that are aimed at a specific person, object or entity. In this study the entity is research, (specifically the research project the participants are involved in, but encompasses all previous experience and exposure to research) as it pertains to the DoO at the UFS.

1.7 DEMARCATION OF THE FIELD AND SCOPE OF THE STUDY

This study was done in the field of Health Professions Education and lies in the domain of academic development. The study is interdisciplinary as it reaches across the fields of Health Professions Education and Optometry.

The scope of this study is limited to a single final year group of Optometry students at the University of the Free State, with the goal to identify contributing factors as components of their attitude towards research.

The open discussion may also address whether or not the students recognise the value of research as part of their undergraduate course as well as in their career paths. Similarly, it might be identified whether the supportive role of the department is sufficient or whether change is deemed necessary by the students. The range of this study is to determine what students feel should be changed, omitted or added to the course in future. This study does not intend to develop a framework or curriculum change at this time. The study is also not designed with the intention to be transferable beyond the Department of Optometry.

In a personal context, the researcher is a qualified optometrist with seven years' private experience before joining the DoO at the UFS and is registered with the HPCSA. After completion of the professional bachelor's degree, the researcher worked within practices of various income brackets, and for three years as a locum at the St John's ambulance service eye clinic, where the disparate levels of care rendered to the impoverished population

became even more evident. The researcher was also exposed to practice and ethical standards in optometry whilst practising in the West Indies. Upon returning to South Africa she pursued an interest in commerce by completing a degree in economics; it became apparent to the researcher that research methodology and research assignments via distance education were more challenging than anticipated. Since working with students, she identified with the students within the DoO and developed an interest in the field of education and the uncertainty students often feel when attempting research for the first time.

The timeline of this study spanned from March 2013 to November 2014, with the empirical research phase lasting from April 2014 to May 2014.

1.8 SIGNIFICANCE AND VALUE OF THE STUDY

To know what causes most stress among students involved in research and to limit those influences, to encourage and inculcate an environment for students to flourish in the area of research projects, implies a proactive approach to improving the quality of the research output at an undergraduate level at the DoO. As stated by Mostafa *et al.* (2006:100), to understand student attitudes is to be able to advise the teaching strategies "to support students' feelings of control and mastery of research methods and reduce negative research orientations".

It is essential to encourage students to be lifelong learners and to do this, the staff responsible for introducing them to research must know what the factors are that cause students to be disinterested in research, or have difficulties in conducting research. This will be important to ensure the maintenance of a high standard of optometry care.

It is of great concern, when looking at the profession of optometry, how patient care has become secondary to meeting the financial targets. The only way to return to the fundamentals of patient care and core ethical standards is to identify the importance and relevance of the optical industry within the community. This can be achieved by awakening the questioning spirit; to be aware of the status of the optical industry outside of South Africa and by gaining knowledge of the movements taking optometry forward elsewhere. Many topics within the field of optometry are researched by engineers, information technologists or medical specialists; optometrists should not allow themselves to be pushed

out of their area of expertise by not being involved in the developments within their profession.

It has also been noted that many practices differentiate themselves as specialists; this requires investment of time and money into up-dating skills, new equipment, technological testing methods and online visual training programmes. Ironically, these practices where out-of-the-box thinking takes place are dedicated to holistically treating their patients and are financially outperforming the strip mall retail practices.

Guidelines to implement in future could possibly include writing workshops for the students to gain an understanding of academic writing skill and the technical aspects expected. Other communication skills should improve along with the ability to interpret data and improve group communication, and might help students deal with criticism. Greater emphasis on statistics could assist with the ability to critically comment on the methods of previous research and able to identify limitations and recommend future studies or improvements. Clear guidelines for performance and rubric mark sheet to assist the student with structure to fulfil the requirements of the research project would be beneficial. Greater positivity towards research could have more students apply to be Master's students.

Guidelines could also be provided for future supervisors, to enable them to provide more structured and beneficial supervision; to create a more supportive role for staff, in order to add structure and provide guidance. This all may in turn improve the quality of undergraduate research projects.

1.9 RESEARCH DESIGN OF THE STUDY AND METHOD OF INVESTIGATION

The design of a study is often called the blueprint or plan (Mouton 2001:55) of how the study will be conducted. Methodology refers to the actions, techniques and instruments that will be used to address the research problems in order to meet the stated goal and objectives (Lues & Lategan 2006:11).

1.9.1 Research design of the study

The design of the study was qualitative in nature. The study was a descriptive, qualitative inquiry, with an explorative and contextual research design to explore the factors that

contributed to the attitudes towards research in the final year optometry students in the DoO at the UFS.

Qualitative research is aimed at gaining a deeper understanding of a specific organisation or event, rather than a surface description of a large sample of population (Data Collection Strategies II: Qualitative research:online). Morris and Burkett (2011:27) describe qualitative research as a holistic manner of use in studying a subjective phenomenon.

The use of an explorative study was to increase knowledge on this topic as such a study as yet has not been undertaken in South Africa within any Department of Optometry. The descriptive design was aimed at accurately giving an account of the participants' feelings and experiences. Contextual studies are utilised to find meaning within specified boundaries, which in this study is the DoO at the UFS.

1.9.2 Methods of investigation

A literature study was done to contextualise the study in the existing body of knowledge. The main themes within the literature control were the previous findings of similar studies within other educational faculties and departments, to outline the contributing factors to the attitude towards research as found in previous studies. The literature control also placed the benefits of research within the context of South Africa, and how it aligns with the mandates and strategic goals of the Department of Higher Education and the UFS. The philosophy of research within the profession of optometry also received attention.

The literature control spanned the whole timeframe of the study; the early readings to justify the methods used and then more extensive readings were done after data analysis. It is important that the researcher notes this, due to the possibility of the reading colouring the findings of the study. The literature is used not only as a framework to theoretically clarify terms and ideologies, but to fully give credence to the findings.

Harvey and Holmes (2012:188), like Jones and Hunter (1995:376), provide support in their articles that state that consensus methods used in qualitative research result in gathering greater amounts of information than with statistical methods - particularly in research in medical and health services research. They specify the Nominal Group Technique (NGT) as one of these consensus gathering methods, and this will be expanded upon (*cf.* 3.3). This

technique gives all participants a chance to voice their opinions; the participants are viewed as experts as they can speak with expertise on how they perceive their experiences. Harvey and Holmes (2012:190) confirm NGT as a reliable method to determine priorities and it is considered a valid and effective method for problem identification.

The results of the NGT and the literature control were used to determine where the department could make changes to the supervision, implementation of the research module and the guidelines for the students and staff alike to undertake undergraduate research. This aims to improve the quality of research as well as the attitude of the students towards the research course and project.

The detailed depiction of the population, sampling, methods, data collection and techniques, data analysis and reporting, and ethical considerations are provided in Chapter 3, Research Design and Methodology.

The research process for this study is depicted in Figure 1.2 on the following page.

1.10 IMPLEMENTATION OF THE FINDINGS

Through this study it was endeavoured to create an as yet not described awareness to the staff within the DoO. The results of the study will be drafted into an article for publication; as this is expected of the researcher by the institution where the study was done, but also to make known the findings to the wider optometry fraternity and other academic institutions that might wish to learn more about the topic. The components identified that can be managed by administrative guidelines will be provided to staff members that are in charge of the modules relating to research and to supervisors of the research project. It is hoped that this study will form the groundwork for guidelines for supervisors as a research thesis.

**FIGURE 1.2: THE RESEARCH PROCESS**

1.11 ARRANGEMENT OF THE REPORT

To provide more clarity on what the reader may expect to find in this dissertation, the study report will be arranged as follows (bold text indicates the title of the chapter):

In this chapter, Chapter 1, ***Orientation to the study***, the background to the study was provided and the problem and research question were stated. The overall purpose, aim and objectives were provided and the research design and methods that were employed were briefly discussed to give the reader an overview of what is contained in the report. It further demarcated the field of study, and the significance of the investigation was highlighted.

In Chapter 2, ***Overview of the factors contributing to developing an attitude towards research and why this is important***, these factors and their importance will be explored and discussed. Attention will be given to the attitudes of students towards research in other health professions and industries. This chapter will serve as the theoretical framework for the study.

In Chapter 3, ***Research design and research technique***, the research design and the methods applied will be described in detail. The data collecting methods and data analysis process will be discussed.

Chapter 4, ***Findings of the nominal group discussions***, will entail a report on the results obtained from the nominal groups, and the findings will be discussed.

Chapter 5 entitled ***A discussion on the factors that contribute to the attitude toward research in final year Optometry students at the University of the Free State***, presents the final outcome of the study, contextualised within health profession education, and discussed in full detail.

In Chapter 6, called ***Conclusions, limitations and recommendations of the study***, an overview of the study, a conclusion, and recommendations ensuing from the study will be provided. Limitations of the study will be brought to the attention, and the researcher will reflect on the personal journey undertaken during the completion of the study.

1.12 CONCLUSION

Chapter 1 provided the background and introduction to the research undertaken regarding the factors that contribute towards the attitude to research.

The next chapter, Chapter 2, entitled ***Overview of the factors contributing to developing an attitude towards research and why this is important***, will be an overview of the relevant literature.

CHAPTER 2

OVERVIEW OF THE FACTORS CONTRIBUTING TO DEVELOPING AN ATTITUDE TOWARDS RESEARCH AND WHY THIS IS IMPORTANT

"Positive attitudes towards research can facilitate the learning and motivation to do research which, in turn, increases the efficacy in doing research and related productivity" (Arthur & Kam Yuet Wong 2000:665).

2.1 INTRODUCTION

This chapter will briefly give a basis on attitude theory, cover literature on similar studies and provide insight into the importance of research and the attitude towards research as it pertains to the academic setting, the UFS and the profession of optometry. The final sections cover the research process within the DoO, relating to the supervision and resources of the department. Below is a synopsis of the chapter, Figure 2.1.



FIGURE 2.1: DIAGRAMMATIC OVERVIEW OF THE DIFFERENT ASPECTS ELABORATED UPON IN CHAPTER 2

A literature control is the term used to describe this chapter, in line with qualitative nomenclature. This implies that the literature is used as a control method in later chapters to inform the researcher on the validity and comparability of the study. The compilation of the literature spanned the length of the study, as to not cause the researcher to have pre-conceived preferences for the findings of the study.

2.2 ATTITUDE

"Attitudes are a hypothetical construct, invented by researchers to account for a body of phenomena. We cannot observe attitudes directly but infer them from individuals' self-reports and behaviour"(Schwarz & Bohner 2001:438).

There have been many developments in the theory of attitude; the starting point of this discourse will be the past and current definitions of attitude.

2.2.1 Definitions of attitude

Early definitions of attitude were broad and incorporated cognitive, affective, motivational, and behavioural mechanisms. These definitions highlighted the permanent nature of attitudes and their connection to individuals' behaviour, whereas now a growing body of literature proposes that attitudes may be less permanent and stable than has conventionally been supposed (Schwarz & Bohner 2001:436).

Allport (1935:810) defined an attitude as "a mental and neural state of readiness, organised through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related". Later Krech and Crutchfield (1948:152) wrote,

"An attitude can be defined as an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world".

Bem (1970:14) was incredibly succinct and stated that attitudes are likes and dislikes and connects attitudes to evaluative judgments.

An attitude is defined by Eagly and Chaiken (1995:215) as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour". In 2007, the same authors offered that this definition is still relevant as an umbrella term and as an abstract definition of attitude that exhibits three features: evaluation, attitude object and tendency. This is considered to be the most widely accepted definition of attitude, currently (Ferguson & Bargh 2007:223; Povee & Roberts 2014:29). Eagly and Chaiken (2007:583) state that evaluation includes aspects of beliefs, thoughts, emotions, intentions as well as overt behaviour. This evaluative response is aimed at an object or entity, known as the attitude object. The term tendency is appropriate as it neither implies permanence or transience, but merely indicates that past experiences can form an inclination to respond toward the attitude object with a degree of positivity or negativity (Eagly & Chaiken 2007:585). The attitudes people hold toward the entities in their world have mammoth personal and social significances; and are thought to be central determinants of behaviours and judgements (Olson & Kendrick 2012:230).

The cognitive aspect pertains to thoughts and opinions about an object or construct. The affective aspect of attitude relates to the feelings and moods towards an object and the behavioural component is the actual behaviour of the person, including the intention to display or avoid certain behaviours. This can be linked to the study at hand by students understanding the value and place (cognitive) in professional development for Optometry, students should feel capable and interested (affective) in conducting and reading research and also their behaviour as they carry out or attempt to use research for their own enrichment.

2.2.3 Theoretical aspects of Attitude

"Attitudes, as social psychology has traditionally conceived them, are strongly social concepts. They are evaluations of social issues, social groups, and social phenomena. They provide a connection between the individual and the world outside of the individual"(Prentice 2004:78).

The discussion below leans heavily on the authors that developed the theory of attitudes and comprises works over the last hundred years of research into the topic of attitude.

2.2.3.1 *Attitude models*

Historically, the most prominent of the theories of attitude has been the tripartite approach, which encompasses emotion, cognition and behaviours; attitude manifests as beliefs, feelings and actions (Fazio & Olson 2003:139). This model implies that all three components need to be present to be able to make a judgment and that these three components hold the same value (positive or negative), which need not be the case (Fazio & Olson 2003:140).

Cognitive origins (Olson & Kendrick 2012:230-232) explain that a person may develop positive or negative connotations to an object through gaining knowledge. The information integration model states that as new pertinent information is learned relating to an object, it is added to existing thoughts and beliefs about the object, which is then integrated and produces an attitude. Social science theorists have long held the view that values serve as criteria for evaluation and researchers have based claims for the relation of values to attitudes, choices, and behaviours and it is broadly consistent with expectancy value models of the relation between values and behaviours (Prentice 2004:71). The expectancy-value model asserts that an attitude is a function of the expectancy that the entity has certain characteristics and the value attached to each of the perceived characteristics of the attitude object. A distinction between these two models, is that in the information integration model, not all information is seen as equal; some may be felt to be more important and contribute a greater weight to the attitude formed from the information (Olson & Kendrick 2012:232).

The value-account model outlines an implicit process where the evaluation of object attitudes can be categorised as value accounts, containing either positive or negative values connected to the attributes of the object. When new information is attained, it is combined into the account, and changes the overall value or attitude toward the object, similarly to how transactions influence on a bank balance (Olson & Kendrick 2012:232).

An explicit belief based framework, such as the reception-yielding model, explains a two-stage process whereby an individual gains new object relevant information and then decides whether or not to "yield" to this new information, by making a change to the evaluation of the object, or to reject it. This model is often used in attitude change theory and describes how people react to learning new information (Olson & Kendrick 2012:233).

Attitudes and their relationship with values has been investigated by Prentice (2004:78) and conclude that if the individual's most important values underline symbolic principles, then that individual will hold attitudes and value objects for what they represent. Alternatively, if the individual's most important values stress instrumentality, then the individual one will take a similarly instrumental approach; values echo the criteria they use when evaluating subjects and objects of all kinds.

In terms of a newer model, the metacognitive model (MCM), the individual reflects on all the various qualities of the object, and also deliberates on the truth value of every belief they hold about the object. Particular beliefs about the object may be considered to be more certain than others and thus it is possible to have contradictory perceptions about an object. Some thoughts are labelled as valid and others labelled invalid and therefore do not influence the overall attitude. It is thought that the use of these validity labels involves some amount of effort, in the absence of which all perceptions are accessible and able to influence the attitude (Olson & Kendrick 2012:233).

Attitudes can also be formed from the emotional reactions that we experience when we are exposed to an attitude object; this is the affective component of the tripartite development of an attitude (Olson & Kendrick 2012:232-233). Zajonc (1980), mentioned by Forgas (2001:1238), explains that affective responses often create the primary response to social stimuli and may impact ensuing attitudes and behaviours, even in the lack of any cognitive memory.

There are three processes that contribute to affectively consequent attitudes: operant conditioning, evaluative conditioning, and exposure. The process of operant conditioning, whereby the increase in the number of incidences of a response occurs following a positive outcome and a decrease in incidence following a negative outcome, provides a mechanism for the construction of affectively founded attitudes.

Classical conditioning does not necessitate that the individual react to an attitude object, argues Fazio and Olsen (2003). The link between an object and an affective evaluation is created by observation of the pairing of an attitude object and a positively or negatively evaluated stimulus. Observation of these pairings generates an association between the former neutral object and the valence (positive or negative) of the object with which it was paired. Evaluative conditioning has revealed that attitudes can develop via affective associations between an object and a valenced object,

without conscious awareness of the association. Explicit awareness or exposure to the recurring couplings of neutral objects with either strongly positive or negative stimuli allows an individual to develop consciously held beliefs regarding the association between the two objects.

With neither a cognitive nor affective basis for an attitude, individuals can deduce an attitude by noting past behaviour toward the object by a method of self-perception. Behaviour can inform attitude development by the process of dissonance; the experience of dissonance between attitude and behaviour is a powerful mechanism that creates attitude change (Forgas 2001:1240). This is explained by an inconsistency within the known context an individual has about an object, and will alter behaviour until there is alignment of the thoughts and behaviours regarding the object, thereby eliminating the dissonance (Olson & Kendrick 2012:234).

Motivation and opportunity as determinants of attitude-behaviour (MODE) is a new model that posits that if motivation and opportunity are present, attitude is a result of a more defined process, however if one (either motivation or opportunity) are not present, attitude develops more spontaneously (Fazio & Olson 2003:151). Due to this defined process, it is possible that a person could overcome their attitude to make better judgments; this implies a malleability of attitude. This is particularly relevant to this study as it shows that with sufficient motivation and opportunity students can adapt their attitude to be the most beneficial to them.

The connectionist model held by Conrey and Smith (2006:3-6) was first postulated by Smith in 1998, and views attitudes as "connectionist network", like a loose equivalent of a biological brain. It is seen similarly to a brain due to the large number of processing units that are elaborately interconnected and send signals to each other; this information that is sent is dependent on each of the nodes' separate levels of stimulation. The integration of these signals or parcels of information creates a meaningful whole. A process of learning can take place, that certain factors or cues can stimulate the pattern of nodes or units that stimulate the integration, this means that the pattern can be identified from fewer pieces of information, similarly to association and memorisation or categorisation. Thus, key triggers can restructure the same pattern in a multitude of contexts (Conrey & Smith 2006:7).

Other researchers hold to the theory of implicit attitude development, which contrasts with the direct self-report methodology, and postulates that the development of implicit attitude measures might be less reactive and more furtive than explicit attitude measures (Ferguson & Bargh 2007:217). Due to the measurement of attitude outside of the participants' awareness, it is felt by these researchers that implicit measurement of attitude provide less flexible accounts of how people feel toward the stimuli in the setting, but also can only gain insight into pre-existing, stable attitudes (Ferguson & Bargh 2007:234).

From these models it can be seen that each researcher and theorist lays emphasis on different aspects of the components of attitude and how it is developed and influenced; this will determine the perspective on the measurement and stability of an attitude.

2.2.3.2 *Attitude measurement*

Krech and Crutchfield (1948:205) extoll the importance of knowing the beliefs and attitudes of people, for it is possible - to some degree - to predict and control the behaviour of the individual with those beliefs and attitudes. Attitudes cannot be directly observed, but inferred from individuals' self-reports and behaviour (Schwarz & Bohner 2001:440).

Through studies, attitude measurement has been shown to be highly context dependent and display an interwoven relationship of cognitive and communicative processes (Schwarz & Bohner 2001:439). Krech and Cretchfield (1948:79) state that the phenomenological method to obtain information about an experience is a systematic attempt to observe and describe the world as it appears to the experiencing individual, and can be fraught with pitfalls. It is for this reason that the skill and art of questioning is very important when wanting to garner an understanding of a participants' point of view.

When a participant is asked a question regarding attitude, the participant needs to retrieve the relevant information pertaining to the attitude object in question. Relevant information includes attributes of the attitude object, the participant's perceived affective reaction to the object, and also the information about the participants own behaviour with respect to the object; also noted is that participants may wish to edit

their private decisions before it is communicated to the researcher for reasons of social appeal and self-presentation (Schwarz & Bohner 2001:440).

When asking questions they also noted that the same piece of available information to a participant can have opposite impacts on their attitude judgments, and is dependent on how the information is used (Schwarz & Bohner 2001:443). A number of variables influence how a given piece of information is used and can be understood in terms of three general decisions. First, why does this information come to mind? The general assumption individuals make about what comes to mind regarding the question is in response to the topic they are thinking about; this assumption was termed by Higgins (1998) as the aboutness principle (Schwarz & Bohner 2001:444). Second, is if the information illustrative of the attitude object. Thirdly, social norms may prohibit the use of information that the listener may be interested in, resulting in the exclusion of this information in the depiction of the attitude judgment.

The group dynamic can also play a role in the measurement of attitude; participants regulate their performance to the pace of others, they also modify their opinions and judgements in the trend of a group norm (Katz 1959:239). Different atmospheres (authoritative, democratic and laissez-faire) in group work has been found to illicit different responses; morale and cohesion in the group, working together toward common goals was found to be highest in the democratic groups (Katz 1959:246-248).

Campbell (1963:149) defines attitude as a disposition, or latent construction, which we identify or measure on the basis of stimulus-response incidents. In order to measure the remains of experience or assimilated behavioural outlooks of attitude, testing can be undertaken by a number of methods: opinion surveys, personality-trait measurements, projective testing, clinical diagnosis, case study reconstruction of life histories, and achievement testing can be sources of this information (Campbell 1963:149). Much of qualitative research uses the method of self-reporting, also mentioned by Campbell (1963:150), these are voluntary responses to questions, and hereby the respondent becomes a "collaborator in the research". Also, participants may be asked their views; attitudes may also be identified by asking the participants about the characteristics of the item or variable as they see it (Campbell 1963:152).

The measurement of attitude can be taken as related to the topic or item concerned; the amount of interference of the researcher wishes to impact on the measurement and also the depth or superficiality of the attitude they intend to investigate.

2.2.3.3 *Attitude stability*

Attitude can be stable over time. If the information or experiences are of the same valence, a new piece of information will not alter the attitude, unless its evaluation is considerably larger in size and carries greater weight to the individual and is of a different valence. This stance is given by Schwarz and Bless (1992:217-245) whereby they explain that the size of context effect bears directly on the stability of the attitude and that the variables that define the size of context effects are also the variables that define the stability of attitude judgments over a period of time.

An attitude is considered to be strong if it is persistent over time and the individual has low ambivalence; that memory easily accesses the attitude (Mutz & Daniel 2013:283).

This indicates that attitude can be varied over a period of time with exposure to factors that are considered to be linked to the attitude by the individual, should the stimulus be sufficient to do so.

When relating these definitions and measurements to the attitude towards research, van der Linden, Bakx, Ros, Beijaard and Vermeulen (2012:405) uses the tripartite model in the promotion of a positive attitude towards research: the cognitive aspect is that students need to know and understand the possibilities of carrying out research and the use thereof, the affective aspect that students need to feel good about research and enjoy doing research. The behavioural aspect is that students attempt to carry out research or plan to learn more about research.

2.3 PREVIOUS STUDIES ON THE ATTITUDE TOWARDS RESEARCH IN HEALTHCARE RELATED PROFESSIONS

"These studies point to the sheer complexity of graduate students attitudes towards research and raise questions about the factors that influence student attitudes" (Morgenshtern, Freymond, Agyapong & Greeson 2011:554).

Many studies have been undertaken to assess attitude to research in various academic departments. These studies have as yet not included optometry. These studies mentioned below focus mostly on health - related fields.

Many of the studies are based on the exposure to a project or course similar to the students in the DoO and the courses are credit bearing; as such, students are required to show competence to complete the module. Research competence is assessed by students' knowledge and orientation, attitudes and skill; a positive attitude was defined by the following features: an interest in research, questioning and critical thinking approach, wishing to pursue answers (Arthur & Kam Yuet Wong 2000:662).

2.3.1 Nursing

There have been studies that have concentrated on specific professions, and much work has been done in the nursing field, and their response to research-based courses. Mehrdad, Salsali and Kazemnejad (2008:53) found that the attitude to research in Iranian nursing students was overall positive; however, that the nurses did not feel that research was relevant or applicable in day-to-day work. Halabi and Hamdan-Mansour (2010:9) also found that Jordanian nursing students have a positive attitude to research and similarly have low agreement on the relevance of research in clinical practice. However, this magnifies the juxtaposition of the belief amongst the same nursing students that nursing research did have a role in improving the quality of patient care.

Björkström, Johansson, Hamrin and Athlin (2003:394) found Swedish nurses to also have a positive attitude to research, and in this study more than half of the students, 60%, stated that they expected to use research occasionally in their daily work.

These studies (Halabi & Hamdan-Mansour 2010:3; Mehrdad *et al.* 2008:53) used a point in time to accumulate their data; the post-test results of Swenson and Kleinbaum (1984:385) show a decline in the perceived value of research in providing patient care on completion of a research course.

Previous studies by Hicks (1995:11-17) found that a lack of confidence was the main barrier to the utilisation of research among English, Scottish and Welsh nurses. Similarly, a lack of confidence was posited, along with lack of knowledge of nursing

research, insufficient means of distributing nursing research, negative attitudes towards nursing research and the difficulty of the transmission of research to practice, as barriers to the benefits of research (Halabi & Hamdan-Mansour 2010:9). Lane, Lane and Kyprianou (2004:255) concluded in their study that self-esteem and self-efficacy are positively correlated and that this is related to performance; hence, if a student does not feel confident of their ability to perform research, they are unlikely to do so.

Positive attitudes have been identified as a possible factor to diminish the barrier to nursing research utilisation (Maljanian 2000:169; Melynk 2002:159). Negative attitudes have influenced the amount of time and effort students are willing to spend on research methodology courses, and also whether the student decides to continue with advanced study (Lei 2008:668; Ma 1995:32).

Mehrdad *et al.* (2008:56) used a stratified random sample of 410 nurses who completed an attitudinal survey and found that the majority (76%) strongly agreed with 'research results are not applicable to my nursing practice' and was contradicted by 92% believing that 'nursing research can help empower the nursing profession', which can be construed to mean that a positive attitude to research does not translate to implementation in practice. This was also observed by Halabi and Hamdan- Mansour (2010:8) as lack of belief in their ability to conduct research, although nursing students believe in its usefulness.

A pre- and post-test study design was implemented by Law Harrison, Lowery and Bailey (1991:809), in the changes of attitudes of American nursing students on completion of an undergraduate research course. The findings were that there was significant increase in the positivity towards research after the completion of the course; this conflicted with the study by Swenson and Kleinbaum (1984:386) to which this original study (Law Harrison *et al.* 1991:808) was compared; the same research attitude instrument was used in both studies.

Students who had expressed an interest in a particular aspect of research were more positive about research (Björkström *et al.* 2003:399), and thus that an interest in developments in the field should be encouraged. Important findings by Mehrdad *et al.* (2008:6) include statistically significant factors that contribute to attitude of research: level of education, professional role, research activities; no relationship was found with gender differences or level of skill in the English language. The involvement in research

activities is a well-established factor contributing to the attitude of research, as well as earlier introduction to research and participation of data collection (Hitchcock & Murphy 1999:125; Owens & Kelly 1998:32).

These studies show that attitude can change, as most students felt more positively towards research after the course; however, this does not necessarily translate to more research nurses.

2.3.2 Chiropractic

In Canada, the Standards of the Council on Chiropractic Education include competencies related to research, whereby the practitioner should "Acknowledge the societal obligation of the profession to produce research, and appreciate the importance of research in education, clinical practise and to the growth of the profession" (McCoy 2008:143).

More than half of the students surveyed by Newell and Cunliffe (2003:109) found research interesting and a remarkable 75% found chiropractic research to be necessary. Similarly McCoy (2008:144) found that over 50% of students were interested in research and over 70% felt that research was important. The previous research experience of the students was significantly correlated to a more positive attitude toward research. Final year students viewed the role of research in chiropractic more positively than first year students; confidence to complete research was also higher in final year students when compared to first year students.

Rieder (2010:137-139) studied the attitude toward research of Chiropractic students at the Durban University of Technology and found that research was challenging, stressful, time consuming and that it caused anxiety; that they found listening to and reading research a pleasant experience and they felt they gained knowledge from it.

Once again, through the exposure to research confidence was improved and certain aspects, such as the knowledge gain created value for the students.

2.3.3 Social work

Kirk and Rosenblatt (1981:29) studied the research orientation of social work students and found their attitude to be generally positive. Similarly Stark and Cohen (2007:194-195) established that students who began an online assisted course in research methodology showed a positive attitude before the course began and an improvement in attitude after the completion of the course; the course had all resources available on the student online websites: reading material, tutorials, instructional manuals and a discussion board. An online tracking function enabled researchers to see how often the site was utilised. Their questionnaire revealed that students felt the online assistance was a contributing factor to their improved attitude (Stark & Cohen 2007:196). The majority (70%) of the students believed that social workers should rely on evidence-based practises (Bolin, Lee, GlenMaye & Yoon 2012:224).

A longitudinal study by Secret, Ford and Rompf (2003:413), revealed that a large portion of social work students feel positively about research, and more than a quarter (n=285) of the students ranked research as appealing, with a mean ranking of seven out of ten. A significant finding was that students who had less statistical knowledge were more fearful of the research course, which is relevant as many courses on research methodology incorporate statistical content.

In a qualitative and quantitative study by Morgenshtern *et al.* (2011:557), results showed that a positive response was elicited to the value of research; however attitudes were more negative regarding the learning and conducting of research. More than 60% of the respondents agreed that research made them anxious.

Bolin *et al.* (2012:224-225) include many researchers who have found the attitude of social work students to be negative (Green, Bretzin, Leininger & Stauffer 2001:333-341; Lazar 1991:34; Maschi, Bradley, Youdin, Killian, Cleaveland & Barbera 2007:1; Rabatin & Keltz 2002:164; Rubin & Babbie 2001:207; Siegel 1983:71; Wainstock 1994:3). As yet, there are opposing opinions from the research, to sufficiently say whether or not the attitude is positive or negative; however, these are context-dependent studies and cannot necessarily be generalisable to social work as a whole.

2.3.4 Medicine

Egyptian medical students were surveyed and it was found that 77.5% felt that research was important (Mostafa *et al.* 2006:101). Questionnaires distributed to medical students regarding their perceptions, impacts and experiences of research revealed that research is viewed as important; obstacles included a lack of professional supervisors, a lack of time and funding. This study was done in Saudi Arabia, where research was not mandatory in their course, and students did feel that it should become mandatory, and should be an influencing factor when applying for residency (AlGhamdi, Moussa, AlEssa, AlOthimeen & Al-Saud 2013:2).

2.3.5 Psychology

A study by Mutz and Daniel (2013:280) found the attitude towards research in psychology students to correlate with their enrolment in institutions that are known for research; better research institutions had more positive attitudes. The desirability of universities was rated by the number of applicants in this study.

2.3.6 Dietetics

Whelan, Madden and Thomas (2007:121-125) compared student dietitians with registered dietitians and found that the students had a positive attitude towards research; this study was undertaken as attitudes "are likely to influence their subsequent involvement in such activities once qualified". There was a difference in their views in role of audit, where student dietitians disagreed that 'audit is not part of the dietitians' role (78%), versus registered dietitians (90%). Registered dietitians and student dietitians agreed that 'doing audit improves patient care' (89% vs 76%). These researchers feel that the positive attitude may be due to the lack of exposure to potential barriers to involvement in research, where involvement in research included reading, applying, undertaking or leading research (Whelan *et al.* 2007:124).

2.3.7 Dentistry

A South African study on dental students found that 92% of students felt that research was important, but a lesser percentage (44%) enjoyed research. The study revealed that at the four universities that have a dentistry degree, only eight hours of theoretical

classes on research methodology are given throughout the five year degree (Grossman & Naidoo 2009:1306,1308).

2.4 PREVIOUS STUDIES IN THE ATTITUDE TOWARDS RESEARCH IN NON-HEALTH RELATED PROFESSIONS

The feelings of Dutch teaching students were found to be generally negative, despite the focus of many textbooks on trying to adjust the motivation and attitude towards conducting and using research (Van der Linden *et al.* 2012:402); these authors continue by mentioning the importance of a positive attitude towards research for the continued professional development of teachers. Education students in Texas had varying responses: counsellor education students lacked interest in research and had little motivation to learn research methods; special education students were more positive and wanted to take classes to improve their career, would take additional research courses voluntarily and "want to do research" (Wang & Guo 2011:5). The difference between the courses of counsellor education and special education students is the compulsory research report. Wang and Guo (2011:6) conclude that by having a compulsory research component, the attitudes towards research are impacted positively; as well as a motivational component to research methods and future research output.

A random selection of summer program music educator master students (who were music teachers) were assessed for their changes in attitude, on completion of an introductory research methods class. All the changes were analysed on a 0.05 significance level and were significant in the areas of understanding of research, and an increased understanding of the connection between research and teaching. They did not, however, feel that research would have an effect on their teaching methods. This is similar to the findings of the various professions observed in this section. The authors Dorfman & Lipscomb (2005:40) state

"While students may feel positive about the content and curriculum of their research methods class, the lasting influence of research methods on their teaching is likely to be limited...".

Monahan (1995:46) also found that although students perceived research positively, the motivation to do independent research or take an additional research class was low.

These studies with education students and educators show that, in some instances the attitude would encourage further research studies and in other instances, not. Stark and Cohen (2007:193) wonder if there is a cognitive dissonance effect in the study of students' attitude towards research after the completion of a module: perhaps students who have worked hard throughout the module feel that they should have gained something out of it; such that they have an unconscious incentive to believe that they are now better, more equipped and more confident.

2.5 BENEFITS OF PERFORMING AND PARTAKING IN RESEARCH

As seen by the discussions above, the knowledge gain (Burgoyne, O' Flynn & Boylan 2010:4; Craney, McKay, Mazzeo, Morris, Prigodich & de Groot 2011:105; Seymour, Hunter, Laursen & DeAntoni 2004:512; Yamada 2013:45) as well as improved confidence has been noted (*cf.* 2.3.2). Other benefits such as the increase in the understanding in the value of research to students and skills development is discussed later (*cf.* 2.7.1).

2.5.1 Critical thinking

Part of research courses requires students to evaluate the quality of the research they are reading; this allows students to develop critical thinking skills (James & Simons 2011:81; Trembley Jr & Downey 2004:735) regarding research. One question that Trembley Jr and Downey (2004:735) emphasised was the reliability of the source of the material. Their study found that by using various sources, from newspapers, magazines, books, theses and dissertations the students after the completion of the research course, students were more confident in their abilities to find credible sources, and critically evaluate the publications.

Critical thinking is also considered useful in the health sciences as each patient needs to be treated on an individual basis.

2.5.2 Reflective thinking

Reflection is a commonly used classroom strategy that is used for self-awareness and as a “platform for discovery” (Polkinghorne & Wilton 2010:462).

Once the project is completed, many students can look back and understand the gains that they have achieved (Gordon, Barnes & Martin 2009:242); this need not be of a personal or technical nature, but that external to themselves. Grossman and Naidoo (2009:1310) found that students realised that research may impact on patient care and that it can bring a lot of issues “to reality”. This reflective thinking was documented in other studies (Burgoyne *et al.* 2010:6; Campisi & Finn 2011:43; Dorfman & Lipscomb 2005:39; Morgenshtern *et al.* 2011:560; Seymour *et al.* 2004:513).

Contrarily, Mostafa *et al.* (2006:102) felt that their students did not truly conceptualise fully, as only 7.6% of medical students agreed that research can solve health problems and 3.4% believed that research could improve the quality of medical care.

2.5.3 Other benefits of research

Benefits of research include the ability to think and analyse critically, to problem solve and debate policy making and high impact decisions (Gibbs 2009:online). Halabi and Hamdan-Mansour (2010:6) note knowledge generation, occasional cost savings, better decision making and the development of individual research skills (Polkinghorne & Wilton 2010:466, Seymour *et al.* 2004:505). Ryder (2004:online) includes understanding of the origins of scientific enquiry and the ethical implications of research designs. Burgoyne *et al.* (2010:5) also includes the ability to work in teams, communication, critical thinking and research-specific skills. Faculty, who partook in a study by Lopatto (2003:141), included better problem solving, learning to read scientific writings, working and thinking independently. Students in this study added career plans and developing relationships, as well as communication. Lei and Chuang (2009:233-235) add generation of curiosity about research, preparation of orals and posters, research skills such as writing of research questions, hypotheses, grant writing and hands-on experience with laboratory equipment. Computer and online research skills and were also mentioned (Polkinghorne & Wilton 2010:467) as well as passing knowledge onto others (John & Creighton 2011:782).

Seymour *et al.* (2004:493) note mostly positive experiences (91%) in their interviews of students; the benefits described by the students include an increase in the understanding of research, increased interest in their fields, undertaking greater responsibility, and improved arguing, presentation and communication skills.

According to Ponte, Ax, Beijaard and Wubbels (2004) research allows for the development of students' own knowledge and the translation of results from scientific research to their own practise. In van der Linden *et al.* (2012:403) three skills were identified in those teachers who use and carry out research (from Doornekamp, Pakkert, Brandsma and Mulder (1997): critical self-reflection and self-evaluation; analysis and interpretation of behaviour and learning results of students; teacher accountability. Being able to work in a team was rated amongst the most important elements in teaching students that contributed towards developing a positive attitude towards research (van der Linden *et al.* 2012:415).

Students who were asked to select benefits from a given list of choices identified that having completed a course in research gave them the advantage in selection for post graduate study, perceived their employability to be enhanced, assisted them in formulating research questions and provided a platform to publish their own work (Craney *et al.* 2011:99). This study also acknowledged that undergraduate research is associated with longer-term student achievement, including a higher graduation rate (Craney *et al.* 2011:103).

The ethical underpinnings of research also provide a moral foundation for future treatment of patients. It can be seen that there are many benefits to research (Table 2.1).

TABLE 2.1: BENEFITS OF RESEARCH AS PER THE LITERATURE
(Continues on following two pages)

POSITIVE EXPERIENCES OR BENEFITS PERCEIVED	AUTHOR	YEAR OF PUBLICATION
Positive attitude towards research	Lei & Chuang	2009
	McCoy	2008
	Mostafa <i>et al.</i>	2006
	Dorfman & Lipscomb	2005
	Kracker & Wang	2002
	Mehrdad <i>et al.</i>	2008
	Newell & Cunliffe	2003
	Van der Linden <i>et al.</i>	2012
Increased interest in research	Lei & Chuang	2009
	Howitt, Wilson, Wilson &	2010

	Roberts McCoy Mostafa <i>et al.</i>	2008 2006
Creative thinking skills	Lei & Chuang Craney <i>et al.</i>	2009 2011
Applying ethical principles	Lei & Chuang	2009
Generating curiosity about research	Lei & Chuang	2009
Library research skills	Lei & Chuang	2009
Computer knowledge and skill	Lei & Chuang Polkinghorne & Wilton Campisi & Finn	2009 2010 2011
Develop research questions and hypotheses	Lei & Chuang Burgoyne <i>et al.</i> Craney <i>et al.</i>	2009 2010 2011
Enhancing data collection	Lei & Chuang	2009
Enhancing data analysis	Lei & Chuang Lopatto	2009 2003
Increase statistical skills	Lei & Chuang	2009
Enhance data interpretation	Lei Lei & Chuang John & Creighton	2008 2009 2011
Enhance knowledge of references	Lei & Chuang	2009
Oral presentation skill	Lei & Chuang Burgoyne <i>et al.</i> Seymour <i>et al.</i>	2009 2010 2004
Making posters presentation	Lei & Chuang Campisi & Finn	2009 2011
Organisational skills	Lei & Chuang Howitt <i>et al.</i> Seymour <i>et al.</i>	2009 2010 2004
Time management skills	Lei & Chuang Howitt <i>et al.</i> Burgoyne <i>et al.</i>	2009 2010 2010
Enjoying interaction with students	Lei & Chuang Van der Linden <i>et al.</i> Yamada	2009 2012 2013
Improving team work skills	Lei & Chuang Howitt <i>et al.</i> Burgoyne <i>et al.</i> John & Creighton Seymour <i>et al.</i>	2009 2010 2010 2011 2004
Increasing self confidence	Lei & Chuang Howitt <i>et al.</i> John & Creighton Campisi & Finn Seymour <i>et al.</i> Newell & Cunliffe	2009 2010 2011 2011 2004 2003
Being a valued member of a team/ sense of community	Howitt <i>et al.</i> Gordon <i>et al.</i>	2010 2009
Communication skills	Howitt <i>et al.</i> Burgoyne <i>et al.</i> Seymour <i>et al.</i> Craney <i>et al.</i> Lopatto Polkinghorne & Wilton	2010 2010 2004 2011 2003 2010
Explaining research to others	John & Creighton	2011
Knowledge gain on their subject	John & Creighton Campisi & Finn	2011 2011

	Craney <i>et al.</i> Lopatto Law Harrison <i>et al.</i>	2011 2003 1991
Research design	Seymour <i>et al.</i> Lei	2004 2008
Contribute new knowledge to society	Craney <i>et al.</i>	2011
Develop proficiency in laboratory/equipment techniques	Lopatto Willis, Kreuger & Kendrick	2003 2013

2.6 FACTORS IDENTIFIED THAT CONTRIBUTE TO THE ATTITUDE TOWARDS RESEARCH

This section will cover the emotional factors, value of research to the student, as well as personal and academic factors that have been found to be a contributor to the attitude to research. On the following page is a diagram that outlines the factors and their sub-sections that contribute to the development of an attitude to research, found in the literature.

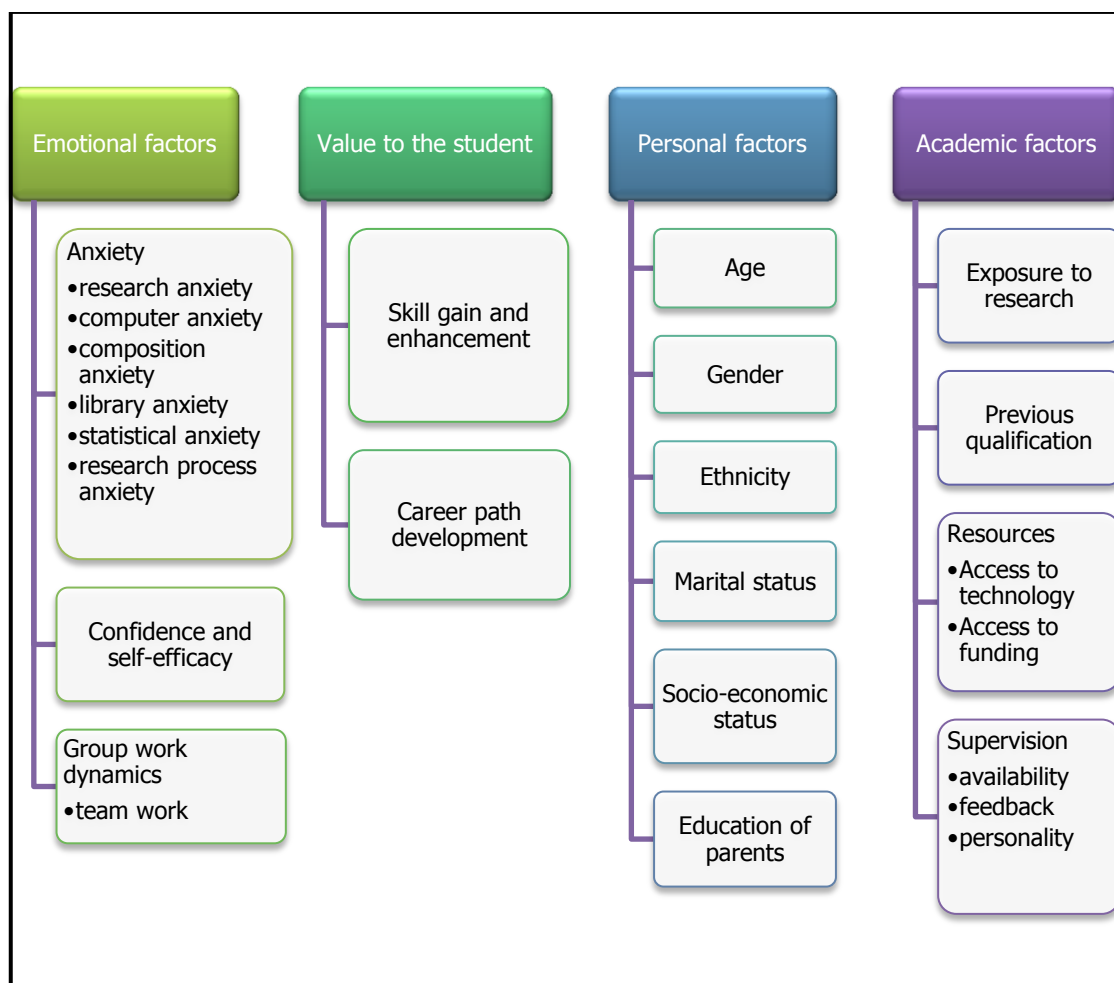


FIGURE 2.2: SCHEMATIC OVERVIEW OF THE FACTORS IDENTIFIED IN LITERATURE THAT INFLUENCE ATTITUDES TOWARDS RESEARCH

In a longitudinal study of a number of American colleges' summer program students, who took a course in research, it was found that the overall positivity towards research as a career option declined at the end of the course (Craney *et al.* 2011:99).

Factors that were identified by Bard, Bieschke, Herbert and Eberz (2000:48-55) which contribute to the attitude towards research were: research training environment, research self-efficacy, personality and affective variables. The training environment is also found to influence the productivity of the researcher (Krebs, Smither & Hurley 1991:365) as well as past research attitudes and self-efficacy (Hollingsworth & Fassinger 2002:327).

Lei (2008:675) also found a number of significantly negatively correlated relationships to research interest, such as research anxiety and task difficulty; and that negative attitudes were associated with high research anxiety. Other emotions that link to anxiety were frustration about flawed methodology and the time taken to do research was also mentioned by John and Creighton (2011:789), the frustration of uncertainty about research techniques by Morgenshtern *et al.* (2011:562) and in general by Kracker and Wang (2002:305). Also where students felt "frazzled" by the task at hand (Willis, Kreuger & Kendrick 2013:26) and confusion (Povee & Roberts 2014:30). Studies generally show that students perceive research as stressful (Howitt, Wilson, Wilson & Roberts 2010:417; John & Creighton 2011:794; Kracker & Wang 2002:304)

2.6.1 Research anxiety

Social work students admit to feeling "frustrated" and "overwhelmed" by research, mostly due to their lack of understanding, the use of jargon and inexperience with research (Morgenshtern *et al.* 2011:561). Contrary to the above findings, there are also findings that students have negative attitudes towards research and research methodology courses (Bolin *et al.* 2012:226; Onwuegbuzie 1997:29; Papanastasiou 2005:16; Secret *et al.* 2003:415) due to the anxiety that is felt. This anxiety is commonly referred to in the texts as research anxiety and various researchers define the components of research anxiety differently.

It was noted that students who have less anxiety towards research, find research less difficult, and that generally lower levels of anxiety facilitate learning and performance (Lei 2008:665). Thus, students with lesser anxiety will be more likely to continue

engaging in research (Bard *et al.* 2000:53). Papanastasiou and Zembylas (2008:164) note how alarming it is that the anxiety of research can be such a large contributor to the attitude toward research; that it may hinder students from being able to read critically or appreciate research results in their professional careers.

Papanastasiou and Zembylas (2008:161-163) have found that anxiety is prevalent in students over a broad range of aspects of research: the concepts taught, the perceived level of difficulty, the applicability to real life and the implications of using the concepts in their future professional careers. Anxiety is multidimensional and includes the fear of negative evaluation, fear to ask questions that would reveal incompetence and not necessarily due to a lack of skills or ability (Papanastasiou & Zembylas 2008:158). It was interesting to discover that the marks that the students were expecting to obtain did not influence their anxiety (Papanastasiou & Zembylas 2008:163).

Papanastasiou (2005:19-22) did a factor analysis on the attitudes towards research and in this instance included tension, stress, fear, difficulties in understanding research. The results showed an overall negative attitude to research, perceived as difficult, but was considered to be useful in professional lives and also in their personal lives. This is contrasting to the studies done in nursing, mentioned previously (Björkström *et al.* 2003:399; Halabi & Hamdan-Mansour 2010:5-6; Law Harrison *et al.* 1991:810; Mehrdad *et al.* 2008:59-60).

Kracker and Wang (2002:303) found the most mentioned state of emotion related to research was anxiety. Other emotions that were mentioned were positivity toward research and interest in research. Students who were from the Humanities mentioned more negative emotions related to research than those in the Sciences. The surveys were conducted in prior and post completion of the research course, and the findings were that the number of mentions of negative emotions increased and the number of positive mentions regarding research decreased over the timeframe. These findings show that there is a wide spectrum of emotions within the attitude to research.

Similarly, Onwuegbuzie (1997:14) did a quantitative and qualitative analysis of research proposals of graduate students who are not of a statistical discipline, and discovered that research proposal writing anxiety had four components: library anxiety, statistical anxiety, composition anxiety and research process anxiety. The sections below will

elaborate on the studies done on specific anxieties that contribute to the overall and vaguer term of research anxiety.

2.6.2 Computer anxiety

Ovens (1991:86) describes computer anxiety as manifestations of the “fears concerning the computer itself, that is, jargon, technological trends, the ‘paperless society’; worries about damaging the computer; the showing an inability to type”. Jerabek *et al.* (2001:280) use categories compiled by Torkzadeh and Angulo (1992) to define computer anxiety: (a) psychological anxiety, which includes the fear of damaging the computer, (b) sociological anxiety, characterised by the need for social contact and the fear of being replaced by a machine and (c) operational anxiety, which is an inability to operate the machine. The study in undergraduates registered as English, psychology and philosophy majors by Jerabek *et al.* (2001:277) showed that the percentage of students that were anxious of computer use was declining, when compared to previous studies. This compares well with the study by Lei (2008:673), who found students to be confident using computers.

2.6.3 Composition anxiety

Onwuegbuzie (1997:21-23) had composition anxiety comprised of: content anxiety, format and organisational anxiety, mechanical anxiety and fear of negative evaluation. In his study Onwuegbuzie (1997:15) used the CARS 26-item, 5-point Likert scale to assess the anxiety experienced by students in preparing for and writing a research proposal. The study (Onwuegbuzie 1997:12-15) also found that students worried about being concise, had unrealistic ideas of the time it should take to complete and rechecked their proposal many times but did still feel it was incomplete. Writing was found to be the most disliked aspect of the research process, mentioned by students in the qualitative survey by Kracker and Wang (2002:300).

2.6.4 Library anxiety

The digital era has turned a stuffy library into a vibrant assimilation of information and technology; no longer will a library patron only look for books as a source, but search on automated system for paperless access to information. However, this could pose a problem for a person who is not able to use the technology (Jerabek *et al.* 2001:278).

Onwuegbuzie (1997:7) broke library anxiety into several components: interpersonal anxiety, perceived library competence, perceived comfort with the library, location anxiety and resource anxiety. Mellon (1986:157) also reports that the (1) size of the library, (2) lack of knowledge about the location of materials and resources and (3) how to initiate a search, contribute to library anxiety.

Symptoms of library anxiety include confusion, uncertainty, apprehension, fear, tension, learned helplessness, and intrusive worries (Onwuegbuzie 1997:7 quoting Kuhlthau 1988, 1991).

Students surveyed by Jerabek *et al.* (2001:283) had never used aspects of the library and many were not confident in using certain aspects of the library. This shows that although the same students felt they were proficient at computer use, they were not as confident in a library setting. Onwuegbuzie's (1997:14) qualitative analysis found the students had feelings of depression, frustration, contempt, anger, apprehension, nervousness, guilt, panic, stress and disgust.

2.6.5 Statistical anxiety

Students describe the fear of statistics as a "brain freeze" when faced with statistics, that they "cringe" when they think about quantitative research (Morgenshtern *et al.* 2011:563); this anxiety can become a barrier and that statistical - related anxiety has increased over the last decade (Bolin *et al.* 2012:226 quoting Pan & Tang(2005)). Onwuegbuzie (1997:7) listed the mechanisms of statistical anxiety as: the perceived usefulness of statistics, fear of statistical language, fear of application of statistical knowledge and interpersonal anxiety.

Papanastasiou and Zembylas (2008:157) quote the factors that contribute to statistical anxiety, from a review of Onwuegbuzie and Wilson (2003:205): situational factors (such as prior experience), dispositional factors (such as self-esteem in engaging in mathematics, statistics), and environmental factors (such as learning style, gender, age, ethnicity). They proposed in their study that research method anxiety is also situational, environmental and dispositional.

A survey of social work students by Secret *et al.* (2003:415) found that many students (53%) could not identify any of the statistical symbols that often appear in research

articles. The same study found that as students increased their statistical knowledge, their fear of the research course decreased.

2.6.6 Research process anxiety

Onwuegbuzie (1997:5) took research process anxiety to be composed of: fear of research language, fear of application of research knowledge and interpersonal anxiety. Students were found to be reluctant to ask for help, and in some cases did not realise that they needed assistance until it was too late (Onwuegbuzie 1997:25). The research method anxiety is a multidimensional concept and is not limited to the difference between qualitative and quantitative (Papanastasiou & Zembylas 2008:158).

Kracker (2002:284) used the Information Search Process (ISP) model from Kuhlthau (1986,1991), which is a model that describes the thoughts, feelings, tasks and actions associated with the 6 stages of research: task initiation, topic selection, prefocus exploration, focus formulation, information collection and search closure. Kuhlthau (1986, 1991) was one of the first to bring attention to emotion in the research process and that these feelings are normal; they vary from confusion to confidence, fulfilment or discontent.

Kracker (2002:290) states that there is a need to instruct students about the process and that with better understanding and comfort with the process, there may be less procrastination, fewer avoidance behaviours, an increase in confidence and a likelihood of a better research product. This study showed that the process of research, along the timeline, contributes to the anxiety of students; Kracker (2002:289) found that anxiety was moderate in the beginning stages, increased and then dropped after completion of the research process.

2.6.7 Confidence and self-efficacy

Bandura (1986:283) describes self-efficacy as the construct that identifies an individual's belief in their ability to do something; in this context, the ability to perform research. Jackson (2002:243) defined self-efficacy as the set of beliefs regarding a person's ability to formulate and carry out a particular course of action; self-efficacy is task specific, which means that one person could have high self-efficacy for certain tasks and low for others.

Bolin *et al.* (2012:226) lists a fear of failure, inadequate preparation and inability to perform, and inability to cope with the course load, as common feelings of students with regard to research. Fear of failure is related to perception or self-efficacy of a student's belief in their own ability; it was found that students with higher self-efficacy were more interested in research and also had lower anxiety toward research (Bolin *et al.* 2012:238). Similarly, Morgenshtern *et al.* (2011:565) linked the apprehension towards research, to the perception of their own inability to perform research.

Students who feel that they lack the ability to be successful may not even attempt to try; this can also be seen by class attendance, or even dropping the course. This allows the student a fall - back response: "I could have done better if I tried, but I didn't feel like doing it" (Akey 2006:4).

Hoffman (2010:278) found that students who had higher self-efficacy did in fact relate to higher levels of problem solving. Self-efficacy also affects how people deal with failure and cope with difficulty (Jackson 2002:244). In his study, Jackson selected students randomly, and used positive and neutral emails to determine if encouragement effected self-efficacy. It was found that students who had received a positive email scored higher on consequent examinations, and had higher self-efficacy than those students who received a neutral email or no email at all. This gives credence to the hypothesis that self-efficacy is a mediated effect.

As undergraduates progress and are exposed to greater volumes of research material, they grow in confidence to be able to complete research (Armstrong & Shanker 1983:182; Campisi & Finn 2011:43; Halabi & Hamdan-Mansour 2010:8; Howitt *et al.* 2010:414; John & Creighton 2011:795; Lei 2008:672; Lei & Chuang 2009:236; Newell & Cunliffe 2003:118; Seymour *et al.* 2004:508,). Likewise Trembley Jr and Downey (2004:739), who exposed students to many various sources of literature, found that students were more confident after the course, to be able to source resources and evaluate the resources.

Students were more confident in their ability to do research, after completing a research project (Seymour *et al.* 2004:493). The increase in confidence was also applicable to "feeling like a scientist" and confidence in presenting, being taken seriously and writing skills.

2.6.8 Group work dynamics: Team work

Team or group work is considered a creative method of implementing active learning (Campisi & Finn 2011:44). Students who worked in groups on a research project, either with other students or with faculty members had stronger agreement that undergraduate research studies strengthened their interest in pursuing advanced study (Craney *et al.* 2011:99). Lei and Chuang's (2009:236), John and Creighton's (2011:789) and van der Linden *et al.* (2012:415) findings were that students enjoyed the peer interaction with the group based research project; also that students were a valued member making contributions (Howitt *et al.* 2010:410).

Kracker (2002:290) found that for students to share their uncomfortable feelings can be an effective way of diffusing the impact of such feelings. How cohesive a group is can determine how students interact with one another (James & Simons 2011:81), this also extends to the participation within a group where passive members can create dissatisfaction among the harder - working group members (Grossman & Naidoo 2009:1311). Nursing students in a study by Arthur and Kam Yuet Wong (2000:667) revealed that nursing students preferred individual work, as opposed to team projects.

2.7 VALUE OF RESEARCH TO THE STUDENT

James and Simons (2011:80) believe that by understanding the variables that impact on the lack of interest in research can assist in a program being designed to address these factors.

2.7.1 Skills gain and enhancement

Arthur and Kam Yuet Wong (2000:665) note that undertaking a research project develops inquiry and investigation skills. Other transferable skills of a more generic nature include improvement in communication, team work, and time management, as mentioned by Burgoyne *et al.* (2010:2). Students also perceived benefits in technical and professional development skills, communication and problem solving (Craney *et al.* 2011:106) and a greater understanding between the relationship of research and their profession (Dorfman & Lipscomb 2005:36). After completion of the project students felt that they could cope better as a result of newly developed skills (Polkinghorne & Wilton 2010:468).

Students felt that there were personal gains with the completion of a research course, one of which was that they felt the skills were transferable to their professions; allowed them to perceive cross-disciplinary connections; and helped them gain greater patience (Seymour *et al.* 2004:529). To develop skills to think creatively was noted by Craney *et al.* (2011:105) and also by John and Creighton (2011:789). Willis, Kreuger and Kendrick (2013:25) in a study with engineering students felt that they gained experience using equipment, a very practical example of skill development. The greatest skill that students felt they benefitted from was an increased ability to communicate. They also felt that the course had reinforced their career ideas (Seymour *et al.* 2004:230).

2.7.2 Career path development

In a study of American social work students, the majority showed an interest in research, but also found that most did not feel that it was useful to the social work practitioner. Those students, who felt that research was important, did tend to have higher levels of interest in research (Bolin *et al.* 2012:224). Morgenshtern *et al.* (2011:560) noted that social work students were aware of the importance of research for their careers, the improvement of quality of work, to support clinical assessment, and the advancement of society. Medical students felt that research is integral to further their career, found it rewarding and to be the basis for future practise (Burgoyne *et al.* 2010:6), whereas Butt and Shams (2013:101) found that students did not see the relevance of research in their daily lives.

One of the outcomes of the research courses is that often students find direction for their career (Campisi & Finn 2011:43; Willis *et al.* 2013:22), and determine from their experience whether or not they would pursue research voluntarily after they graduate or continue with postgraduate studies (John & Creighton 2011:782). Students that reported an interest in a career in research were more motivated to do the project (Burgoyne *et al.* 2010:6).

Of particular interest was a study on students who meet the Employment Equity Act designated demographics for transformation (Portnoi 2009:406). Great emphasis is placed on all tiers of employment to employ along demographic representations and to increase transformation, and universities are no different. The study investigates what factors students of previously marginalised sectors take into account when considering academia a possible career. Students who are completing Ph.D. degrees have choices of entering the private sector, government institutions and academia. Students often

choose a commercial career over academia, citing more practical and “real” environment, that working in academia has a low social status, as well as a need to support their families financially (Portnoi 2009:409) and that they prefer to be interactive with patients and clinical practise (Burgoyne *et al.* 2010:6).

2.8 PERSONAL FACTORS

Various factors can have an influence on students’ approach to research - including gender, working experience, educational background and local health authority culture (Arthur & Kam Yuet Wong 2000:665).

2.8.1 Age

Rieder (2010:140) found that students who had not started studying directly after school were more positive to research at an undergraduate level, whereas Secret *et al.* (2003:418) also found that older students found research to be more appealing. Older medical students were found to be more interested in research than their younger counterparts (Mostafa *et al.* 2006:101); this was also found with a study using mechanical engineering students (Willis *et al.* 2013:21). Abdelhafez (2007:2) found no difference in the attitudes to research of older students.

2.8.2 Gender

The study of 472 Greek students by Papanastasiou and Zembylas (2008:162) found that men were less anxious of research than females. Gender differences were found to be statistically significant with the variable “Personal interest in research”, examined by Halabi and Hamdan-Mansour (2010:6), indicating that more female nurses showed an interest in nursing research. However, the study did not identify an overall gender difference in the attitude to research.

Björkström *et al.* (2003:399) found that female nursing students were significantly more positive to four of seven factors investigated regarding attitudes to research. Male chiropractic students agreed more strongly with the statement that research might be part of their job than females (Newell & Cunliffe 2003:111).

Babalís, Xanthakou, Kaila and Stravrou (2012:1456) found that males prefer to work on research independently and females preferred to work in groups. Also, that male students liked situations where the study was incomplete and required their contribution and decisions to be completed, whereas females preferred a clear guideline of expectations within the context of the research, with structured tasks as not to make mistakes.

Transferable skills in a study by Burgoyne *et al.* (2010:5) were grouped as: writing and oral communication, numeracy, project management, time management, problem solving and information gathering and working independently; it was found that males felt more confident than females in these skill sets.

2.8.3 Ethnicity

In American schools, research has been performed to evaluate the relationship between mathematics test scores and ethnicity. At a high school level, African American students fared poorer than Hispanic students, who in turn fared poorer than White students (Akey 2006:19). Rieder found that black students were more positive than other ethnicities with respect to research (2010:138). Contrarily, Burgoyne *et al.* (2010:7) found no significant difference in the attitude toward research among Asian or North American Caucasians.

Interestingly, when asked how students chose their research topic, many respondents (n= 241/365) chose according to their ethnic background (Craney *et al.* 2011:103).

A study in South Africa mentions how students are underprepared for academic life, and come from culturally diverse backgrounds (Grossman & Naidoo 2009:1307). In South Africa, with the inherited school systems of Apartheid, there is still a divide in the quality of schooling among low income citizens and middle and upper earners; there is strong support at redress and transformation at higher education level.

2.8.4 Marital status and support structure

Students are more motivated by an atmosphere of caring; and learning is conducive in an environment of a sympathetic network (Akey 2006:5). The supportive home

environment of a caring partner can provide married students (or students with life partners) the inspiration to carry on when the motivation level is flagging.

2.8.5 Socio-economic factors

Students who grow up in a low income socio-economic environment often take on the added responsibility of part-time employment, to assist their families and themselves, which is a source of financial pressure (Creighton 2007:online; Grossman & Naidoo 2009:1311). These students often do not have a vehicle of their own, and spend a larger proportion of time commuting; struggle to buy text books and personal computers (Creighton 2007:online).

2.8.6 Parents' level of education

Often if students are enrolled as first generation graduates, their parents are not able to support them academically as they themselves have not been through the higher education process (Creighton 2007:online). This factor was investigated by Papanastasiou (2005:18), where no students indicated that their parents had low level of education; this study was done in Cyprus and is not easily transferable to a South African context. Grossman and Naidoo (2009:1307) state that as first generation students in the tertiary education environment there is an additional academic barrier to be overcome.

2.8.7 Mother tongue

Grossman and Naidoo (2009:1307) also list the language barriers within South Africa to be a stumbling block in the academic environment. This was also seen by Yamada (2013:34) in Japanese students who were enrolled in a class who spoke predominantly English; these Japanese students were silent in classes and gave the reasons as being their limited language ability and seeing themselves as less knowledgeable than the other students.

Casanave and Hubbard (1992:38,42) found that students who wrote in their second language had more problems with sentence form than mother-tongue English speakers; however, all students regardless of language had difficulty in writing at a graduate level.

2.9 ACADEMIC FACTORS

The environment in which the students perform their research projects is an academic environment. There may be varying experiences within this environment, and many factors could contribute to the attitude towards research. Findings from previous studies revealed a number of these factors.

2.9.1 Exposure to research

Students were found to have an increase in their positivity towards research after exposure to research (van der Linden *et al.* 2012:414) as well as self-image and confidence (Campisi & Finn 2011:43; Li, Wang, Price & Fu 2010:588; Newell & Cunliffe 2003:118; Seymour *et al.* 2004:508). It has been argued that there is some form of cognitive dissonance; students who work hard to succeed at their research coursework may have an unconscious reason to feel their skill levels and confidence had improved once they have completed their research course (Stark & Cohen 2007:193).

2.9.2 Previous qualifications

An argument can be made that a student with prior learning, and thus a more mature student, is more likely to perceive research positively.

Akey (2006:2) testifies in her model of student achievement, that prior achievements influence students' subsequent achievement. Attitude was found to be determined by educational background (Arthur & Kam Yuet Wong 2000:665), and Burgoyne *et al.* (2010:7) found students who have obtained a previous qualification have a better understanding of research methodology. Rieder found that students who had no post-school qualifications were more positive about research at an undergraduate level; in contrast Mehrdad *et al.* (2008:60) found students who had prior learning to have a more positive attitude towards research.

2.9.3 Resources

Resources span a variety of factors, and can be dependent on the home-life of the student. Resources that are important for undergraduate research include course content, the facilities and equipment and the provision of literature (Lopatto 2003:139),

the training environment can also be viewed as a resource (Lei 2008:2). Often the study can be impacted by the lack of resources (Grossman & Naidoo 2009:1310).

The resources covered below focus on the aspects that relate to the university environment of the student.

2.9.3.1 Access to technology

Salma Din, Shahabuddin, Rambely, Suradi, Ahmad, Majid, Mohammed and Mamat (2010:441) found that science students utilised the internet as their main source of data, Mathematics students used the internet as their second most important data tool. Also, that Journals and internet were the most common sources of literature. Software such as SPSS to analyse data is a popular technology (Lei 2008:6-8) that creates an interest in research and elevates the levels of students. Students cite the internet as their primary source of information (Mostafa *et al.* 2006:103). Yamada's (2013:49) study shows how the use of an internet-based discussion board can be of great advantage to students.

2.9.3.2 Access to funding

Senior medical students ranked the lack of funding as a barrier to performing research (AlGhamdi *et al.* 2013:1). At postgraduate level, students feel that the institutions do not provide sufficient financial support (AlGhamdi *et al.* 2013:1; Grossman & Naidoo 2009:1311; Mostafa *et al.* 2012:103;106).

In a South African study, 80% of participants responded that funding affected their decision to study at all (Portnoi 2009:411). Students also list the cost of the course as a drawback as well as not having financial compensation for the completion of the research project (Lei & Chuang 2009:238); that applying for funding is stressful and scarce (Howitt *et al.* 2010:415).

2.9.3.3 Access to information

The material that students need should be available before the course begins; this includes the assessment criteria of the research project (Howitt *et al.* 2010:415,417). Gordon, Barnes and Martin (2009:232'233) state that the study material should include

lecture information, textbook extracts or sources, grading rubrics for the assessment process; Yamada (2013:47) adds that examples of contrasting styles of scientific writings are also an aid.

2.9.3.4 Time

Time is a scarce commodity, and in the working environment there is the adage that time is money. Similarly, the time spent on research is often viewed negatively by students (Abdelhafez 2007:14; AlGahamdi *et al.* 2013:1; Grossman & Naidoo 2009:1310; Howitt *et al.* 2010:412; John & Creighton 2011:788; Lei & Chuang 2009:238; Mostafa *et al.* 2006:103; Povee & Roberts 2014:31; Willis *et al.* 2013:25).

Willis *et al.* (2013:25) found that in their responses to first, second and third year students who were engaged in a research project and that were asked to write three words they associate with research, time was a prominent theme. Students used words like "slow", "time-consuming", and "very, very tedious"; this was similarly mentioned in a study by John and Creighton (2011:788) where the expressions used were "research takes longer than you think", and "research can be tedious".

In a study by Howitt *et al.* (2010:409-410) students felt that six months was insufficient time for them to understand their project, and that they only understood their study after it was completed. Feelings of their being 'not enough time' was the most reported personal aspect of research in a study by Howitt *et al.* (2010:412). Grossman and Naidoo (2009:1311) also found that "time issues were a major hindrance" to directing research similar to Mostafa *et al.* (2006:103) and Povee and Roberts (2014:31).

2.9.4 Supervision

The quality of supervision has been identified as a significant determinant of the students' learning process, and affects the affective and pedagogical outcomes of the undergraduate research project (Howitt *et al.* 2010:406-407).

The feelings of chiropractic students were that there was insufficient staff involvement with regards to the teaching of research and the carrying out of research (Newell & Cunliffe 2003:117). Salma Din *et al.* (2010:443) emphasises that regular meeting and discussions with supervisors are crucial to successfully complete the research projects in final year Mathematics Science disciplines; enquiry found that students meet once a

week with their supervisors, and that students preferred to select their own supervisor. Lopatto (2003:139) also advocated the importance of the support of a mentor, and that students learn from how their mentors think.

Craney *et al.* (2011:107) state the mentor-protégé relationship is an important part of the undergraduate research experience and found that the role of supervision is more important for the minority or underrepresented undergraduate student; which is in agreement with previous studies (Hurtado, Eagan, Cabrera, Lin, Park & Lopez, 2008:126) in the health professions. In the summer research programme followed by Craney *et al.* (2011:97), it was indicated that those students who interacted with mentors daily had a greater interest in pursuing research as a career or continuing with advanced studies.

Lazar (1991:34) warns against having low expectations of students, thus inadvertently conveying negative messages about research; that faculty pessimism about student attitudes could be a cause of self-fulfilling prophecy. Furthermore, that incomplete knowledge of students' attitudes to research could have implications for both students and faculty, a fuller understanding of the attitudes can give better predictions and can lead to better teaching strategies (Secret *et al.* 2003:420). Secret *et al.* (2003:419) recommends asking students directly what they think before making assumptions on the attitude toward research. Papanastasiou and Zembylas (2008:158) endorse using humour to help students understand the objectives, applying statistics and research to real world examples, giving extensive feedback and assigning work to groups. Feedback can be given by way of a marked rubric, to aid students by highlighting areas that require the most attention (Rowe & Wood 2008:online).

Hoffman (2004:281) validates that those teachers who are faced with limitations with the problem-solving process should take into account the benefits of instilling confidence in these students and emphasises the intervention to limit the consequences of anxiety.

The attrition rate of postgraduate students was investigated by Ssegawa and Rwelamila (2009:295), and they postulated the following factors from a supervision perspective: a failure to act as a mentor, failure to find a suitable supervisor and also not sufficient time spent with a supervisor. A breakdown in the supervisor/student relationship and a high supervision load were also listed; a possible solution to high supervisor loads

amongst faculty is given by having experienced postgraduate students mentor undergraduates (Li *et al.* 2010:595). Students ranked the need for supervision as the strongest response item on a questionnaire (Arthur & Kam Yuet Wong 2000:666) and the response of students to their worst research experiences was that there was no clarity on the expectations of supervisors or that they expected too much from students (Howitt *et al.* 2010:412).

A study by Hollingsworth and Fassinger (2002:327) indicates that the relationship with a mentor is a vehicle through which the training environment has the greatest impact on the individual students' research productivity. They also note that the mentor-student relationship is not static, but changes over time and often become more collegial. Social work students discussed how important skilled instructors and compassionate responses towards fear from supervisors were to contributing towards their overall development towards a positive attitude towards research (Morgenshtern *et al.* 2011:564). The mentor relationship is thus unquestionably part of the research experience for students.

2.9.4.1 Availability of supervisors

AlGhamdi *et al.* (2013:1) found that medical students found the lack of professional supervisors to be an obstacle to performing research and Lopatto (2003:140) states that supervisors should be available for consultation, act helpful and be open to student views.

Findings by Rieder (2010:138) were that students found it difficult to find a supervisor and that scant supervision had delayed their research progression. In another South African study by Chireshe (2012:231), students felt that one of the factors that contributed to their bad experiences was that their supervisors were not always available. Abdelhafez (2007:3) found that students felt that supervisors were too busy, or unavailable due to study leave, promotion, illness or personal problems and retirement.

There was agreement by students that a twenty minute meeting on a weekly basis with supervisors is sufficient (Salma Din *et al.* 2010:444). Students who were exposed to a hybrid class format expressed concern over the possibility of limited contact with the lecturer (Gordon, Barnes & Martin 2009:232).

2.9.4.2 Feedback from supervisors

Feedback was found to be the most powerful influencer of student achievement (Hattie 1987:194) and a way of motivating students (Hyland 2000:240). Rowe and Wood (2008:online) rated feedback as key element of teaching and that in their study of Australian students, it was established that students are commonly dissatisfied with the feedback they received and that students did value feedback.

Students request feedback that is clear, gives guidelines in the context of assessment criteria, and is timely (Chireshe 2012:231). It is not appreciated that feedback is negative or not related to the assessment criteria. The focus groups of the study said that feedback made them feel cared about, that they should not have to ask for feedback and the worst feedback was none at all.

2.9.4.3 Personality of the supervisor

Students felt it was important to choose their own supervisor (Salma Din *et al.* 2010:444) and that when they did, they achieved greater satisfaction (Armstrong & Shanker 1983:182); Derounian (2011:92) mentions that student and supervisor can have clashes if they have very different personalities; this may be due to "emotional baggage", prejudices, mental health issues, upbringing, cultural norms and when supervisors are brought in to replace another colleague.

Other researchers found that it is important to students to ask for assistance without feeling they will be judged and that they should be supportive of the students' emotions (Kracker 2002:290), show concern (Lopatto 2003:140) and be supportive (Armstrong & Shanker 1983:179) and be friendly (Chireshe 2012:232). Morgenshtern *et al.* (2011:565) note how students are often very apprehensive about research and the supervisor should put the students at ease and be supportive. Honesty and patience are also characteristics that students feel are required in supervisors (Derounian 2011:97).

Seymour *et al.* (2004:510) found that students felt appreciative when supervisors trusted them to perform research and let them take independent decisions; Howitt *et al.* (2010:410) found that students want supervisors to be enthusiastic and

approachable, organised and thorough. Also, when supervisors are irritable towards their students, they can feel discouraged (Armstrong & Shanker 1983:181).

2.9.4.4 *Supervisor experience and expressions about research*

McCoy (2008:144) states that if faculty are unfamiliar or have a negative attitude towards research, it will be reflected in the students' attitudes. Faculty often have low expectations of student's research ability and this may affect the messages they convey to the students (Bolin *et al.* 2012:225). It is also described that it is difficult to find sufficiently trained supervisors to assist with research (Povee & Roberts 2014:31); students do want supervisors who are knowledgeable (Chireshe 2012:232). Engelbrecht (2012:41) found this to be the case in South Africa, as many academics are in a transitional phase, and uncomfortable with research themselves.

Students gave recommendations for supervisors to attend regular training sessions on supervising research and attend seminars, also that the university have a supervision guideline (Chireshe 2012:232). It was found that most healthcare educators received their training on how to conduct research from master classes, and often faculty members lacked confidence to undertake their own research. Stemming from this, it can lead to a lack of a positive and active role model for students; this may have been due to teachers not being geared to developing their own research skills (Ning, Murphy & Jinks 2010:537-539). These researchers pointed out that faculty require the support of managers and fellow educators and a mentoring program can be implemented to develop a culture of active research.

Wright (2005:4-10), in a study of South African nursing educators, emphasised the importance of a positive attitude to research, as it can impact on how educators teach research.

2.9.4.5 *Staff appointment structure*

Within many academic health courses, the staff are joint appointments; this means that they are in part employed by the state and in part employed by the academic institution. Grossman and Naidoo (2009:1307) state how this then muddies the waters as the academic institution requires a mandate of research and the state, that of patient care; these two mandates are often at odds with one another.

2.10 EDUCATIONAL ASPECTS AND MANDATES OF RESEARCH

The guidelines for research at an undergraduate level, and the strategic importance of research are outlined in the excerpts from documents published by the Ministry of Education and Department of Education below and summarised in Table 2.3.

Higher Education	<ul style="list-style-type: none"> •National plan for Higher Education •The White Paper 3 •The Higher Education Qualifications Framework •Measurement of research output
University of the Free State	<ul style="list-style-type: none"> •Strategic goals and plans regarding research •Department of Optometry •Research process and timeline •Resources •Supervision
Philosophy of research within the profession of Optometry	<ul style="list-style-type: none"> •Value to the profession •Professional bodies

FIGURE 2.3 SUMMARY OF THE EDUCATIONAL ASPECTS AND MANDATES OF RESEARCH IN THE CONTEXT OF THIS STUDY

2.10.1 The National Plan for Higher Education

The National Plan for Higher Education (MoE 2001:online) provides outcomes and strategies for the development of the country's higher education; section 5 is dedicated to the sustaining and promoting of research. The paper points out the emphasis of the efficiency of funds regarding research, and the sustainability of academia through research.

Under Section 1 of the National Plan, challenges are noted; these include the role of higher education to provide national competitiveness through the acquisition and application of new knowledge in a continuous fashion. One of the four primary purposes of the National Plan is to ensure that "the quality of the academic

programmes, including teaching and research, is improving across the system" (MoE 2001:online).

The following is an excerpt from the National Plan for Higher Education regarding the goals related to research:

SECTION 5: SUSTAINING AND PROMOTING RESEARCH

GOAL FOUR:

"To secure and advance high-level research capacity which can ensure both the continuation of self-initiated, open-ended intellectual inquiry, and the sustained application of research activities to technological improvement and social development" (RSA DoE 2001:online).

STRATEGIC OBJECTIVE:

To sustain current research strengths and to promote the kinds of research and other knowledge outputs required to meet national development needs, and which will enable the country to become competitive in a new global context.

Priorities to:

- Increase outputs of postgraduates, particularly Master's and Doctoral graduates.
- Increase research outputs.
- Sustain existing research capacity and strengths, and to create new centres of excellence and niche areas in institutions where there is demonstrable research capacity or potential.
- Facilitate collaboration and partnerships, especially at the regional level, in research and postgraduate training
- Promote articulation between the different elements of the research system with a view to developing a national research strategy linked to the national system of innovation.

The National Plan goes on to expound the importance of research with a critical phrase "The value and importance of research cannot be over-emphasised"; also to link the dissemination of research to upliftment of social challenges. There is note made of the decline in research and also the low enrolment in master and Doctoral programmes; that it questions the ability of Higher Education to meet the mandate stated by the National Plan. It is stated emphatically: "low enrolment in postgraduate programmes

need to be addressed urgently” and that the “future sustainability of the national research system and of the higher education system is under threat” (MoE 2001:online).

In the context of the labour market and student enrolment trends it was identified that a goal for Higher Education would be “to build high-level research capacity to address the research and knowledge need of South Africa”. Section 2 covers the need to increase the enrolment and output of graduates, as acknowledged by the trend of fewer than normal students entering into postgraduate studies directly after carrying out their first qualification. The minimum output over a 5 year period was proposed to be for a Master’s course: 6% of annual graduate output; for a Doctoral level: 1% of the annual graduate output.

Outcome 6 of Section 2 states how problem-solving and knowledge reconfiguration are skills that are required to equip the modern graduate, both of which have been linked to undertaking research (Burgoyne *et al.* 2010:5). This is reiterated in the White Paper (RSA DoE 2001:14) and adds critical thinking, communication skills and analytical thought to the skills required to build the foundation of a lifelong student.

Once again it can be seen that research builds skills that are useful as productive workers in society; these skills can benefit South Africa, even if they are not directly used in research itself.

2.10.2 The White Paper 3

Chapter 1 of the Education White Paper highlights the needs and challenges of South Africa; one of which is the mismatch between the outputs of higher education and the needs of the modern world. The transformation of the education system in post-Apartheid South Africa requires responsiveness to societal needs and must “also deliver the requisite research, the highly trained people and the knowledge to equip a developing society with the capacity to address national needs and to participate in a rapidly changing and competitive global context” (RSA DoE 1997:10).

This reiterated in the newest edition of the White Paper for post-school education and training (DHET 2014:20): “...DHET policy will focus on increasing research and innovation, improving the quality of research, and building on areas of strength

identified as important for national development” and further on: “...to cater for the needs of an economy that must enhance its skills levels in order to grow and to provide the high-level research and innovation required by a modern economy”.

With the implementation of a transformative approach to higher education, the government is aiming at reviving the culture of research in universities. The nature of research capacity implies a long term, multidimensional and multi-layered approach (Engelbrecht 2012:42).

The vision of a transformed education system of the White paper encompasses research in the statement: “through well-planned and co-ordinated teaching, learning and research programmed, national development needs...” (RSA DoE 1997:11) such that the broader view of an enriched and sustainable South Africa can be achieved.

The Education White Paper extols the virtues of research in their statement 2.89 (RSA DoE 1997:32): “The importance of traditional or basic research must be underscored, as it is crucial in nurturing a national intellectual culture, generating high-level and discipline-specific human resources, and providing opportunities for keeping in touch with international scientific developments—all of which facilitates innovation”.

The campaigning of research is also listed as a mechanism to promote capacity building and human resource development (RSA DoE 1997:33). Accountability and efficiency of funding is highlighted in section 4.54, the funding of research should be dedicated to faculties that demonstrate research capacity and potential.

With all this in mind, one can see the emphasis and importance of research in higher education.

2.10.3 The Higher Education Qualifications Framework

The Higher Education Qualifications Framework policy issued a draft in 2004 under the Higher Education Act (101 of 1997) to standardise the higher education qualifications. This blueprint stipulated that the National Qualification Framework (NQF) would have 10 levels and that postgraduate was reflected in NQF level 8-10 (MoE 2004:11).

Postgraduate courses would include a Bachelor Honours Degree; such is the Bachelor of Optometry that is offered at UFS. An undergraduate course would contain broad areas of study and the postgraduate studies would “additionally include trans-, inter- and multi-disciplinary programmes”. The Bachelor Honours Degree is designed to “prepare students for research based post graduate study” and to “develop research capacity in the methodology and techniques” of the discipline (MoE 2004:12); that the course should engage independent intellectualism. The research component of the qualification should include performing and reporting research under supervision (MoE: 2004:26).

Thus the mandate from higher education is that universities encourage and promote research; by making it mandatory for an honours degree, this also highlights the ministry of education plans for research.

2.10.4 Policy and Procedures for Measurement of research output of public higher education institutions

This policy was issued by the Department of Education in June 2003, for the purpose of encouraging the research productivity and providing guidelines on the rewarding of quality output at public higher education institutions. This came into effect on 1 January 2005.

Kamper (2004:237) extols how academic institutions and educational research institutions should communicate closely with government to ensure that there is a database of the research projects

2.10.5 Requirements from UFS

The UFS has recently put more emphasis on research.

To achieve their vision, the UFS aims to advance excellence in the scholarship of research, teaching and public service (UFS Vision, Mission and Values 2012:online). The strategic planning to achieve the goal of being a research-intensive university has been undertaken. Among the policy documents of the university, a document titled “Strategic framework for the development of research at the University of the Free State” is available; this shows the emphasis and importance of research at the institution.

The main objective is “to create an environment at the University in which:

- Research can improve and flourish
- Researchers and post-graduate students feel that they are valued
- The University’s profile is enhanced, both nationally and internationally” (UFS 2003:3).

This document further lists six objectives specific to research:

- 1) Develop a research culture through a strategic focus to research development
- 2) Quality assurance
- 3) Equity
- 4) Financial stability
- 5) Support systems
- 6) Output dimension

The report of 2012-2013 shows an increase in the number of post-graduate Doctoral graduates, as a result of these strategies being implemented. However, a study into the UFS’s comparative research performance, within the group of the top 10 South African universities “provides some cause for concern” (University of the Free State Integrated Report 2012:30).

From these excerpts it can be seen that the UFS views research as one of the requirements from both staff and students and would like to view research as a core competency in the competitive field of higher education (UFS Policy Document 2006:online).

2.11 PHILOSOPHY OF RESEARCH WITHIN THE PROFESSION OF OPTOMETRY

The Canadian Association of Optometrists (2005: online) defines an optometrist as “an independent primary healthcare provider who specialises in the examination, diagnosis, treatment, management and prevention of disease and disorders of the visual system...”.

Optometric education is being altered by the result of research and evidence based health care methodologies; patient care is being based progressively on scientific validation due to the access to online health information (Adams 2007:233). Evidence-based medicine has been defined as a system to collect and synthesise evidence and

distribute it widely in order to improve medical decision-making (Healy 2006:online). The use of evidence-based healthcare has increased the importance of teaching research skills to students in healthcare professions (Ning *et al.* 2010).

Bolin *et al.* (2012:224) state that the current emphasis on evidence-based research “attests to the belief that research is a valid method of discovering truths about practice”. Evidence-based research using randomised controlled trials is the gold standard, and the College of Optometry in the United Kingdom has evidence-based guidelines on many topics.

Adams (2007:232) is quoted: “The optometrist exercises multiple hypothesis testing on every patient and manages the patient by bringing to the management past experiences and established knowledge...Research...expands the tools for diagnosis and management of our patients”.

Similarly, it is noted that healthcare practitioners have to deal with uncertainty as they encounter ambiguity and complexities in their diagnoses and treatment options of patients; the attitude towards this uncertainty can shape how they approach critical thinking tasks (Spafford, Schryver, Campbell & Lingard 2007:157). These researchers found that in a study of Canadian students, when questioned about their case presentation of patients, thus exhibited “owning limits” of their knowledge and management.

A neat summation by Adams (2007:233) states that “research and discovery are essential components of an independent profession”.

2.11.1 Value of research to the profession of Optometry

A professions’ mission is reflected in the ethical code that holds dear the interests and well-being of their clients (Kamper 2004:233).

In a study to determine the international impact of the Journal of Optometry, it was found that more than 20 countries actively contribute to the journal, and that approximately 80% of submissions are original works (Gonzales-Meijome, Montes-Mico & Villa-Collar 2011:1). Reviews have been done by more than 30 countries, of which South Africa is one; however contributing less than 5%. This indicates that the

research published in this journal has far-reaching readership; that South Africa being the largest African contributor, there is still room for much improvement, and great exposure is possible.

A unique study by Faucher (2011:218-219) investigated the development of expertise in optometry, and found that the chief source of new knowledge was from reading scientific and clinical journals, the internet and specifically PubMed and Medscape and also from books. Newly developed areas of practise, which is synonymous with an increase in scope, identified the need to be able to interpret data from new technologies. Faucher (2011:221) mentions that organisations like the American Academy of Optometry enhance excellence in practise by disseminating knowledge, such that professional do not stagnate, but contribute to continuous learning that ensures competent patient care; and providing a platform for colleagues to communicate.

Research in the field of optometry will contribute to the advancement of optometric knowledge, which can translate to better skills in practise and be beneficial for patients and professionals alike.

So it can be seen from this diverse discussion that there is great value in determining the attitude towards research at an undergraduate level, in order to challenge and encourage students' paradigms on research, with a view to future sustainability of the profession, the community and the country at large. Professional education requires that students consider all-encompassing moral and ethical questions as well as the question of technique in research (Winston & Bahnaman 2008:223).

2.11.2 Perspectives on research from South African Professional bodies pertaining to Optometry

The Health Professions Council of South Africa (HPCSA) and the South African Optometrists' Association (SAOA) are two professional bodies who oversee the profession. The membership to the SAOA is optional.

The HPCSA prescribes guidelines for research and explains the importance of research to our country: "South Africa with its scientific expertise, advanced infrastructure, developing country burden of disease and large number of vulnerable populations

provides fertile ground for research...Research in South Africa should be responsive to the health needs of our communities" (HPCSA 2008:1-6).

It also encouraged that researchers "maintain and improve the standard of their performance by keeping their professional knowledge and skills up to date throughout their working life. In particular, they should regularly take part in educational activities that enhance their scientific and research ethics knowledge". This is often achieved by reading literature and attending conferences, these educational activities are usually credit bearing, for Continuing Professional Development (CPD) points. Optometrists require 30 points at any given time. Within the division of Optometry and Dispensing Opticians, the mission statement includes the education and training of qualified members.

Last year, SAOA held a conference in conjunction with the African Council of Optometry (AFCO), and declared to undertake six challenges in eye care, the sixth being that there should be advanced post-graduate training (SAOA 2013:online). SAOA promotes research through its affiliate journal, The African Vision and Eye Health Journal. The title holder for this journal is the African Vision Research Institute and also has a dedicated contact person for research queries. The journal frequently publishes National Research Foundation (NRF) rated researchers, and the editor of the journal holds a PhD in Optometry. The SAOA CONNEX conference 2014 has drafted the call for abstracts and posters; also indicating the on-going dedication to research within the profession (SAOA CONNEX 2013:online).

2.12 RESEARCH WITHIN THE CONTEXT OF THE DEPARTMENT OF OPTOMETRY AT THE UNIVERSITY OF THE FREE STATE

A research project is a prerequisite to complete the qualification Bachelor of Optometry at the UFS. Students are encouraged to choose a topic that is not too broad, or too complex; this enables them not to be discouraged and to learn quality is more important than quantity. The size of the task is not the most important aspect; rather complete a simple study well, than a larger study poorly. Emphasis is placed on the methodology, understanding their results, and writing the report with unique content and in an academic writing style.

2.12.1 The research process and timeline

Class numbers are small, below 40 students. Third year students complete a research methodology course, ORE304; the classes are given by lecturers from the DoO and also the department of Biostatistics. Students are required to submit a completed protocol for a mark contributing the ORE304 predicate. Students are divided into groups of 4-6, each group will draw out of a hat a speciality: Binocular Vision, Community Engagement, Contact Lenses, Low Vision, Paediatric Optometry, Pathology and Microbiology, Vision Science. Each supervisor within the department is given the group which drew their speciality within the field.

At present, the staff complement comprises of six Optometrists (including the head of department) to assist students with these projects. The outcome required is Ethical Clearance within the 3rd year of study, or very early on in their final year, in order to finish their study before Research day in August. The presentation at Research day contributes to their overall mark for the project; allocated to the COT409 module. This process is similar to other final year projects in undergraduate courses (Salma Din *et al.* 2010:443).

Abdelhafez (2007:13) investigated the students' knowledge of the supervision policy in the United Kingdom (University of Exeter). Students were aware of the process to complain and other processes; this implies that in other institutions such policies are instated and students are given these guidelines; this is absent within our department. An example of a supervisor and student contract is given by Derounian (2011:98), and covers the responsibilities of both parties. Campisi and Finn (2011:98) also give guidelines for such a document and include co-operation, regular communication, that it is the responsibility of the student to contact the supervisor, and to submit work to the supervisor on an agreed-upon timetable.

Figure 2.4 which follows, is a diagrammatic explanation of the process the students and staff follow, from planning to presentation, of the final year research project.

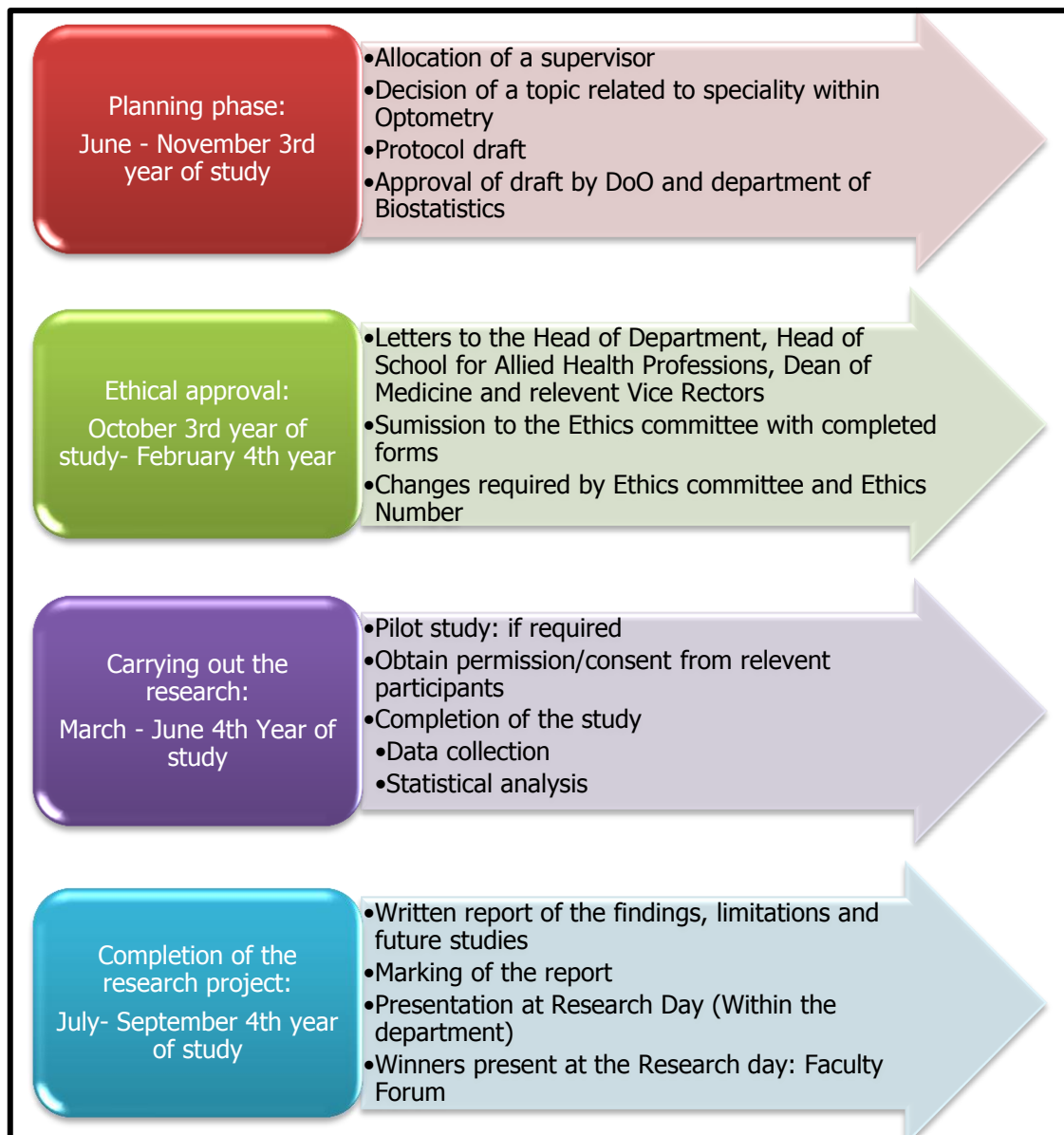


FIGURE 2.4 THE RESEARCH PROJECT PROCESS

The total length of time of this process, excluding the theory classes, is 16 months, or can be taken to span three semesters. This process is similar to other undergraduate programmes (Yamada 2013:42) where students undertake a project and the time span is from one semester to three years (Lei & Chuang 2009:238); the length of time of the project was listed by students as a drawback.

2.12.2 Factors relating to staff involvement in the research project

Each student is allocated a staff member to assist with the research project, below are the factors that relate to the staff involvement in the completion of the research project. Each staff member is allocated a speciality within the scope of optometry; this

ensures that no two groups choose very similar topics. Also, as staff members lead speciality clinics, it provides more insight (and fewer methodological errors) from the supervisor that spends the majority of the lecture time on one specific niche area. It only makes sense that the lecturer in charge of the pathology clinic supervises the students who are going to research a particular pathology incidence or treatment plan.

2.12.2.1 *Research experience of the staff*

Of the six optometrists employed (four joint staff and two University appointments), one holds a PhD in Optometry, one has submitted a PhD in Optometry and one holds a Master's in Optometry. The remaining three department members hold a degree in Optometry at undergraduate level, and are registered in Master's Programmes. The research output in articles has been nil in the past 5 years, up to February 2014. Since then, two articles (one from the PhD study and one student study) have been published in the South African Optometrist. An additional article in a non-peer-reviewed magazine was also published.

Looking at the "track record" of publications and personal research, it is surmised that research is seen as less important than the practical training of the students enrolled; however, this is an assumption and has not been investigated. It may also question the capability of staff, which do not hold postgraduate qualifications, to supervise students in their undergraduate research. It has been suggested that healthcare educators do not focus on research, but feel the graduation of new practitioners is of more value than that of knowledge within the field (Rolfe & Gardner:2006:208).

The department is also at present 12 years old, this too may be a factor for the inexperience of the staff relating to research.

2.12.2.2 *Staff number*

The department has six optometrists and one dispensing optician. Although staff may lack research experience, the small number of staff requires that each member assist a group with their research project.

2.12.2.3 *Assistance from the Department of Biostatistics*

The Medical Faculty includes a Department of Biostatistics, which assists many departments and staff researchers with statistics.

Each group is allocated a biostatistician, who assists with the writing up and interpretation of statistical data. Many concepts in Optometry have a clinical meaning that is difficult to quantify. A complication of the collection of data is that it be able to be defined in a statistically meaningful way. This can require that a clinically meaningful result is interpreted as statistically insignificant. The recommendation of the biostatistician is that students decide if their results are clinically significant, as that may make their study meaningful in the field of Optometry; a distinction is drawn between clinically and statistically significant findings.

The lecturers in this department share the course work of ORE304, the research and protocol module, and assist in the marking of the final projects.

2.12.2.4 *Guidelines for supervisors*

There are no written guidelines given to the supervisors; each supervisor takes it upon themselves to determine the time spent with their group; to give feedback, this was also noted in a study by Chireshe (2012:231). No rubric has been disseminated to supervisors to provide an outline for the assessment of progress before handing in of the protocol or the final written report. Guidelines are given to students regarding the referencing that is required by the department of Biostatistics. Although the project mark is allocated to the COT409 module (15% of the year mark), the module guide is limited to three pages whereby the students are informed of the basic information; in the 2012 module guide a rubric was provided, however, this was omitted in the 2013 and 2014 version (Appendix C1-3). Also, there are no changes to the important dates section from the 2013 to 2014 module guide; it was never updated for the new academic year. Dates in the 2013 version have also incorrect dates listed (dates given are for 2012 and not for 2013).

Students who were questioned about guidelines, ranked guidelines as the most important factor, this was followed by workshops on statistical programs and computer software. It is recommended that the guidelines include the scope of the research, the

assessment of the project, the writing format and important dates (Salma Din *et al.* 2010:444).

2.12.3 Resources of the UFS

A resource is defined by Merriam-Webster Dictionary (2014:online) as a place or thing that provides something useful; generally resources are limited, thereby making them valuable.

The topics the students choose are limited to the resources of the department. Equipment can be requested if the budget allows; however, this may hinder the success of the project being completed in time. Literature is available in the Frik Scott Medical Library as well as the main library on campus, and online sources from the KovieKat search engine. The University provides a computer laboratory for students to use, which would have all programs that they are familiar with, such as Windows Office and the internet. A discussion board and other facilities are available on Blackboard; the discussion forum allows for students to ask questions and can be utilised as a method of peer-assisted learning.

Students are expected to print literature, questionnaires, consent forms and final reports using their own funds. Mutz and Daniel (2013:300) reflect that greater resources should be dedicated to the teaching of research, to reflect its importance; this was based on their study in which attitude towards research predicted study success.

Other resources are the infrastructure of the clinic at the National District Hospital; there are twelve clinic rooms that run full time from Monday to Thursday 7:30am to 5:00pm and Friday 7:00am to 2:00pm. The equipment also extends to various specialised visual training apparatus, low vision charts and magnifiers, colour vision tests, contact lens fit sets, diagnostic lenses for pathology detection, a fundus camera and a topographer, an electronic field analyser and also a tangent screen.

Supervisors themselves can be viewed as a resource as they have the skills and knowledge to assist the students; and the time of students and supervisors alike are also limited and valuable.

2.12.4 Timeline and time management of the research project

The final years start class in mid-January and are expected to hand in a completed research report by July; the presentation is delivered in August. This provides the students with six months to complete the task, including the two weeks that students are away for community service on the Phelophepa train, and also the three weeks holiday at semester break. Many final years make use of the lower years' students as participants, who only come back to the university in early February. Some undergraduate programs expect students to complete a research study in eight weeks (Li *et al.* 2010:594).

Students would also have to complete the study with the equipment in the clinic; these instruments are often in use for patients visiting the clinic, thus students would either have to juggle the study between the clinic times they are scheduled and when the clinic is not in use. Occasionally students do historical data studies, utilising the patient files and have been known to conduct the searches over weekends when the administrators are not using the files.

Salma Din *et al.* (2010:443) found that most students (705) spend at least four hours a week on their project. Kracker and Wang (2002:300) made mention of time management as a source of anxiety for students who were completing a research course. The improvement of time management was included as a benefit of doing a research project (Burgoyne *et al.* 2010:5).

Time management can thus be seen as a by-product skill that is learnt through research, but during the process of research can be seen as a stressor.

2.13 CONCLUSION

Van der Linden *et al.* (2012:415) state that the development of a positive attitude is critical to the using and conducting of research. Ning *et al.* (2010:554) conclude that research in the healthcare education sector has an impact on patient care.

Butt and Shams state that (2013:97):

"In modern world, attitudes of people are considered more important than their experiences and academic preparation. A positive attitude towards research is a key to success and progress in the knowledge based societies".

Povee and Roberts (2014:29) add that by understanding student attitudes, it can inform teaching approaches which in turn can support students' feelings of control and mastery of research, and lessen negative research bearings. From this literature control it can be seen that the development of a positive attitude to research is multifaceted and a complex process, which is of importance not only to the academic world, but society at large.

The next chapter, Chapter 3, entitled "**Research design and research technique**", will expand on the researcher's paradigm and the theoretical underpinnings of the design chosen and implemented for the study.

CHAPTER 3

RESEARCH DESIGN AND RESEARCH TECHNIQUE

"Qualitative research...is concerned with understanding the processes and the social and cultural contexts which underlie various behavioural patterns ..."

Nieuwenhuis (2007:51)

3.1 INTRODUCTION

This chapter describes the research design and research techniques used to investigate the contributing factors towards attitude to research in undergraduate optometry students at the UFS. Theoretical aspects on the research design are first specified. This is followed by a detailed explanation of the process involved in the technique. The sample selection and data analysis are also discussed. Finally, trustworthiness as well as ethical considerations are discussed.

3.1.1 Research paradigm

The concept of a paradigm was introduced by philosopher Thomas Kuhn, who defines 'paradigm' as the application of theories in the solution of important problems. He is considered to be one of the most influential philosophers of the twentieth century and added great significance to the positivist view (Stanford Encyclopaedia of Philosophy 2014:online). A Paradigm fulfils three functions: it suggests new problems; (ii) it suggests approaches to solving those problems; (iii) it is the standard by which the quality of a proposed solution can be measured (Kuhn 1970:38–9).

Nieuwenhuis (2007:47) describes a research paradigm as a set of assumptions or views about fundamental traits of reality, which generates a particular worldview. A requirement to conduct any research is that the researcher should have a gestalt of philosophies associated to "the scientific nature of seeking knowledge" and a well-established world view (Botma, Greeff, Mulaudzi & Wright 2010:39). Weaver and Olsen (2006:460) explain that a paradigm can influence and guide the research by stating that:

“paradigms are patterns of belief and practices that regulate inquiry within a discipline by providing lenses, frames, processes through which investigation is accomplished”.

Three philosophical assumptions: ontological, epistemological and methodological, should be used by researchers as guidelines to formulate their views (Botma *et al.* 2010:40).

Ontology is the view on the nature of reality and asks “what is truth?” (Nieuwenhuis 2007:47); the positivist philosophy argues that there is one objective reality and the observation of a participant does not impact the object being observed. The interpretative philosophy, which dominates in qualitative research, is that there are many truths and multiple realities; that these realities are constructed from the social context. Epistemology is how we come to know that reality and asks: “What is the relationship between the knower and what is known? How do we know what we know? What counts as knowledge?” (Krauss 2005:759).

The basic argument of the constructionist debate is that reality is socially created by and between the people who experience it (Gergen 1999:702). Thus it requires the researcher to investigate these actions or beliefs in terms of meaning (Nieuwenhuis 2007:55). Meanings are the linguistic categories of the person’s view of reality, by which their actions are defined; a person draws meanings from or gives meanings to events and experiences. As such, meanings are the underlying motivation behind thoughts and the analysis of knowledge (Krauss 2005:762,763).

The interpretivist view holds the following assumptions (Nieuwenhuis 2007:59,60):

- Human life can merely be understood from within: the focus is subjective experiences
- Social life is a uniquely human product: truth is socially constructed
- The human mind is the purposive origin of meaning: by exploring phenomena of participants in their social settings, researchers can uncover meaning
- Human behaviour is influenced by knowledge of the social world: realities will differ in time and place
- The social world does not occur independently from human knowledge: knowledge is limited to an individual’s exposure to experiences.

The researcher holds an interpretative relativist constructionist ontological view, as every person has their own set of experiences through their unique environment and this will provide them with their own unique set of insights and perceptions; each person may experience the same event differently, and is a reflection of their own personal truth; thus there are multiple realities and truths for any particular event. This can be categorised as by Grbich (2007:4) as the subjective truth, the relative truth, the objective truth and the philosophical truth. This concept of a participant voice is called *verstehen* and defined as an "intuitive method of interpreting human culture especially in its subjective motivational and valuational aspects through the understanding of symbolic relationships" (Merriam-Webster Dictionary 2014:online).

As in this study, it is assumed that each student may have a different experience of the research exposure in the DoO and may interpret it in their individual personal way, to form their attitude towards research. It is not the concern of the researcher that these represent the whole truth for these students, but rather the contributions that the students are able and willing to share and capable of identifying with and to verbalise.

The researcher will meticulously follow the required strategies such as the ethical considerations and the data collection, in order to identify and describe the factors that contribute to the attitude towards research in the final year students in the DoO.

3.2 RESEARCH DESIGN

A research design is defined as a strategy of enquiry (Ebersohn, Eloff & Ferreira 2007:130). The design of the study is primarily qualitative. The study is more specifically a descriptive qualitative inquiry, explorative and contextual research design to explore the factors that contribute to the attitudes towards research in the final year optometry students in the DoO at the UFS.

Qualitative research in the field of attitude toward research has been used by Morgenshtern *et al.* (2011:552-568), with social work students, to understand their perceptions of research; this is due to the multifaceted nature of attitude and the complexity of emotions attached to research. They state that "qualitative data enabled us to be more specific about variations in student perception" (Morgenstern *et al.* 2011:568). Qualitative research is becoming more prominent as a method of research (Povee & Roberts 2014:28).

3.2.1 Descriptive qualitative inquiry

The use of a descriptive design is motivated by the fact that it makes provision for the accurate portrayal or valid account of the characteristics of a particular individual or to describe the variables or behaviours of a particular population in a methodical and accurate fashion (Leary:*s.a.*). This allows for new meaning to be identified, to describe what exists and to categorise information of the phenomenon of interest. Phenomenological research is described as when the researcher categorises the "essence" of human experiences regarding a phenomenon, as designated by participants in a study. Understanding the "lived experiences" allows that phenomenology is a philosophy as well as a method (Creswell 2009:15).

3.2.2 Qualitative research

Qualitative research is aimed at gaining a deeper understanding of a specific organisation or event, rather than a surface description of a large sample of population (Data Collection Strategies II: Qualitative research:online). Morris and Burkett (2011:27) describe qualitative research as a holistic manner of use in subjective phenomena. This form of research is also used to establish a form of action or solutions to a problem, to give perspectives on what people think and to define hypotheses for future research (Skinner 2007:319).

Key (1997:online) and others (Morris & Burkett 2011:31) explain what the characteristics of qualitative research are: the purpose is to gain understanding of people's interpretations; the representativeness is dynamic as the reality will alter as people's perceptions change; the data are that of the perceptions of the people in the environment and that the human is the primary collection tool which provides rich and real data.

Qualitative research have characteristics that are advantageous and disadvantageous, as listed by Key (1997:online) and Morris and Burkett (2011:30): The advantages of qualitative research are that it produces inclusive information that seeks an extensive understanding of the whole situation; it uses subjective information and contributor observation to describe the context and also the interaction of all the variables. The samples can be purposefully selected; the participants are active and take the environment to be dynamic. Disadvantages include the difficulty in identifying or

detecting researcher-induced bias, and that the scope is limited. Other disadvantages mentioned include that qualitative research is very time consuming, data are often difficult to quantify and coding of data can be problematic (Data Collection Strategies II: Qualitative research:online).

The explorative study is used to investigate little understood phenomena or to discover categories of meaning and asks "What events, beliefs, attitudes or policies define these phenomena? (Marshall & Rossman 1999:33; McMillan & Schumacher 2001:397); is designed to increase the knowledge of the field of study and not intended for generalisations. Skinner (2007:319) explains that every action or behaviour necessitates exploration to understand the meaning of a specific situation. As mentioned before, no current information exists to my knowledge of the explicit topic of the attitude toward research in Optometry students in general and more specifically those registered in their final year at the UFS.

3.2.3 Contextual design

It will also be a contextual study, in the essence that it explores and describes phenomena in the context of the students in their final year of study in the DoO at the UFS. The environment is unique to itself and can influence the experience of the students, which in turn can impact the outcome of the study.

3.3 RESEARCH TECHNIQUE

The method utilised in this study is elaborated on below. A literature control was done in the analysis of the data; however, this was an aid to the primary method, namely the nominal group technique.

3.3.1 Nominal group technique

Discussion sessions were completed using the Nominal Group Technique (NGT), under the supervision of an expert. The expert holds a PhD in qualitative research, which used the NGT as the main method and has much experience as a facilitator. The Division Health Sciences Education has made use of this expert to introduce the method to the postgraduate students in the Health Professions Education programme.

The expert was a previous staff member in the School for Allied Health Professions, and will be familiar with any jargon that might arise.

Harvey and Holmes (2012:188) similarly to Jones and Hunter (1995:376) provide support in their articles that confirms that consensus methods used in qualitative research are able to gather greater amounts of information than in common statistical methods; particularly for research in medical and health services research. This method is also often used in education research (Jones 2004:online). As this study combines education and allied health professions, it was deemed suitable.

Jones and Hunter specify NGT as one of these consensus gathering methods. This will be expanded upon. The benefit of this technique is that it can balance the influence of individuals and can reduce the conforming effect (Dunham 1998:online). Also, this technique gives all participants a chance to voice their opinion; the participants are viewed as experts: they can speak with expertise in how they perceive their experiences. Harvey and Holmes (2012:190) confirm NGT as a reliable method to determine priorities and are considered valid and effective for problem identification.

3.3.2.1 *Theoretical aspects*

Nominal group technique (NGT) is a structured method for gathering information from groups of individuals who have insight into a particular area of interest; it combines qualitative and quantitative data collection in a group setting; the group is "nominal" to the extent that it is a group in name only and is highly controlled (Gallagher, Hares, Spencer, Bradshaw & Webb 1993:76-77).

This method was first described in 1971 by Delbecq, Van de Ven and Gustafson (1975:466) following research funding from the Institute for Research on Poverty and NASA (Gallagher *et al.* 1993:77). This technique is also called the expert panel and is often used in medical, nursing and health service research and to aid the design of educational programmes (Jones & Hunter 1995:376-379; Jones 2004:online). The sample is selected to meet the sampling criteria and is controlled in time and place (Delbecq, Van de Ven & Gustafson 1975:466).

Potter, Gordan and Hamer (2004:130) state that it is a decision-making process which is time-saving and cost effective. Gallagher *et al.* (1993:77-78) add many advantages

of NGT: that the structured group process encourages participation and that idea generation and problem solving can be combined; it allows measurement of the importance of the ideas; encourages minority opinions to be voiced. Nominal group technique also has the advantage over brainstorming, which can suffer from dominance in the discussions, and getting stuck in a single train of thought. Very early on, the benefits of group discussions were identified, (Katz 1959:241) these include the diversity of original opinion and the awareness of how others in the group differ in opinion; group work was also considered by Katz to be a good technique for problem solving.

Harvey and Holmes (2012:190) bring to attention a number of practical benefits of this technique:

- Time efficiency: it is possible to collect data at one time
- Financial efficiency
- Little preparation of the participants: this is of importance when participants are very busy and it may encourage participation as they need not prepare any reading before arriving at the session
- Completion and dissemination of the results in-session
- Equal representation of the participants
- The environment is one that is conducive to change: in the context of identifying problems and possible solutions, participants feel that they are part of the solution
- The structure is established (with minor changes, for example some allow a break time before the ranking and allow for re-ranking) and is as follows (Gallagher *et al.* 1993:79; Jones & Hunter 1995:377):

Step 1:

The discussion group is facilitated by an expert or a credible non-expert, who welcomes all the participants. Informed consent will be obtained before continuing further.

Step 2:

The question is posed to the group, the facilitator gives brief information about the topic or question and clarification if required.

Step 3:

The participants spend a few minutes writing down their views on the topic or question; to write down as many ideas as possible. This is done in silence and a time limit is given for the writing down of views and ideas.

Step 4:

Each participant in turn contributes an idea to the facilitator who records it on the flip chart. Similar suggestions are grouped together if appropriate. Participants may also skip a turn and then come back at a later round, which can provide a feeling of "safety".

Step 5:

This is the first opportunity for discussion. The group discusses each of the contributions for clarification; it provides opportunity for elaboration, defending or disputing of ideas and also the addition of ideas. Ideas may not be removed. The discussion proceeds with one item at a time and one person speaking at a time.

Step 6:

The participants rank the ideas, on their own personal priority. This is written on index cards and handed in to the facilitator. It is tabulated and presented as a final ranking list. The time allocation for each session is a maximum of two hours. The facilitator thanks the participants for their time and contributions. Refreshments may be provided.

The role of the facilitator is to ensure that each of the participants is able to express their opinions and to keep particular views from dominating the discussion, to tactfully move the process along and asking details (Jones & Hunter 1995:379). The researcher will record from an unobtrusive distance and not be actively involved in any part of the discussion process.

3.3.2.2 *Nominal group technique in this study*

The students were reminded about the NGT sessions via the student representatives in the final year. The researcher contacted the student representatives; who in turn sent a group message via Whatsapp to the class. This is the format for communication of reminders for each year group for any messages from the DoO staff to students.

A venue was chosen such that the students can sit facing each other; the venue was small enough to feel comfortable and intimate and isolated enough so that there were not disturbances. The debriefing room has a very heavy door to block out sound. The venue had video and sound recording, which was overt (cameras in the ceiling very similar to cameras used in shopping malls); as to allow the researcher to review the sessions, and record the sessions without it distracting the participants. This is recommended by Skinner (2007:322), as observations should be done as unobtrusively as possible.

The use of videography or sound recording was used for analysis and was only viewed by the researcher and the researchers' supervisor to assist with analysis. This is also a method of an audit trail for the researcher. Students were informed that the session would be recorded.

The students who had consented to participate filled in an information sheet that addressed demographic issues (Appendix B3): age, gender, marital status, mother tongue and any previous tertiary education (complete and incomplete), previous research experience and parents' highest level of education.

The duration of the different sessions was between one hour twenty minutes and one hour forty minutes each. Each session consisted of the two questions mentioned. In each session the following was available for the students to use and for the facilitator to make use of:

- A Flipchart
- A whiteboard;
- Pens;
- Loose sheets of paper;
- Index cards; and
- Coloured markers to write on the flipchart.

The questions that were asked to achieve the objective were:

"What are the positive experiences related to research?"

"What are the negative experiences related to research?"

These questions were piloted at the first nominal group session, to ensure that there was no confusion regarding the question. It was explained that research referred to any form of research that they had been involved in before; they described experiences as something that happens to them and that positive is good and negative is bad or something that breaks you down. The facilitator agreed that the group had a good understanding of the main concepts in the questions. The questions were not altered.

These questions were asked separately, in such a manner that all positive aspects are recorded in one discussion and the negative aspects in another discussion. The students were offered a break between the questions for those who needed health breaks. The participants were asked to rank their preferred top five ideas for each of the questions, one being the most important. Consensus was reached in this manner. The groups were facilitated by the same expert moderator in each session and the structure to be followed was the same for each of the three groups. The discussions were completed in English in the session containing participants who speak an African language other than Afrikaans; the alternate sessions students were able to respond in Afrikaans or English as per their preference (*cf.* 3.4.1.2).

The other group included students who felt that their language of choice would be their African language and English. Due to translation concerns, these students responded only in English. Often unwittingly Afrikaans speakers explain themselves in their home language, and students who do not speak Afrikaans do not always ask for the explanation to be translated. This can be a source of confusion and items or statements listed may be grouped together that would have separate meaning for other members in the group. As the facilitator is an Afrikaans first language speaker, the non-Afrikaans speaking students were paired with first language English speaking students and African first language speaking students. This limited the chances of explanations from the participants being done in Afrikaans.

3.4 TARGET POPULATION

A target population consists of a group of individuals who have and share certain specified characteristics (De Vos, Strydom, Fouché & Delport 2008:223). In this study, there is a single group of individuals that have the required characteristics.

The target population are all students registered as final year (4th year) Optometry students of the School for Allied Health Professions (SAHP) at the University of the Free State, and in the process of completing a research project (2014). Students who were in their final year, and repeating modules, that had completed the research the previous year were excluded from the population.

3.4.1 Unit of analysis

The unit of analysis was the Bachelor of Optometry class of 2014, at the University of the Free State. The inclusion criteria were that the student be a registered final year optometry student at the DoO at the UFS, partaking in the research project and giving consent to participate in the discussions of the NGT.

3.4.1.1 *Sampling*

Sampling methods are often grouped into sampling for quantitative research and sampling for qualitative research (Bowling 2002:187). Further divisions can be made into random and non-random sampling. Random sampling can be used when the researcher desires to draw conclusions on how the study would apply to the broader population. Non-random sampling methods are typically used in qualitative research and are comprised of convenience sampling, purposive sampling, snowballing and theoretical sampling. Within qualitative research, there is a greater emphasis on purposive sampling, as this can ensure that the sample covers the facets that are of concern to the researcher (Skinner 2007:323). Purposive sampling is appropriate when the research wished to have rich data for in-depth understanding (McMillan & Schumacher 2001:400).

Sampling in this study was purposive, as only students who met with the sampling criteria were included in the study.

3.4.1.2 *Unit of analysis in this study*

The sample consisted of 22 students, which is almost the whole target population; this can be called comprehensive sampling, (McMillan & Schumacher 2001:402); one student was ill on the scheduled date and could not attend the discussion.

The groups were divided into language preferences. The language of instruction in the DoO is English and fewer than 10% of the population are English speakers, thus it is not possible to divide them into Afrikaans and English groups. The students were asked to sign up for the study, in either a bilingual group (equally comfortable in English or Afrikaans), as some students will feel more comfortable expressing themselves in their mother-tongue. This also prevented the students who do not speak Afrikaans from feeling side-lined or discriminated against.

3.4.1.4 *Sampling criteria*

The unit of analysis is the study participants on which the researcher will focus, for this study the final year optometry students who comply with the inclusion criteria. The inclusion criteria are that the student be a registered final year optometry student at the DoO at the UFS, partaking in the research project and giving consent to participate in the discussions of the NGT.

Within this year group, there was a single student excluded, as she was not participating in a research project, having completed the module in 2013; this student was merely registered as a final year in 2014 to complete her patient numbers required before graduation. Thus, the unit of analysis in this study was purposive, as the students selected were done so for the purpose of gaining understanding of a specific phenomenon (Nieuwenhuis 2007:79).

3.5 THE EXPLORATORY INTERVIEW

An exploratory interview is a smaller version of the research study, and can be used to identify any complications and drawbacks of the proposed techniques. This advance warning may indicate that changes need to be incorporated in the research study.

The context-dependent interpretation of question meaning requires that the same literal question can acquire different meanings in different contexts, which results in answers to substantively different questions (Schwarz & Bohner 2001:441). For this reason, the participants' understanding of the question is of great importance.

The first group that was asked the NGT questions were used as the exploratory interview; these students clarified any concerns over ambiguity in the questions. The

participants understood the questions and the facilitator was satisfied that none of the core concepts of the question were misconstrued. The facilitator agreed that the group would be valid as part of the sample. The question was not altered.

3.6 DATA COLLECTION

Data collection denotes the precise collection of data relating to the study purpose or the specific objectives, questions or hypothesis of the investigation (Burns & Grove 2009:695). Data collection took place on 3 and 24 April and 8 May at the Medical Simulation Unit in the debriefing room. All the dates are Thursdays, as this was the most convenient time for the scheduling of the facilitator and the participants.

3.6.1 Demographic data

The participants were requested to fill in a questionnaire that contained questions pertaining to their demographic and socio-economic information.

The demographic information that was requested from the participants included:

- Age
- Home language
- Gender
- Marital status
- Previous qualifications
- Previous research experience
- Parents highest level of education

This data sheet did not include a participant's name, for confidentiality. Previous experience to research was clarified as any contact with research, either as a participant or as a researcher.

3.6.2 Access to the setting

The Medical simulation unit at the UFS main campus was the venue for the NGT sessions. The students sat at a large table, such that they were all able to see the facilitator and each other. This venue was selected as it is a very quiet area of the

campus, which is known to the students and has access to media recording. This media includes the ability to record the sessions with sound and video feed.

Each student was given a brief introduction to the session by the facilitator. The students were informed of their right to privacy, and explained the difference between anonymity and confidentiality. Students were informed that they could leave at any time, and those that chose to participate, signed the consent form (Appendix B2) after reading the information leaflet (Appendix B1).

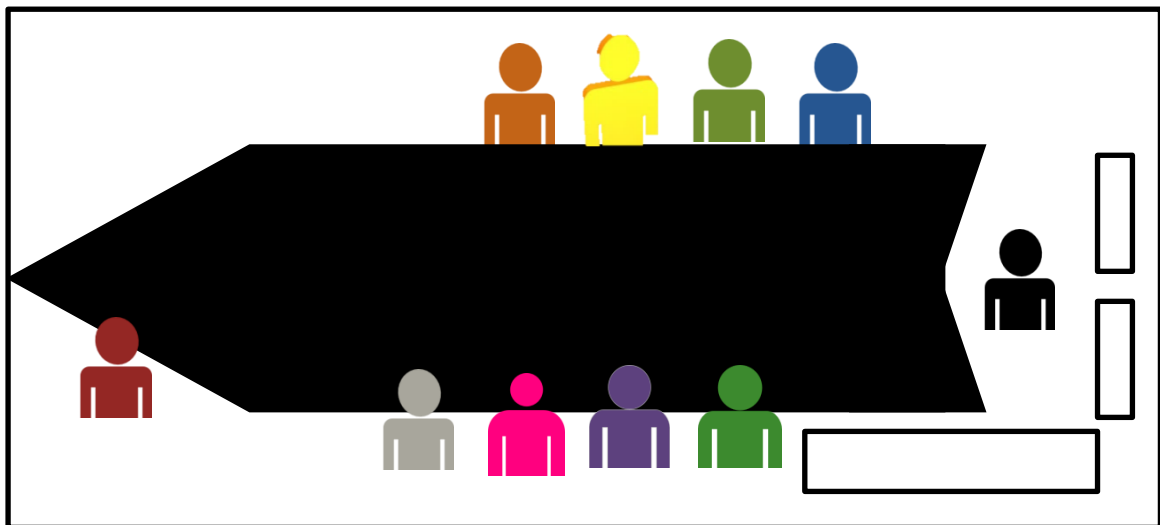


FIGURE 3a: VENUE SEATING ARRANGEMENT NGT GROUP 1

There were eight students and the facilitator in the first nominal group discussion, indicated by the coloured dots (clockwise orange through to grey). The red dot on the left indicates the researcher and the black dot to the right the facilitator. The two flipcharts are extreme right and the white board on which the recorded statement sheets were stuck for voting is indicated as the rectangle to the bottom right.

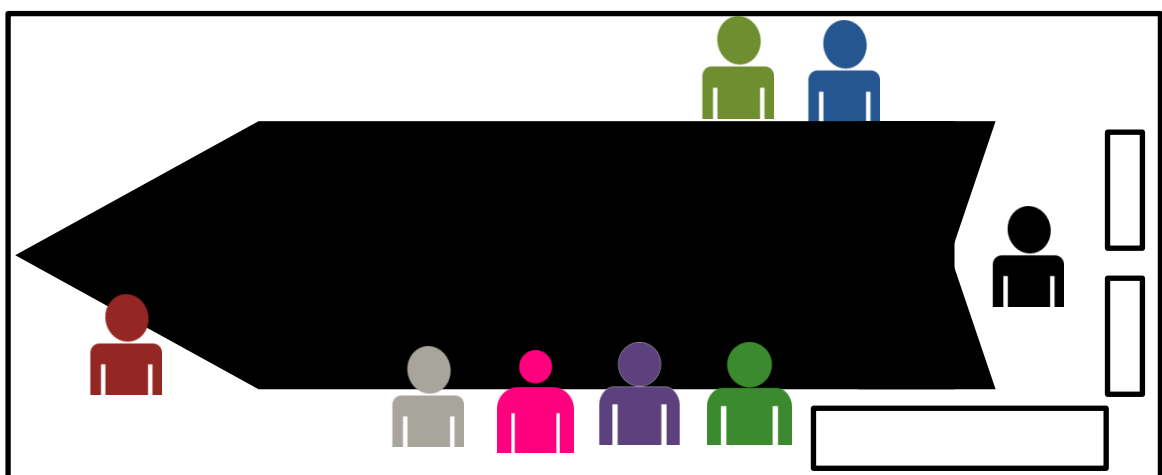


FIGURE 3b: VENUE: SEATING ARRANGEMENT NGT GROUP 2

There were eight students taking part in the second group (clockwise the dots green through to grey). The red dot on the left indicates the researcher and the black dot to the right the facilitator. The two flipcharts are extreme right and the white board on which the recorded statement sheets were stuck for voting is indicated as the rectangle to the bottom right.

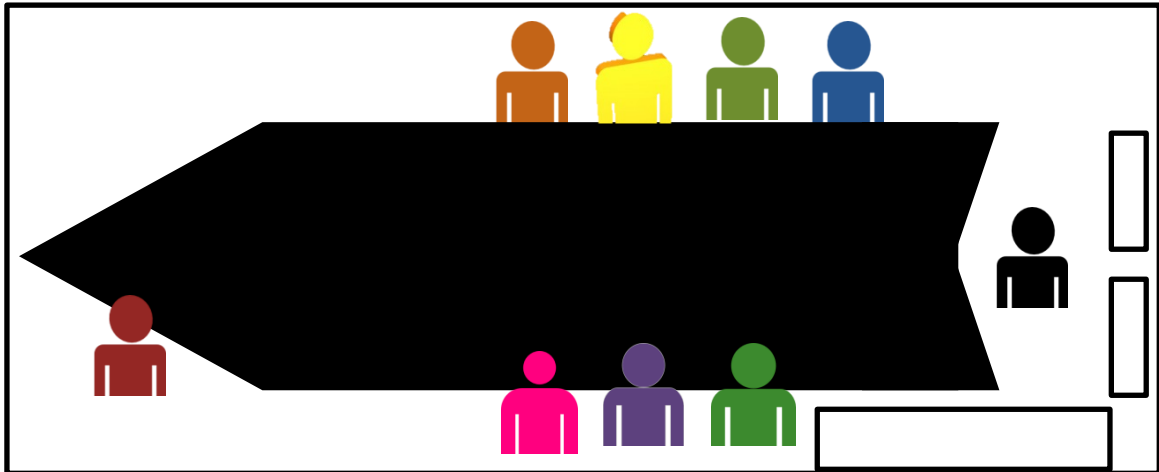


FIGURE 3c: VENUE: SEATING ARRANGEMENT NGT GROUP 3

There were six students who participated in the third and final nominal group, indicated by the orange through to pink dots. The red dot on the left indicates the researcher and the black dot to the right the facilitator. The two flipcharts are extreme right and the white board on which the recorded statement sheets were stuck for voting is indicated as the rectangle to the bottom right.

3.6.3 Data collection process

The data were collected at NGT sessions, facilitated by an expert. The dates were set to suit the expert and the timetable of the final year students. The discussions were done in English in one group and in the other two groups, students were able to comment in either English or Afrikaans. English is the language of instruction within the department and understood by all the students; Afrikaans is not understood by all of the students. The sessions lasted between 80 and 120 minutes, inclusive of a health break of ten minutes between the two questions. The NGT followed the steps as mentioned in the theoretical aspects of the technique (*cf.* 3.3.2.1). The researcher sat in as an observer for the second question of the first NGT group, as the facilitator asked the students if they would mind, and they all agreed that the researcher could sit in.

Each of the participants offered a statement from their list of ideas, often the ideas had already been listed, this occurred within every group. This showed the similarity of the ideas within the groups and within the population.

To ensure that the statement recorded reflected what the participant meant, the facilitator used a number of communication tactics. These include:

Probing, in a manner that is not threatening by asking questions:

- "Can you explain what you mean by the term X?"
- "Did this happen to you with your research project?"
- "Can you expand on that?"

Paraphrasing is a clear and concise expression of the participant's ideas in the facilitator's own words (Burns & Grove 2009:712). The facilitator writes down the basic message of participants' contribution using her own words, but not altering the meaning thereof. This is due to very long explanations of the students, often with them not using the jargon of research. Many times the students would talk about the detail of the experience without giving it "meat".

Clarification means making things clearer or simpler in some cases, so that the students in the group can decide if what their colleague is saying, also agrees with what they have already mentioned, or to determine if the statement is explained on the flipchart in the clearest manner. She drew data from participants in this way, by example:

- "If you are saying it is difficult to get questions, do you mean the formulation of a research question, or what question in particular?"
- "When you mention it is hard to finish research with people in it, do you mean that the people in question are participants, and they drop out of the study?"

3.7 TRUSTWORTHINESS OR RIGOUR

Trustworthiness is best defined as the "believability" of a researcher's findings (Maykut & Morehouse 1994:64).

Guba (1981) established four criteria for trustworthiness in qualitative research, namely credibility (truth value), transferability (applicability), dependability

(consistency) and confirmability (neutrality). Krefting (1991:214) listed a nominal sample and solid descriptions as a measure of transferability in qualitative research.

The trustworthiness of this study will be defined by the proposed outline of interpretation of the analysed quantitative and qualitative aspects of the data collated during the discussions.

3.7.1 Credibility

Credibility is defined as the extent to which the instrument measures what it purports to measure (Kimberlin & Winterstein 2008:2278) or how truthful the research results are (Golafshani 2003:3). Merriam (1998) as quoted by Shenton (2004:64) states that credibility in the view of qualitative research asks the question: "How congruent are the findings with reality?" Mansourian (2008:282) states that credibility is a three-dimensional concept of neutrality (objectivity), truthfulness (validity) and replicability (reliability).

Credibility can be ensured by the adoption of a research method that is well established in qualitative investigation, from tactics that help ensure the honesty of the participants, random sampling, iterative questioning, member checks, examination of previous research findings and triangulation (Shenton 2004:64-66). Member checks are the act of returning to the participants to see whether they recognise the findings and determine the accuracy of the qualitative findings; this can be achieved by clarification of the expert moderator in the NGT discussions before continuing with the voting process. Objectivity can be enhanced by the use of a co-coder/intercoder to ensure the agreement of the codes or themes that are used in the analysis of the results. The researcher's supervisor, Dr S.B Kruger, assisted in this capacity.

Credibility can be maintained in qualitative research being a careful listener, recording accurately during the data gathering session, seeking feedback and writing accurately, as stated by Key (1997:online) quoting Walcott (1990). As the recording of the contributors will be done by the researcher in an observer capacity and also by the expert on the flip chart, the recording was done during the discussion and also accurately recorded as the participants agreed via a statement of consensus when the data collection or factor list is complete; this is another method of member checking.

This study made use of an established method, member checks and the examination of previous research findings.

3.7.2 Transferability

This is whether or not the study can be applied to another situation or wider population; however, qualitative studies must be understood within their context of geographical area or organisation (Shenton 2004:70). This study aimed to be understood within the context of the DoO at the UFS.

The study is similar to previous research within the field and the same techniques could be applied to other departments within the SAHP at UFS, should the need be identified.

Transferability need not always be an exact duplication just that the essence of what is obtained can be useful to others and can be applied in a similar manner in another context (Smit 2013).

3.7.3 Dependability

This is the qualitative aspect of reliability. Joppe (2000) as cited in Golafshani (2003:2) defines reliability as the extent to which results are consistent over time and an accurate representation of the total population under study. Shenton (2004:71) adds that to ensure dependability one should detail the processes used in the study, such that another researcher could repeat the process.

As the unit of analysis will be groups that take part in multiple NGT discussions, the dependability can be enhanced, as they will be a variety of participants and will take place over a period of time; the groups equated to nearly all of the population, the findings can be said to be a representation of the whole population, in this study the final year class of Optometry students (2014).

The study made use of established steps in the NGT process. This assisted in the researcher leaving an audit trail. The processes will be documented, including the seating arrangements. The original data were also kept, which can aid interested parties in following the researchers' train of thought.

3.7.4 Confirmability

The concept of confirmability is equitable to that of objectivity; as much as possible the researcher should ensure that the findings are representative of the experiences of the participants, rather than the preferences of the researcher (Shenton 2004:72).

The authenticity of the research is the extent to which the researcher is able to portray the contributing factors to the attitude toward research of the participants as they were experienced. This can be assisted by methodological description, the researcher admitting their beliefs and assumptions, and recognition of the short-comings of the study.

As the participants prioritise the generated ideas and the facilitator is an unbiased individual, this protects the study from the researcher enforcing their personal objectives and thoughts.

3.8 DATA ANALYSIS

Babbie and Mouton (2008:646) define data analysis as the non-numerical scrutiny and interpretation of observations for the purpose of determining underlying meanings and configurations of relationships. It requires integrating and synthesising the description of the non-numerical information that has been concentrated to categories and themes by means of a coding process (Brink, van der Walt & van Rensburg 2006:55). In qualitative research, data analysis and data collection are carried out at virtually the same time (Botma *et al.* 2010:220).

In the NGT process, data gathering and analysis take place simultaneously and the participants prioritise the data. Although the NGT can be seen as both quantitative and qualitative, the emphasis of the study will be on the qualitative aspects. The researcher will use the guidelines proposed by Van Breda (2005:4-11) to analyse the data obtained.

This is a step-wise process:

- Capture the original data
- Identify the priorities of each of the two groups
- Analyse the content of the data according to categories and themes

- Confirm the content analysis
- Calculate the combined ranks
- Report the NGT data

The content analysis by coding will use the guidelines by Tesch as cited in Creswell (2009:186), which may vary with the study, as this is a guideline for textual data.

- Get a sense of the whole
- Analyse each participant's responses for their underlying meaning
- Cluster similar topics, into columns
- Return to the original data and organise according to the codes already identified and see if new categories and codes emerge
- See if any categories relate to each other
- Make final decisions about the abbreviation of the categories
- Perform a preliminary analysis of each category
- If required, recode the existing data

Content analysis is an inductive and iterative process (Nieuwenhuis 2007:101) and allows for multiple categories and subcategories to emerge as the researcher immerses in the data, looking for similarities and differences and issues that recur (Nieuwenhuis 2007:109).

3.8.1 Content analysis

A code is a short phrase or word that is assigned to a salient attribute or piece of data, it has been described as "essence-capturing" (Saldana 2008:8). The codes label what the researcher feels are relevant collection points, and one data point can be allocated more than one label (Nieuwenhuis 2007:105-107). Coding is an interpretative act, and can be used to find patterns. These patterns can be of similarity, difference, and frequency, sequence, in relation to another aspect or event and also as causation (Saldana 2008:6). Grbich (2007:21) explains that codes are grouped to find meaning and codes can be grouped according to a shared characteristic, and these groupings lead to categories. These categories can then give way to themes and be seen as part of theories of existent knowledge (Saldana 2008:12). Codes may also fit with one or more categories (Nieuwenhuis 2007:109).

This study made use of descriptive coding, which gives the substance of the data; in vivo coding which uses verbatim statements, and also emotion coding. Emotion coding can be inferred by the researcher or be given by the participants by their verbalisation of experiences. Value coding reflects the attitudes of the participants and is given by the feelings attributed to a thing, person or idea (Smit 2013).

3.9 ETHICAL CONSIDERATIONS

The intent of the study is in no way to impinge on the rights of the participants, but merely to increase the body of knowledge, such that future students could be assisted with the information gathered.

3.9.1 Expertise or competence of researcher and co-coder

This is the researcher's first attempt at a qualitative study; as such the NGT method is suitable, as it requires no direct contact with the participants, with which to bias the results. The co-coder has a PhD on topics of a qualitative nature and has coded NGT data for her thesis as well as doctoral students. The facilitator could also be called upon to assist in areas where the researcher felt clarification was required.

The NGT is also suitable for a novice researcher as it allows the participants to have their own voice, the statements are recorded in their own words and this cannot be misinterpreted by the researcher.

3.9.2 Approval

This study has approval of the Ethics Committee. Approval has also been sought from the Dean of the faculty of Health Sciences, the Head of the School for Allied Health Professions, the Vice Rector Academic of the University of the Free State and the Head of the Department of Optometry of the University of the Free State (Appendices A1-A4).

Before the students start the discussion, an information letter (Appendix B1) and an informed consent letter (Appendix B2) were given to the students. This explained the purpose of the research as well as gaining informed consent from the students. It addressed the confidentiality of the session, the right to stop participating at any time.

Neither harm nor victimisation occurred with regards to students who did not participate. There was no form of monetary compensation for the participation in the study; a snack was given out on completion of the session and was out of sight before the beginning of the session (it has been advised that any incentive, even that of a snack should not be visible prior to the discussion as it may be misconstrued as a bribe (van Heerden 2013). As mentioned, the language of instruction within in the department is English and is understood by all students, thus the discussions will take place predominantly in English and all non-Afrikaans speakers were together in the same session.

3.9.3 Respect for people

The study will in no way limit, effect or impose on any human rights. Students were aware they could withdraw at any time without fear. No discrimination towards participants for any reason will be condoned.

3.9.4 Right to privacy

The respondents' identities were known to each other, as well as the expert and researcher. Each contribution was put on the flip chart and was not directly attributed to any one individual in written form. Students in the group could address each other by name if the need arose, as they faced each other in the seating arrangement. Respondents were assured that any feedback will remain confidential. The researchers' name and contact details were made available to the respondents.

3.9.5 Coercion

No students were coerced to partake in the study.

3.9.6 Confidentiality

The researcher obeyed the principles of confidentiality by ensuring that any records and data gained from participants were kept secure and that no identities were made public (Burns & Grove 2009:202). Only the researcher, the facilitator and the supervisor had access to the data.

3.9.7 Dissemination of results

Each of the participants was able to view the full list and the final ranked items and agreement was reached; these were the final results of the NGT sessions. Further dissemination of the results will be done in the application for publication and in the availability of this dissertation online on the UFS resources catalogue.

3.9.8 Benefits

Although the implementation of recommendations from this study may improve the research module and research project guidelines, this will benefit future students and not the participants of the study.

3.10 VALUE OF THE STUDY

This study was done in the field of Health Professions Education and lies in the domain of academic development. The study is interdisciplinary as it reaches across the fields of Health Professions Education and Optometry. This can allow for the results of the study to be implemented within the department; guidelines can be written to supervisors and areas of weakness that are of concern to students can be proactively challenged with workshops and if required practical sessions.

The value is also for the reflection on knowledge gain and awareness of skill development by the participants through the NGT process.

3.11 LIMITATIONS OF THE STUDY

The scope of this study was limited to a single final year group of Optometry students at the University of the Free State, with the goal to identify contributing factors to anxiety as a component of the attitude towards research.

The widest arc of this study was to determine what students feel should be changed, omitted or added to the course in future in terms of research. As there was only one method employed, it is possible that not all contributions to attitude could have been identified. This has been shown to be a factor, as some participants will reveal different concerns in a questionnaire format, as they feel that it is acceptable in

anonymity, but not acceptable within the public, such as in a NGT session (Potter 2013:47).

Also, as the students are in different phases of research, and few had completed data collection, other experiences would have been reflected upon had the project been completed or near completion. They may also have been more familiar with the terminology of research and had more concise or in-depth contributions had the study been undertaken after Research Day presentations.

This study does not intend to develop a framework or curriculum change at this time. The study is also not designed to be transferrable beyond the Department of Optometry.

3.12 CONCLUSION

In Chapter 3 an overview was provided of the research design and the research technique involved in the study as well as the procedures that were followed. The next chapter, Chapter 4, titled "**Findings of the Nominal Group Discussions**", will tabulate and summarise the findings of these group discussions. A thematic analysis will also be elaborated on.

CHAPTER 4

FINDINGS OF THE NOMINAL GROUP DISCUSSIONS

4.1 INTRODUCTION

This chapter reports on the findings of the nominal group interviews with the final year students in the Department of Optometry (DoO) at the University of the Free State (UFS). There were three groups of students, each attending a scheduled discussion according to their language preference; there was one English group and two Afrikaans groups. The statements recorded were recorded in the language of preference and were translated by the researcher. Translated statements are indicated in brackets in the tables (*cf.* 4.3, 4.4, 4.6, 4.7). The nominal groups were undertaken to achieve the objectives listed.

The first set of findings relates to the demographic information of the participants, according to their age, gender, home language and marital status. Other information includes their exposure to research prior to enrolling in their final year, and if they had previously completed a qualification and what their parents' highest level of education completed was.

Further results discussed and tabulated will be done so chronologically, group one first, and so on; for the positive statements and later the negative statements. The final sections of the chapter relate the themes and categories of the findings.

4.2 DEMOGRAPHIC DATA

Each student was asked to complete a demographic questionnaire, and was specifically asked not to put their names on the sheet, to ensure anonymity. Each of the participants consented to completing the sheet.

There were 22 participants, of which the majority were female ($n=19$), and the most prominent language spoken was Afrikaans, with a mean age of 22 years. The eldest student was 31 and the youngest 21 years old. Other home languages were English, Sotho and Xhosa in order of prevalence; one student was married and the remainder were single. Historically, the enrolment of females in the DoO is predominantly female, and this trend is still true today. The UFS, previously the University of the Orange Free State was originally an institution that maintained Afrikaans as the main language of tuition and this legacy is

retained in the hesitancy of scholars to study at the UFS if they are not confident of their Afrikaans language skills.

Figure 4.1 – 4.4 display the results of the demographic information.

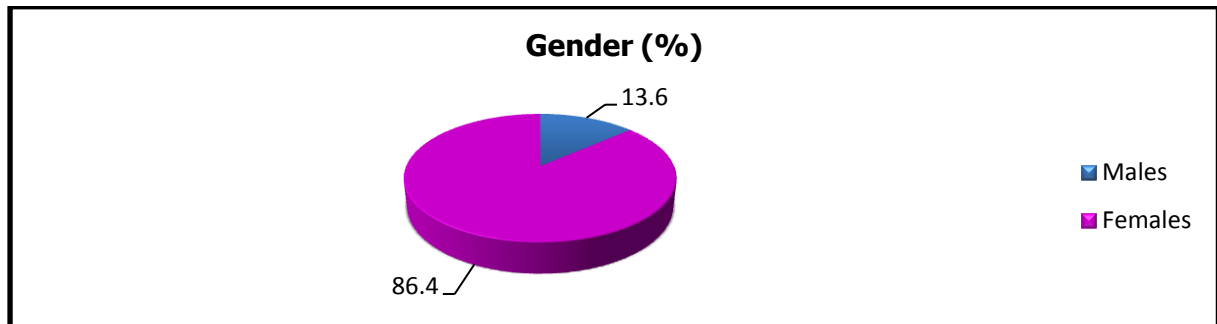


FIGURE 4.1: GENDER OF THE PARTICIPANTS

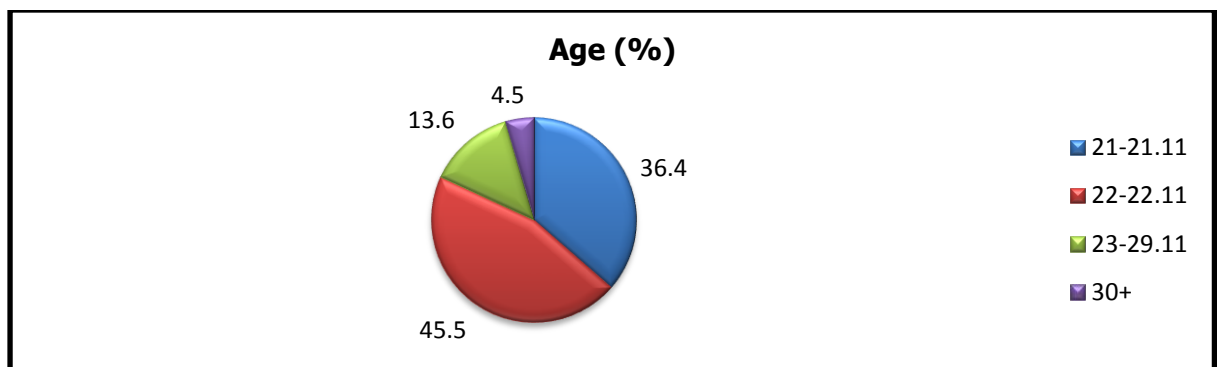


FIGURE 4.2: AGE OF THE PARTICIPANTS

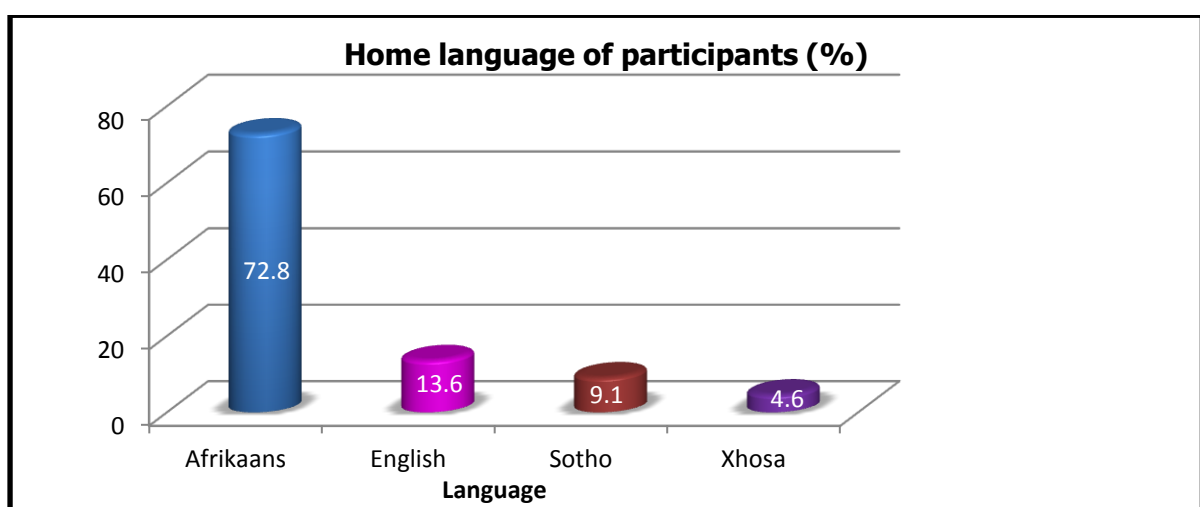


FIGURE 4.3: HOME LANGUAGE OF THE PARTICIPANTS

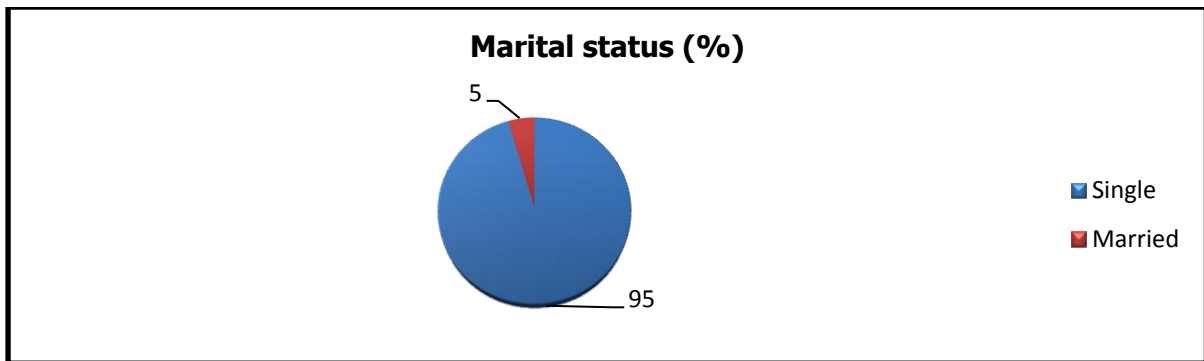


FIGURE 4.4: MARITAL STATUS OF PARTICIPANTS

Two of the students had already completed a BSc undergraduate (3 year) degree, but were not required to perform research, as this is usually undertaken at the Honours level (*cf.* Figure 4.5). Twenty-one students felt that they were not exposed to research outside of their studies towards their current courses; one student listed being a participant in research outside of the DoO (*cf.* Figure 4.6). The majority (N=15) of students' parents had a tertiary qualification, and four of these were at an honours level; seven students' parents had completed Grade 12, the highest exit level of schooling, often called a matric certificate (*cf.* Figure 4.7).

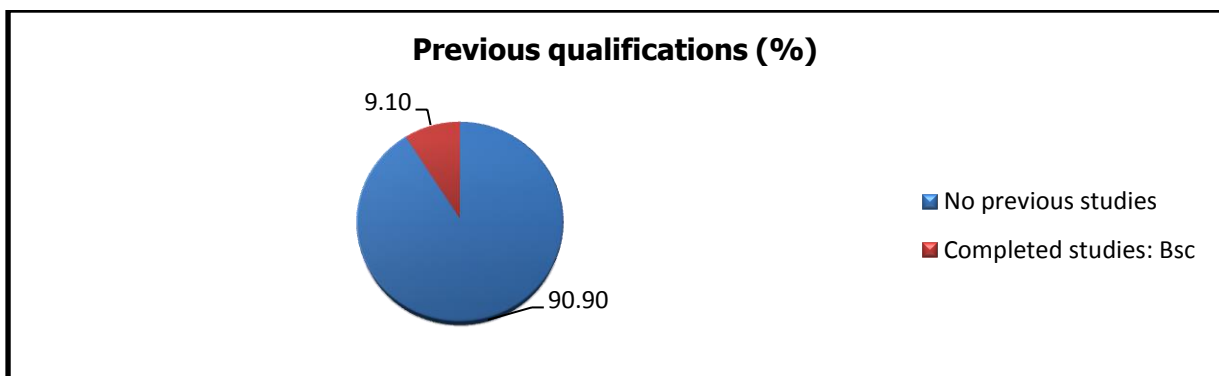


FIGURE 4.5: PREVIOUS QUALIFICATIONS OF THE PARTICIPANTS

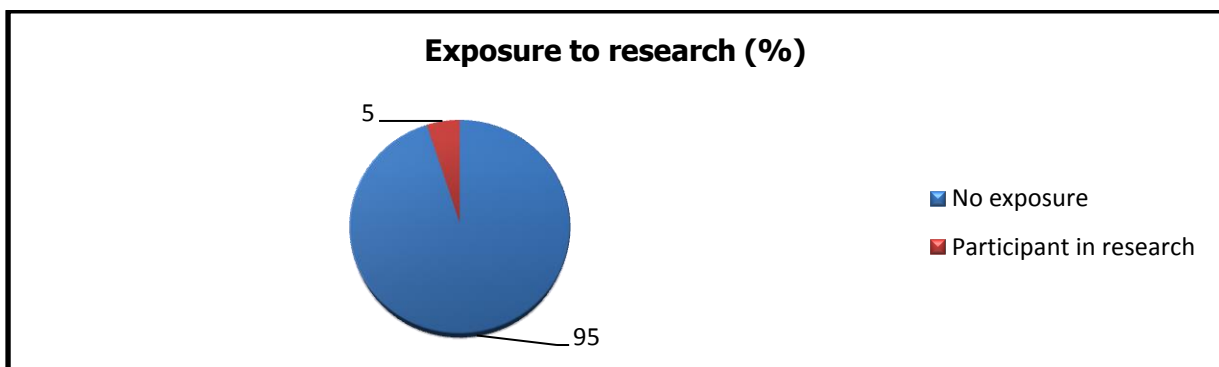


FIGURE 4.6: EXPOSURE TO RESEARCH OF THE PARTICIPANTS

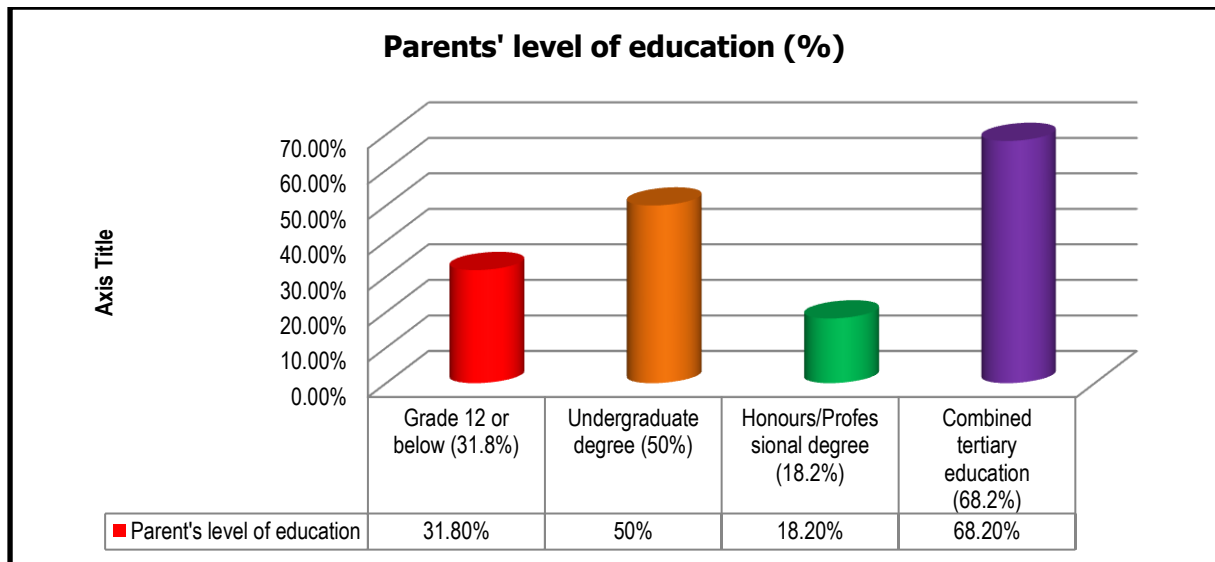


FIGURE 4.7: PARENTS' LEVEL OF EDUCATION OF THE PARTICIPANTS

To have 68.2% (15/22) of at least one parent having a higher education qualification is a significantly high percentage, as the average populace of South Africa do not reach this level of education.

4.3 PROCESS OF ANALYSIS

Each group met at the same venue, with the same facilitator and were asked two questions once they had signed consent to participate in the nominal groups:

"What are the positive experiences related to research?"

"What are the negative experiences related to research?"

The facilitator explained each of the questions, to ensure that there was no ambiguity; the experiences need not have related to their current research project, but also any exposure, thoughts and feelings related to research; some students took experiences that had happened to fellow students to add to their lists of statements.

Upon completion of the NGT-interviews, the raw data - established from the written statement on the flipcharts - were transferred to the computer and tabulated according to groups to simplify the reading. The seven steps for the analysis of NGT-interviews according to Van Breda (2005:4-12) were used to analyse the data (*cf.* 3.3.2.1). Data were collated

per group and the priorities of each group (Van Breda 2005:5) relating to the statements were determined as per step 2 (*cf.* Tables 4.2-4.8).

As suggested in step 3 and 4, the researcher and the facilitator grouped the responses of the students into positive or negative influence on their experience of research. All the responses recorded from the different groups were used for the research findings. The students prioritised the different statements they recorded during the NGT interviews by identifying the five most important statements and scoring them by giving a five to the most important statement and one to the statement they regarded as least important.

All of the statements were used for the analysis of themes and categories, as each statement was thought to be worthy or a part of the experience of the students. These statements were recorded verbatim on the original flipcharts and copied as such into the tables in this chapter. The researcher is aware that there are grammatical errors in the statements; these are noted in tables and in the text with the addition '(sic)' after the error.

4.4 NOMINAL GROUP DISCUSSIONS: POSITIVE STATEMENTS

Each of the three groups' positive statements will be elaborated on in the following sections. The numbers of participants for each group are tabulated below (Table 4.1):

TABLE 4.1: NUMBER OF PARTICIPANTS PER GROUP

GROUP 1	GROUP 2	GROUP 3
N=8	N=8	N=6

Only one student was unable to attend the last group, as she was ill. Twenty two of the 23 registered final years participated.

4.4.1 Group one positive statements

In response to the question: "What are the positive experiences related to research?", the following statements were provided (Table 4.2); this group was an English group of students, and also students who spoke Sotho or Xhosa as a home language. All the statements were recorded in English. The verbatim quotations were recorded in field notes

and also from the video recording made by the debriefing room at the Medical Simulation Unit.

Statement one related to the new experience of “going somewhere new” and into the field to perform research, and also being involved in the community when performing community research. The second statement was getting more knowledge on the research subject. The third statement related to research helping the student in the future (sic), and finding results that will be “helpful in my future”.

TABLE 4.2: POSITIVE STATEMENTS FROM GROUP ONE

STATEMENT NUMBER	STATEMENT	VOTES RECEIVED	FINAL RANKING
1	First exposure to a research field	0	
2	Getting more knowledge about the research subject	5,5,5,5,4,4,3 Total (31) (4.43)*	2
3	Gaining information that can possibly help in the future (sic)	5,5,5,5,4,4,1 Total (33) (4.13)*	1
4	Finding the true answer in controversial cases	0	
5	Learning where to find accurate information	3,3,1 Total (7) (2.33)*	4a
6	Different opinions in group work helps with the research process	0	
7	Improving research techniques and methods	3,3,2,2,2,2,2 Total (16) (2.3)*	3
8	Feeling valuable	3,1,1 Total (5) (1.67)*	5a
9	Advanced critical reasoning during the research process	2 (2)	
10	Creativity during research	2 (2)	
11	Improving communication skills	4,1,1,1 Total (7) (1.75)*	4b
12	Learn how to format a research question	4,1 Total (5) (2.5)*	5b
13	Build up confidence	3,2 (5) (2.5)	5c
14	Teach others on the new information found	4,3 Total (7) (3.5)*	4c

An * indicates the average weight of the statement (total vote counts summed divided by the number of votes obtained)

The fifth statement recorded was that the true answer to a controversial question can be answered and that this can assist the optometrist in being able to manage the patient “the correct way”. Statement six concerned team work: “When it involves group work, it helps to share ideas and work with one another, to interact with one another. To say this is better, to find ways of solving it”. The seventh statement was that it is positive to improve research techniques and methods in research. The eighth statement was the experience of feeling valuable and experiencing gratitude. Statement nine was that it helped critical thinking, or critical reasoning. The tenth statement was that when brainstorming, the students learn from the different opinions and that creativity can be used. Statement eleven the student felt that it assisted in the improvement of communication skills.

The twelfth statement was that you learn “to compile or formulate a question in order to have a successful project”; the facilitator clarified this to mean the research question in order to perform the research project. The 13th statement was that research builds up confidence and the final statement was that “you can teach others on the new information you have found”, that this ability also made the student feel valuable.

The asterisk in each of the votes received column is the average weight of the statement; the votes added together divided by the number of students that voted for the statement. Statements that received an equal total number of points were listed as an a, b, or c with the number ranking obtained.

The top five most important ranked items that were voted for by group one were:

- 1) Gaining information that can possibly help in the future (sic)
- 2) Getting more knowledge about the research subject
- 3) Improving research techniques and methods
- 4
 - a) Learning where to find accurate information
 - b) Improving communication skills
 - c) Teach others on the new information found
- 5
 - a) Feeling valuable
 - b) Learn how to format a research question
 - c) Build up confidence

The sixth most voted for statements were statements 9 and 10, Advanced critical reasoning during the research process, Creativity during research. Only three of the 14 statements did not receive any votes (First exposure to a research field; Finding the true answer in controversial cases; Different opinions in group work helps with the research process).

4.4.2 Group two positive statements

When answering the translated question “Wat is die positiewe ervaringe rakende navorsing?”, the following statements were provided by the participants (Table 4.3).

TABLE 4.3: POSITIVE STATEMENTS FROM GROUP TWO

STATEMENT NUMBER	STATEMENT	VOTES RECEIVED	FINAL RANKING
1	Kritiese denke ten opsigte van die navorsingsproses beter te verstaan (Critical thinking in relation to understanding the research process better)	4,3,1,1 Total (9) (2.25)*	
2	Goeie leiding van 'n studieleier (Good guidance by a study leader/supervisor)	5,5,5,5,4 Total (24) (4.8)*	2
3	Groepwerk vergemaklik die werk tydens die navorsingsproses (Group work makes the workload during the research process easier)	5,5,5,4,4,4 Total (27) (4.5)*	1
4	Effektiewe tydsbestuur in the navorsingsproses (Effective time management in the research process)	3	
5	Taalvaardigheid van studieleier (Language skills of the study leader/supervisor)	1	
6	Menseverhoudings met die deelnemers tydens die studie (Personal relationships with the participants during the study)	4,3,2,2,2,1 Total (14) (2.33)	4
7	Positiewe ervaringe om die kennis oor te dra aan deelnemers (Positive experience to carry knowledge over to participants)	4,3,3,1 Total (11) (2.75)*	5
8	Leerervaring rondom die groepwerk (Learning experience relating to group work)	3,3,2,1 Total (9) (2.25)*	
9	Beter selfvertroue ten opsigte van navorsing (Better confidence in relation to research)	5,2 Total (7) (3.5)*	
10	Vermeerderde kennis rakende studie onderwerp (More knowledge related to the study topic)	4,3,2,2,2,1,1 Total (15) (2.14)*	3

An * indicates the average weight of the statement (total vote counts summed divided by the number of votes obtained)

The first statement was that it is positive to understand and evaluate literature and the research process, and this improves critical thinking. Statement two was that supervision is important for guidance and motivation, and teaches you where to start the project; the facilitator grouped these factors as supervisor guidance. The third statement related to the feeling of pressure not being on one person when working in a group; it is easier if you think together and work together then no one has to do everything on their own. The fourth statement was that planning and time management skills to do the research are gained during the research project.

Statement five concerned the language that is required to write the protocol and the sentence construction and scientific writing of the report. This is due to the protocol and report being written in English and the majority of students not being first language English speaking. The sixth statement was that participants are interested in the topic, as they are part of it; this leads to building relationships with the participants due to the interaction with them. Statement seven was that it is "lekker" to teach the participants, as it is like giving patients education. The eighth statement was that during group work you grow relationships and learn how to work with others and that all the personalities require that you learn to get along and are exposed to thinking differently and reach agreement or meet each other halfway. An increase in self-confidence was the ninth statement; this related to research and the specific topic that was undertaken. The final statement was that there is an increase in knowledge, that you undertake a literature study and this informs you of the topic of the study.

Table 4.3 provides positive statements given in this group of participants. Underneath each Afrikaans statement, the English translation is provided in brackets, the statements are then thereafter used in the chapter in English. The asterisk indicates that the value is the average vote (sum of votes divided by the number of students who voted for that statement).

The final five top most important statements for group two were:

- 1) Groepwerk vergemaklik die werk tydens die navorsingsproses (Group work makes the workload during the research process easier)
- 2) Goeie leiding van 'n studieleier (Good guidance of a study leader/supervisor)
- 3) Vermeerderde kennis rakende studie-onderwerp (More knowledge related to the study topic)

- 4) Menseverhoudings met die deelnemers tydens die studie (Personal relationships with the participants during the study)
- 5) Positiewe ervarings om die kennis oor te dra aan deelnemers (Positive experience to carry knowledge over to participants)

4.4.3 Group three positive statements

The third group of students were also an Afrikaans speaking group and the question remained the same as the translated question for the second group. The information is presented on the following page in Table 4.4.

The students' first statement was that it is interesting to get findings from research, to see tendencies and trends develop. The second statement was that it was a positive experience to work in a group. Statement three was that your interest grows as you do research and then your curiosity is piqued about new areas within the field. The fourth statement was that an increase in knowledge about the topic of research is positive. Resources such as new equipment are available for research purposes and learning to use these apparatus and being exposed to it is good, as it is not generally used in Optometry; this was the fifth statement.

The sixth statement was that you learn "about research and what it contains, how much effort goes into getting published", you learn about the doing of research. Statement seven was that better relationships are grown in group work, that you have more personal relationships that are at another level. Time management and patience teach you to have better planning of time was the eighth statement. To learn what steps to take, as in the process of research, that can be used again in future, is a positive experience and was the ninth statement. Statement ten was that to teach others, and build up their knowledge; research results in the knowledge gain of others. An example was given of sports vision, of which the athletes that participate want to know how they can improve their sport and how their vision plays a role in their improvement.

Excel was an example of the technology available to use when loading and analysing data and this is made easier by using these technologies; this was the eleventh statement. Statement twelve was that in research with group work, you are dependent on others and that you need to take their opinions into consideration. This is something you learn and you

must use in future; to know that others can influence you. Those in the team, with whom you need to reach consensus. This was combined by the facilitator to be the dynamics of the group, lead to working to together. The thirteenth statement related to the increase in knowledge you gain into specific facets of the topic that are being researched.

TABLE 4.4: POSITIVE RESPONSES GROUP THREE (continues on following page)

STATEMENT NUMBER	STATEMENT	VOTES RECEIVED	FINAL RANKING
1	Interessante bevinding uit die navorsingsvraag (Interesting findings from the research question)	3	
2	Groepsamewerking (Working together in a group)	3,2,1,1 (7) (1.75)*	
3	Prikkel nuwe belangstellings (Raise curiosity for new areas of interests)	2	
4	Vermeerderde kennis oor spesifieke onderwerp (More knowledge about specific topic)	5,5,4,3,2 (19) (3.8)*	1
5	Kennis oor nuwe apparaat (Knowledge about new apparatus/equipment)	0	
6	Konsep van verstaan wat navorsing alles behels (Understanding the concepts of what research is all about)	5,5 (10) (5)*	4
7	Leer groeplede op 'n ander vlak ken (Get to know group members at a different level)	0	
8	Leer om tyd meer effektief te beplan (Learn to plan time more effectively)	4,4,1 (9) (4.5)*	5
9	Kennis oor navorsingsproses (Knowledge about the research process)	5,4,4 (13) (4.33)*	2
10	Bevindinge lei tot meer kennis vir ander (Findings lead to others having more knowledge)	4	
11	Tegnologie wat datahantering vergemak (Technology that simplifies the management/analysis of data)	3,1 (4) (2)*	
12	Dinamika in groep groei kennis oor samewerking (Dynamics of the group creates knowledge about working together/compromising)	0	
13	Verbreed kennis oor fasette in dieselfde onderwerp (Broadening knowledge of facets within the same topic)	1	
14	Verbeter selfvertroue (Improve self-confidence)	1	
15	Negatiewe persepsies verander soos die navorsingsproses aangaan (Negative perceptions change as the research process is underway)	0	
16	Respek vir deelnemers (Respect for participants)	0	
17	Aanleer van geduld (Learning patience)	0	
18	Leer jou om inligting te organiseer en te beplan	3,3,2,2,2	3

	(Teaches you to organise and plan information)	(12) (2.4)*	
19	Bly nederig - jy weet nie alles nie (Stay humble - you don't know everything)	5	

An * indicates the average weight of the statement (total vote counts summed divided by the number of votes obtained)

Self-confidence was the fourteenth statement, and it was linked to presentation skills; you have to present your research in front of others. Statement fifteen was that you have pre-conceived ideas about research and these perceptions change as you do research, you have more positive experiences that you thought and realise "it is not so bad as you thought in your second year...it stood like a mountain in front of you", it was intimidating. The respect for others, and behaving ethically towards your participants was the sixteenth statement. Seventeen was that patience was learnt, you have to repeat the same thing many times, each time you hand it in, you get told it is wrong and to do it again, and then it is wrong again! Statement eighteen was that the flow of information and how to organise it and plan how to put all your information together is learnt. The last statement was that you realise "how little we know, there is still so much to find out" and it makes you humble.

The five most important statements that were voted for by group three were:

- 1) Vermeerderde kennis oor spesifieke onderwerp (More knowledge about specific topic)
- 2) Kennis oor navorsingsproses (Knowledge about the research process)
- 3) Leer jou om inligting te organiseer en te beplan (Teaches you to organise and plan information)
- 4) Konsep van verstaan wat navorsing alles behels (Understanding the concepts of what research is all about)
- 5) Leer om tyd meer effektief te beplan (Learn to plan time more effectively).

Groepsamewerking (Working together in a group) was the next most important with a vote of seven points, followed by Bly nederig - jy weet nie alles nie (Stay humble - you don't know everything) with a vote of five points. Bevindinge lei tot meer kennis vir ander (Findings lead to others having more knowledge) and Tegnologie wat datahantering vergemak (Technology that simplifies the management/analysis of data) both received four points each; Interessante bevinding uit die navorsingsvraag (Interesting findings from the research question) was next most important with three points. Verbeter selfvertroue

(Improve self-confidence) and Negatiewe persepsies verander soos die navorsingsproses aangaan (Negative perceptions change as the research process is underway) each got one point. The remaining statements did not receive any points; there were five statements that did not get a vote.

4.5 NOMINAL GROUP DISCUSSIONS: NEGATIVE STATEMENTS

The second question of the nominal group was "What are negative experiences related to research". This question was asked after the positive statements as the facilitator has seen from previous nominal groups that the positivity can be dampened if the negative experiences are probed first. Students were offered a health break between questions.

The sections below take each group in turn and elaborate on the results obtained.

4.5.1 Group one negative statements

The group had eleven statements that pertained to negative experiences. Table 4.5 on the following page summarises the findings of the negative experiences related to research for the first group of participants.

The first statement was that research was very time consuming, and one aspect of this was the gaining of permission before starting the research. Statement two was that if you are inaccurate, and these result in errors, it can lead to people being misinformed by the results of the study. When you are in a group and each member is not being actively involved, it is negative. The facilitator discussed this with the participants and they agreed that this is the same as having a passive team member; this was the third statement. If there are too many different opinions, it can create friction within the group, was a negative factor, and was listed as statement four. Statement five was that doing research is stressful, as "it is not the only thing you are doing"; implying that they are multi-tasking and the added responsibility of research adds to the stress levels they feel.

Limited resources pertained to the lack of funding available to do research and their own personal limited finances; they also related this to the resource of participants and how this may impact the research question you may want to ask. You cannot do the research you want to, as you do not have the money or the participants.

TABLE 4.5: NEGATIVE STATEMENTS FROM GROUP ONE (continues on following page)

STATEMENT NUMBER	STATEMENT	VOTES RECEIVED	FINAL RANKING
1	Time consuming	5,5,5,5,5,4,4,3 (36) (4.5)*	1
2	Misinformed, making errors	5	
3	Group work - passive members	4,2 (6) (3)*	
4	Different opinions cause friction	1,1,1 (3) (1)*	
5	Stressful	4,4,3,2,1 (14) (2.8)*	3
6	Lack of resources	5,5,4,4,3,2 (23) (3.83)*	2
7	Not enough participants to finish research, due to withdrawing	3,2,1 (6) (2)*	
8	Subjects unwilling to participate	3,2,2 (7) (2.33)*	5a
9	Loss of interest while busy with the research	3,1 (4) (2)*	
10	Missing data makes analysis difficult	3,2,2,1,1 (9) (1.8)*	4
11	Too complicated research question	4,3 (7) (3.5)*	5b

An * indicates the average weight of the statement (total vote counts summed divided by the number of votes obtained)

Time and the lack thereof was also mentioned as a resource. This was encompassed in the sixth statement. The dropping out of participants and then not being able to complete the research or to finalise the research due to the dropping out of participants was listed as the seventh statement. The eighth statement was that subjects that are not willing to participate represent a negative experience. Statement nine was that you lose interest in the topic that you are researching, as it is very time consuming, and the length of time dissolves the interest you had in the research. The tenth statement was that missing data makes it difficult; this was probed by the facilitator, as to what exactly "it" was; and it was determined that "it" was the analysis of data. The inability of the students to use the jargon or terminology of research hindered their clarity of the expressions they used. The last

statement was that if they have a complex research question, it is difficult to do the research and this is negative experience.

The top five most voted for statements by group one were:

- 1) Time consuming
- 2) Lack of resources
- 3) Stressful
- 4) Missing data makes analysis difficult
- 5) a) Subjects unwilling to participate
b) Too complicated research question

Group work - passive members and Not enough participants to finish research, due to withdrawing obtained a tied sixth place, with six points each. This was followed by Mis-informed, making errors with five points and Loss of interest while busy with the research and Missing data makes analysis difficult each having four points. Different opinions cause friction received the least number of points, with three points. Each statement received a top five vote.

4.5.2 Group two negative statements

This group had ten statements that pertained to negative experiences. Table 4.6 given below summaries the findings of the negative experiences related to research for the first group of participants.

The first statement was a mini-dialogue: the parties who are part of the administrative process for ethics do not know "how it all works"; there are contradictory instructions from the offices of the people required to sign the ethics documents and each party wants a different form filled in; it requires a lot of "back and forth".

TABLE 4.6: NEGATIVE STATEMENTS FROM GROUP TWO (continues on following page)

STATEMENT NUMBER	STATEMENT	VOTED RECEIVED	FINAL RANKING
1	Onkunde rakende die administratiewe proses tydens die navorsingsproses (Ignorance relating to the administrative process during the research process)	5,4,4,3,3,2,1 (22) (3.14)*	3

2	Wat jy insit is meer as wat jy uit kry! (What you put it in, is more than you get out!)	5,5,5,5,5,2 (32) (4.57)*	1
3	Tydrowend (Time consuming)	(5,4,4,4,4,3,2) (30) (3.75)*	2
4	Swak riglyne rakende die module (Poor guidelines relating to the module)	4,3,3,2 (12) (4)*	4
5	Belangstelling in die navorsing lei tot verlaagde motivering (Interest in the research leads to lowered motivation)	3,2,1,1 (6) (1.5)*	
6	Finansiële implikasies (Financial implications)	1,1, (2) (1)*	
7	Onwilligheid van deelnemers tydens die werwingsproses (Unwillingness of participants during the selection process)	3,3,2,1,1,1 (11) (1.83)*	5
8	Logistieke reëlins in die navorsingsproses - groep en deelnemers (Logistical arrangements with the research process - both with participants and group members)	2,2 (4) (2)*	
9	Ooneffektiewe kommunikasieproses (Ineffective communication process)	0	
10	Beskikbaarheid van hulpbronne (Availability of resources)	0	

An * indicates the average weight of the statement (total vote counts summed divided by the number of votes obtained)

The second statement was that what you put in, is more than you get out. There was a lot of laughs with this statement and it drew agreement from the other participants, with an effusive “definitely”. There was also a murmur of consent for the third statement, of time consuming and a comment of “waste of time”.

The fourth statement was that there is confusion within the Department on what the guidelines are. An example was given by the students saying they do not know what is expected of them to hand in: a report or an article as the final product. These comments were specific to the period of time after having obtained ethical approval. The fifth statement was that there was minimal support and that this was manifested by low motivation, when queried by the facilitator as to what motivation, the reply was “in the study, punt (point)”, meaning the whole exercise. This was summarised as a lack of interest in the study leads to a poor motivation. The sixth statement was that the costs of the project are a negative aspect; this was given by the example of printing of the protocols, due to so many people needing a copy, it was R250 for each draft they wrote. This

statement also showed agreement with many of the participants and there were additions to the statement by more than one member; it included that for every protocol revision there were people wanting it in various formats (email, printed, on USB or disc) and no clear guidelines on how the drafts needed to be submitted, for each person. This was listed as financial implications.

Statement seven listed that there was difficulty experienced in finding participants and that they did not want to take part, as they felt "you are taking up their time". The eighth statement related to the logistics and scheduling of the group members of the project, was a complicated thing as they have been divided into groups, but they clash with the clinic schedule; not all members are off duty in the clinic on the same day. The ninth statement related to communication; the process "is too complicated with too many people all wanting different things" and it not being stipulated anywhere (no module guide/subject guide). Statement ten was that there is equipment going missing in the clinic. An example was given with the D15 colour vision set; the study cannot be completed if this set is not available (lost) and the study "gets put on hold"; also a comment was made about the availability of the clinics to perform research. There are 12 rooms that are used for most of the working week and only available for practise after 2pm on a Friday. These factors were titled under resources.

The final statement was that there was no clarity on the end product in the module of research, no rubrics are provided and they do not know what is expected of them, neither for their presentation nor the report or article that is the written evidence of the study. This was incorporated into the fourth statement after a discussion.

The top five statements that obtained the most votes were:

- 1) Wat jy insit is meer as wat jy uit kry! (What you put it in, is more than you get out!)
- 2) Tydrowend (Time consuming)
- 3) Onkunde rakende die administratiewe proses tydens die navorsingsproses (Ignorance relating to the administrative process during the research process)
- 4) Swak riglyne rakende die module (Poor guidelines relating to the module)
- 5) Onwilligheid van deelnemers tydens die werwingsproses (Unwillingness of participants during the selection process).

Only two statements did not receive a vote: Oneffektiewe kommunikasieproses (Ineffective communication process) and Beskikbaarheid van hulpbronne (Availability of resources). Belangstelling in die navorsing lei tot verlaagde motivering (Interest in the research leads to lowered motivation) was ranked sixth with six points; Logistieke reëlins in die navorsingsproses - groep en deelnemers (Logistical arrangements with the research process- both with participants and group members), came in seventh with four points and lastly Finansiële implikasies (Financial implications) with two points. Only two statements did not receive a vote: Oneffektiewe kommunikasieproses (Ineffective communication process) and Beskikbaarheid van hulpbronne (Availability of resources).

4.5.3 Group three negative statements

The last group was the most serious regarding the topic, with very little giggling or comic expressions and this presented itself in the greater number of statements that they generated. Table 4.7 is a summary of the statements and their rankings.

Statement one was that research is time consuming. The second statement was that there was no time allocated to the research project in the program schedule; this is the case "in some of the other departments" and also in the third year "CSL gets a week". CSL (Community service learning) is a project carried out in the third year where the students go into the community, usually a school, and they do not have class in that week. The third statement was that there is not always co-operation on the side of participants. Statement four was limited funding for the research; that "you can't do what you want", as the UFS does "not give funding". The fifth statement was the length of the module for research; the students perceive it as too long, as it stretches over two years.

The sixth statement was the clashing of personalities within a research group; students do not choose their group members. Statement seven was that it is difficult "to get together", once again due to the clinic groups not coinciding with the research groups.

TABLE 4.7: NEGATIVE STATEMENTS FROM GROUP THREE (continues on following page)

STATEMENT NUMBER	STATEMENT	VOTES RECEIVED	FINAL RANKING
1	Tydrowend (Time consuming)	5,4 (9) (4.5)*	4
2	Geen geallokeerde tyd vir navorsing in die program (sic)	5,5,5,4,3,1	1

	(No allocated time for research in the program)	(23) (3.83)*	
3	Verminderde samewerking van deelnemers (Reduced cooperation of participants)	4,1 (5) (2.5)*	
4	Fondse om navorsing uit te voer is beperk (Funds for the carrying out of research is limited)	1	
5	Duur van die module (2 jaar) is lank (The length of time the module takes (2 years))	5,1 (6) (3)*	5a
6	Botsende persoonlikhede in 'n groep (Personality clashes in the group)	0	
7	Gepaste tyd vir alle groepslede (A convenient time for all group members)	4,1 (5) (2.5)*	
8	Gebruik van UV se fasiliteite verhoog kostes (The use of UFS facilities increases the costs)	4,3,3 (10) (3.3)*	3
9	Prosesse om toestemming te kry is tydrawend (The processes of obtaining permission is time consuming)	5,4,3,2 (14) (3.5)*	2
10	Beskikbaarheid van deelnemers (Availability of participants)	3	
11	Eksterne faktore wat uitvoering beïnvloed (External factors that influence the carrying out)	2	
12	Onsekerheid oor die prosesse (administratiewe) (Uncertainty about the administrative processes)	3,2,1 (6) (2)*	5b
13	Kommunikasie in die administratiewe proses (Communication in the administrative process)	2	
14	Beskikbaarheid van studieleier 'n probleem (The availability of a supervisor is a problem)	0	
15	Eksterne faktore wat die uitvoer van die studie beperk (External factors that limit the carrying out)	0	
16	Die plek van uitvoering - ongerief (The place of carrying out is inconvenient)	2	
17	Onvolledige inligting in die lêers van deelnemers (Incomplete information in the files of the participants)	2	

An * indicates the average weight of the statement (total vote counts summed divided by the number of votes obtained)

The resources mentioned also touched on funding, but was seen as a different aspect. The example that was given was that in order for the group to perform research with participants in the pool at UFS, there had to be a lifeguard, and ER24[®] (private emergency services company) quoted them R8 000. So “the pool is available, but it’s also not available”, “you go through the whole process, and it’s a lot of time, and then only do they say about the costs”, this put project on hold. The process of permission was time consuming to obtain permission from multiple people, was the ninth statement. Difficulty finding participants or the availability of participants was the tenth statement.

The external factors that affect the performing or carry out of research was seen negatively; these were factors over which the students had no control. The weather, costs and schedules were listed as constraints; these were grouped as the eleventh statement. The twelfth statement was the uncertainty surrounding their supervisors, that they cannot “get hold of” the supervisor, and also with Ethics. An example was the ethics letter; the letter was delivered to the DoO, but as we do not have an administrator, no one told the students that the letter had arrived and ethics did not communicate that it had been sent. These factors, both supervisor and Ethics, were grouped under communication process. Statement thirteen continued with the thread of supervision, that their supervisor did “not call back” and that the office number had “no answer”, when they tried to call. Now the supervisor had resigned and no new supervisor has been allocated to the students; they jokingly said “now she is gone”. When the facilitator asked how they knew if their study was on track they said they “hear from other groups”. This was listed under the availability of a supervisor.

Time is limited and external factors affected the timeline; this was the fifteenth statement, which was listed under the limitation of carrying out research due to external factors. Statement sixteen was the “fetching and dropping off of participants”, the effort of having to commute the participants back and forth between the UFS campus and the National District Hospital where the clinic facilities are. The last statement, seventeen, was the missing data that made the analysis difficult - when files were drawn and there was incomplete paperwork or coding on the patient file.

The top five statements that group three voted for were as follows:

- 1) Geen geallokeerde tyd vir navorsing in die program (sic) (No allocated time for research in the program)
- 2) Prosesse om toestemming te kry is tydrowend (The processes of obtaining permission is time consuming)
- 3) Gebruik van UV se fasiliteite verhoog kostes (The use of UFS facilities increases the costs)
- 4) Tydrowend (Time consuming)
- 5 a) Duur van die module (2 jaar) is lank (The length of time the module takes (2 years))
b) Onsekerheid oor die prosesse (administratiewe) (Uncertainty about the administrative processes)

Other statements that obtained votes, in order of the total vote count, were: Verminderde samewerking van deelnemers (Reduced cooperation of participants) and Gepaste tyd vir alle groepslede (A convenient time for all group members) both with five votes; Beskikbaarheid van deelnemers (Availability of participants) (3); Eksterne faktore wat uitvoering beïnvloed (External factors that influence the carrying out), Kommunikasie in die administratiewe proses (Communication in the administrative process), Die plek van uitvoering - ongerief (The place of carrying out is inconvenient), Onvolledige inligting in die lêers van deelnemers (Incomplete information in the files of the participants) each with two votes and Fondse om navorsing uit te voer is beperk (Funds for the carrying out of research is limited) with one vote.

Only three statements did not receive a top five vote: Beskikbaarheid van studieleier 'n probleem (The availability of a supervisor is a problem), Eksterne faktore wat die uitvoer van die studie beperk (External factors that limit the carrying out) and Botsende persoonlikhede in 'n groep (Personality clashes in the group). It may seem very strange that not having a supervisor available to the student would not rank higher; this is discussed later in the chapter (*cf.* 4.7).

4.6 COMBINED FINDINGS OF THE TOP FIVE PRIORITIES PER GROUP

The top five statements were grouped into categories according to the similarity of the statements.

4.6.1 Combined findings for the top five priorities: positive statements

When combining the topmost five statements from the three groups, the positive statements relate mostly to knowledge gain, the process of research, communicating research results or findings to participants and organising and planning; they were grouped according to the similarity of the context of the statements. The full range of statements is given below, on the following page (Table 4.8). Nine categories in total were seen in the top five positive statements. When looking at the contribution of these statements to the whole, it shows that these top five priorities constituted 74,3% of the total votes. This shows that nearly a quarter of the experiences that were mentioned, that did not receive a top five rating, still contribute to the overall experiences relating to research. The benefit of gaining information

received the highest percentage contribution at 28.4% and secondly the gain of skills at 13.5%.

TABLE 4.8: COMBINED POSITIVE STATEMENTS

CATEGORY	STATEMENT	GROUP	FINAL RANKING IN GROUP
Benefits of research/ reflection/research process	Gaining more information that could possibly help in the future (sic)	1	1
Gaining information	Getting more knowledge about the research subject	1	2
Gaining information	More knowledge related to the study topic	2	3
Gaining information	More knowledge about specific topic	3	1
Group work	Group work makes the workload during the research process easier	2	1
Participants/skills development	Personal relationships with the participants during the study	2	4
Research process/ skills development	Improving research techniques and methods	1	3
Research process/ Skills development	How to format a research question	1	5b
Research process	Knowledge about the research process	3	2
Research process	Understanding the concepts of what research is all about	3	4
Skills development/ Resources	Where to find accurate information	1	4a
Skills development	Improvement of communication skills	1	4b
Skills development	Teaches you to organise and plan information	3	3
Skills development	Learn to plan time more effectively	3	5
Skills development	Teach others on the new information found	1	4c
Skills development/participants	Positive experience to carry knowledge over to participants	2	5
Supervision	Good guidance of a study leader/supervisor	2	2
Emotions	Feeling valuable	1	5a
Emotions	Build up confidence	1	5c

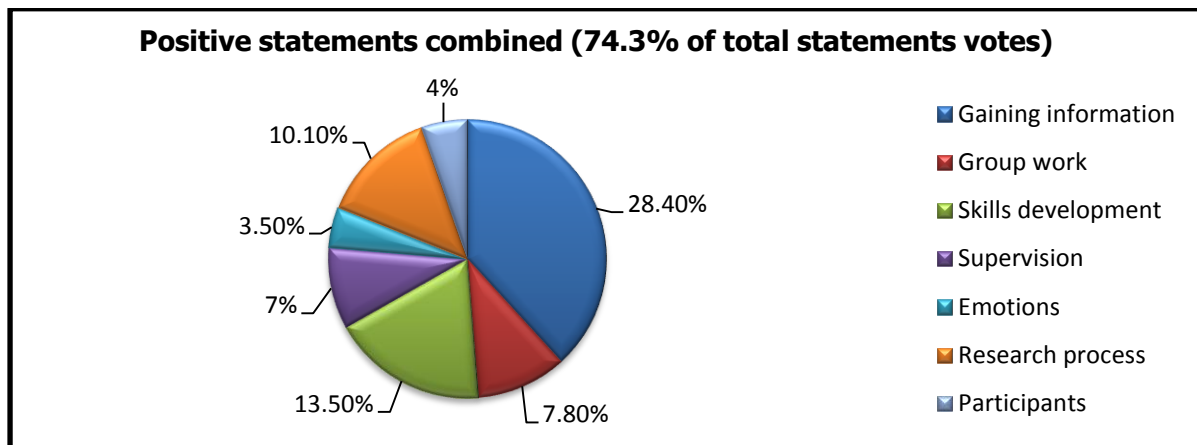


FIGURE 4.8: RANKED POSITIVE STATEMENTS COMBINED SHOWN AS A PERCENTAGE

The remaining statements that complete the total of the votes obtained will be discussed later (*cf.* 4.6.3).

4.6.2 Combined findings for the top five priorities: negative statements

The negative statements can similarly be collated (*cf.* Table 4.9). The statements related mostly to the time consuming nature of research, the administrative guidelines or processes within the different departments that are involved in the research program; resources and the research process itself, and the emotions and level of satisfaction (or rather dissatisfaction) felt towards their experiences relating to research.

Six categories contributed to the top five negative statements that were prioritised; a smaller spread of categories comprised the most important factors when compared to the positive statements of the top five priorities.

TABLE 4.9: COMBINED NEGATIVE STATEMENTS

CATEGORY		GROUP	FINAL RANKING IN GROUP
Time-related	Time consuming	1	1
Time-related	Time consuming	2	2
Time-related	Time consuming	3	4
Time-related/Administrative	The process to obtain permission is time consuming	2	2
Resources	Lack of resources	1	2
Resources	The use of UFS facilities increases the costs	3	3
Administrative	Ignorance relating to the administrative process during the research process	2	3
Administrative	Poor guidelines relating to the module	2	4
Administrative	No allocated time for research in the program	3	1
Administrative/Time-related	The length of time the module takes (2 years)	3	5a
Administrative	Uncertainty about the administrative processes	3	5b
Reflection	Missing data makes analysis difficult	1	4
Reflection	Too complicated research question	1	5b
Participants	Subjects unwilling to participate	1	5a
Participants/emotions	Unwillingness of participants during the selection process	2	5
Emotions	Stressful	1	3
Emotions	What you put in is more than you get out	2	1

The top five statements obtained 76.1% of the possible votes, as shown in Figure 4.9. This shows that nearly a quarter of the experiences that were mentioned, which did not receive a top five rating, still contribute to the overall experiences relating to research.

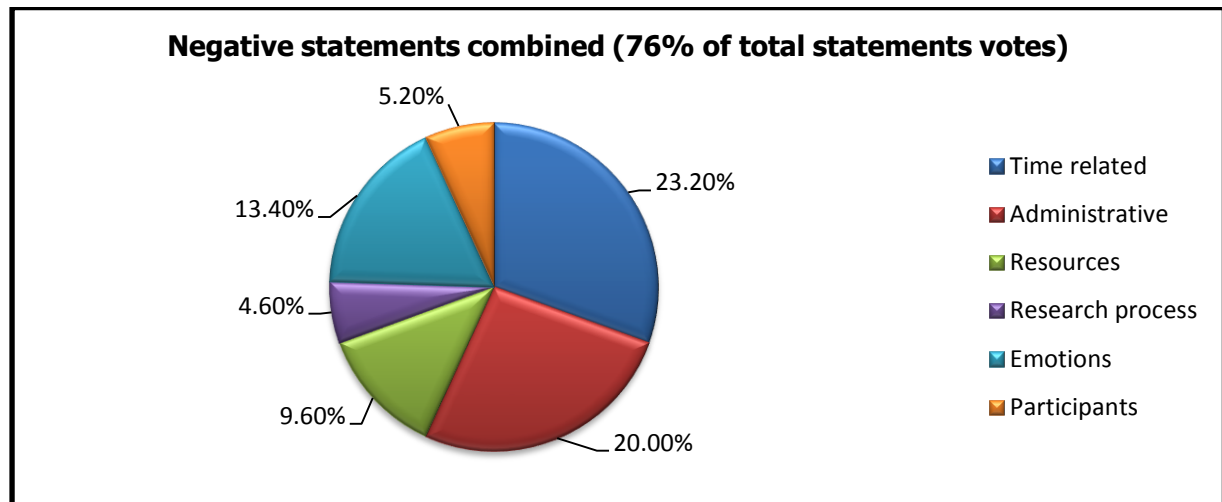


FIGURE 4.9: RANKED NEGATIVE STATEMENTS COMBINED SHOWN AS A PERCENTAGE

The greatest source of negative experiences is administrative concerns within the departments involved in the research projects, including the process of obtaining permission from ethics, at 26.7%; secondly, the time-consuming nature of obtaining ethical permission and implementing the research at 23.2%.

4.6.3 Positive statements that were not in the top five priorities

From the two figures (*cf.* 4.8, 4.9) that show the contribution of the top five statements, from both positive and negative, they do not reflect the full picture. This is due to the fact that other statements did receive votes, and to those students were considered important; also by the very mentioning of the statement, it reflects an experience that they brought to mind when the topic was discussed.

TABLE 4.10: POSITIVE STATEMENTS THAT WERE NOT RANKED IN THE TOP FIVE PRIORITIES (continues on following page)

CATEGORY	STATEMENT	GROUP	FINAL RANKING IN GROUP
Research process	Creativity during research	1	6a
Research process/ reflection	Interesting findings from the research question	3	9
Research process	First exposure to a research field	1	7a

Research process	Raise curiosity for new areas of interest	3	10
Research process	Findings lead to others having more knowledge	3	8a
Research process	Broadening knowledge of facets within the same topic	3	11a
Benefits of research	Finding the true answer in controversial cases	1	7b
Benefits of research	Advanced critical reasoning skills during the research process	1	6b
Benefits of research	Critical thinking in relation to understanding the research process better	2	6a
Group work/skills development	Different opinions in group work helps with the research process (sic)	1	7c
Group work	Learning experience relating to group work	2	6b
Group work	Working together in a group	3	6
Group work	Get to know group members on a different level (sic)	3	12b
Group work/skills development	Dynamic of the group creates knowledge about working together/compromising	3	12c
Skills development	Effective time management in the research process	2	8
Skills development/resources	Knowledge about new apparatus	3	12a
Skills development/resources	Technology that simplifies the handling/analysing of data	3	8b
Supervision	Language skills of the study supervisor	2	9
Emotions	Better confidence in relation to research	2	7
Emotions	Learning patience	3	12f
Emotions	Improve self-confidence	3	11b
Emotions/ reflection	Stay humble - you don't know everything	3	7
Reflection/ Research process	Negative perceptions change as the research process is underway	3	12d
Participants/skills development	Respect for participants	3	12e

Thus, all the statements will be used in the thematic analysis. Above (Table 4.10) are the positive statements that were mentioned and their rankings within the group. The statements span nine categories; the most prominent being that of the research process and group work, followed by the emotions expressed and the perceived benefits of research.

4.6.4 Negative statements that were not in the top five priorities

Similarly, the negative statements that were mentioned by the groups, but were not ranked within the top five most important can be tabulated as seen in Table 4.11 on the following page.

TABLE 4.11: NEGATIVE STATEMENTS THAT WERE NOT RANKED IN THE TOP FIVE PRIORITIES

CATEGORY	STATEMENT	GROUP	FINAL RANKING IN GROUP
Benefits of research	Misinformed, making errors	1	7
Research process	Loss of interest while busy with the research	1	8
Group work	Group work - passive members	1	6a
Group work/ skills development	Different opinions cause friction	1	9
Group work/skills development	Personality clashes in the group	3	10a
Group work/skills development	A convenient time for all group members	3	6b
Participants	Not enough participants to finish research, due to withdrawing	1	6b
Participants	Reduced cooperation of participants	3	6a
participants	Availability of participants	3	7
Participants/ group work/research process	Logistical arrangements with the research process - both with participants and group members	3	7
Emotions	Interest in the research leads to lowered motivation	2	6
Resources	Financial implications	2	8
Resources	Availability of resources	2	9b
Resources	Funds for carrying out of the research is limited	3	9
Resources	The place of carrying out is inconvenient	3	8c
Administrative	Ineffective communication process	2	9a
Administrative	Communication in the administrative process	3	8b
Administrative/participants	Incomplete information in the files of the participants	3	8d
External factors	External factors that influence the carrying out	3	8a
External factors	External factors that limit the carrying out	3	10c
Supervision/resources/ administration	The availability of a supervisor is a problem	3	10b

The range of statements that appeared in this question were grouped into nine categories. Group work, resources and participants reflect the greatest number of statements, followed by the administrative factors.

4.7 OPEN DISCUSSION

It became apparent that "you don't know what you don't know". By this, the researcher means that the students did not know what else was there to mention in the group, until we reached the end of the nominal group voting. The facilitator asked each group for any

comments or how they experienced the nominal group, as none of the students who were participants had ever taken part in a NGT.

The first group had no comments to give. The second group, in the discussion period said that they would like to have a week allocated in the schedule for them to perform their research. The third group said when queried about the lack of a supervisor, how they received feedback, they stated that there is no feedback and this is “normal” for them. Also they mentioned when they went to another lecturer to ask assistance, the lecturer asked them “what do you think?”; this then made them feel that “it is better without a supervisor”, if you have to provide your own answers to the questions you have.

Another factor that was brought up, but not explicitly mentioned in the NGT, was the timeline of the project. There is no independent (stand-alone information for the project) given for the project that forms part of the practical fourth year module (COT409), carried over from the protocol and research theory module in the third year (ORE304). The research project guidelines for 2014 (Appendix C3) are not correctly dated, but show the dates as for 2013. There was also no clarity on the format of the results that had to be handed in at the end of the month, and even the exact date was in question. No defined meetings or dates for appointments for supervisors are given and are arranged on an ad hoc basis. So in short, they do not know when to hand in what, to who and how, at the beginning of the year. They see nothing wrong with this; this is for them how it is done. Hence, “you don’t know what you don’t know”.

4.8 CATEGORIES AND THEMES

Each of the statements from the three groups was taken to be a stand-alone code. These codes were then grouped according to their similarity to form a theme. For example, if a code (statement) gave a link to group work, positive or negative, regarding relationships or work load or any other relatedness, these themes were grouped together and formed a category “group work”.

The categories identified were: the research process, skills development, emotions, supervision, participants, and resources, benefits of research, administration, reflections, group work, external factors and time (Figure 4.10 below).

Positive categories	Research process
	Benefits of research
	Reflection
	Skills development
	Group work
	Supervision
	Participants
	Emotions
Negative categories	Resources
	Research process
	Time-related factors
	Administration
	Group work
	Supervision
	Participants
	External factors
	Emotions
	Resources

FIGURE 4.10: THE CATEGORIES FROM ANALYSIS OF STATEMENTS

It can be seen that there are overlaps in the categories, where there are both positive and negative components. The following sections represent the descriptions of the different categories and themes.

4.8.1 Research process

The research project can be the first exposure to research; students were positive about this exciting new environment. They also through the research process, gained new knowledge about their topics and also improved their research techniques and skills. Research is a creative process, and the findings can lead to a greater interest in performing further research. Knowledge is gained about the concepts of research and equipment used in the implementation of the study. Some students found that their perceptions about research changed once they had completed their project; others felt that their interest waned. The planning of the project needed to take into account the logistics of the participants; this was also mentioned as the location of the clinic was inconvenient. Statements relating to the research process are tabulated below (Table 4.12).

TABLE 4.12: CATEGORY: RESEARCH PROCESS

THEME	STATEMENT
New experience	First exposure to a research field
Research skills	Improving research techniques and methods
	Creativity during research
	Learn how to format a research question
Knowledge gain	Getting more knowledge about the research subject
	More knowledge related the study topic
	More knowledge about a specific topic
	Knowledge about new apparatus
	Knowledge about the research process
	Understanding the concepts of what research is all about
	Findings lead to others having more knowledge
	Broadening knowledge of facets within the same topic
	Gaining information that can possibly help in the future (sic)
Interest in research	Interesting findings from the research question
	Raise curiosity for new areas of interests
	Negative perceptions change as the research process is underway
	Loss of interest while busy with the research
Planning	Logistical arrangements with the research process - both with participants and group members

There were seventeen statements that related to the research process and 15 were positive; this indicates that the students feel that the research process was a positive experience for them. The largest recurring theme was the gain in knowledge that the students perceived in relation to being involved in research. Eight of these statements related to knowledge gain and were from all three groups.

The interest in research theme was also mostly positive (three out of four statements); the student realised that more interests were discovered whilst doing research and these interests could be researched in future, or found that they were interested in the results that they had obtained from their research; these all relate to improved interest levels after being exposed to research. One statement on the interest in research showed that students initially felt very overwhelmed by research. The student who contributed the statement said that research stood in front of her "like a mountain", and once they got started they realised that they could do it and that it "wasn't so bad"; their negative perceptions changed to a more positive stance during the process of research.

4.8.2 Emotions

Students found that there were aspects that were very satisfying, such as learning to use new equipment, feeling valued and building better relationships with their team mates and

their participants. Statements such as “what you put in is more than you get out”, refers directly to a lack of satisfaction from the research process, as well as the sighs and *sotto voce* statements such as “waste of time” that were recorded in the field notes. The recorded statements on the flipcharts were grouped according to positive and negative emotions, as tabulated below (Table 4.13).

TABLE 4.13: CATEGORY: EMOTIONS

THEME	SUB THEME	STATEMENT
Positive emotions	Self-worth	Feeling valuable
	Confidence	Build up confidence
	Confidence	Better confidence in relation to research
	Confidence	Improve self-confidence
	Patience	Learning patience
	Humility	Stay humble - you don't know everything
Negative emotions	Anxiety/Stress	Stressful
	Dissatisfaction/ Demotivation	What you put in is more than you get out!
	Demotivation	Interest in the research leads to lowered motivation
	Frustration	Unwillingness of participants during the selection process

Confidence was the most recurring emotion (three statements), which indicates that all three groups felt that by doing research they were more confident about the process or certain aspects of the tasks involved in research. This was although the first group were all very effusive of the level of stress that research brought to their lives.

4.8.3 Benefits of research

The benefits of performing research excluding skills development (separate category) and the knowledge gained (a theme following from research process), include future use of the skills learnt and also critical thinking which can relate to patient care. The statements that relate to these benefits are listed below in Table 4.14.

TABLE 4.14: CATEGORY: BENEFITS OF RESEARCH

THEME	STATEMENT
Future use	Gaining information that can possibly help in the future (sic)
Patient care	Finding the true answer in controversial cases
	Advanced critical reasoning during the research process
	Critical thinking in relation to understanding the research process better

Students identified that the knowledge and skills that they gained from doing research may be of benefit to themselves in future, and that others who may have an interest in the topics and also their future patients may benefit through their knowledge. One student explained how when there are controversial cases, you need to know the right treatment, and research can provide these answers, which would enable optometrists to make better decisions about patient care in those cases. Similarly, the ability to critically reason can assist in individual patients' cases.

4.8.4 Reflection

Students understood not only the benefits of research, but how this is valuable to them and to others; that the skills learnt are applicable in the greater working environment. It can be seen also that every statement recorded was a form of reflection; however, the statements that directly related to acknowledgement of past to present perceptions or insight were recorded in this category. This is summarised in Table 4.15 below.

TABLE 4.15: CATEGORY: REFLECTION

THEME	STATEMENT
World external to self	Gaining information that can possibly help in the future (sic)
	Interesting findings from the research question
	Stay humble - you don't know everything
Positive emotions	Feeling valuable (participants appreciate findings)
Perceptions change	Negative perceptions change as the research process is underway
Consequences	Misinformed, making errors
	Missing data makes analysis difficult
	Too complicated research question

Reflection often comes with the realisation that you are not the reason the world revolves; students were insightful to realise that other people beyond themselves can benefit from the research they do, that it may be useful to themselves and others in future. The old adage that "the more you learn the less you know" also became apparent; students became aware of the huge amount of knowledge that has been published and came to find that there were also gaps in the knowledge that was researched.

Similarly, the cliché of hindsight is 20/20, is particularly appropriate in an optometry study, but also applies to the realisation that if you are to have a successful research project, aspects of the study need to be done properly and knowing the boundaries of the study and what you can actually do, plays a big part. Many students, who want to choose their own

topics, bite off more than they can chew. The researcher, in the capacity of a research group leader often tells the students that this project should be as small as possible; they are not there to change the world, not yet. The consequences of not working carefully, tackling a complicated research question and trying to answer the research question with missing data was identified by the students, which is also quite an insightful few statements as they had at the time of participating not yet finished their data collection phase of the research.

Although they may have struggled to get participants, to arrange the logistics of participants (*cf.* 4.8.9), at the end of working with the participants they discovered that what they had done was appreciated by the participants.

4.8.5 Skills development

Many students realised that they could do things better, after having undertaken research; these included time management, organisational skills, communication skills. Having to get along in a group takes a lot of diplomacy, listening to others, learning to debate ideas without getting angry or upset, also that often you can learn from other people's opinions and that you have to compromise. The list of statements relating to the development of various skills follows below and is recorded in Table 4.16.

These are wide-ranging skills that can assist in being adaptive in the working environment. These skills can be considered to be cross-field outcomes and are also called soft skills, such as communication. Having to work with people that you do not necessarily get along with, or share opinions with, teaches conflict management and resolution, which can only be an advantage when many of these students will be working with the public; also these students are not exposed to "comeback" patients in the clinic, and have not yet had to deal with a dissatisfied customer.

TABLE 4.16: CATEGORY: SKILLS DEVELOPMENT (continues on following page)

THEME	STATEMENT
Information gathering	Learning where to find information
Communication	Improving communication skills
Research skills	Learn how to format a research question
	Improving research techniques and methods
Transfer information	Teach others on the new information found

	Positive experience to carry knowledge over to participants
Time management	Effective time management in the research process
	Learn to plan time more effectively
	A convenient time for all group members (negative)
Interpersonal skills	Personal relationships with the participants in the study
	Dynamics of the group creates knowledge about working together/compromising
	Respect for participants
	Different opinions cause friction (negative)
	Personality clashes in the group (negative)
Practical skills	Knowledge about new apparatus
Organisational	Teaches you to organise and plan information
Technological	Technology that simplifies the handling/analysing of data

Time management, planning and organisation are management skills that are invaluable if you are to be a practice manager or work as an independent practitioner in their own business.

4.8.6 Resources

Resources are items, people or skills that are limited. The themes for resources include supervisors, funding, information, equipment and technology. Resources are often not able to be controlled by the student, the supervisor or the department. The category "Resources" is summarised in Table 4.17 below.

TABLE 4.17: CATEGORY: RESOURCES

THEME	STATEMENT
Availability	Learning where to find accurate information
	Knowledge about new apparatus
	Technology that simplifies the handling/analysing of data
Lack of	Lack of resources
	Availability of resources (negative statement related to the loss of equipment in the clinic)
	Financial implications (cost of printing)
	Availability of a supervisor is a problem
	The place of carrying out is inconvenient (lack of transport or insufficient space on campus to perform research)

4.8.7 Group work

As the students are allocated to groups, there are bound to be many feelings about this factor. The groups were allocated without thought to the clinic schedules, which has shown

it was very difficult to schedule a time to meet and implement the research. The statements are recorded in Table 4.18 below.

TABLE 4.18: CATEGORY: GROUP WORK

CATEGORY	STATEMENT
Personal growth	Learning experience relating to group work
	Working together in a group
	Get to know group members on a different level (sic)
	Dynamics of the group creates knowledge about working together/compromising
Co-operation	Different opinions in group work helps with the research process
	Different opinions cause friction
	Personality clashes in the group
Workload	Group work makes the workload during the research process easier
	Group work - passive members
	Logistical arrangements with the research process - both with participants and group members
	A convenient time for all group members

Not all work being shared equally is a cause for upset, as the students then have to carry the extra workload, even though the mark for the project is shared. This category was mentioned by all three groups, with the most positive experiences relating to growing relationships and getting to know people and the most negative relating to fair workload sharing and timetable clashes of working in a group.

4.8.8 Supervision

Some students perceived the guidance from their supervisors positively, whereas another set of students had not been allocated a new supervisor after the resignation of a staff member. In the discussion section it was revealed the students felt that no feedback was normal and that it could even be a better thing to have no supervisor than a supervisor who is not "present" in their support of the students. Statements relating to this category are shown in Table 4.19 below.

TABLE 4.19: CATEGORY: SUPERVISION

THEME	STATEMENT
Availability	The availability of a supervisor is a problem
Guidance	Good guidance by a study leader/supervisor
	Language skills of the study leader/supervisor

Other comments were recorded in the field notes pertained to the discussion and were not recorded as part of the statements on the flipcharts. The recorded statements are mostly positive; the student in group three who brought up the fact that they had no supervisor allocated to them, explored this further in the discussion after the nominal group was completed.

As the majority of the students are not first language English speaking, the supervisors assist in the grammar and spelling of the protocol and the reports and articles submitted for the module.

4.8.9 Participants

Much of the research projects involve real people; this can complicate the data collection for the students; also this brings with it its own array of interpersonal growth and learning.

The majority of the statements relating to participants were negative; only the interactions on a personal level were perceived to be positive (Table 4.20). Several of the research groups in this year were undertaking topics that required participants; the forms required to use students and the timetables of our students and those involved in the research complicate the availability and co-operation of the participants. The logistics are influenced by the location of the optometry clinic in relation to the campus where the other allied health departments and faculties are based; it is approximately 4km kilometres distance between the National District Hospital where the Optometry clinic is based and the campus of UFS.

TABLE 4.20: CATEGORY: PARTICIPANTS

THEME	STATEMENT
Availability	Not enough participants to finish research, due to withdrawing
	Availability of participants
Co-operation	Subjects unwilling to participate
	Unwillingness of participants during the selection process
	Reduced co-operation of participants
Logistics	Logistical arrangements with the research process - both with participants and group members
Information	Incomplete information in the files of the participants
Interpersonal	Personal relationships with the participants of the study
	Positive experience to carry knowledge over to participants

4.8.10 Administration

Administration in this sense is the process of obtaining ethical approval and all the persons that students interact with, the department of Biostatistics who help offer the course on protocol writing and mark the ORE304 module and act as co-supervisors for the projects, as well as the DoO.

TABLE 4.21: CATEGORY: ADMINISTRATION

THEME	STATEMENT
Lack of guidelines	Ignorance relating to the administrative process during the research process
	Poor guidelines relating to the module
	Uncertainty about the administrative process
Communication	Ineffective communication process
	Communication in the administrative process
Time	No allocated time for research in the program
	The length of time the module takes (2 years)
	The process to obtain permission is time consuming
Policy	The availability of a supervisor is a problem
	Incomplete information in the files of the participants

All of the statements relating to the administration were negative (Table 4.21 above); this will be discussed further in Chapter 5 in greater detail. The two major themes were the guidelines for the research project and the time of the research project. At present there are no outcomes listed in the COT409 module guide for the research project and no explicit timeline is given in the beginning of the year for the students to plan their time accordingly. The research project also has to be completed between clinics; one group this year was supervised on voting day to get time in the clinic to perform the research.

4.8.11 Time-related factors

The factor of research being time consuming was one of the main factors in group two and group three; the other factor related to time was the length of the module. The protocol is written in the third year in the ORE304 module and the project is given in for a mark in the COT409 module; thus, the length of the project is longer than a single year.

4.8.12 External factors

Other factors that did not relate to one of the main categories were brought up in the third group. They discussed that often weather, people working at other departments and their

processes and communication channels were the reasons that it “influenced the carrying out” of the research and also that it “limits” the students’ ability to carry out the research.

4.8.13 Summary

The analysis showed that there are areas that overlap and integrate both positive and negative experiences. Positive categories: benefits of research, reflection and skills development. Negative categories: time-related factors, administration and external factors. Categories that had mixed codes (positive and negative statements): research process, group work, supervision, participants, emotions and resources.

From the categories above, it can be seen that the statements provided by the students pertain to emotive, behavioural and cognitive experiences that all contribute to the overall attitude towards research. The chapter that follows combine the themes and categories into positive and negative collations.

4.9 CONCLUSION

This chapter compiled the statements to the questions asked in the nominal group discussions and the researcher grouped the statements according to categories. The category and thematic analysis shows a strong agreement with the overall votes that students felt were the most important to them.

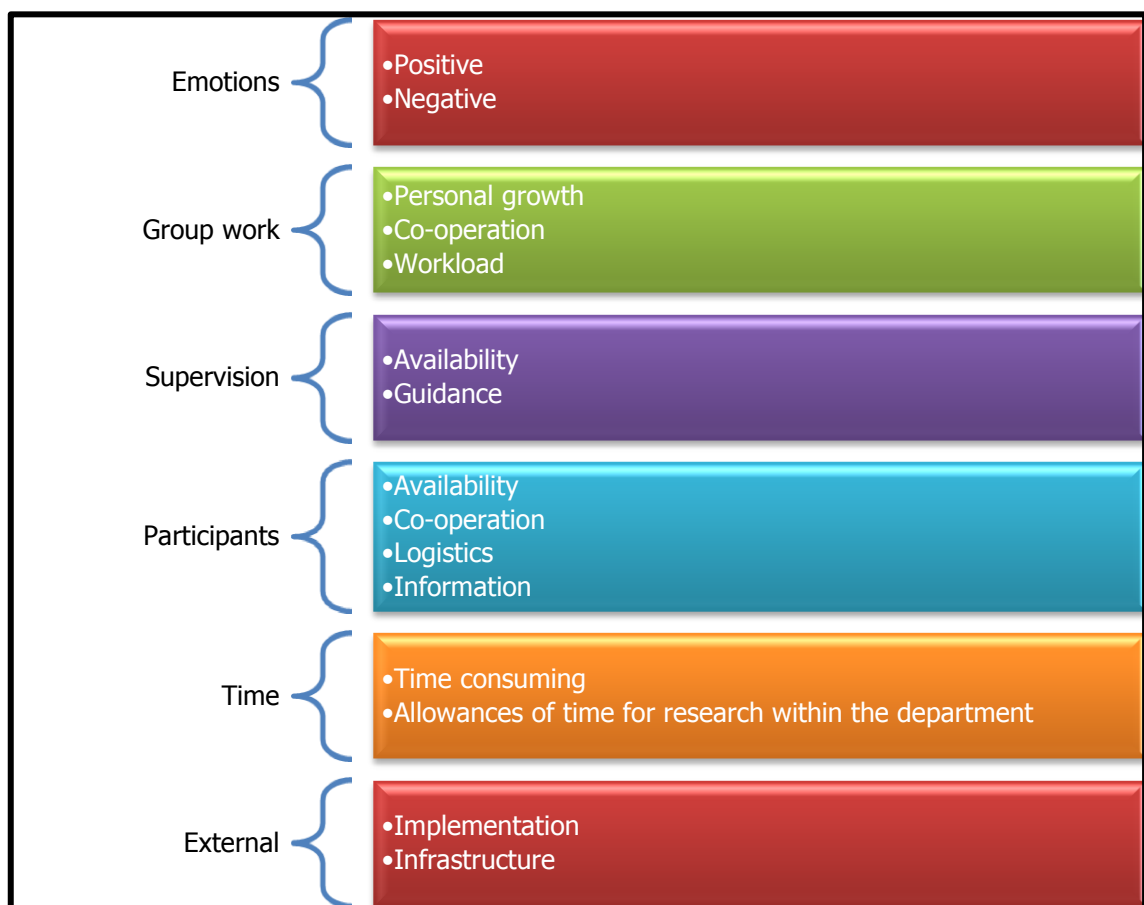
The following chapter will discuss this in greater detail; **Chapter 5** entitled “**A Discussion on the factors that contribute to the attitude toward research in final year optometry students at the University of the Free State**”.

CHAPTER 5

A DISCUSSION ON THE FACTORS THAT CONTRIBUTE TO THE ATTITUDE TOWARD RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS AT THE UNIVERSITY OF THE FREE STATE

5.1 INTRODUCTION

From the content analysis that was undertaken in chapter 4 *Findings of the Nominal Group Discussions*, twelve categories were established. In this discussion each of the categories will be looked at with a view to find similarities and differences with the current literature on comparable studies, as seen in Chapter 2, *Factors contributing to developing an attitude to research and why this is important*. The themes will also be differentiated into the three components of the familiar tripartite model of attitude (*cf.* 2.2.3.1). A summary of the categories (left column) and the themes within the category (right column) are given by the diagram below (Figure 5.1).



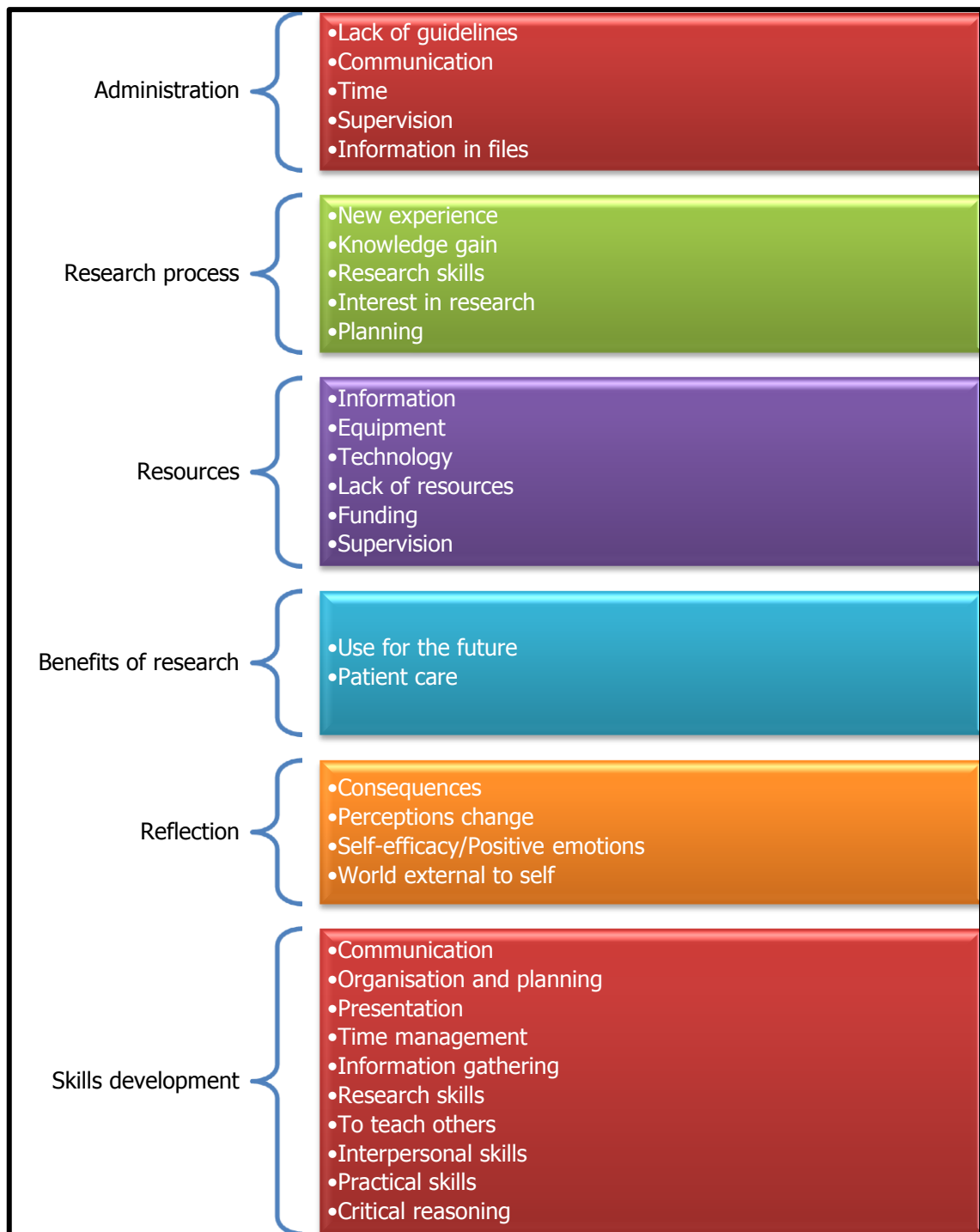


FIGURE 5.1: CATEGORIES AND THEMES OF THE STUDY IDENTIFIED FROM THE NOMINAL GROUP DISCUSSIONS

Attitude is a multifaceted and complex concept that is dynamic and can be positively influenced (*cf.* 2.2.3.3). Positive and negative aspects of the experiences the students relate to research were identified; this can be utilised to improve the overall attitude towards research, by eliminating or ameliorating the negative aspects. With a more positive outlook towards research, benefits could accrue to the University in the

number of undergraduate publications from these research projects and also with a greater number of applications for further study.

The discussion will be done with the view to describe the final year optometry students' experiences of research, which were documented in the nominal groups, and to make recommendations to the betterment of future research at undergraduate level, in the DoO. Each of the themes that were identified will be contextualised within the theoretical framework given in the literature control.

Stakeholders' benefits are outlined and changes that could be implemented within the scope of power of the DoO are highlighted.

5.2 CATEGORY COMPARISON WITH THE LITERATURE

Each of the categories is considered individually, and both positive and negative aspects, (where applicable) will be addressed in comparison with the current literature. The categories have been taken in turn alphabetically, to prevent any emphasis being placed on any one category.

5.2.1 Administration

All of the statements relating to administration were negative. There has been no direct complaint regarding administration by previous researchers in the literature control that was completed. The recommendation by students that there be a supervision policy held by the University (*cf.* 2.9.4.4), was given by students at UNISA, which being a distance education institution may play a role and is thus not entirely relatable to this study. It is not in dispute, however, that at present there is no policy within the DoO for supervisors and also no guidelines given to supervisors (*cf.* 2.12.3).

The impact of administration on the students by these statements is quite enlightening for the researcher and no doubt also for the staff members who are supervisors in the DoO. When it was mentioned to the course co-ordinator that one group of students had not been allocated a new supervisor after the resignation of their previous supervisor, it came as new knowledge; however, only in June 2014 was the group formally allocated a new supervisor. There should be clear steps to follow in the replacement of a supervisor.

Students feel that there are insufficient guidelines in the module, and that there is uncertainty concerning the administration process. This creates additional frustration and financial costs for the students, for when seeking ethical approval for a study, students are incorrectly informed about the process. This resulted in multiple printing of protocols, duplicate form printing and trips around campus to obtain signatures, only to find out the signature cannot be obtained without a different form or a signature from a person who was not listed originally by either the ethics department or their supervisors. This also linked in with the negative statement on the ineffective communication from ethics to the department and/or students and from supervisors (Biostatistics and Optometry) and the students; also with the time-consuming nature to obtain permission that was mentioned by the students.

The length of the module cannot be made shorter in the current curriculum; however, a dedicated week for practical research could be implemented as mentioned in the group discussions by two groups.

Recommendations from an administrative perspective would be:

- More detailed information of the outcomes and rubrics, scheduling and expectations (page length, number of references etc.) to be included in the module guide for the research project
- Guidelines for the meeting times and roles of the supervisor must be developed
- Clear steps to be taken when replacing a supervisor
- An information booklet for the Department's supervisors from Ethics on the required forms, signatures and order of obtaining signatures for studies
- A dedicated week for the research to be undertaken in the final year
- A telephone directory of contact personnel for each supervisor
- Appoint a student administrator in the DoO; there is not a university administrator within the department, as the position has been vacant since March 2014. This would provide a contact person for correspondence from Ethics and various other departments
- A contract with supervisors and students as to the roles and responsibilities of the relationship and expectations, dates for meetings and feedback sessions.

Students who have signed a supervision agreement should be responsible for completing the work as scheduled and handing it in for feedback at the required time

(*cf.* 2.12.1). The supervisor in turn is responsible for timely constructive feedback, early identification of stumbling blocks to the success of the project and to formulate solutions to the problems identified as well to listen to students. Feedback is recommended to be given by a known set of standards (*cf.* 2.9.4, 2.12.3), possibly a rubric that can be filled in by each supervisor (DoO and Biostatistics) to prevent duplication and also instructions that are at odds with one another. The rubric for the ORE304 module is available in the third year of study; however, this covers the assessment of the protocol that is handed in for ethical approval of the study to be undertaken in the final year.

The rubric should indicate exactly the weighting of each section, and include sections for each stage of the process, i.e. the literature review, the methodology, the results and technical aspects and referencing. A further rubric could be drawn up for the presentation of the research project. The formats of the presentation and the research article are different; marks are often awarded for the ease of reading the slides and tone of voice, attire of the group and keeping the presentation within the required time limit.

These recommendations would need the support of the Biostatistics Department and those at the Ethics office; buy in from all the stakeholders could vastly improve the way students view the administration of the research project. This is something that can actively be done by the Department and implemented without much approval processes and other red tape.

The number of statements relating to administration and ineffective policies during the research process is deemed quite unique as it has not explicitly come up in the literature control (with the exception of the availability of supervision). Should the administrative processes be cleared up, and the communication with the departments involved be improved, the overall attitude toward the research project could be uplifted.

5.2.2 Benefits of research

Two themes that emerged, in addition to the skills developed (*cf.* 5.2.10) with the undertaking of the project, related to the future use of information gained from the study and also that patient care may be improved through critical thinking and

research done to answer controversial questions in clinical conditions. These themes show the in-depth growth or higher order thinking that developed within the students as a result of being exposed to research.

The benefits of research can also include higher order thinking of reflection, skills development and knowledge gain from the research. Among these benefits are skills that are sought by employers, and aid the individual to be an ethical and efficient member of the community. Table 5.1 relating to the benefits of research below shows how this study compared with common findings (indicated by an *) in similar studies.

TABLE 5.1: BENEFITS OF RESEARCH AS PER THE FINDINGS OF THE STUDY

POSITIVE EXPERIENCES OR BENEFITS PERCEIVED	AS FOUND IN THE LITERATURE	FOUND IN THIS STUDY
Positive attitude towards research	<i>Cf. 2.2.3.3</i>	*
Increased interest in research	<i>Cf. 2.7.2, 2.9.3.1</i>	*
Critical thinking skills	<i>Cf. 2.5.1</i>	*
Creative thinking skills	<i>Cf. 2.2.3.1</i>	*
Applying ethical principles	<i>Cf. 2.11.2</i>	*
Generating curiosity about research	<i>Cf. 2.5.3</i>	*
Library research skills	<i>Cf. 2.6.4</i>	*
Computer knowledge and skill	<i>Cf. 2.6.2</i>	*
Research skills:		*
• Develop research questions and hypotheses	<i>Cf. 2.11</i>	
• Enhancing data collection	<i>Cf. 2.5.3</i>	
• Enhancing data analysis	<i>Cf. 2.5.3</i>	
• Increase statistical skills	<i>Cf. 2.6.1, 2.6.5</i>	
• Enhance data interpretation	<i>Cf. 2.5.3</i>	
• Enhance knowledge of references	<i>Cf. 2.6.4</i>	
Oral presentation skill	<i>Cf. 2.11, 2.12.1</i>	*
Making posters presentation	<i>Cf. 2.5.3</i>	
Organisational skills	<i>Cf. 2.7.1, 2.8.2</i>	*
Time management skills	<i>Cf. 2.7.1</i>	*
Enjoying interaction with students	<i>Cf. 2.6.8</i>	*
Improving team work skills	<i>Cf. 2.6.8</i>	*
Increasing self-confidence	<i>Cf. 2.6.7</i>	*
Being a valued member of a team/ sense of community	<i>Cf. 2.7.1</i>	
Communication skills	<i>Cf. 2.7.1</i>	*
Explaining research to others	<i>Cf. 2.5.3</i>	*
Knowledge gain on their subject	<i>Cf. 2.5</i>	*
Research design	<i>Cf. 2.5.3</i>	*
Contribute new knowledge to society	<i>Cf. 2.11.1, 2.12.2.1</i>	*
Develop proficiency in laboratory/equipment techniques	<i>Cf. 2.5.3</i>	*
Problem-solving	<i>Cf. 2.5.3</i>	*

This shows a number of skills and perceived benefits that students in this study identified and that are also found in the literature control.

The students in this study are not likely to improve their statistical skills, as the data analysis is completed by the Department of Biostatistics. Also, as mentioned before, the students in this study seemed to struggle to find the correct terminology and research vocabulary and thus may group “research techniques” as a multitude of skills, such as data collection, or interpretation or any other sector of the research. Data collection and analysis were only mentioned in the context of having difficulties if one was not working carefully.

The students are not expected to make poster presentations, as is often done in medical faculties, and thus this would also not likely to be mentioned as none of the students had been exposed to poster delivery for research. It is also unknown whether or not the students feel more positively towards research after the completion of the research project as the nominal groups were completed during the data collection phase of the students’ research.

In general, this study compares very similarly to the benefits perceived by students in other studies.

5.2.3 Emotions

Both positive and negative emotions surfaced in the analysis and this is in agreement with many studies. Confidence was the most commonly referred to emotion, where students felt more confident in their ability to perform research and to present their research to others (*cf.* 2.9.4, 2.6.6, 2.6.7, 2.9.1, 2.9.3.1) Patience was referred to when students realised the time going into the research project and the number of revisions required by various staff (*cf.* 2.7.1). Working with others and informing participants about their study made students valued, and once performing research there was a realisation of the effort and commitment one must have to become a published researcher, this made the students become more humble; knowing that there is so much knowledge available and still so much that is yet to be investigated. Humility was an emotion that was not noted in the literature that the researcher had read.

Like in any human interaction, compromise or working together requires the willingness from both sides, students felt frustrated as they were dependent on their participants’ willingness to co-operate, and also that of prospective participants. When

struggling with participants and other administrative uncertainties, students felt demotivated, summarised as what they put in, was more than what they got out of the research process.

Like other studies, the students felt stress related to the research project (*cf.* 2.6, 2.3.2, 2.9.3.2, 4.5.1, 4.6.2). What specific aspects of the research that was stressful was not elucidated upon, but there was great agreement within the group that the process of the research project was an anxiety filled exercise. The frustration that was felt in this study related to the unwillingness of participants to co-operate and also the time consuming nature of research; frustration was also a common denominator in other studies (*cf.* 2.6).

It can be seen that many of the emotions that were felt by the students in this study were also mentioned in other studies; it is encouraging to see that the students brought confidence to the fore as the most emphasised and repeated emotion.

5.2.4 External factors

External factors as a category really brings home the message that even with all factors brought up by the students being controlled; improved upon (where negative) and maintained (where positive); would not be enough to create a research utopia.

Students felt that these external factors hindered their research, and the example that was given was the weather - it was too cold to have their participants swim in the outside pool; this could not have been foreseen or avoided. The other example from the same group related to external departments, in this case the department that gives permission for the pool to be used. What occurred was that all the forms for permission were filled in, only to discover that the staff member had omitted to inform the students that they would have to have a lifeguard present at the pool and they were to arrange a quotation. As they did not know about this rule, and not having the funding (R8 000) for the lifeguard, it places limits on their ability to perform the study as they had wished to do. Thus, the external department caused a delay in the implementation of the research, which could not have been dealt with by the DoO directly.

The external factors will always be present and will be different with every study. This does, however, go a way to teach students perseverance, adaptation to circumstances and being flexible. These are all characteristics or traits that are valued in any employee, as the modern business environment is dynamic; these are also personality traits that are present in entrepreneurs. Entrepreneurship is considered a rare human resource and is vital for prospective business owners to be successful, and for the sustainability of the economy.

5.2.5 Group work

Three themes relating to group work were evident in the analysis and spanned both positive and negative perceptions. Personal growth was a positive product of the group work, where students felt that they enjoyed working together, they learnt about compromising and taking each other's opinions into consideration; also growing deeper personal relationships with their group members (*cf.* 2.2.3.2, 2.6.8, 2.7.1).

Co-operation was also a theme, where they acknowledged that there was conflict with the different personalities and opinions and they had to deal with these clashes; they are not going to go away if you ignore it; the project requires everyone to get along and to contribute. Likewise, this will be an asset when dealing with difficult clients and the value of professional discussion cannot be overlooked (*cf.* 2.7.1, 2.7.2).

The workload was the third theme. Passive members made working in groups difficult and arranging the logistics of meeting and completing the research was also complicated due to the students not being grouped according to their practical groups. This is a real concern as the final years have four speciality clinics a week, which alternate between two groups. If they are placed in a group where they are not in the same practical groups, it means that there is one day a week when they could meet between classes, and on weekends. Students wanted to choose their own group in part due to the "passive" work ethic of some of the group members; this has been noted previously (*cf.* 2.6.8).

Recommendations for the smoother implementation of group work would be to ensure that each student contribute to the project either through anonymous peer assessment, or allocating a task to each group member. Future research groups should come from the same practical groups to allow for easier meeting schedules.

One study (McCoy 2008:146) suggests that each student should do research in the form of a case study; that this would increase the autonomy of the students, whilst learning similar skills pertaining to research and also increase the Department's publishing rate. This is a very feasible suggestion as the students see very interesting cases and patients come from across the Province and the surrounding provinces to be administered to. Many rare conditions are seen, particularly in the pathology clinic, and are able to be diagnosed with the help of an ophthalmologist. These cases could assist practitioners in gaining knowledge of prevalence, aetiology and management.

5.2.6 Participants

Participants as a category also drew a mixed response, mainly negative with seven responses and only two positive responses. Once again, the positive experiences came with the personal interaction with the participants and also in being able to transfer knowledge to their participants (*cf.* 2.5.3).

There were five themes that emerged with this category; the availability of participants were of concern to students and also that of participants that dropped out of the study. As some groups were in the data collection phase during the nominal group discussions, this drew a hearty response from the discussants. Likewise, the unwillingness of prospective participants to do the screening process and also not giving their co-operation was cause for frustration to the students. Students said that their participants felt that they (the students) were wasting their (the participants') time.

With the facilities of the DoO being at the National District Hospital, participants often had to be brought to the hospital to take part in the studies; this was a costly and time-consuming exercise for the students. They gave the example that on voting day they brought participants in to be examined for their study, but they had to drop and fetch around the voting schedule and location of the participants.

Some studies are retrospective or historical and students utilise the data from patient files; this was also not complication free, as data from the patient files were incomplete or lost.

It is good to note that the students enjoy the human interaction, as this profession requires good interpersonal skills. Likewise, many patients require information about various conditions and advice on their ocular health and optometrists should be willing to spend time with patients to inform them of how they can manage their ocular health.

5.2.7 Reflection

The category of reflection was grouped into themes that showed changes from the beginning of the process of research and also to that of seeing the world external to themselves. Reflection is where the students link service or treatment of patients (or profession-specific theory) and research after they have completed their research project (*cf.* 2.5.2). They came to the conclusion that it is more manageable than they first thought and the new skills they have gained can also help (*cf.* 2.7.1). Howitt *et al.* (2010:419) point out that higher order thinking of this nature is not often reported.

The future use of the findings of research also shows a type of adaptive thought process, or thinking out of the box. Up to now, many students see research as purely a mark to be given or a module to be passed; now they see that what they have learnt can be useful to them and can help with their decision-making when seeing patients (*cf.* 2.3.1, 2.3.6, 2.5.2, 2.14) and also as an orientation to future work (*cf.* 2.4, 2.5.3, 2.6, 2.6.1, 2.7.2, 2.9.4). The students did link patient care to research, as was the case with nursing students (*cf.* 2.3.1) and with dietetic students (*cf.* 2.3.6). Also, the use of research to solve controversial patient management cases and also to apply the knowledge gained from research to patients in the future was reflected by the students in this study.

Consequences are also a theme of reflection, as they say - hindsight is 20/20. When the students start to think about their research question, they realise that they often make it very complicated and do not pay attention to detail. An example is the group of students who wished to determine contrast sensitivity differences with various contact lenses, using a FACT chart in a room with natural lighting. These pilot studies had to be redone as the lighting conditions changed with the time of day and the weather outside; these consequences of missing data, complicated research questions and making errors with the methodology became apparent to the students.

This shows that there is a change in the perception of research, that the students can see it for themselves without being told. This higher level of thinking is encouraged in clinical decision-making and that the lessons learnt at an undergraduate level will be corrected if the student intend to pursue research at a postgraduate level.

5.2.8 Research process

The dominant theme in the research processes category was the gains in knowledge that the students perceived. This is often recorded by researchers (*cf.* 2.3.2, 2.5) as well as the improved level of interest in research that students report. Research skills are also commonly referred to in the literature (*cf.* 2.5.3, 2.11). Another generic skill that is transferable to the working environment is that of planning the research project. To develop skills to think creatively during research was also a positive aspect of the research process (*cf.* 2.7.1).

The implication of this category is that the research project does make a difference in the level of interest students feel towards research once they have been exposed to it. Also beneficial is that the knowledge that they gain can be applied to their patients, shared with colleagues and the profession at large.

5.2.9 Resources

Resources were mostly perceived by the students to be insufficient; the theme has five statements linking to the lack of resources. The two main resources that can be actively managed are the availability of the clinic space in which students perform the research and also the stock control of the equipment. The example that was given by the students was the use of the Farnsworth colour vision set, which disappeared from the clinic and then reappeared later and also various low vision charts. This is a concern, even seen out of the context of research. Much of the equipment is very costly and imported from overseas; it is not easily or quickly replaceable.

The use of the clinic should be available to the students in a research week; this is obviously at odds with the mandate from the health department for service delivery. And so we sit with a catch 22: there is a waiting list of over 3 000 patients waiting to have an eye test, and we have students who have to ask special permission to use the clinic on public holidays to get their data collection completed. The utopia is a practise

clinic, such as that seen at the University of Johannesburg, where students have test rooms that are not used for anything else but to practise their skills. Two cubicles on campus at the skills unit would go a long way to alleviate the transport, time and financial costs from the view of the student.

The availability of a supervisor was also a resource that was seen as lacking (*cf.* 2.9.4.1); this should be addressed by the policies advised in the administration category (*cf.* 5.2.1).

Funding is a scarce resource and often and recommendations are that the University should consider the additional costs they weigh on students who perform research (*cf.* 2.3.4, 2.9.3.2). Funding undergraduate research could be seen as a method of enhancing the success of the university reaching the goals and mandates of the state (*cf.* 2.10.1, 2.10.2).

5.2.10 Skills development

Many researchers also found that doing research provides a platform for students to develop new or improve skills (*cf.* 2.7.1). The students in this study observed improvements in gathering information, communication and critical reasoning, research skills, transferring information, time management, interpersonal skills, practical skills, organisational skills and technological skills, communication and critical thinking. Other studies were in agreement with this study for communication skills, organisation skills, finding information, presenting their research and working in teams (*cf.* 2.5.3). These skills are important for general living and as management skills within a practise, and were discussed previously in this chapter (*cf.* 5.2.2).

5.2.11 Supervision

The guidance of the supervisor was appreciated by the students; and some students were not allocated a supervisor after theirs had resigned. This lack of availability of supervisors is not unique, and was also seen in other studies (*cf.* 2.9.4.1) and involvement of staff was seen by students to be "lacking" in a study another study (*cf.* 2.9.4). What was quite astounding was the comment by the students who had no supervisor, and felt that they were getting on better without a supervisor and that if they need to query something, they would merely ask their peers.

The diverse experience of this small group of students is quite interesting, for some do not even have a supervisor to consult or get feedback from and others felt that their supervisors did help and guide them. This is a concern in the Department as this is not allowing for equitable treatment for each student, even if unintentional. This is a stark oversight by the Department, and also that of Biostatistics as both Departments are required to communicate about changes to the results and other sections of the project. With whom is Biostatistics communicating with regards to these students' methodology or results?

There were both bad and good supervisor experiences; bad experiences were the lack of support, not being available and no guidelines. Good experiences were that the supervisor was informative and contributed to the motivation of the students. This is very similar to a South African study of supervision (*cf.* 2.9.4.1, 2.9.4.4). The recommendations of this researcher are that supervisors have a training programme, guide or course.

As most of the staff at the DoO moved from practise in a commercial setting to academia, this is a possibility for the lack of experience in research, and was also noted before (*cf.* 2.9.4.4), where staff are not confident of research themselves. Supervisors should be mentored by senior staff; as there are insufficient senior researchers within the Department, it could be recommended that a supervisor pair up with a senior researcher from a different department, preferably within the School for Allied Health Professions, as the methodologies of studies are likely to have threads of similarity.

Supervisors should be clear in their expectations and have clear goals that are achievable; this could be drafted into the supervisor-student relationship agreement (*cf.* 5.2.1). Students who choose their own supervisors obtain greater satisfaction (*cf.* 2.9.4.3) and this is also an aspect that could be considered for implementation.

5.2.12 Time-related factors

The time-consuming nature of research was very apparent to the students and has been seen in other studies (*cf.* 2.3.4, 2.6.3, 2.6.6 2.9.3.4).

Students mentioned that they would like to have a week dedicated to performing research, just as there are allocated times for residency (work experience one week) and community service learning (project one week and Phelophepha train two weeks); students have previously commented on the lack of time during the curriculum for completion of a research project and also the conflict of schedules whilst trying to implement research (*cf.* 2.3.4, 2.9.3, 2.12.5).

What can be done to improve this process for the students? If the process of approval for studies could be streamlined for undergraduates, and having an information brochure online or in the module guide for the students to consult when they are uncertain would limit the time going backwards and forwards for signatures. Online applications by the Ethics Committee are underway for postgraduate students. By supervisors choosing the topics, it is possible that the studies could be simplified; or as mentioned before a case study on a single interesting patient would also cut the time significantly.

5.3 PRACTICAL IMPLICATIONS OF THE STUDY

The key recommendations given as a result of the findings of the study would be to implement policies within the DoO for better communication with students, the Department of Biostatistics and the Ethics office; and management of the roles of supervision and drafting of a supervisor-student contract. The addition of a week dedicated to the research project in the final years' schedule and combining of groups from the same practical groups are within the scope of ability of the DoO.

A further recommendation would be that the ethics committee be allocated a time slot in the staff development and staff training programmes. Staff development and training are undertaken by the office of the Dean for Health Sciences and the academic staff development co-ordinators in the teaching and learning division for the University at large. New staff are enrolled in these courses and the exposure to the guidelines given by the Ethics Committee could assist with the administrative queries held by many unfamiliar with the requirements for undergraduate research studies.

The weight of the research project is 15% of a year mark for one module (COT409), with the research article and presentation contributing half each to the total 15%. This is considerably low where students carry seven year modules; this equates to 2% of

the total mark distribution from all seven courses. Surely if students are to take research more earnestly this should be adjusted upwards to carry greater weight. In the new curriculum, currently phased in up to second year (in 2014), there will be a new module ORES4802, Optometry Research Skills. This module is a research module, carrying 8 credits and will be phased into 4th year in 2016. The outcomes of this module have not yet been written, and will provide the platform for greater emphasis and importance placed on the exit level requirements for such a research project. This may also create the impetus for the research project to be taken more seriously by students. Below in Table 5.2, proposed changes to the research project implementation within the DoO are provided.

TABLE 5.2: PROPOSED CHANGES TO IMPROVE THE IMPLEMENTATION OF THE RESEARCH PROJECT

CURRENT STATUS	PROPOSED CHANGE	POSSIBLE BENEFITS
No present protocol of communication between the departments involved in the research project	Formalised line of communication Drafting of rubrics for the presentation and the article to be submitted; these are to be included in the module guide	Time delays, confusion and ambiguity of assessment minimised Smoother planning for meeting outcomes
No formal schedule or responsibilities of team members delineated	Clear guidelines on deadlines and meetings with the supervisor. A timeline for the study is to be included in the supervisor-student contract and responsibilities made transparent in this agreement	Leadership and commitment from both parties Accountability from members
Research performed throughout the final year, as it suits the group members	Allocated week to perform research	Shorter time span Concentrated effort allows for continuity of the research mind-set Fewer clashes in the timetable that allows for passive group members
Students from various practical groups in the research group	Groups for the research project share the same practical schedules	Less hassle for students to meet Fewer delays in the implementation of the research project

The researcher has met recently with colleagues from the Department of Biostatistics; a simple act of showing the researcher the links from the university webpage to the health ethics library of documentation will make the application for new research groups a much more efficient process. These documents give guidelines for the writing

of the protocol and the curriculum vitae format, numbers of copies of documents, additional forms to be filled in for various types of studies. Such a small piece of knowledge within the DoO will allow supervisors to feel more in control of the process.

Should the current status be addressed, it may go a long way to improve the administrative frustration of the students; allow for less anxiety related to finding the time to meet, collect data and interact with one another. These issues were mentioned as contributors to the negative experiences related to their research project; if addressed these could provide a platform for more positive experiences and a more positive attitude towards research (*cf.* 2.2.3.1).

5.3.1 Benefits to the stakeholders

Students perceive that there are numerous personal, practical and professional skills that are grown and improved upon, with the undertaking of their final year research project. This can directly benefit stakeholders (Figure 5.2) such as employers, patients and the community that the practitioner will work in. With guidance and support, these students who show potential to become researchers, may continue with postgraduate studies. This will contribute to the success of the institution in which the student enrolls in meeting strategic postgraduate goals (*cf.* 2.10.5), and also to the mandate given by the Department of Higher Education (*cf.* 2.10.1).

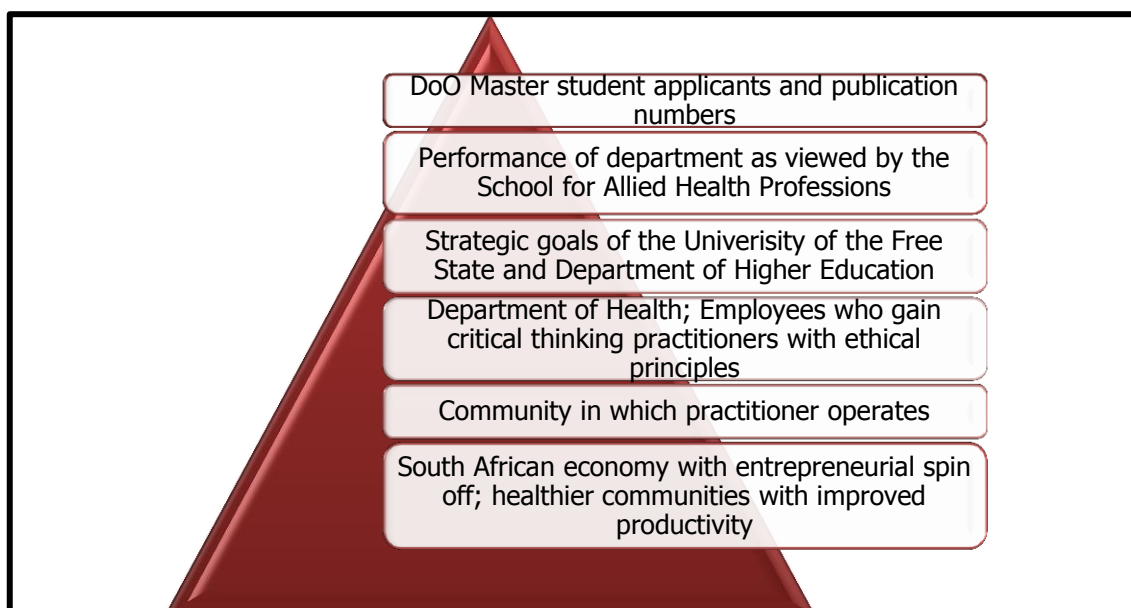


FIGURE 5.2: DIRECT AND INDIRECT STAKEHOLDERS WHO MAY BENEFIT IN THE LONG RUN

The rolling out of the National Health Insurance and the increasing need for professionals (*cf.* 2.11.1) in the health sector will gain from individuals with a skills set that includes flexibility, interpersonal skills and critical analysis of patients.

5.4 A CHECKLIST OF CONTROL AND ADDITIONAL RECOMMENDATIONS

Control is a process used in management that evaluates the outcome achieved compared to the desired or planned outcome and how the variance or discrepancy can be ameliorated. By looking at the results of this study, it can be seen that there are many aspects of the research projected that are being executed well; and some that may need adjustment or additions. This study can act as a control tool to determine what areas require attention with respect to the undergraduate research projects. Control is an iterative process and changes that are implemented can be analysed to identify if the intended outcome of the change was in fact obtained or met.

The areas that are considered to be implemented correctly are benchmarked against results of previous studies, which were considered to have a positive impact on the students' view of research.

What are the enabling actions, towards a positive attitude to research, of the DoO?

- Presentations (*cf.* 2.5.3) at annual faculty conferences that are not clashing with the examination timetable
- Group work for the research assignment (*cf.* 2.6.8)
- Exposure to new equipment (*cf.* 2.7.1)
- Students earn credits towards their degree upon the completion of the project (*cf.* 2.3)
- Exposure to literature as a source of learning/method of instruction (*cf.* 2.9.3)
- Drafting the protocol of the study in the third year of study and performing pilot studies, to complete the study in the final year
- Having an online arena for student discussions, such as Blackboard (*cf.* 2.3.3)
- Providing an outline in the module guide

What actions can be taken by the DoO?

- Letting students choose their own groups, within their clinic schedule (fewer clashes), to allow for more time to collect data

- More dedicated research time in the schedule, similar to the Community Service Learning week
- Provide guidelines that require the project to meet technical aspects of publication standards
- Consider reimbursement of running costs, subject to a pre-determined budget and ethical approval
- Quality assurance policy on supervision
- Writing workshops for students to learn to organise research papers
- Share the supervision with a senior researcher from a different department
- Allow staff to attend supervision workshops
- Moderated (and updated) rubric, which ensures fairness. This includes a rubric for the presentation at research day and also for the submission of the final article or report.
- Module guide should provide more information of the assessment of the project, and more detailed timelines with a grading rubric (*cf.* 2.9.4.3, 2.12.1). Not every module guide (Appendix C1-C3) included a rubric (2012 did include a rubric), and it was not evident from the NGT that the students have received such an assessment tool.

The department should know the feelings of the students towards research to better address the needed teaching and learning methods, assessment strategies that are applicable to the student group; this study in some way adds towards that recommendation.

5.4.1 Researcher's reflection on the research projects of 2014

The students who participated in this study presented their research in August of 2014. The need for this study became even more apparent to the researcher when one of the groups came to the limitations of their study; the slide only showed a short list of limitations, of which one was "no literature study was performed". This glaringly large oversight within the study was literally jaw dropping. The judges for this occasion were an optometrist with a PhD affiliated with another South African optometry school and an optometrist holding an OD qualification (the degree that American optometrists qualify with and are titled doctor). The researcher struggles to find a scientific sentence to sum up the embarrassment felt at that moment.

Acknowledging the aspects that are being completed with aplomb or satisfactory results, as bulleted above, the end product does not necessarily reflect the work that has been done to get to that point. More emphasis needs to be put on the presentation that is given; other departments within the School practise for weeks to ensure the timing, pronunciation, tempo and voice projection are in place. This presentation is an advertisement for the students to future employees and to other academic institutions.

Furthermore, upon the handing in of the article to be assessed externally, three of the six groups of students failed to submit an abstract. Each group was aware of the requirement of the abstract, as it was submitted to the judges as a summation of the studies in the program at the research day presentation. The failure to submit the completed article once more emphasises the lack of appropriate decorum, despite having the knowledge thereof beforehand. To reiterate, it is the opinion of the researcher that the students do not take the research project as earnestly as it should be (*cf.* 5.3).

Occurrences such as these reflect the much-needed support of the students within the department. The hope is that once this study is presented to the DoO, changes in the supervisors' viewpoint of their responsibilities towards the reputation of the Department and also that of themselves, as being the leaders of these projects will create the impetus to dedicate more time to this task. Students who have more engaged and more 'on the ball' supervisors are compelled to meet the standard set; this can only lead to improvement in the quality of the work performed at undergraduate level.

5.5 DISCUSSION ON THE TRIPARTITE MODEL OF ATTITUDE AND THE MEANING THEREOF IN THIS STUDY

The impact of undergraduate research was seen as: "a powerful affective, behavioural, and personal-discovery experience whose dimensions have profound significance for their emergent adult identity and sense of direction" (Seymour *et al.* 2003:530-531).

This quote encompasses the feelings and experiences of the students that partook in this study. Many learnt about themselves, and in a very real sense tested who they considered themselves to be. They learnt that they could do more than they thought

possible, could learn skills to work with difficult situations and be co-operative with people, provided them with confidence that comes with tackling something challenging.

The diagram below (Figure 5.3) indicates how each of the categories aligns with one or more of the components of the tripartite model of attitude. The overlap of some categories indicates the complex nature of attitude; both valences are seen in these components. For example, in the affective component the category of emotion was both positive and negative, reflection mostly positive and time-related factors and resources mostly negative. These combined valences show that within the sphere of the affective component, should the resources within the DoO improve and the time scheduling be completed with greater consideration to the time table, the overwhelming feeling would be more positive.

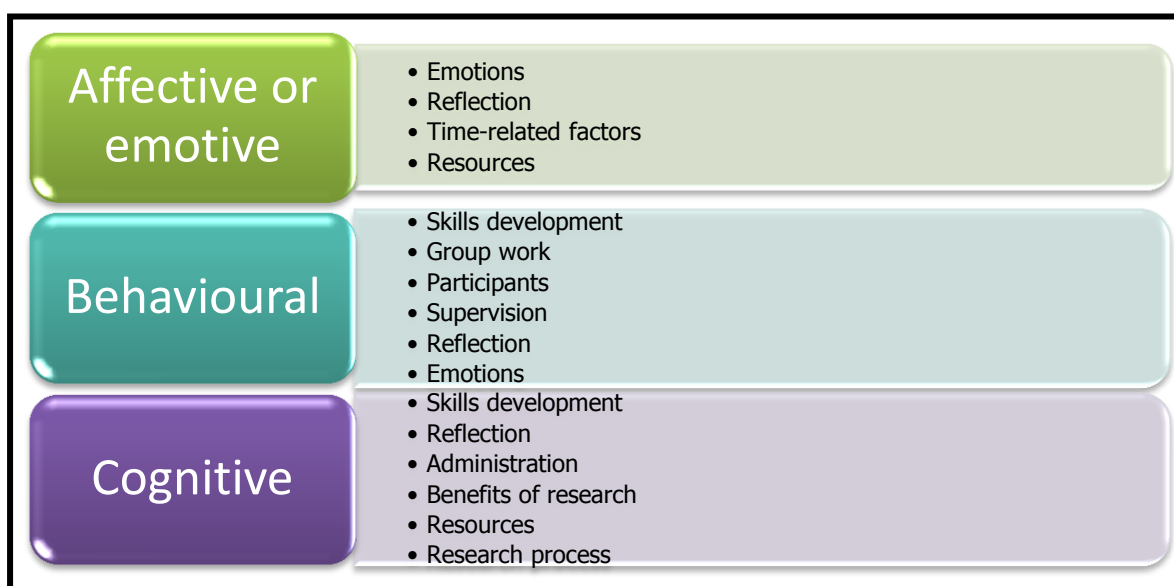


FIGURE 5.3: CATEGORIES IN THE STUDY AND THE TRIPATITE MODEL OF ATTITUDE

The behavioural component shows how the students develop and grow; they acknowledge a broad range of skills that they feel they improved upon and also learnt to deal with difficult interpersonal situations with group members and participants.

The cognitive aspect indicates the higher order thinking of linking theory to practise, of understanding the limitations of their study and also the benefits of what research could mean to themselves, the profession and their patients. The knowledge gain was noted throughout the NGT sessions.

Reflection spans all three components, from having a humble outlook, to altering their behaviour to co-operate with each other for the greater good of the team, to knowing that the skills obtained can be of value later in their career.

Nieuwenhuis (2007:49) explains this within the context of the systems theory where all phenomena consist of open systems or environments, which interact with other systems, and this makes it difficult to identify the causality of the relationships and acknowledges the complexity of the interdependence of the truths. These systems in the context of this study may be the students' home environments, the DoO, the culture of the UFS and that of their interactions with people and things related to research.

Should the study be repeated on different year groups of final year students, new categories could well be identified; as each individual could have additional experiences not yet described by this unit of analysis.

5.6 CONCLUSION

In this chapter, an overview discussion on the categories of the study was elaborated upon. Similar findings in relation to supervision, skills development, group work, benefits of research, participants, reflection, time-related factors, emotions, resources and the research process were linked to literature. External factors specific to the study were mentioned and statements relating to administration were not able to be directly compared with the literature control. The practical implications of the study were highlighted and the benefits that could accrue to stakeholders were outlined.

The categories were compiled into the components of the tripartite model of attitude and the limitations of the study were identified. In the following chapter, entitled "Chapter 6 ***Conclusions, limitations and recommendations of the study***", the study will be summated and final conclusions will be drawn.

CHAPTER 6

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS OF THE STUDY

6.1 INTRODUCTION

This study was undertaken to identify the contributing factors of the final year optometry students' attitude toward research. This was done by way of nominal group discussions whereby students attributed positive and negative connotations to the experiences that form their frame of reference to the concept of research. As these students are undergraduates, their main focus was their research project which they complete in order to meet the requirements of the professional bachelor's degree.

By identifying factors that were negatively perceived by the students, this study represents a starting point from which improvements can be made; positively perceived factors can be built upon and measures put in place to ensure their continuance. The role of attitude development towards research in the undergraduate program can influence the progression of students to higher degrees and their likelihood of participating in future research, utilising research in their professional lives as practitioners and thereby can impact on the care a patient receives.

Generic findings of the study could be applied across to other fields and professions, to assist the larger goal of higher education to improve research within the country.

This chapter outlines an overview of the study, the researcher's reflection as well as limitations of the study identified and recommendations briefly discussed; the last words and concluding remarks ends this chapter.

6.2 OVERVIEW OF THE STUDY

The study opens with an introductory chapter (Chapter 1) to orient the reader as to the background and rationale for the study. The importance of research was introduced from an economic, academic, political and business perspective (*cf.* 1.2). The first chapter also offered the research question, from which the body of the study was developed.

The study was implemented with the view to answering the **research question**: *What are the factors that contribute to the attitude towards research of final year optometry students?*

The following **objective** was pursued: *To identify the factors which contribute to the attitude of final year optometry students towards research.*

In answer to the research question, the factors which contributed to the development of an attitude towards research were: elements of gaining knowledge of the research process; the interpersonal skills development; working in groups; the administrative processes that are encompassed by the ethical approval and departmental policies, implementation of the their studies with regards to participants; positive and negative emotions such as stress and self-confidence; awareness of benefits of the skills gained through the process of research, the time-consuming nature of research, the role of supervisors; availability and lack of needed resources; and funds and factors that are external and case-dependant.

This study was undertaken in a qualitative context, by the consensual participation of the final year students (class of 2014) in three nominal group discussions; a literature control was completed to determine the comparative similarity and differences of this study to previous research. Chapter 2 comprised a framework of literature and educational policies that give credence to the value of research and how previous studies inform this study.

Within Chapter 3, the theoretical underpinnings of the method were discussed and the use of the nominal group technique in this study was specified. Chapter 4, detailed the results of the study for each of the nominal group discussions and the researcher combined these statements into various categories and themes. The meaning of the statements was derived from the context of the statements. These categories were titled **research process** (*cf.* 4.8.1), **emotions** (*cf.* 4.8.2), **benefits of research** (*cf.* 4.8.3), **reflection** (*cf.* 4.8.4), **skills development** (*cf.* 4.8.5), **resources** (*cf.* 4.8.6), **group work** (*cf.* 4.8.7), **supervision** (*cf.* 4.8.8), **participants** (*cf.* 4.8.9), **administration** (*cf.* 4.8.10), **time-related factors** (*cf.* 4.8.11) and **external factors** (*cf.* 4.8.12). Themes within these categories were also expanded.

Chapter 5 provides the discussion of the findings and relates this study to the literature control; recommendations to the DoO are given with regards to improving the aspects that contributed to negative experiences. Checklists of actions that are suitable and positive are also given.

6.3 RESEARCHER'S REFLECTION ON THE STUDY

From the ontological view that each individual has their own assumptions, values, feelings, intentions and attitudes and beliefs, this study tried to make sense of the context of these students' experiences and construct a reality by the asking of questions in the nominal group.

It is impossible to say that all the experiences were expressed, for a multitude of reasons. Not all aspects of the contributions towards the attitude to research may have been identified for the fear of stating negative experiences that would be deemed socially unacceptable, or for fear of repercussions or victimisation. Students could also have not really tried too hard to think of all the experiences that were of importance to them, as the sessions were held on their once-a-week off afternoons.

From a methodological perspective, a one-to-one interview may also have added depth to the data.

The researcher can identify with the students given her own experiences of lack of communication from the supervisor in a distance learning research project; and also the unwillingness or unclear answers of participants that can cloud the research findings or limit the progression of the study. At undergraduate level optometry, the researcher recalls struggling to interpret the data and sift the important or core data from the results; this was not mentioned by the students in this study; however, no student project results had been handed in at the time of the nominal group discussions.

Any researcher, however they may try not to, does bring a level of bias into the research. The expectations of the researcher were met in certain instances, but what was not mentioned by the participants in this study was the concept of fairness. No student brought up the differences in the level of commitment/expertise of the different supervisors and that meetings frequency varied significantly from supervisor

to supervisor; nor was there mention of not being able to change supervisors, which was an oversight in the view of the researcher.

It was unexpected that so early in the research process students were able to identify so many benefits that they perceive in doing research; likewise, the consequences of inaccurate research techniques and the link from theoretical or abstract concepts and research to patient care.

6.4 RECOMMENDATIONS ARISING FROM THE STUDY

No study pertaining to the attitudes towards research in undergraduate optometry students was found by the researcher, in a search of the literature. This study aims to provide new knowledge on this topic, to aid the implementation of the research project in future years within the DoO.

The summary of these recommendations (*cf.* 5.4) to improve the research project are:

- Formalised line of communication between the departments involved in the research project
- Drafting of rubrics for the presentation and the article to be submitted; these are to be included in the module guide
- Clear guidelines on deadlines and meetings with the supervisor.
- A timeline for the study is to be included in the supervisor-student contract and responsibilities made transparent in this agreement
- An allocated week to perform research during the year schedule, similar to the CSL week in the third year
- Groups for the research project share the same practical schedules
- To allocate the ethics committee a time slot in the staff development and staff training programmes
- Increase the weight of the research project in the module (COT409) for 2015. The new curriculum allows for this change in 2016, by adding a stand-alone research module (ORES4802) in the 4th year programme.
- Guidelines for supervisors regarding the process of undergraduate research and procedures provided for the frequency of meetings with the group

- The findings of this study are to be brought to the attention of the Ethics office, the department of Biostatistics and the DoO, for the consideration of the implementation of the recommendations contained herein.
- Interviews with staff: do they perceive the students' experiences as this study found them to be? Do supervisors feel confident and able to guide the research group?
- Focus groups should be held with departmental heads in drafting the protocol for the supervision contract, and also the policy on communication.
- Specific focus can be placed on the likelihood of students continuing a higher degree with a survey. The survey could include sections that cover considering employment as an academic and the use of research in their practise. It can be investigated to see if these decisions made by students correlate to the attitude (positive or negative) in their undergraduate years.

The factors that were identified which contributed to negative experiences can now be proactively addressed by those who are directly involved in the research project.

6.5 LIMITATIONS OF THE STUDY

The study only have participants from one year group of final years; more detailed data could have been achieved if the study was repeated on a number of final year groups. The study is not generalisable, as it is in the context of one university and the ethos of research may differ at other institutions that have optometry as a course. The specific experiences are not likely to be repeated in another unit of analysis in a different context. However, the principles of the findings (the use of time, the policies of communication, assessment and supervision) are generic in nature and could be examined by other departments.

More information could have been obtained from the third year group that were doing the theoretical module of research methodology (ORE304), in order to identify gaps in their theoretical knowledge which could impact on their confidence and their experiences of the theoretical module.

Data collection of this study was done during the time scheduled for the students' data collection phase of their research, thus no change in attitude after the completion of a research project could be queried explicitly. Likewise with students in various phases of

their research project, some were busy with the literature review and others with collection of data; none being busy with the results stage could have limited the documentation of their full experience. Factors such as statistical analysis and meaning, reading of graphs and drawing up of conclusions of findings could have added significant depth in their experiences. This was briefly mentioned, as it related to the presentation, at which the researcher was present (*cf.* 5.4.1).

That of the nervousness experienced during the oral presentation, the skill of simplifying their two year research struggle into a concise ten minutes; the disappointment or elation when the winning presentation is announced would provide additional emotive expressions that could have added to the this study.

A pre- and post-completion of the research study could have been undertaken; however, in hindsight the difficulties experienced could have been minimised by the participants. Similar to a rollercoaster ride: it is a lot less scary when it is over; the thrill of achievement remains. The category of reflection could be enhanced with this data.

As the researcher is a member of staff within the Department, it is possible that the students did not fully express negative experiences that could reflect poorly on the members of staff; that some degree of social niceties were observed by the students, even if subconsciously.

6.6 CONTRIBUTION TO RESEARCH

The study provided the first answers to the attitudes development towards research, within the context of the DoO at the UFS. These findings provided practical recommendations to improve the learning environment that the students are in, in order to limit any negative feelings (*cf.* 5.2.1, 5.2.5, 5.2.9, 5.2.12, 5.3, 5.4). Similarly, the positive findings can be continually sustained by the continued implementation of the positive factors encountered. The researcher is of the opinion that the research made a valuable contribution by the accumulation of new data, meaning and understanding to the existing body of knowledge concerning the experiences of undergraduate research and new knowledge concerning the final year optometry undergraduate students regarding the attitude toward research at the UFS. The soundness of the data are reinforced by the use of an expert facilitator, recording of the sessions and the detailed outline given of the methodology, such that it may be

repeatable. The findings of this study bring into sharp focus the importance of structure within departments and the communication protocol for students. The anticipations of the researcher were unable to predict the great impact of this for the students; as such this study could be completed in other departments using the same questions that were asked in the nominal group sessions. The guidelines written for the better implementation can also be applied in other health profession departments.

The **value** of the study will be appreciated in the contribution it will make via recommendations with regard to the administrative protocols to implement within the DoO and between Ethics and the department of Biostatistics, in order to make it more effective and to provide maximum opportunities for corrective measures and benefits for the students.

The **significance** of this research lies in its contribution to the body of scientifically-based knowledge regarding the factors that contribute to the development of an attitude towards research, as well as its value in terms of generating awareness and providing guidelines and recommendations to the DoO, which will enhance constructive alignment in terms of the undergraduate research modules and the project that is undertaken by the students with departmental supervision. Not only does this awareness reach the DoO, but through dissemination of the findings, can impact on the Ethics office and that of Biostatistics, who interact with many other departments in the same manner as that with the DoO.

6.7 RECOMMENDATIONS FOR FUTURE RESEARCH

These recommendations pertain to the value of this study and considerations of new studies to be undertaken, derived from limitations of scope in this study; and areas of interest identified and questions arising from areas within this study that have as yet not been investigated.

- Investigate by way of survey the impact that research literature and professional discussions, the presentations of findings at conferences and distributed by CPD has altered the processes of examination by the practitioner and also individual patient care cases.
- Investigate the considerations of funding, and the process thereof for undergraduate research.

6.8 FINAL REMARKS

In conclusion, this study identified various factors that the final year students in the DoO, at the UFS, experienced both positively and negatively, in relation to the contribution of their attitude toward research. By altering, improving and minimising negative aspects that were recommended in this study, the attitude towards research can be enhanced; which can assist future students within the department and promote the quality of research, thereby meeting the goals of the UFS. The continuance and betterment of the profession as well as the patients within the graduates care, by the creation of lifelong learners, could also be achieved.

*"It has become more important than ever to teach our students how to do research,
and how to evaluate different sources of information"*

-Jimmy Wales 2013

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APPDENDICES 41-A4

APPENDIX A1:	LETTER TO DEAN FACULTY OF HEALTH SCIENCE
APPENDIX A2:	LETTER TO HEAD OF SCHOOL FOR ALLIED HEALTH PROFESSIONS
APPENDIX A3:	LETTER TO VICE RECTOR: ACADEMIC
APPENDIX A4:	LETTER TO HEAD OF DEPARTMENT: OPTOMETRY

Prof G van Zyl
Dean: Faculty of Health Science
University of the Free State

**APPLICATION FOR PERMISSION TO CONDUCT RESEARCH ON THE
ATTITUDES OF FINAL YEAR OPTOMETRY STUDENTS IN THE FACULTY OF
HEALTH SCIENCES, UNIVERSITY OF THE FREE STATE.**

Dear Prof van Zyl

I am in the process of writing a dissertation to obtain the Magister in Health Professions Education in the Faculty of Health Sciences at the University of the Free State (Student number 2012135873). The title of my research is FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS

My study leader is:
Dr S Kruger
Division Health Science Education
Faculty of Health Sciences, UFS
Bloemfontein, SOUTH AFRICA.

The aim of the study is to identify the factors that contribute to the attitudes towards research in final year optometry students.

To achieve this goal, the following objective will be pursued:

To investigate the factors which contribute toward the attitude towards research of final year optometry students' (Nominal group technique).

My research population are the students of the department of Optometry at the University of the Free State who are final (4th) year students who are completing a research project in fulfilment of their bachelors degree.

A unit of analysis of consenting students will be divided into random groups that will be involved in discussions by manner of a Nominal Group Technique to identify the contributing factors that are relevant to these students.

I hereby apply to conduct research as approved by the Ethics Committee (Faculty of Health Sciences) on the factors which contribute to the attitudes towards research of final year Optometry students. Permission is required to request the students to participate in the study.

Yours faithfully

Ms L S Coetzee
Junior Lecturer
Department of Optometry
Allied Health Professions
University of the Free State
Tel: 074 793 7970/ 051 405 2173

APPENDIX A2:

Dr S van Vuuren
Head of School for Allied Health Professions
University of the Free State

APPLICATION FOR PERMISSION TO CONDUCT RESEARCH ON THE ATTITUDES OF FINAL YEAR OPTOMETRY STUDENTS IN THE FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE FREE STATE.

Dear Dr van Vuuren

I am in the process of writing a dissertation to obtain the Magister in Health Professions Education in the Faculty of Health Sciences at the University of the Free State (Student number 2012135873). The title of my research is FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS

My study leader is:

Dr S Kruger
Division Health Science Education
Faculty of Health Sciences, UFS
Bloemfontein, SOUTH AFRICA.

The aim of the study is to identify the factors that contribute to the attitudes towards research in final year optometry students.

To achieve this goal, the following objective will be pursued:

To investigate the factors which contribute toward the attitude towards research of final year optometry students' (Nominal group technique).

My research population are the students of the department of Optometry at the University of the Free State who are final (4th) year students who are completing a research project in fulfilment of their bachelors degree.

A unit of analysis of consenting students will be divided into random groups that will be involved in discussions by manner of a Nominal Group Technique to identify the contributing factors that are relevant to these students.

I hereby apply to conduct research as approved by the Ethics Committee (Faculty of Health Sciences) on the factors which contribute to the attitudes towards research of final year Optometry students. Permission is required to request the students to participate in the study.

Yours faithfully

Ms L S Coetzee
Junior Lecturer
Department of Optometry
Allied Health Professions
University of the Free State
Tel: 074 793 7970/ 051 405 2173

APPENDIX A3:

Prof HR Hay
Vice Rector: Academic
University of the Free State

APPLICATION FOR PERMISSION TO CONDUCT RESEARCH ON THE ATTITUDES OF FINAL YEAR OPTOMETRY STUDENTS IN THE FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE FREE STATE.

Dear Prof Hay

I am in the process of writing a dissertation to obtain the Magister in Health Professions Education in the Faculty of Health Sciences at the University of the Free State (Student number 2012135873). The title of my research is FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS

My study leader is:

Dr S Kruger
Division Health Science Education
Faculty of Health Sciences, UFS
Bloemfontein, SOUTH AFRICA.

The aim of the study is to identify the factors that contribute to the attitudes towards research in final year optometry students.

To achieve this goal, the following objective will be pursued:

To investigate the factors which contribute toward the attitude towards research of final year optometry students' (Nominal group technique).

My research population are the students of the department of Optometry at the University of the Free State who are final (4th) year students who are completing a research project in fulfilment of their bachelor's degree.

A unit of analysis of consenting students will be divided into random groups that will be involved in discussions by manner of a Nominal Group Technique to identify the contributing factors that are relevant to these students.

I hereby apply to conduct research as approved by the Ethics Committee (Faculty of Health Sciences) on the factors which contribute to the attitudes towards research of final year Optometry students. Permission is required to request the students to participate in the study.

Yours faithfully

Ms L S Coetzee
Junior Lecturer
Department of Optometry
Allied Health Professions
University of the Free State
Tel: 074 793 7970/ 051 405 2173

APPENDIX A4:

Prof TA Rasengane
Head: Department of Optometry
School for Allied Health
University of the Free State

APPLICATION FOR PERMISSION TO CONDUCT RESEARCH ON THE ATTITUDES OF FINAL YEAR OPTOMETRY STUDENTS IN THE FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE FREE STATE.

Dear Prof Rasengane

I am in the process of writing a dissertation to obtain the Magister in Health Professions Education in the Faculty of Health Sciences at the University of the Free State (Student number 2012135873). The title of my research is FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS

My study leader is:
Dr S Kruger
Division Health Science Education
Faculty of Health Sciences, UFS
Bloemfontein, SOUTH AFRICA.

The aim of the study is to identify the factors that contribute to the attitudes towards research in final year optometry students.

To achieve this goal, the following objective will be pursued:

To investigate the factors which contribute toward the attitude towards research of final year optometry students' (Nominal group technique).

My research population are the students of the department of Optometry at the University of the Free State who are final (4th) year students who are completing a research project in fulfilment of their bachelor's degree.

A unit of analysis of consenting students will be divided into random groups that will be involved in discussions by manner of a Nominal Group Technique to identify the contributing factors that are relevant to these students.

I hereby apply to conduct research as approved by the Ethics Committee (Faculty of Health Sciences) on the factors which contribute to the attitudes towards research of final year Optometry students. Permission is required to request the students to participate in the study.

Yours faithfully

Ms L S Coetzee
Junior Lecturer
Department of Optometry
Allied Health Professions
University of the Free State
Tel: 074 793 7970/ 051 405 2173

APPDENDICES B1-B4

- APPENDIX B1: INFORMATION LETTER FOR REQUEST OF PARTICIPANTS
IN THE NOMINAL GROUPS TECHNIQUE (NGT)**
- APPENDIX B2: COVER LETTER TO OBTAIN CONSENT FROM
PARTICIPANTS**
- APPENDIX B3: DEMOGRAPHIC INFORMATION QUESTIONNAIRE FOR
PARTICIPANTS**
- APPENDIX B4: QUESTIONS OF THE NOMINAL GROUPS**

APPENDIX B1:

**INFORMATION LETTER FOR REQUEST OF PARTICIPANTS IN THE
NOMINAL GROUPS TECHNIQUE (NGT)**

Dear Student

**Request to participate in a Masters study titled: FACTORS WHICH
CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR
OPTOMETRY STUDENTS.**

I am currently occupying the position of Junior Lecturer in the Department of Optometry, Faculty of Health Sciences at the University of the Free State. I am mainly responsible for the contact lens clinic and modules.

I am in the process of writing a dissertation to obtain the Masters degree in Health Sciences Education at the University of the Free State (student number 2012135873). The title of my research is **FACTORS WHICH CONTRIBUTE TO THE ATTITUDES TOWARDS RESEARCH IN FINAL YEAR OPTOMETRY STUDENTS.**

My supervisor is:

Dr S.B. Kruger

Division Health Science Education

Faculty of Health Sciences, UFS

Bloemfontein, SOUTH AFRICA.

Ethics number:

ECUFS211/2013 REC 230408-011

The **problem** that has to be addressed is that to date the factors which contribute to the attitude towards research in final year Optometry students are unknown.

The **aim** of the study is to identify the factors that contribute to the attitudes towards research in final year optometry students.

To achieve this goal, the following **objective** will be pursued:

To investigate the factors which contribute toward the attitude towards research of final year optometry students'.

The **method** that will be used is the Nominal Group Technique, which will involve discussions with groups of final year optometry students. The nominal group discussions will follow six steps. Participants are welcomed, informed about the study and informed consent will be obtained by the facilitator (an independent person who has expertise in NGT). Thereafter, the nominal question will be put to the participants. They will generate ideas in silence and write them down on a card. The fourth step of the discussion will follow, namely the verbalising of their ideas in a round-robin fashion. In the fifth step a discussion of ideas generated will create the opportunity to clarify any possible misconceptions. Lastly participants will get the opportunity to prioritise ideas from the pool of ideas generated by all participants.

You have been chosen as one of the students to participate in the nominal group discussions. I respectfully request your co-operation by consenting to take part in the nominal group discussions for this project. I am aware that time is a valuable commodity. The nominal group discussions will take approximately 60-120 minutes. Should you have any questions regarding the study or nominal group discussions, I can be contacted at:

Telephone: 051 405 2173

Cellular phone: 074 793 7970

Email: coetzeels@ufs.ac.za

The nominal group discussions are scheduled to take place during the period 01 April – 30 May 2014. Should you be willing to participate, please complete the accompanying consent form and return it to me as soon as possible.

Thank you for taking time to read this communication. I will appreciate your contribution to the project.

Sincerely,

Lauren Coetzee

Faculty of Health Sciences

University of the Free State

Bloemfontein

COVER LETTER TO OBTAIN CONSENT FROM PARTICIPANTS

CONSENT FORM FOR PARTICIPATION IN A NOMINAL GROUP DISCUSSION

Hereby I, the undersigned, consent to participate in a discussion on the attitude toward research of final year optometry students at the University of the Free State.

My full particulars are as follows:

Title:.....

Surname:.....

Full names:.....

Email address:.....

Cellular number:.....

Signature.....

Date.....

The researcher's details are as follows:

Telephone number: 051 405 2173

Email address: coetzeels@ufs.ac.za

I wish to assure you that the information will be treated in a highly confidential manner and that there will be no references to any names. Thank you in advance for your kind cooperation. Please take note that the results coming from this a masters study will be published. Thank you for your kind cooperation.

Yours sincerely,

Lauren Coetzee

Faculty of Health Sciences

University of the Free State

Bloemfontein

APPENDIX B3:

DEMOGRAPHIC INFORMATION QUESTIONNAIRE FOR PARTICIPANTS

Dear Participant

Please fill in the relevant information below, please do not put your name or student number anywhere on this sheet.

Age in years:

Gender (M/F):

Race (Asian, African, Caucasian, Coloured, Indian):

Mother tongue; the language you are most comfortable with (Afrikaans, English, Sesotho, Xhosa, Other):

Any previous tertiary academic qualifications:

Please also indicate if your qualification was completed or not.

Thank you,
Lauren Coetzee

QUESTIONS OF THE NOMINAL GROUPS

Question 1:

"What are the positive experiences related to research?"

"Wat is die positiewe ervarings rakende navorsing?"

Question 2:

"What are the negative experiences related to research?"

"Wat is die negatiewe ervarings rakende navorsing?"

APPDENDICES C1-C3

- APPENDIX C1: MODULE GUIDE FOR THE RESEARCH PROJECT CONTAINED
IN COT409 MODULE 2012**
- APPENDIX C2: MODULE GUIDE FOR THE RESEARCH PROJECT CONTAINED
IN COT409 MODULE 2013**
- APPENDIX C3: MODULE GUIDE FOR THE RESEARCH PROJECT CONTAINED
IN COT409 MODULE 2014**

**MODULE GUIDE FOR THE RESEARCH PROJECT CONTAINED IN COT409
MODULE 2012**

Research

The purpose of the module is to expose students to conducting a vision related research and presentation of the research results. The module will enable the students to publish papers and present papers in national and international conferences. Submission for publication of outstanding reports/papers in this module is encouraged. This module is a continuation of ORE 304 module. This is a student project. No formal lectures will be given. Staff members will act as project supervisors (study leaders).

Student's tasks (Also Check Table 1 for due dates)

- a. Writing a protocol for a study to be conducted
 - i. A draft should be handed to the supervisor / study leader.
 - ii. The protocol will be marked by the biostatisticians and the module leader. The submission to the module leader should be electronically.
- b. Ethics committee applications
 - i. The protocol and the ethical forms must be signed by the study leaders and the biostatistician before being submitted to the module leader. All ethical applications have to be submitted to the **module leader for final signature before being submitted to the ethics committee.**
- c. Conducting a study
 - i. This is the fieldwork that has to be done by the students after obtaining approval from the Ethics committee.
 - ii. Collecting data
- d. Data Submission
 - i. Data analysis is done by the Biostatisticians. The students should know the different tests that will be conducted.
- ii. The data should be submitted to the biostatistician by **12.00pm June 1st, 2012**
- e. Compiling a written report on the study

- i. The report will be written using the Optometry and Vision Science paper style. The students must acquaint themselves with the writing format of this journal, which is obtained in the journal under the heading **"instructions for authors"**. Also the format may be obtained on internet: <https://www.editorialmanager.com/ovs/default.asp>. Students will be **penalized (10%)** for not using the correct format. The Optometry and Vision Science journal is available in the Frik Scot Library.
- ii. Only typed or word processed document will be accepted.
- iii. Note that translation or copying from internet, textbooks or journals is called plagiarism, and is research misconduct. No marks will be given for the work that has been translated or copied from other sources. You have to use your own words or sentences.
- iv. The written report is due by **12.00pm August 13, 2012. It should be handed to the departmental secretary.** The raw data (data forms) together with the statistical analysis computer print-outs should be handed with the report. Each group should sign the class list when handing in the report. **The report should also be submitted electronically to the module leader.** The report that is handed in 16 hours and less later after deadline: 10% will be deducted from the assignment mark. The report that is handed in 32 hours and less but more than 16 hours later after deadline: 20% will be deducted. The report that is handed in 56 hours and less but more than 32 hours later after deadline: 40% will be deducted. The report handed later than 56 hours and without arrangements, proper reason and approval: 100% will be deducted.
- f. Oral presentation of the project
- i. **The abstract of the project should be electronically submitted to the Module leader**
 - a. **The abstract should be no more than 300 words (excluding title and names).**
 - b. **The author's names and department should be included with the title of the abstract.**
 - c. **The abstract should be written under the following headings: Introduction, Methods, Results and Conclusion**
- ii. Each group should discuss the project and the presentation with the study leader before the presentations.
- iii. The project will be presented at the optometry research day on the **3rd August 2012**. The best two research projects will be presented at the student forum on the **22th August 2012**.

Table 1: Student tasks and due dates

Task	Due Dates
1. Give a copy of the Protocol that was given to Biostatistics to your study leader to mark - ELECTRONICALLY.	11 January
2. Make appointments with Biostatistics to see them during the week of 23-27 January for feedback. Give a copy of the Protocol that was given to Biostats to your study leader to mark.	16-20 January
3. Meetings with biostatisticians Each group together with the <i>study leader</i> should make an <i>appointment with the biostatisticians in advance</i> . During these meetings, the study leaders will also give feedback. You will thus receive feedback from the study leader as well as from the Biostatistician during this meeting.	Meetings: 23-27 January
4. Get Ethical committee documents from Mrs Strauss at the Faculty of Health Sciences. These documents have to be handed in with your protocol, a signed letter from Biostats and your questionnaires for ethical approval.	23-27 January
5. Final revised protocols and ethics committee application documents have to be handed in at Mrs Strauss for ethical approval. No documents that are handed in late will be accepted! <u>NOTE: The ethical committee's secretary will not allow any group to submit the protocol and the ethical application documents without the module leader and the biostatisticians approval.</u>	21 February
6. Conducting a study This is the fieldwork that has to be done by the students. <i>No data collection can commence before the approval of the protocol by the Ethics committee.</i>	March to May
7. Data submission The biostatistician and your study leader will help you	11 May

with data analysis. <i>Remember to make an appointment with the biostatisticians in advance.</i>	
8. Submission of the Abstract to the module leader (ELECTRONICALLY).	20 July
9. Departmental Oral presentation of the research projects	3 Aug
10.Oral presentations at the Student Forum The best departmental groups will present at the Student forum	21 Aug
11.Submission of written report on the study. The raw data (data forms) together with the statistical analysis computer print-outs should be handed with the report. The written report should be submitted electronically.	13 Aug

Oral Presentation and Written Report's Assessment Criteria

1. Introduction:	Background (Appropriate literature abstracted and presented clearly)
	Overview of the problem area provided
	Objectives clearly stated
	Hypothesis (or experimental question) clearly stated
2. Methods:	Overview of the experimental design used
	Overview of the subjects used and how they were obtained.
	Materials or stimuli used were described
	Procedure used was presented
3. Results:	How the behavior (variable) measured was scored, was explained
	Statistics used clearly presented
	Use of figures and tables to explain the results

4. Discussion and conclusions	Whether results were or were not in agreement with your research hypothesis clearly stated
	Relate the results to other previous studies
	Major findings and interpretations briefly summarize
	Implications of the results for knowledge in the problem area were pointed out
	Problems (Limitations of the study) discussed
	Future research address (suggestions)
5. General aspects of the presentation (referring to oral presentation only)	Answers to questions from the audience
	Figures or tables: Quality (design and legibility) and use in the presentation
	Clear, easy to read and informative visual aids (simple, sufficient time)
	Presentation: no cluttering of information, few bullets per slide, acceptable font (18 and larger)
	Presentation: Organization and delivery of the oral report, including voice, pace, clarity of presentation
6. General aspects of the written report	Is the research publishable?

**MODULE GUIDE FOR THE RESEARCH PROJECT CONTAINED IN COT409
MODULE 2013**

Research

The purpose of the module is to expose students to conducting a vision related research and presentation of the research results. The module will enable the students to publish papers and present papers in national and international conferences. Submission for publication of outstanding reports/papers in this module is encouraged. This module is a continuation of ORE 304 module. This is a student project. No formal lectures will be given. Staff members will act as project supervisors (study leaders).

Student's tasks (Also Check Table 1 for due dates)

- a. Writing a protocol for a study to be conducted
 - iii. A draft should be handed to the supervisor / study leader.
 - iv. The protocol will be marked by the biostatisticians and the module leader. The submission to the module leader should be electronically.
- b. Ethics committee applications
 - ii. The protocol and the ethical forms must be signed by the study leaders and the biostatistician before being submitted to the module leader. All ethical applications have to be submitted to the **module leader for final signature before being submitted to the ethics committee.**
- c. Conducting a study
 - i. This is the fieldwork that has to be done by the students after obtaining approval from the Ethics committee.
 - ii. Collecting data
- d. Data Submission
 - ii. Data analysis is done by the Biostatisticians. The students should know the different tests that will be conducted.
- ii. The data should be submitted to the biostatistician by **12.00pm June 1st, 2012**
 - e. Compiling a written report on the study
 - v. The report will be written using the Optometry and Vision Science paper style. The students must acquaint themselves with the writing format of this journal, which is obtained in the journal under the heading

"instructions for authors". Also the format may be obtained on internet: <https://www.editorialmanager.com/ovs/default.asp>. Students will be **penalized (10%)** for not using the correct format. The Optometry and Vision Science journal is available in the Frik Scot Library.

- vi. Only typed or word processed document will be accepted.
- vii. Note that translation or copying from internet, textbooks or journals is called plagiarism, and is research misconduct. No marks will be given for the work that has been translated or copied from other sources. You have to use your own words or sentences.
- viii. The written report is due by **12.00pm August 13, 2012. It should be handed to the departmental secretary.** The raw data (data forms) together with the statistical analysis computer print-outs should be handed with the report. Each group should sign the class list when handing in the report. **The report should also be submitted electronically to the module leader.** The report that is handed in 16 hours and less later after deadline: 10% will be deducted from the assignment mark. The report that is handed in 32 hours and less but more than 16 hours later after deadline: 20% will be deducted. The report that is handed in 56 hours and less but more than 32 hours later after deadline: 40% will be deducted. The report handed later than 56 hours and without arrangements, proper reason and approval: 100% will be deducted.
- f. Oral presentation of the project
- iv. **The abstract of the project should be electronically submitted to the Module leader**
 - a. **The abstract should be no more than 300 words (excluding title and names).**
 - b. **The author's names and department should be included with the title of the abstract.**
 - c. **The abstract should be written under the following headings: Introduction, Methods, Results and Conclusion**
- v. Each group should discuss the project and the presentation with the study leader before the presentations.
- vi. The project will be presented at the optometry research day on the **3rd August 2012**. The best two research projects will be presented at the student forum on the **22th August 2012**.

Table 1: Student tasks and due dates

Task	Due Dates
12.Finalize the protocol after amendments from Biostats.	7 January
13.Get Ethical committee documents from Mrs Strauss at the Faculty of Health Sciences. These documents have to be handed in with your protocol, a signed letter from Biostats and your questionnaires for ethical approval	
14.Make appointments with Biostatistics to see them during the week of 9-18 January for feedback. Give a copy of the Protocol that was given to Biostats to your study leader to mark.	9-18 January
<p>15. Final revised protocols and ethics committee application documents have to be handed in at Mrs Strauss for ethical approval. No documents that are handed in late will be accepted!</p> <p><i>NOTE: The ethical committee's secretary will not allow any group to submit the protocol and the ethical application documents <u>without the module leader and the biostatisticians approval.</u></i></p>	19 February (Latest date as sitting of the Ethics Committee is on 5 March)
<p>16.Conducting a study</p> <p>This is the fieldwork that has to be done by the students.</p> <p><i>No data collection can commence before the approval of the protocol by the Ethics committee.</i></p>	March to May
<p>17.Data submission</p> <p>The biostatistician and your study leader will help you with data analysis. <i>Remember to make an appointment with the biostatisticians in advance.</i></p>	23 May
18.Submission of the Abstract to the module leader (ELECTRONICALLY).	19 July
19.Departmental Oral presentation of the research projects	2 Aug

20.Oral presentations at the Student Forum The best departmental groups will present at the Student forum	20 Aug
21.Submission of written report on the study. The raw data (data forms) together with the statistical analysis computer print-outs should be handed with the report. The written report should be submitted electronically.	12 Aug

Oral Presentation and Written Report's Assessment Criteria

1. Introduction:	Background (Appropriate literature abstracted and presented clearly)
	Overview of the problem area provided
	Objectives clearly stated
	Hypothesis (or experimental question) clearly stated
2. Methods:	Overview of the experimental design used
	Overview of the subjects used and how they were obtained.
	Materials or stimuli used were described
	Procedure used was presented
3. Results:	How the behavior (variable) measured was scored, was explained
	Statistics used clearly presented
	Use of figures and tables to explain the results
4. Discussion and conclusions	Whether results were or were not in agreement with your research hypothesis clearly stated
	Relate the results to other previous studies
	Major findings and interpretations briefly summarize
	Implications of the results for knowledge in the problem area were pointed out
	Problems (Limitations of the study) discussed

	Future research address (suggestions)
5. General aspects of the presentation (referring to oral presentation only)	Answers to questions from the audience
	Figures or tables: Quality (design and legibility) and use in the presentation
	Clear, easy to read and informative visual aids (simple, sufficient time)
	Presentation: no cluttering of information, few bullets per slide, acceptable font (18 and larger)
	Presentation: Organization and delivery of the oral report, including voice, pace, clarity of presentation
6. General aspects of the written report	Is the research publishable?

**MODULE GUIDE FOR THE RESEARCH PROJECT CONTAINED IN COT409
MODULE 2014**

Research

The purpose of the module is to expose students to conducting a vision related research and presentation of the research results. The module will enable the students to publish papers and present papers in national and international conferences. Submission for publication of outstanding reports/papers in this module is encouraged. This module is a continuation of ORE 304 module. This is a student project. No formal lectures will be given. Staff members will act as project supervisors (study leaders).

Student's tasks (Also Check Table 1 for due dates)

- a. Writing a protocol for a study to be conducted
 - i. A draft should be handed to the supervisor / study leader.
 - ii. The protocol will be marked by the biostatisticians and the module leader. The submission to the module leader should be electronically.
- b. Ethics committee applications
- iii. The protocol and the ethical forms must be signed by the study leaders and the biostatistician before being submitted to the module leader. All ethical applications have to be submitted to the **module leader for final signature before being submitted to the ethics committee.**
- c. Conducting a study
 - iv. This is the fieldwork that has to be done by the students after obtaining approval from the Ethics committee.
 - v. Collecting data
- d. Data Submission
- vi. Data analysis is done by the Biostatisticians. The students should know the different tests that will be conducted.
- vii. The data should be submitted to the biostatistician by **12.00pm June 1st, 2012**
- e. Compiling a written report on the study
- viii. The report will be written using the Optometry and Vision Science paper style. The students must acquaint themselves with the writing format of this journal, which is obtained in the journal under the heading **"instructions for authors"**. Also the format may be obtained on

internet: <https://www.editorialmanager.com/ovs/default.asp>. Students will be **penalized (10%)** for not using the correct format. The Optometry and Vision Science journal is available in the Frik Scot Library.

- ix. Only typed or word processed document will be accepted.
- x. Note that translation or copying from internet, textbooks or journals is called plagiarism, and is research misconduct. No marks will be given for the work that has been translated or copied from other sources. You have to use your own words or sentences.
- xi. The written report is due by **12.00pm August 13, 2012. It should be handed to the departmental secretary.** The raw data (data forms) together with the statistical analysis computer print-outs should be handed with the report. Each group should sign the class list when handing in the report. **The report should also be submitted electronically to the module leader.** The report that is handed in 16 hours and less later after deadline: 10% will be deducted from the assignment mark. The report that is handed in 32 hours and less but more than 16 hours later after deadline: 20% will be deducted. The report that is handed in 56 hours and less but more than 32 hours later after deadline: 40% will be deducted. The report handed later than 56 hours and without arrangements, proper reason and approval: 100% will be deducted.
- f. Oral presentation of the project
- xii. **The abstract of the project should be electronically submitted to the Module leader**
 - a. **The abstract should be no more than 300 words (excluding title and names).**
 - b. **The author's names and department should be included with the title of the abstract.**
 - c. **The abstract should be written under the following headings: Introduction, Methods, Results and Conclusion**
- xiii. Each group should discuss the project and the presentation with the study leader before the presentations.

The project will be presented at the optometry research day on the **3rd August 2012**. The best two research projects will be presented at the student forum on the **22th August 2012**.

Table 1: Student tasks and due dates

Task	Due Dates
22.Finalize the protocol after amendments from Biostats.	7 January
23.Get Ethical committee documents from Mrs Strauss at the Faculty of Health Sciences. These documents have to be handed in with your protocol, a signed letter from Biostats and your questionnaires for ethical approval	
24.Make appointments with Biostatistics to see them during the week of 9-18 January for feedback. Give a copy of the Protocol that was given to Biostats to your study leader to mark.	9-18 January
<p>25. Final revised protocols and ethics committee application documents have to be handed in at Mrs Strauss for ethical approval. No documents that are handed in late will be accepted!</p> <p><i>NOTE: The ethical committee's secretary will not allow any group to submit the protocol and the ethical application documents <u>without the module leader and the biostatisticians approval.</u></i></p>	19 February (Latest date as sitting of the Ethics Committee is on 5 March)
<p>26.Conducting a study</p> <p>This is the fieldwork that has to be done by the students.</p> <p><i>No data collection can commence before the approval of the protocol by the Ethics committee.</i></p>	March to May
<p>27.Data submission</p> <p>The biostatistician and your study leader will help you with data analysis. <i>Remember to make an appointment with the biostatisticians in advance.</i></p>	23 May
28.Submission of the Abstract to the module leader (ELECTRONICALLY).	19 July
29.Departmental Oral presentation of the research projects	2 Aug

<p>30.Oral presentations at the Student Forum</p> <p>The best departmental groups will present at the Student forum</p>	<p>20 Aug</p>
<p>31.Submission of written report on the study.</p> <p>The raw data (data forms) together with the statistical analysis computer print-outs should be handed with the report.</p> <p>The written report should be submitted electronically.</p>	<p>12 Aug</p>