

**A WORK-INTEGRATED LEARNING MENTORSHIP MODEL FOR
NATURE CONSERVATION AT AN OPEN DISTANCE LEARNING UNIVERSITY
IN SOUTH AFRICA**

By
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Declaration

I, GRAEME AUSTIN WILSON, hereby solemnly declare that the research and the resultant dissertation of limited scope, submitted in part fulfilment of the requirements for a Master's Degree in Open Distance Learning, is my original work. Furthermore, this manuscript has never been reproduced or submitted to any other institution. All the sources or quotes used have been properly acknowledged and specified through the inclusion of a complete reference list at the end of this submission.

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February 2019

Dedication

I would like to dedicate this dissertation to my loving wife, Ann and my son James, for all their selfless support for my studies. I appreciate the time, encouragement, ideas, motivation, love and inspiration you gave me when times became difficult and stressful. It is through your loving assistance that I have been able to focus on completing this study.

With love and thanks

I will not forget

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WIL students

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University of South Africa

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Acronyms

App	Application (for a mobile phone)
CAES	College of Agriculture and Environmental Science
CAQDAS	Computer Assisted Qualitative Data Analysis Software
CHE	Council on Higher Education
DEA	Department of Environmental Affairs
DHET	Department of Higher Education and Training
EL	Experiential Learning
ELRO	Experiential Learning Resource Office
ESSP	Environmental Sector Skills Plan
ICT	Information and Communications Technology
LMS	Learning management system
miniSASS	Mini South African Scoring System (novice water quality investigations)
Nat Con	Nature Conservation
NCA	Nature Conservation Application
NQF	National Qualifications Framework
NSDS	National Skills Development Strategy
ODL	Open and Distance Learning
ODeL	Open Distance e-Learning
PDF	Portable Document Format
RPSC	Research Permission Subcommittee
SAQA	South African Qualifications Authority
URL	Uniform Resource Locator
Unisa	University of South Africa
Wi-Fi	A popular wireless internet and network connections technology
WIL	Work-integrated Learning

Abstract

In this dissertation of limited scope, the phenomenon of providing effective work-integrated learning mentorship to nature conservation undergraduate students is explored, specifically to determine if mobile technology can be offered as an alternative or supplementary mentoring strategy for an Open Distance Learning university.

Mentoring of work-integrated learning undergraduate students is an integral component of the Nature Conservation Diploma offered by the University of South Africa. The prerequisite mentoring of students is not consistent across all required sector-based placements and this could be construed as being unjust and discriminatory. This possible negative perception has motivated this investigation into work-integrated learning mentorship approaches within the Nature Conservation Diploma. This exploratory case study provides insights into and lays a foundation for the development of a supplementary mentorship provision strategy, for students who find it difficult to secure mentorship opportunities.

Applying a social learning and integration perspective, three cohorts of undergraduate nature conservation work-integrated learning students participated in this study. This qualitative exploratory case study focused on the interaction and subsequent results achieved by students, through engaging with one of three different mentorship methods available to students at the University of South Africa. The three methods were: face-to-face mentoring by an academic, digital mentoring provided by means of a mobile phone application and sector-based mentoring. The latter method represents the current mentorship provision status quo for all nature conservation work-integrated learning diploma students.

The findings reveal that the three mentoring methods are effective in supporting work-integrated learning students. The students indicated their preference for mentorship provided by the University of South Africa, over that of the sector-based mentors. No significant difference between the two university-provided methods of mentorship was found. This study recommends that the University continue with its development of the digital mentor option, to function as a fully functioning supplementary mentor.

Key concepts

Africa, applications, case study, conservation, mLearning, mentoring, mobile technology, nature conservation, open and distance learning, open distance and e-Learning, qualitative research, social learning theory, work-integrated learning (WIL).

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CHAPTER ONE

STUDY ORIENTATION AND BACKGROUND

1.1 Introduction

In this dissertation of limited scope, the phenomenon of providing effective work-integrated learning (WIL) mentorship to nature conservation undergraduate students registered with an Open Distance Learning (ODL) university is explored. The study aims to determine whether mobile technology could be offered as an alternative mentoring method and considers three main areas, namely, mentoring and mentors, technology and mobile learning, and WIL.

There is no doubt that technology and its ubiquitous nature has had a substantial impact on almost every facet of modern society. According to Cleveland-Innes (2010:1) technology-induced changes have permeated formal and informal education and there is growing evidence of how technology is changing teaching and learning processes in the classroom.

Change within education is not a new phenomenon, according to Bates and Sangrà (2011:3) who state that universities, as a concept, have remained relatively unaltered for more than eight centuries, while managing to retain their academic independence and societal relevance. Moreover, they stress that universities have become more numerous while simultaneously experiencing immense academic development and reform during this time. However, Bates and Sangrà (2011:3) also mention that these higher education institutions are experiencing sustained pressure for further change. The need for socio-economic development and the growing demands of a knowledge-based society are just some of the driving forces behind higher education institutional change. The use of technology is viewed as a key role-player and driver in this change.

In addition, Hill, Song and West (2009:100) state that learner and societal expectations and needs have undergone similar changes over the years, as technologies have been integrated into formal and informal learning processes. Thus, the above arguments imply that social learning perspectives, provided by the integration of

technology, offer promising levers for practical and desirable teaching and learning processes.

According to Cleveland-Innes (2010:2), the reconceptualising, restructuring and reshaping of how teaching and learning is approached in higher education institutions is a consequence of technology incorporation. However, Herrington and Kervin (2007:219) claim that technology use in the classroom is often employed for the wrong reasons. They assert that frequently the inclusion of technology is purely for the use of the teacher, for convenience, for student entertainment or for the appeasement of school administrators. Furthermore, they stress that technology cannot be introduced in an ad hoc manner, for the reasons tendered above. Jonassen (1994:1) validates the views of Herrington and Kervin by stating that generally, technology has been used to convey information, to transmit knowledge or tutor students. Jonassen (1994:2) continues by stating that if technologies were used as 'cognitive tools', this would represent a divergence from the use of technology in education as presented above by Herrington and Kervin.

Conversely, Mays (2011:866) states that in South Africa, teachers have by and large been slow to access the affordances of technology in general, and its online potential in particular. Moreover, Mays highlights the disparity between schools in South Africa regarding access to technological infrastructure and reliable internet connectivity. This variance is also noticeable among South African teachers and their willingness to use technology to achieve curriculum outcomes, and not simply for administrative purposes. Consequently, Mays and his observations are linked to the way technology is used in education and how it represents particular values and uses for students. Further, Mays (2011:866) suggests that conscious choices need to be made to use appropriate technology in appropriate ways, which addresses both desired learning outcomes and the technological profile of the student.

The Mays suggestion is relevant and there is growing evidence that demonstrates how technology is providing affordances to WIL. According to Howard (2011:13), the development of digital technologies has provided curriculum developers with the opportunity to develop sophisticated role-plays and virtual environments, which can

address some of the limitations linked to student placement and mentorship. Moreover, developments in Web 2.0 and gaming technologies have the potential, according to Howard, to develop graduates with both experience and problem-solving skills. In addition, student exposure to a broad array of workplace-based complexities and ambiguities can be enriched beyond that, which most formal placements can offer, by the employment of technology.

Conversely, even with the escalation in the use of pervasive technology, there remains a gap in Afrocentric research literature relating to the use of technology in WIL mentorship scenarios. This perspective is further substantiated by the limited academic discourse around using mobile technology as a tool, to supplement or replace the responsibilities of a mentor for Open Distance Learning WIL students.

1.2 Background

Kaliisa and Picard (2017:1) state that the popularity of mobile devices has led to an uptake in their use within higher education. They also state that the concomitant research into mobile learning within differing contexts has also increased; however, only a few of these resultant studies emanate from Africa.

Mobile learning or mLearning, according to Brown and Mbatia (2015:115), offers exciting new opportunities within open and distance learning. Brown and Mbatia elaborate by saying that mLearning is still in the process of maturing and assimilating into mainstream education but has advertised its appropriateness for use in distance education.

The background to this study is located in the utilisation of mobile devices combined with their applications, to facilitate mentorship of WIL students in the field. Thus, WIL, mobile learning and mentorship form the three concept pillars of this study. This concept will be expanded and explained in detail.

This study delves into what is traditionally viewed as a vocationally grounded sector, namely, nature conservation. As implied, the sector seeks to employ higher education

nature conservation graduates who are suitably skilled and imbued with sector-based experience. This set of prerequisites presents an open and distance learning institution, such as the University of South Africa (Unisa), with a unique challenge. The University has responded by including a series of WIL modules into its nature conservation diploma qualification.

Freudenberg, Brimble and Cameron (2010:575) highlight a particular concern regarding the work-readiness of graduates. They proffer that the employability and generic work skills of graduates are deficient, resulting in employer dissatisfaction. They suggest that utilising WIL as a learning method employed by higher education could deliver work-ready graduates in response to an identified sector need. Jackson (2016:833) presents the need to develop the pre-professional identity of students through WIL. She explains that this identity is linked to sector needs and says her findings indicate that WIL placements could provide the affordances required to construct a pre-professional identity for students.

Jackson, Rowbottom, Ferns and Mclean (2016:35) have explored the employer or sector understanding of WIL. They concluded that while the sector had a very poor understanding of WIL, it nevertheless recognised the benefit thereof. Jackson *et al.* emphasise that a number of issues influence the synergy between the sector and students. The sector cited issues such as a lack of suitable projects or tasks, sourcing appropriate students, student performance and commitment, and its own capacity to mentor students, as influencing factors.

Furthermore, Carden (1990:275) describes mentoring as the task of socialising students into their professional identities, thus linking Jackson's pre-professional identities and WIL processes. Lankau and Scadura (2002:779) corroborate Carden and Jackson and identify three types of information linked to new recruit mentoring. These informational needs relate to technical information, which covers the 'how to' of executing a task, referent information, which covers the 'what' other employees expect, and lastly, normative information, which deals with expectations about the attitudes and behaviour in the workplace of new recruits.

However, Lankau and Scadura (2002:779) also state that this technical and procedural inductive-type formative mentoring, during the induction phase, is no longer sufficient. They posit that learning does not stop once a recruit is inducted. However, this study and the student research participants have focused on gaining and honing these introductory skills and experiences in an effort to gain access to the job market. Thus, exploration of WIL and mentoring expectations was at the introductory level, on the understanding that once the graduates have found gainful employment, the sector will continue to provide opportunities in support of lifelong learning for their employees.

When I reflect on the past thirty years of my conservation career, I can remember clearly all the challenges I faced when seeking suitable employment in the career of my choice. These events and memories are so vivid and were so impactful and influenced me so deeply at the time, which to this day I recognise this feeling and empathise with my students. I firmly believe that my conservation and education career was shaped by these traumatic events and that I am where I am today because of them.

Furthermore, I am motivated by the affordances which technology has to offer. I also spend a good portion of my time interacting with nature conservation students and we discuss many of the challenges, which affect their study and career ambitions. I have noticed that all the students have access to mobile phones and use them almost exclusively for their studies. An extension to these discussions is a student-generated Facebook group which focuses on conservation, particularly studies in conservation, and to which I have been added as a member. The group functions outside the realm of Unisa's *myUnisa* student portal. I draw attention to this to illustrate the student-generated social networks which exist between students, and which operate independently of the University.

Based on the above and on my personal experience of thirty years as a conservationist and mentor, the evidence for mobile learning and integrating its affordances into providing mentorship for WIL, warrants empirical investigation.

1.3 Problem formulation

Many students indicate that they are unable to find suitable placement that they can engage with and that can fulfil their WIL module requirements, Furthermore, they are unable to access suitable, appropriate, dedicated and/or specialised mentors within the sector. The inability, by some students, to access mentors places these students at a distinct disadvantage. This can have a direct negative impact on their acquisition of the required skills and competencies to complete their nature conservation WIL module assignments, and ultimately their qualifications.

Unisa (n.d.(a)) claims to be the largest open distance e-learning higher education institution on the African continent, with more than 400 000 registered students across a range of short courses, certificate programmes, diplomas and degrees. Consequently, this mega open distance higher education institution has students located across the country and throughout the world. This huge geographic distribution of students presents the University with a substantial problem regarding suitable placements and mentors for every registered WIL student and for each unique experience required. Further compounding the Universities dilemma, is a South African Government gazetted directive (2014:17), which compels all institutions of higher learning, which offer WIL modules within any of their qualifications, to provide suitable placements and mentors for all their registered students.

Navarro-Perez and Tidball (2012:14) emphasise the importance of the role of education in efforts to achieve sustainability and the conservation of global biodiversity, through the changing of human attitudes and behaviour towards the natural environment. However, Ehrlich and Pringle (2008:11583) report a 20-year correlation between the rise in electronic media and a decline in visits to national parks in the United States, commenting that the growing disconnect between people and nature is common in developed nations worldwide. This statement is supported by Navarro-Perez and Tidball (2012:13), who claim that this disconnect presents a particular impediment to achieving set educational targets and conservation objectives.

A specific component of this study is the low number of annual registrations garnered by the nature conservation qualification. According to Unisa (2018(b)), student registrations within the College of Agriculture and Environmental Science account for only 3% of the total annual registrations processed University-wide. The Experiential Learning Resource Office (2018) reports that the nature conservation qualification accounts for 5% of total registrations for the College of Agriculture and Environmental Science, and, among registrations for the nature conservation qualification, only 53% registered for one or more of the WIL modules. To put this into perspective, the nature conservation WIL module represents 0,07% of the total student body of Unisa. Consequently, the registered student cohort for the Diploma in Nature Conservation provided a limited number of potential research participants from which to select for this study.

1.4 Research question formulation

An open distance e-learning institution of higher learning, such as Unisa, offering qualifications that contain WIL modules, should be able to ensure that all its students are suitably placed and appropriately mentored. However, the provision of suitable placements and mentoring for many of its distant or remotely located students, presents the University with a considerable challenge.

According to the Experiential Learning Resource Office (2018), only 49% of all students who registered for one or more of the Nature Conservation Application modules indicated, upon registration, that they had secured placement and, by association, secured a mentor. Of the remaining 51%, a further 18% indicated that they were uncertain if they would be able to secure placements and mentors for all their module assignments. The remaining 33% indicated that they did not have a placement or a mentor. Herein lies the University's dilemma: how can it ensure the satisfactory provision of WIL placements and mentorships, for all its students.

Additional factors, which contribute to this dilemma, include the geographical distribution of students and the design of nature conservation WIL modules (Nature Conservation Application). Students are at liberty to select any WIL module

assignment, which suits their study schedules, time preferences and geographic location. Thus, due to the geographic distribution of students and the nature of the WIL modules, which accentuate student centeredness and offer flexibility of choice, topic selection by students is completely random.

According to Crisp and Cruz (2009:527) there is no single, conclusive definition for mentoring. However, the principles that underpin mentoring include the provision of help, assistance and guidance, to someone in need. Within this study, the primary beneficiaries of mentoring are the nature conservation WIL students. For this reason, a concerted and sustained effort should be made by the University to ensure that it delivers on its placement and mentorship provision mandate, as outlined by a South African Government gazetted directive (2014:17). Accordingly, no WIL student should be left to complete his or her modules without a suitable placement and an appropriate mentor.

1.4.1 Primary research question

The provision of suitable mentoring for all WIL students compels the University to provide alternative mentoring options for those students who may not have secured a mentor who can help, assist and guide them with their WIL module needs. If Unisa were to embrace the affordances offered by technology in support of teaching and learning, the provision of a suitable, alternative mentoring service could be delivered. The principal research question for this study is as follows:

- How effective is a mobile application in providing mentorship for a nature conservation WIL experience?

1.4.2 Sub-questions

Deconstruction of the principal research question gives rise to the following sub-questions:

- How best can a mobile technology be designed, in order to serve the outcomes required by the nature conservation WIL module?
- How do the students' perceptions of mentoring differ, between those who were mentored by means of mobile technology and those who were mentored face-to-face?
- How do the academic outcomes achieved by the students differ, between those who were mentored via mobile technology and those who were mentored face-to-face?

1.5 Aim of the research

Based on the research questions presented in the section above, this study aimed to determine the efficacy of a mobile application in the provision of mentorship for a nature conservation WIL experience. Emanating from this main aim, the following objectives were identified and investigated as part of this study.

1.6 Objectives

Three main objectives were identified for this study. These are as follows:

1.6.1 Objective 1

To design a mobile phone application to meet the outcomes required by the nature conservation WIL module.

1.6.2 Objective 2

To compare the perceptions of students who were mentored via mobile technology, with those who received face-to-face mentoring from a university academic.

1.6.3 Objective 3

To compare the academic outcomes achieved by students who were mentored via mobile technology, with those who received face-to-face mentoring from a university academic.

The envisaged outcome is a possible workable digital alternative, to enable the provision of academic mentorship where suitable and or skilled sector mentorship is absent.

1.7 Contextual framework

This study is complex and needs to be explicitly described and contextually grounded. Unisa is an open and distance learning institution of higher education. It offers an undergraduate qualification in nature conservation. This field of study is viewed traditionally as being vocationally focused by design.

Expectations that the University should produce employable graduates obliges it to produce graduates who are imbued with sector-required skills and experiences. The University meets this obligation by including six WIL modules in the nature conservation undergraduate qualification. A further expectation stems from the South African Government gazetted directive (2014:17), which directs all institutions of higher learning that offer WIL modules, within any of their qualifications, to find suitable placements and mentors for all their registered students.

Within the Department of Nature Conservation in the College of Agriculture and Environmental Sciences, a dedicated office has been established to manage the WIL curriculum and, by association, the placement of all its registered students. Due to the geographic distribution of these students and the limited capacity of the WIL office, the directive as outlined in the South African Government gazette (2014:17), has not been implemented in its entirety.

As stated above, the WIL curriculum comprises six modules, designed specifically to reduce the placement and mentorship dilemma faced by the University. In an attempt

to address this predicament, the WIL office has created an extensive list (see Appendix 1) describing potential nature conservation WIL activities, any of which students are free to select. Included in this comprehensive list of topics are a number of skills and experiences, which, under certain circumstances, can be pursued without placement and, by association, without a mentor. However, not all the skills and experiences listed can be acquired using this approach.

Each nature conservation WIL student is expected to acquire 30 conservation skills across seven predetermined conservation themes, as per the comprehensive topic list. Each of the six WIL modules comprises five assignments based on skills gained in the field by the students. To assist students to capture their experiences, a standardised template (see Appendix 2) has been created. This ensures that the information captured and submitted by all students is received in a structured and standardised format, ready for formal assessment.

For the past ten years, the Department of Nature Conservation at Unisa has benefited from an agreement with the Oppenheimer Family and the owners of the private nature reserve named Telperion. The agreement covers the use of the land and certain allocated facilities and serves as a placement (with accompanying mentoring) for young nature conservation diploma students. Consequently, the nature reserve has been utilised also to offer WIL mentorship opportunities to unplaced students. According to Wilson and Wilson (2015:1), a total of 53% of all graduates for the 2015 academic year acquired all or part of their WIL experiences at the Telperion Nature Reserve.

The mentoring provided at Telperion takes place during specially planned and hosted week-long excursions, which are offered every month. The accommodation capacity of the facilities at Telperion is limited to twenty students. Each month different WIL experiences are offered and students are invited to apply for participation in these excursions. A set of applicant selection criteria is shared with prospective applicants and ensures that no student is favoured over another.

However, for this specific study a compulsory topic was selected, which facilitated the face-to-face and digital mentoring approaches and enabled students to engage with and develop the required skills. The topic selected to support this study was the miniSASS water monitoring method. Only after completion of the entire experience were students asked to provide their perceptions of mentors and mentoring, during a semi-structured interview (see Appendices 12 and 13).

The context of Nature Conservation WIL within Unisa and the provision of mentorship for students at Telperion will be explained in detail in Chapter Two.

1.8 Theoretical framework

Bandura's Social Learning Theory is well suited for analysis of the behaviour and motivation of participants in this study, while Tinto's Social Integration Theory adds the perspective of learning that takes place within learning communities, utilising collaborative teaching strategies. Both these theories focus on how humans learn and are directly relevant to interpretation of the affordances offered by mobile technology, as a vehicle for mentorship of students in need. Wilber's Integral Theory offers intriguing alternatives for viewing the data gathered, and thus provides the opportunity for a transdisciplinary perspective of the study focus. These three theories were used to illuminate aspects of relevance to the primary research question and sub-questions.

1.8.1 Bandura's Social Learning Theory

The first theory is Bandura's Social Learning Theory, which provides a practical framework for teaching and learning research and practice and is particularly relevant to technology-enabled learning. Bandura's theory (1971:2) integrates aspects of both behavioural and cognitive theories. Of relevance to this study is the notion that humans can and do learn through direct observation of others and the ensuing consequences. Another of Bandura's findings (1971:5) focuses on modelling as an indispensable facet of learning and leads to the statement that "a good example is a better teacher than that of unguided actions".

Two further aspects of Bandura's Social Learning Theory involve associational preferences (1971:6) and the influence that flows from anticipation of reinforcement (1971:9). Associational preference alludes to students selecting interesting models over those deemed to be less exciting. Anticipated reinforcement can be observed when a student intentionally chooses to study a particular model, expecting that it will produce an anticipated outcome (1971:9). This behaviour improves observational learning and can lead to longer retention of observed experiences.

1.8.2 Tinto's Social Integration Theory

The second theory is Tinto's Social Integration Theory (1995:12), which suggests that students who are incorporated into learning communities in which collaborative teaching strategies are employed, are more likely to succeed. Additionally, the collaboration between lecturers and students in these teaching and learning processes requires students to become actively involved not only in their own learning, but also in the learning undertaken by their fellow students (1995:12).

1.8.3 Wilber's Integral Theory

The third and final theory of importance is Wilber's Integral Theory. According to Esbjörn-Hargens (2007:75), Wilber's Integral Theory provides a comprehensive method for viewing a particular actuality. This theory was applied when viewing the digital mentor, from several different perspectives, which assisted with the development of a more holistic understanding regarding the impact of the digital mentors on nature conservation WIL mentoring.

All three theories function well as research lenses through which the data collected can be understood and interpreted. These three theories will be explained in detail in Chapter Two.

1.9 Research design

The methodology adopted for this study included a formal literature review and an empirical inquiry, which will be introduced in the sections listed below.

1.9.1 Literature study

According to Ellis and Levy (2008:22), a literature review creates a research foundation through the establishment of a research problem. They state also that the bulk of research studies are based on problems, which are already well-documented. Furthermore, Ellis and Levy add that literature supports the establishment of appropriate research questions, research goals and research methodologies, and informs results analysis as well as the type of research to be conducted.

In summary, the foundation provided by an in-depth literature review launches the research process by informing its structure, providing direction and adding credibility. Literature associated with this study provided an account of the complexities associated with WIL, mentoring and mLearning. The foundational literature for this study will be reviewed in detail in Chapter Two.

1.9.2 Empirical inquiry

This study adopted a qualitative approach and utilised a single exploratory case study to focus on the current phenomenon within an actual context. The empirical inquiry examined multiple sources of data and thus was able to illuminate the viewpoints of participants.

Data pertinent to this study was collected during semi-structured interviews, which also contained an aspect of member checking. Additional documents completed by the participants were also used to garner additional relevant data.

Although the study adopted a qualitative approach overall, a small aspect of the data collection generated numerical data which, in turn, was statistically tested. The results

were used to provide additional credence for this qualitative study and its outcomes. The research design will be revisited in detail in Chapter Three.

1.10 Research methods

According to Creswell and Miller (2010:124), qualitative researchers utilise a wide range of procedures to authenticate their studies. This study harvested data from three different cohorts of undergraduate nature conservation students and produced a detailed analysis of the information collected.

Research participants took part in the provided WIL experience both as individuals and as a collective community of learning. The criteria for participant selection, the method of data collection and the means by which data was analysed will be introduced in the sections below.

1.10.1 Selection of participants

This study required the formation of three cohorts of students selected from all registered nature conservation WIL students. The cohorts selected were each assigned a different mentorship approach. The first group was assigned a Unisa-allocated academic, to fulfil a formal face-to-face mentoring role. The second group was assigned a Unisa-designed mobile phone application, to fulfil the mentoring function. The third group was not offered any mentorship options by Unisa and thus represented the mentorship norm provided by the sector.

Research participants required to participate in the face-to-face and digital mentoring components of the study (cohort one and cohort two, respectively) were selected through Unisa's digital student portal, *myUnisa*. A formal advertisement (see Appendix 3) was loaded onto the portal and invited any registered WIL student to apply, to acquire one of their compulsory skills with assistance from a Unisa-provided mentor.

A few standard application conditions had been ascribed to the invitation and were shared with potential applicants within the text of the formal advert. Applicants were

required to submit an assignment. The first twenty compliant applications received were assigned the excursion with a face-to-face mentor. The next twenty compliant applications received were assigned the excursion with the Unisa-designed digital mentor.

Selection of the students within the group deemed to be receiving sector-based mentoring was based on the first twenty completed and marked assignments received after the excursion, with the same topic focus as the two university-mentored groups. However, the sector-based students were not interviewed; only their marks, the content of their assignments and the comments provided by the markers were considered representative of the impact of mentoring provided by the sector.

1.10.2 Data collection

The study utilised and linked multiple types of qualitative data, including semi-structured interviews, document analyses and a student opinion poll, to capture and assess the experiences of research participants.

The semi-structured interview method of data collection was selected, to elicit the views, opinions and experiences of research participants. Document analysis was conducted on a variety of documents, including the student opinion poll, and linked directly to the primary research question.

Each of the research participants submitted an assignment, which was marked, analysed and interpreted, using statistics. Although statistical analyses are quantitative rather than qualitative data, the results endorse the qualitative nature of this study.

The collection of data for this study will be covered in detail in Chapter Three.

1.10.3 Data analysis

According to Bowen (2009:27), the process of document analysis involves the systematic review and evaluation of selected documents. This is supported by Creswell (2014:240), who states that documents should be selected purposely, to assist with the unpacking of the research phenomenon. Bowen (2009:27) explains further that documents include printed and electronic material. This study has employed a particular form of data analysis known as thematic analysis.

Thematic analysis, as defined by Braun and Clarke (2006:79), is a research method used to identify, analyse and record themes, or patterns, that emerge from a particular dataset. The process is flexible, requires minimal organisation of the data, and enables detailed descriptions of findings and interpretations.

This study employed three different sets of documents submitted by research participants and nature conservation course students. The documents were scoured for possible linkages, themes, excerpts and quotations, which validated the interpretations generated by analysis of other relevant data.

The analysis of study data will be covered in detail in Chapter Three.

1.11 Ethical measures

According to Orb, Eisenhauer and Wynaden (2000:93), ethical issues are omnipresent within any form of research and these issues often impact on the aims of the research and/or on the participants. Orb *et al.* describe ethics simply as “doing good and avoiding harm”.

The researcher associated with this qualitative study was aware of possible ethical implications and ensured that appropriate steps were taken to minimise these concerns. An ethics application was submitted to the Unisa College of Education Ethics Review Committee and was approved by the Committee (see Appendix 4). Both staff and students at Unisa were involved in the study; accordingly, additional

permission was sought from the University's Research Permission Subcommittee, which formal approval was received. A further request to access and use electronic data captured via the University's student portal, *myUnisa*, was also approved.

All research participants were informed about the study and everyone willing to contribute was asked to complete a formal consent form. The Unisa Policy on Research Ethics (2016) provides a clear definition of the boundaries of ethical research, to which this study adhered. The confidentiality, anonymity, respect and safety of all research participants before, during and after the study, was assured.

1.12 Trustworthiness

The founding characteristics of validity and reliability assured that this qualitative study produced acceptable and unquestionable research findings. All potential risks were emphasised and various strategies were put in place to mitigate the effects of these threats and risks.

This study selected a methodology designed to yield consistent, comparable and repeatable results. Various data collection strategies were used to ensure internal validity was true and accurate.

The convenient sampling technique was used as a selection strategy to mitigate any potential bias in the selection of students as research participants (see Section 3.5.2). Furthermore, a competent external assessor was contracted to conduct formal assessments of all the selected student submissions. A pre-developed marking rubric was used for the summative assessments.

Triangulation was used, thus validating the congruency of data collected through the employment of various data collection methods. To reduce potential errors from occurring, I was solely responsible for the collection, transcribing, analysing and interpreting of the data gathered, which improves the ultimate accuracy and trustworthiness of the results.

Judgement of the soundness of the research rests on its trustworthiness and transferability, and therefore the research methodology is considered valid and the results are deemed reliable.

1.13 Definitions of key terms

A number of key concepts are used throughout this study and contribute to the formation of a supporting context to this study. These key terms are briefly described below.

1.13.1 Work-integrated learning (WIL)

According to the Unisa Policy on Experiential Learning (2015:1), WIL is viewed as an all-encompassing concept which covers a wide scope of academic disciplines and integrates both formal theoretical learning and workplace concerns, through curricular, pedagogic and assessment strategies. The WIL good practice guide developed by the Council on Higher Education has directed and informed Unisa's understanding of WIL theory and practice (2014:4).

1.13.2 Mentorship

According to Qahtani (2014:149) mentorship is a process whereby a highly regarded and experienced person guides another in developing and reflecting on their own ideas, understanding and their individual or professional development. Unisa's Policy on Experiential Learning (2015:1) describes a mentor as a person of suitable experience and reciprocal academic acumen, who is employed and operates within the real world of work. The mentor then commits to supervising and mentoring a WIL student for as long as the student remains registered for a WIL module.

1.13.3 Distance learning

As stated by Moore, Dickson-Deane and Galyen (2011:129), authors often and inconsistently use the notions of distance learning and distance education

interchangeably. The underlying thinking for both notions is linked to providing learning access to geographically distributed students.

1.13.4 Distance education

Desmond Keegan (1980:13) in the synopsis for his article, *On Defining Distance Education*, highlights a few generally accepted definitions, as posited by Holmberg, Moore and Peters.

Holmberg's understanding (1995:49) describes two clear components to distance education: the locations of teacher and learner are not the same, and the learning taking place is planned and guided by the responsible educational institution. According to Moore (1973:663), who further develops the first component of the Holmberg definition, the teaching and learning behaviours are conducted apart from one another. Furthermore, he includes the options of print, mechanical and electronic devices, which facilitate two-way communication.

According to Keegan (1980:16), the Peters definition describes the same components presented by both Holmberg and Moore. However, Peters goes on to equate the structure of distance education with the principles of industrialisation. In response to the controversy resulting from his notion that distance education is a form of industrialised education, Peters (1989:3) concludes that the debate continues to widen and includes aspects such as computer assisted distance education.

However, it is Unisa's definition (2008:1) of distance education that has informed the primary focus for this study:

[Distance education] is a set of methods or processes for teaching a diverse range of students located at different places and physically separated from the learning institution, their tutors/teachers as well as other students.

1.13.5 e-Learning

According to Moore, Dickson-Deane and Galyen (2011:130), there is very little consensus among the various definitions of e-Learning. They link these differing views to the scope of technological tools being used to provide learning at a distance. Other authors, according to Moore *et al.*, (2011:130) believe that e-Learning should include knowledge construction and interactivity, to give credibility to the description of the intended learning experience.

However, for the purposes of this study, the Unisa definition of e-Learning presented in its curriculum policy (2012:4) will be followed. The University's policy defines e-Learning as learning which is facilitated by the use of information and communication technologies, online platforms and other multimedia equipment.

1.13.6 Case study

According to Robert K. Yin (1981:97), the case study is a research method, which can be used for exploratory research and also for explanatory or descriptive motives. He goes on to say that case studies can be used also to test and compare accounts of specific events and their outcomes and states (1981:109) that the most acceptable case study findings are those based on planned variations by the same researcher, or the synthesis of experiments completed by different researchers.

1.13.7 Mobile technologies

According to Kiliisa and Picard (2017:2), mobile technologies are small electronic devices sufficiently compact to be carried on a person. Viberg and Grönlund (2017:358) indicate that mobile technologies should be considered within the context of their use and define mobile devices as tools that are used specifically and repeatedly, on a daily basis.

1.13.8 Nature conservation

According to Unisa (n.d.) the purpose of the Nature Conservation Diploma qualification is to develop competent conservation officers who can provide management assistance and support to employed conservation and resource managers at a local, regional and national level. Furthermore, the qualification will improve the professional competencies of graduates in the fields of ecosystems management, sustainable and responsible utilisation of natural resources, environmental education and ecotourism.

Thus, nature conservation, in the context of an undergraduate diploma offered by Unisa, can be interpreted as the competent management of ecosystems in association with ecotourism, environmental education and the sustainable and responsible utilisation of natural resources at a local, regional and national level.

1.14 Chapter outline

In accordance with the stipulated requirements for a dissertation of limited scope within the degree of Master of Education, five chapters have been prepared and presented. Within each chapter, three basic segments (introduction, body and conclusion) were employed to order, present, discuss and summarise the research topic and the components of the research. The last two items lead into and inform the discussion, conclusion and recommendations.

Chapter One: Introduction and Background

Chapter One focuses on providing a setting for the study by broaching the underpinning topics of technology in higher education, mobile learning, WIL and mentoring of open and distance learning (ODL) undergraduate nature conservation students.

The main intention of this chapter is to introduce the research project while highlighting the phenomenon of providing effective WIL mentorship to nature conservation

undergraduate students; and determining if a mobile technology could be developed to support unplaced and un-mentored WIL students.

Following the introductory discussion is the study's research problem together with its ensuing research questions and associated aims and objectives. Three theories were selected to provide the theoretical framework for the study, while the research design took the form of a literature review and a qualitative empirical inquiry. The research methods employed for this study, namely, a semi-structured interview, document analysis and a student opinion poll were presented. The chapter ends with coverage of the ethical measures adopted by the study, trustworthiness, the definition of key terms and a brief chapter outline for this dissertation of limited scope.

Chapter Two: Literature Review

Chapter Two is dedicated to introducing the context, the theoretical framework and a concomitant literature review, which sustains this study. The three theories in question are the Social Learning Theory by Bandura, the Social Integration Theory by Tinto and Wilber's Integral Theory. Together these theories provide the necessary research lenses required for this qualitative research study.

This chapter also provides the research study with attendant scholarly works covering a number of supporting concepts such as WIL, mentoring, open and distance learning and mobile learning. The chapter closes with a synopsis of the context that underpins the study and an explanation of the key components identified by the theoretical framework and literature review.

Chapter Three: Research Methodology

Chapter Three addresses the execution of the empirical study and begins with a justification for the study followed by an explanation of the research design and methods. An exploratory case study provides the design for this empirical enquiry while the research methods were used to probe and analyse the study's research questions. Aspects such as research participant composition, their selection, data

collection, semi-structured interviews, document analyses and opinion polls are addressed.

This is followed by the contextualisation of this unique study in two sections: the first section describes the research setting; the second focuses on the development of a digital application required by the study.

The chapter concludes with the notion of trustworthiness and the ethical considerations pertinent to this study, followed by a short, concluding summary.

Chapter Four: Results

Chapter Four presents the findings from the analysis of data sources provided by research participants. Demographic data relating to the research participants is constructed, drawing on data from the semi-structured interviews. Analysis of this data identifies a number of themes and sub-themes, which are introduced and discussed.

A document analysis of student assignments and excursion evaluations is conducted and discussed. The chapter concludes with a summary of all the findings.

Chapter Five: Discussion, Conclusion and Recommendations

Chapter Five, the final chapter in this dissertation of limited scope, presents a synthesis of the research study, focusing on the phenomenon of providing effective WIL mentorship to nature conservation students.

Prior to the full synthesis of this study's findings and recommendations, summaries of the underpinning literature, empirical inquiry and research findings are provided. The research questions are answered, and the limitations of the research are highlighted.

The chapter and the dissertation of limited scope concludes with sections devoted to specific recommendations, aimed at various management levels and departments within Unisa, and suggestions for further research as prompted by this study.

1.15 Conclusion

The main aim of Chapter One is to provide a clear overview of the entire research study in terms of the orientation and background, supportive literature, design and methods, research results and conclusions.

The chapter begins by introducing the ubiquitous nature of technology and how it is influencing teaching and learning in higher education. The background to the study is described and the issue of mentoring in a WIL context is highlighted. This enables the formulation of a problem statement and subsequent research questions, to address the identified problem.

Consequent to the research question and sub-questions, the research aim and objectives are articulated. The theoretical framework and the research design and methods are formulated to address the research questions and achieve set objectives. The chapter closes with a discussion of ethical measures, trustworthiness, the definitions of terms and an outline of the five chapters constituting this study. Finally, the chapter is summarised in a conclusion.

The ensuing chapter will focus on providing a comprehensive review of related scholarly literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter One introduced some of the main challenges faced by both Unisa and its WIL students, to provide and make use of suitable mentoring, respectively. This overview highlighted the needs and strategies currently in place to ensure that mentorship is provided and accessed. The issues described culminated in the formation of a problem statement, a research question and sub-questions, and accompanying research objectives, which provided the study with its particular focus.

The first part of this chapter (Chapter Two) is dedicated to introducing the theoretical framework which underpins this study. The three theories in question are the Social Learning Theory of Bandura, the Social Integration Theory by Tinto and Wilber's Integral Theory. These three theories provide the necessary structure for this qualitative research study.

This is followed by an expanded scholarly review of the key sustaining concepts of skills needs, graduate employment, WIL and mentoring, to provide additional contextual support to this research study.

2.2 Contextual framework

The field of Nature Conservation, or Environmental Conservation, is widely regarded as a profession, which focuses on the management and conservation of our natural biodiversity. This study identifies with the explanation provided by Van As, Du Preez, Brown and Smith (2012:52) who state that the term biodiversity represents all forms of life on earth, at all levels and from all habitats and ecosystems. Consequently, the preparation of conservation graduates, so that they are adequately equipped with the knowledge, skills and experience required to make positive contributions to the conservation of our natural biodiversity, is the underpinning motivation for this study.

The Environmental Sector Skills Plan for South Africa (2010:18) published by the Department of Environmental Affairs (DEA) alerts us to definite skills shortages within the environmental sector. Further, the DEA states that the environmental sector is a rapidly emerging sector and its latent economic potential is beginning to be realised. However, the DEA concedes that formal skills development planning initiatives have not tracked the growth of the sector sufficiently. As a result, skills development within the sector is currently uncoordinated, disjointed and re-active.

The Environmental Sector Skills Plan (2010:17) identifies the various skills shortages linked to the sector, being leadership skills, scarce skills, critical skills, new skills and developmental skills. This paucity of skills requires potential future employees to acquire further education from higher education institutions. The skills shortages described in the Sector Skills Plan allude to two distinct scenarios; first, the sector has limited skills reserves within its institutions; secondly, there is a dearth of suitable skills within the sector with which to fill these known gaps. Hence, the skills shortage situation within the environmental sector may have a negative impact on potential WIL students seeking suitable placements and experienced mentors.

These skills development issues arise from the many deep-rooted labour related challenges experienced since South Africa's independence in 1994, including slow transformation, low productivity and inadequate skills development and training. In response, the South African government has developed the New Growth Path framework (2018) which aims to create five million jobs by 2020. This framework is viewed as an indication of the government's commitment to employment creation within its own developmental agenda.

In efforts to address skills development within South Africa, the Department of Higher Education and Training (DHET) has developed a National Skills Development Strategy (NSDS). The current version is the National Skills Development Strategy III of 2011–2016, or NSDS III (Department of Higher Education and Training: 2011). Central to this strategy is the plan by government to increase access to quality education, training and skills development, so that citizens may be empowered to contribute to the growth and development of the economy. According to DHET (2011:3), the fundamental

motivator for the development of the strategy is the redress of entrenched societal inequalities, which have persisted well beyond the fall of apartheid.

While the New Growth Path framework (2018) has a broad and national focus, the NSDS III (2011:18) addresses skills needs directly and expects an increase in the provision of suitable training in the workplace. Furthermore, the strategy stresses the need to provide for and support WIL, in particular the placement needs of higher education students (2011:18).

However, WIL as offered by institutions of higher learning is rarely a stand-alone subject and usually forms a composite part of a formal qualification. The National Qualifications Framework (South African Qualifications Authority 2014) is the South African government-approved system for the classification, registration and publication of quality-assured national qualifications and part-qualifications. This study focuses on the Diploma in Nature Conservation (South African Qualifications Authority (n.d.) which is a 360-credit National Qualifications Framework Level 6 qualification, offered by Unisa.

2.2.1 The Nature Conservation Diploma

According to Pretorius, Brand and Brown (2016:289), the undergraduate qualification offered (the Nature Conservation Diploma) employs a blended approach of theory, practical contact sessions and work-integrated learning. The associated theory covers four major subjects, namely: animal, plant, ecology and resource management studies. The remaining theoretical modules cover subjects such as conservation interpretation, soil science and the fundamentals of conservation.

Pretorius *et al.* (2016:290) also state that formal practical sessions were introduced to ensure that each theoretical area was also addressed practically, hence ensuring their integration and reinforcement. These formal practical contact sessions address skills and techniques such as basic plant and animal identification, management techniques, data collection and interpretation, and basic communication skills.

The third constituent part of the Nature Conservation Diploma is that of work-integrated learning, which comprises six, individual, one-year WIL modules. The aim of these modules is to ensure the application of the theoretical learning, in a formal place of work. As presented in Figure 1, below, the blended approach applied by this undergraduate qualification highlights the importance attributed to both practical and WIL components offered, which together constitute a third of the qualification's credit allocations.

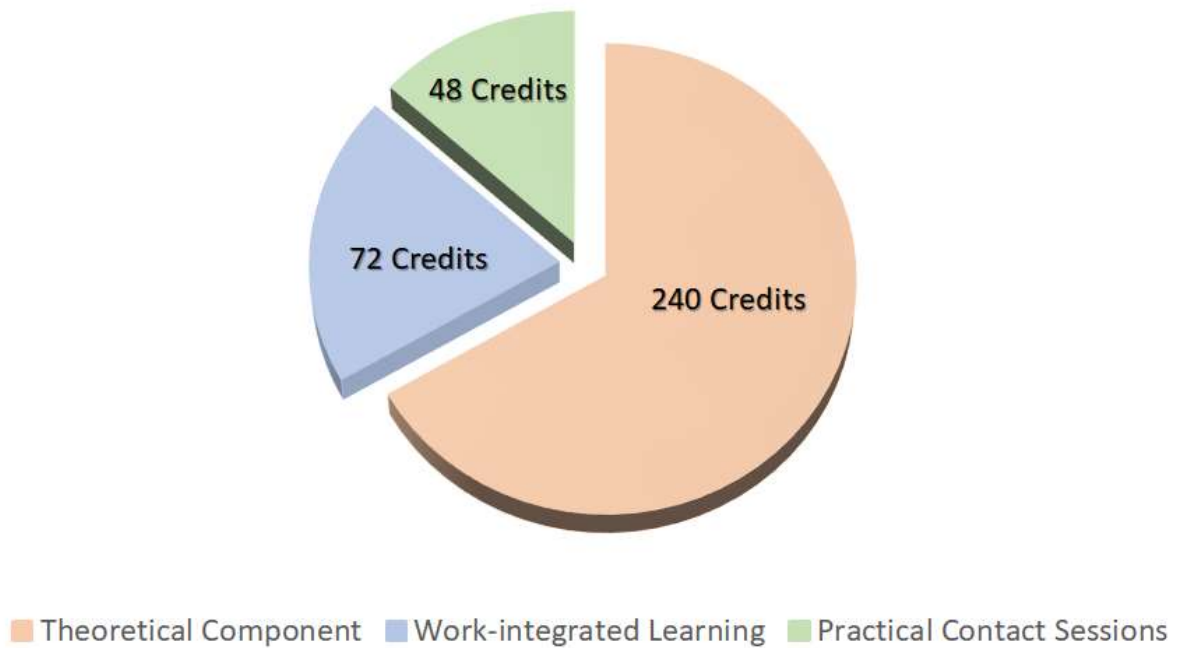


Figure 2.1: National Qualification Framework credit allocations for the constituent components of the Nature Conservation Diploma qualification offered by Unisa (Source: Self Compiled)

As previously mentioned, the Environmental Sector Skills Plan has identified particular skills shortages, which vindicates the inclusion of these six WIL modules into the Diploma in Nature Conservation. All Nature Conservation Diploma graduates will have participated in and acquired thirty different and unique workplace-based skills and experiences, across a wide variety of conservation linked occupations.

Students will acquire and hone these skills and their experiences by completing the six Nature Conservation Application modules. Each WIL module comprises five assignments, all of which are field-based activities. Students are required to pass all

five of these assignments to obtain a final mark for the module. Each of the assignments is presented in template format (see Appendix 2), which students must complete in full, including the details and evidence of their nature conservation WIL experiences in the workplace. The template requires students to reflect on their WIL experiences and to link their newly gained workplace-based skills to their existing theoretical knowledge and understanding. Thus, on completion of all six WIL modules, a student will have participated in and reported on 30 individual workplace-based WIL activities across seven pre-determined, conservation-focused themes. The conservation themes are as follows: animal studies, plant studies, legal studies, technical studies, communication studies, water studies and general administration.

WIL students have access to and can select WIL topics from a comprehensive topic list (see Appendix 1) containing seventy-three potential activities, spread across the seven conservation themes. To ensure that all students attain a fair mix of experiences, ten of the designated topics are compulsory activities, while the remaining twenty topics are elective activities. Tabulated below are the seven conservation themes together with the associated compulsory and elective assignment allocations (see Table 1).

A simple scan of the Table provided will determine where the learning emphasis is located – plants and animals, with four and three compulsory assignments respectively. Communication and technical studies are next in importance, according to the number of assignments required. However, students are expected to acquire only one core skill per the communication and technical themes, respectively.

Table 2.1: Allocation of compulsory and elective assignments for the Nature Conservation Application Modules

Conservation Themes		No. of Compulsory Assignments	No. of Elective Assignments	Total Assignments Per Theme
1	Animal Studies	3	4	7
2	Plant Studies	4	3	7
3	Legal Studies	0	2	2
4	Technical Studies	1	3	4
5	Communication Studies	1	4	5
6	Water Studies	1	1	2
7	Administration	0	3	3
Total Assignments required		10	20	30

Source: Self Compiled

2.2.2 This study's primary Work-integrated learning assignment

The primary assignment used for this case study is a water monitoring assignment, the compulsory assignment within the water studies theme (see Appendix 1). Distribution of the assignment topics across the seven conservation themes ensures that all students, irrespective of their geographical locations, acquire a set of core conservation skills. At the same time, they are offered the opportunity to select and gain other unique experiences, based on their own preferences, personal contexts, learning styles, goals, availability and geographic location. The flexibility embedded in this strategy nevertheless remains true to the planned qualification outcomes.

2.3 Theoretical framework

The contextual thread woven into this study is the provision of mentorship to students in support of their WIL requirements. As previously outlined, there is disparity between work-integrated learners regarding the securing of appropriate work placements and access to suitably skilled and competent mentors. Consequently, the provision of a conducive workplace-based learning environment, in which students can construct knowledge through their observation and interactions with their mentors, is an essential component for a successful learning experience. This serves to emphasise

the importance, whenever mentorship cannot be provided by a suitably resourced workplace, of an alternate support resource such as technology-enabled learning.

Three established theories provide support for this study. Together they serve as a theoretical lens through which to view the question: how can technology assist nature conservation WIL students to achieve academic success? This question is especially pertinent given the scarcity of suitable mentors in the field.

Bandura's Social Learning Theory, as suggested by Hill, Song and West (2009: 88) provides a workable framework for teaching and learning research and practice. They suggest that Social Learning Theory is particularly relevant to technology-enabled learning. Prensky (2001:1) supports this suggestion and confirms that the current generation of students think and process information profoundly differently from students in the past. He suggests that this fundamental change can be attributed to the pervasive digital environment in which modern day students live and learn.

There are several key elements to Bandura's theory, all of which have a direct influence on this study. The comprehensive learning theory developed by Bandura (1971:2) integrates aspects of both behavioural and cognitive theories and confirms that humans can and do learn from direct observation of others. Bandura also believes that the creation of new behaviours and attitudes is facilitated through direct experience or reciprocal engagement with others.

Another aspect of Bandura's social learning theory, which has direct bearing on this study, is the concept of learning through modelling. Bandura (1971:5) claims that modelling is an indispensable aspect of learning and underscores this by saying, "A good example is a better teacher than that of unguided actions".

Bandura also highlights the importance of 'associational preferences' (1971:6), which restricts the frequency of observations necessary for assimilation of the required learning or behaviour. Moreover, he believes that the attention afforded to models is closely linked to interpersonal attraction. Thus, interesting models are more likely to be selected than those deemed less favourable. Information linked to models and

observational learning, according to Bandura, includes verbal communication, visual representations, distinctive persons and/or the actions of others. This particular finding, according to Saeed, Yang and Sinnappan (2009:100) has been explored extensively in relation to student learning styles and technology preferences. Their paper links various student-learning styles to different teaching and learning strategies, including various technologies, and their findings suggest that students select and learn by means of a number of different forms of communication.

Furthermore, Bandura (1971:9) adds that anticipation of reinforcement influences what a student selects or observes, or not. Students may knowingly select to observe a particular model, expecting that it may produce an identified or preferred or anticipated outcome, and in so doing may improve their observational learning. In addition, a knowing selection may lead to longer retention of what has been observed, thus motivating students to rehearse modelled responses of perceived high value. Bandura also reveals (1971:11) that people can be influenced by models acting as educators, behaviour inhibitors, as motivators and behaviour stimulators, as solicitors of responses or emotions, and even as desensitisers of fears and inhibitions.

According to Allen, Eby, O'Brien and Lentz (2007:343), there has been a groundswell of mentoring focused research in recent years. However, Crisp and Cruz (2009: 526) argue that research has made little headway in defining and conceptualising mentoring in a consistent fashion; as such, they posit that mentoring is predominantly atheoretical. In her review of undergraduate mentoring research, Gershenfeld (2014:365) states that research has not tracked the increased uptake of mentoring programmes by higher education institutions. She adds that the current paucity of rigorous, sustained research has created a lack of clarity regarding mentoring efforts and their envisioned outcomes. However, she also says, subsequent to the Crisp and Cruz paper, that 70% of the research conducted into undergraduate mentoring has utilised conceptual frameworks or theories. A theory, which has particular resonance with this study, is the Social Integration Theory developed by Vincent Tinto. Tinto's paper (1995:11) suggests that students who are integrated into learning communities in which collaborative teaching strategies are employed, are more likely to succeed. Ragins and Scandura (1994:957) define mentors as committed individuals with vast

experience and knowledge who commit to providing support for their protégé. They also refer to the formulation of a learning community.

The third and final theory of consequence for this study is that of Ken Wilber's Integral Theory. Wilber (1997:71) describes integral theory as a method of interpreting traditional forms of education as well as holistic or transformative forms of education. He suggests the use of a four-dimensional framework, applicable across, within and between disciplines, making use of four quadrants. He has defined the quadrants as intentional, behavioural, cultural and social. Esbjörn-Hargens (2007:74) states that both traditional and holistic forms of education have valuable qualities to offer. He also points out that each of these two forms lacks the capacity to recognise or embrace the nuances of the other.

The generation of a meta-perspective on the viability and suitability of a digital mentor led to the use of selected elements of Integral Theory, which provided valuable assistance with the interpretation, analysis and synthesis of various datasets employed by this study. Integral theory provides researchers with a comprehensive means of viewing a particular reality; in the case of this study, the particular reality was the application of a digital mentor. Integral theory facilitated investigation of this possibility from multiple perspectives and enabled an integrated understanding of digital mentoring as part of WIL mentorship.

All three of these theories, Bandura's Social Learning Theory, Tinto's Social Integration Theory and Wilber's Integral Theory, have demonstrated their suitability as research lenses through which the design, application and analysis of data collected from the proposed model can be viewed and interpreted.

2.4 Literature review

Levy and Ellis (2006:181) offer constructive reasons for including a literature review in any academic research. They state that compilation of a proper and meaningful literature review can assist with the formulation of a robust literature-based foundation for any formal research project. A literature review is a methodical process of reviewing

past literature within a body of knowledge, prior to commencing any research study; and a literature review is used (2006:182) by the researcher, to assemble ideas contained within other literature sources, which adds clarity and depth to the developing research project.

The literature review for this study explored related and complementary studies on unemployment, skills needs, WIL, mentorship, higher education, ODL and mLearning, and provided this study with a formal literature-based foundation. The sections that follow constitute Chapter Two's literature review.

2.4.1 Unemployment

According to Statistics South Africa (2017:22), twenty-three years into a post-apartheid and democratic South Africa, the official government unemployment rate stood at 26.5%. The Central Intelligence Agency World Fact Book (n.d.), states that this unemployment percentage places South Africa in slot 182 of 208 countries listed, with the highest unemployment rates.

In 2008 Pauw, Oosthuizen and Van der Westhuizen (2008:45) claimed that the unemployed population of South Africa did not have the prerequisite skills required by the various employment sectors of society. Pauw *et al.* (2008:45) qualify their statements on the South African unemployment rate by indicating that the number of unemployed people is not restricted to people without tertiary education, and that unemployment of people with tertiary qualifications has increased since independence. Yet, according to Archer and Chetty (2013:134), the very reason many prospective students enrol with an institution of higher learning is to acquire a tertiary qualification; and that the primary motive for their enrolment is their belief that a tertiary qualification will assist them to secure gainful employment. Archer and Chetty (2013:134) contextualise these student motivations within the broad South African unemployment scenario.

2.4.2 Skills needs

According to Hughes, Mylonas and Benckendorff (2013:265) the need for a skilled and experienced labour force provides higher education institutions with explicit motivation for the development of qualifications and employable graduates. In addition, Archer and Chetty (2013:134) comment that one of the responsibilities of a university is to provide for the needs of both its students and the various employment sectors seeking employable graduates. However, Pauw *et al.* (2008:45), claim that universities do not prepare their graduates adequately for the labour market, which leads prospective employers to choose to employ candidates who are more experienced. Jing, Patel and Chalk (2016:23) validate the findings of Pauw *et al.*, viz. that graduates with no previous work experience stand very little chance of finding employment.

Equally, the conservation sector seeks experienced, skilled and competent graduates to fill critical and scarce skill shortages, as highlighted in the Environmental Sector Skills Plan prepared by the Department of Environmental Affairs (2010:17). The Diploma in Nature Conservation curriculum offered by Unisa, as detailed by Pretorius *et al.* (2016:289) is managing to provide for these sector skills needs, albeit at an entry level only.

2.4.3 Work-integrated learning

It is generally accepted that the provision of WIL, through mentorship by tertiary education facilities, is an influential teaching and learning strategy, which builds student capacity and employability skills. This statement is supported by Jackson (2015:350), who suggests that the effectiveness of WIL affordances should be considered, predominantly, from an outcome perspective. She indicates that there is little evidence of attention to the inputs received by WIL students. According to Du Plessis (2010:206), there is a need to oversee and administer every aspect of WIL implementation, to ensure that educational objectives are achieved.

According to Beham, Kump, Ley and Lindstaedt (2010:2783) the most important method by which people learn, in the workplace, is by means of what is called

'interpersonal help seeking', which is intrinsically social. Smith-Ruig (2014:771) links WIL with the provision of mentorship, which further confirms that WIL and mentoring are forms of social learning in the workplace, and thus are linked to skills development.

Hughes, Mylonas and Benckendorff (2013:277) indicate that there are learning affordances to be gained from WIL. They identify benefits accrued to students from their WIL experiences, through being contextually grounded within their chosen career path. Moreover, they suggest that learning experiences gained from WIL contribute to the preparation of work-ready graduates. Further, they accentuate the affordances of WIL as not being limited to technical skills and knowledge, claiming that WIL includes the development of transferable and work-ready skills. These WIL outcomes can go a long way towards bridging the theory-practical gap, improving the academic success of students and can improve graduate employability.

2.4.4 Mentorship

According to Jacobi (1991:505), mentorship is poorly defined and therefore is more of a fluid construct. This is corroborated by Crisp and Cruz (2009:540) and Gershenfeld (2014:365). However, Gershenfeld goes on to state that this situation need not be a limiting factor, if the mentoring roles and functions are described in detail. Further, she adds that the mentoring functions most frequently used were focused on academic support, psychosocial support and role modelling.

Qahtani (2014:150) posits that poor career development and progression is caused primarily by the lack of access to a suitable mentor. He goes on to highlight that students to whom a mentor was assigned indicated greater satisfaction with their career prospects and a mentorship-developed sense of "personal transformation and empowerment". However, Qahtani's findings on mentorship are not grounded in formal tertiary education but derive from the formal working environment. According to Rayner and Papakonstantinou (2015:13), a central precept within higher education is the provision of good quality skills to cater for the socio-economic needs of society. They highlight that potential employer expectations of graduates have grown over the

years and include traits such as teamwork, understanding the sector, confidence and the ability to become immediately productive.

2.4.5 Open Distance Learning

Open Distance Learning (ODL), according to Unisa (2008:2), is a multi-dimensional concept, which aims to address the time, geographical and distance divide between students, as well as the divide between students and academics. The definition acknowledges also the social, economic and educational range of students. Furthermore, the focus of ODL, according to Unisa, is to remove access barriers to learning, to provide flexibility of learning and to foreground student-centredness.

Moore and Kearsley (2012:3) submit that ODL is a European concept, which equates to their understanding of distance education and claim that terms such as open learning and/or open education are all associated with distance education. Their understanding of the word, 'open' alludes to access to elitist schools or institutions, which traditionally have excluded many potential students.

However, Unisa (2008:1) states that distance education is simply a compilation of methods for teaching students who are geographically distributed and physically disconnected from the academic institution, its academics and their fellow students. This understanding does not elevate distance education over that of Open Distance Learning, as implied by Moore and Kearsley.

Rumble (1989:9) argues the various issues regarding terms such as 'distance learning' and 'open learning'. He states that in practice they are frequently ambiguous and confusing and emphasises the need for greater clarity regarding the understanding and use of these terms. Nevertheless, disagreements and/or misunderstandings within this space remain and the discourse surrounding these classifications continues. This lack of clarity highlights the need for institutions to adopt a position and define their understanding and use of the terms, as Unisa has done.

Evans and Pauling (2010:198) predict that the demand for higher or further education will increase, inevitably, in line with the expanding world population. They allege that formal synchronous teaching in a classroom cannot accommodate this demand and that distance education is essential for the future of education. Consequently, Unisa's understanding of ODL and distance education are germane to this study.

2.4.6 Higher education

Within the undergraduate qualification of nature conservation, students are required to gain both theoretical knowledge and vocational skills before being able to graduate. Without suitable placement and sector-based mentors, students are at a distinct disadvantage and may run the risk of not realising their educational goals.

As part of their educational mandate, institutions of higher learning strive to maintain high throughput levels of graduates. According to Ramdass and Masithulela (2016:1) the ever changing higher educational landscape and the increasing demand for access to further education can be viewed as a 'competitive threat'. Every effort is employed, therefore, to ensure maximum student success without compromising the academic quality and standards offered. Consequently, in some situations where students are not able to secure suitable WIL placements and mentors, academics are compelled by the South African Government gazetted directive (2014:17), to assist these students to overcome their WIL and mentorship challenges.

Students need placements with suitably skilled and qualified sector-based mentors who are also empathetic towards and understand the current context regarding conservation students. However, it is highly unlikely that all registered WIL students will secure suitable placements and/or mentors to cover all thirty of their WIL required outcomes. This situation has the potential to affect many students; it will place them at a distinct disadvantage and will negatively influence their ability to complete their WIL modules successfully. This observation is based on work experience I have gained as a WIL academic and mentor to nature conservation undergraduate students and is corroborated by the arguments presented in the Environmental Sector Skills Plan (2010:17).

In light of this, Groenewald (2009:75) points out that WIL has become a major addition to many higher education qualifications. He states that WIL has become widely regarded as a valuable, and progressively more vital, component of a student's learning experience. The Diploma in Nature Conservation offered by Unisa has assigned seventy-two NQF level six credits, of a three hundred and sixty credit curriculum, to the six WIL modules. Consequently, the University is bound by the requirements stipulated in the South African Government gazette (2014:17), to provide suitable placements and, by default, suitable mentors, for all its WIL registered students.

2.4.7 Mobile learning, also known as mLearning

According to Brown and Mbatl (2015:116), mLearning promises exciting prospects for open and distance learning. They indicate, however, that mLearning is an emerging concept and is still in the early stages of its development, although it shows potential for further growth and advancement. Furthermore, Brown and Mbatl highlight a number of myths which have infiltrated this area and which demonstrate various misconceptions about mLearning. Simply put, Brown and Mbatl (2015:118) suggest that mLearning represents any form of learning which makes use of a mobile device, in formal and informal settings, where learners are working alone or collaboratively.

Within an African higher education perspective, Kaliisa and Picard (2017:1) claim emphatically that mobile learning improves communication, student and lecturer collaboration, and student participation and engagement. Furthermore, they indicate that mobile learning also enables authentic learning and promotes the establishment of learning communities. However, they caution that research has revealed substantial challenges with attempts by higher education to integrate mobile learning into its institutions, citing poor information and communications technology infrastructure, the inability of learning management systems within universities to support mobile devices, poor development of pedagogical skills regarding mobile learning, and the lack of policies to facilitate the inclusion and development of mobile learning at a tertiary level.

According to McConatha, Praul and Lynch (2008:15), mLearning does not strive to substitute mobile devices for the personal computer. On the contrary, they suggest that this technology can be used to supplement learning and posit the notion that mobile learning can make a “positive and significant difference” in outcome performances (2008:20). Of particular relevance to this study is their observation that motivated and driven students who embrace mLearning are more likely to succeed with their studies. In addition, they claim it is hard to dispute the advantage of convenience, as offered by mobile devices, for the dissemination and facilitation of information sharing.

As mLearning slowly matures, according to Cobcroft, Towers, Smith and Bruns (2006:26), the discussion of overarching principles for, and a definition of, high quality mLearning will emerge. They go on to highlight four key elements, which they regard as fundamental to improving student experiences: providing practice, challenging students, engaging students and considering the learning context, all of which are relevant to this study, at various levels.

El-Hussein and Cronje (2010:20) consider that the proper design of mobile technologies can lead to the greater effectiveness of mobile learning. However, they caution that the pace of this change, and the effect of the proliferation of mobile technology, are such that the impacts of mLearning are not yet clearly understood. However, Gikas and Grant (2013:25) offer some encouragement, claiming that learning will take place regardless of location and even if the long-term impact of mobile learning has not been fully determined.

2.5 Conclusion

In conclusion, Bandura’s Social Learning Theory is relevant for technology-enabled learning and is of particular importance to this study, as is the understanding that individuals can learn through direct observation and modelling. In addition, their learning time could be shortened through associational preferences and the anticipation of reinforcement influences, based on a particular desired or anticipated outcome.

The growing societal pressure for tertiary education, offers universities an opportunity to provide qualifications, which will produce employable graduates. However, earning a formal qualification does not guarantee employment. Potential employers, for example within the Environmental Sector, require graduates to have supplemented their theoretical learning with practical experience.

With positive mentorship support, WIL students can be effectively absorbed into the workplace and can acquire valuable insights, skills, experiences and competencies. However, sub-standard or ineffectual mentoring can have a profoundly negative impact on the ability of students to obtain the required experiences, which, ultimately, will affect their academic and career aspirations.

The affordances provided by technology offer the opportunity to explore suitable alternatives for poor mentoring. These alternatives need to be investigated and assessed for possible future use.

A detailed description of the research methodology for this study will follow in Chapter Three.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The preceding chapters (One and Two) described the underpinning concepts and guiding theories of this qualitative study. Further details were provided in the review of related and relevant literature. In addition, pertinent and interrelated aspects of the study – work-integrated learning, mentoring and conservation skills development – were presented and clarified.

This chapter (Chapter Three) focuses exclusively on the execution of the empirical elements of the study. It concentrates specifically on presenting the research design and methods that were implemented, to garner information from a selected cohort of nature conservation undergraduate students. The research participants were selected because they needed to acquire specific WIL experience and skills, with the assistance of a mentor.

Justification for the study is provided within the parameters of the research question and sub-questions, as presented in Chapter One. This chapter places the contextual setting, being the research participant cohorts and various mentorship approaches employed, at the centre (see Section 3.4) of the study. In addition, this chapter presents an explanation of the data collection methods and the associated data analysis.

The chapter concludes by presenting a description of the notion of trustworthiness and clarification of the ethical considerations, followed by a short concluding summary, all of which are pertinent to this study.

3.2 Rationale for the study

The rationale of this research into mobile technology use, to provide WIL mentorship to students in need of the services of a specialist mentor, within an open and distance learning university, is of paramount importance.

This study aims to identify a viable alternate mentorship option, to address the needs of undergraduate nature conservation WIL students seeking specialised and skilled mentorship. The investigation aims to determine whether the digital mentorship option compares favourably with other mentoring options available to nature conservation WIL students.

The outcomes of the study should enable Unisa to provide more equitable student support, leading to improved student academic success; in turn, this will lead to graduation and the improved potential for student employment, within their chosen careers.

While there is a growing body of literature regarding mentoring and work-integrated learning, these studies generally are focused on education scenarios within developed western societies. This qualitative study will contribute to a more Afrocentric body of knowledge, which is grounded in developing societies and their unique needs.

3.3 Research design

This study adopted a qualitative, exploratory case study approach to address the identified research question. The primary purpose of the research was to garner information and data demonstrating that technology can be used to fill the mentoring gap for conservation undergraduate WIL students. Data collection tools designed to capture student experiences and insights regarding various mentoring approaches were deployed.

Williams (2007:65) points out that it is inaccurate to view research as simply gathering facts and looking for information, and confirms that qualitative research involves

describing, clarifying and constructing meaning from collected data. Further, Williams (2007:67) states that research is a systematic process operating within defined frameworks, and that the process is organised to gain an understanding of an identified phenomenon from a participant point of view.

This study focused on gathering data that would help to construct a deeper understanding of the phenomenon, (providing effective work-integrated learning (WIL) mentorship to nature conservation undergraduate students registered with an Open Distance Learning (ODL) university), from the perspectives of the WIL research participants.

A case study, according to Yin (2017:1), is an empirical inquiry, which focuses on a current phenomenon within an actual context. Tellis (1997:1) elaborates further, by stating that case studies have been designed to illuminate participant viewpoints using multiple sources of data. Related to exploratory case studies, Benbasat, Goldstein and Mead (1987:373) suggest that when research is highly exploratory a single-case study would be useful. Considering the uniqueness of the focus, this exploratory case study method was selected.

Analysis of the data collected was executed by means of a thematic analysis, as described by Braun and Clarke (2006:80). In this approach, data is minimally organised but allows for a detailed description of your dataset. Themes were identified within a dataset but not across all the datasets, which enabled reporting on the experiences and the reality of the participants, from different perspectives. This method works in synergy with Wilber's Integral Theory and was deemed appropriate and useful for this study. According to Braun and Clarke (2006:82) a theme is something important, which links the data to the research question. I employed an inductive approach, as suggested by Braun and Clarke (2006:84), for the process of coding the data, which meant that I did not have to fit the data into my 'analytic preconceptions'.

This study investigated the application of three different mentorship methods, namely, face-to-face mentorship, digital mentorship and sector-based mentorship. Based on

its composition, the case study research approach proved to be a successful means of addressing the research question. In addition, the supporting investigation was able to examine student interaction with the three different mentorship approaches in a contemporary real-life context.

Accordingly, the exploratory case study approach was able to describe the phenomenon of providing effective WIL mentorship to nature conservation students in a real-life context. In addition, it enabled in-depth reflection of the mentorship affordances as experienced by the students, and consideration of the influence exerted by the three different mentorship formats on academic outcomes.

In this study, three different cohorts of undergraduate students from Unisa's Diploma in Nature Conservation were investigated as individual students (research participants) and as a collective community of learning. In addition to the contributions from students, specific contexts or challenges were addressed as contributing factors and linkages to student success.

3.4 Contextualisation

This unique research is considered a complex study in that it investigates more than one cohort of participants, requires the case study to take place off-campus, and involves the development and provision of a mobile application for use by participants during the study.

Added to this, the WIL modules offered by Unisa were originally designed to assist registered students overcome some of the inherent placement and mentorship challenges they incur (see Section 2.2.1) in the absence of formalised agreements with potential Unisa WIL experiential learning providers. This status quo affects the ability of students to attain the skills and experience required for their (ultimate) qualification. Between 35% and 45% of the research participant cohort (see Section 4.2.3) indicated that they did not have access to placement and, by association, also did not have a mentor. This circumstance can be construed as unjust and

discriminatory and has served to initiate and motivate this investigation into WIL mentorship approaches, within the Nature Conservation Diploma.

The two ensuing sections focus on the research setting and the development of a digital mentor, and also provide some additional context for this study. A clear understanding of the setting and processes, which were put in place for the participants to gain a WIL experience, offered by Unisa, is deemed important. It is equally important for the students to have provided their views, insights and suggestions, based on this newly gained experience.

For the data to be comparable, the same research site was utilised and the same WIL experience was offered to participant cohorts one and two, who were selected from all the nature conservation WIL students. It is also important that a clear understanding of the differences between the two cohorts and the mentorship offered to them, by Unisa, is generated. The first cohort was provided with mentorship by an academic known to the participants. The second cohort was provided with mentorship by means of a mobile application, which functioned as a digital mentor or an e-mentor.

The use of mobile technology to mentor nature conservation WIL students is unique and thus needs additional descriptive attention.

3.4.1 Research setting

Since 2008, Unisa has been granted full and unrestricted access to a 7 349 hectare nature reserve named Telperion, which serves as a venue for nature conservation WIL opportunities. The Telperion Nature Reserve is located about 30 kilometres north-west of the town, Emalahleni (Witbank) within the Mpumalanga Province, and roughly 90 kilometres east of Pretoria and the main Unisa campus (see Figure 3.2) in the province of Gauteng.

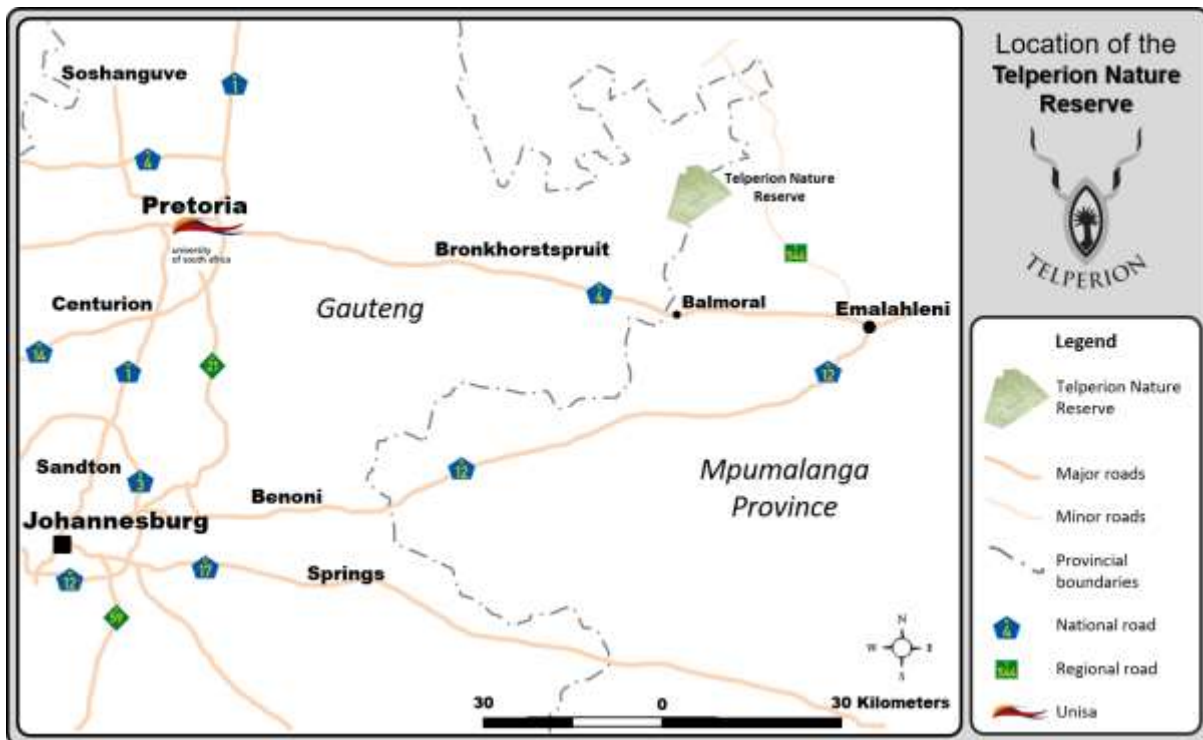


Figure 3.2: The physical location of the Telperion Nature Reserve in relation to the main Unisa Campus in Pretoria
(Source: Self Compiled)

The study site is owned by the Oppenheimer Family and features a great diversity of wildlife. According to Mucina and Rutherford (2006:399), Telperion forms part of the Rand Highveld Grass biome, which they say receives little conservation recognition within South Africa. However, the most appealing feature of the Telperion Nature Reserve as a suitable WIL facility is the absence of large predators or dangerous game animals. Not having any lion, buffalo, elephant or rhino on the reserve offers the University and its WIL students the freedom to engage with their module requirements in relative safety. The absence of these dangerous animals produces a safe and conducive learning environment in which WIL students can work and gain valuable experience and the skills they require.

Unisa has also been provided with full and unrestricted access to two facilities on the reserve. A large hall, known as the Conservation Campus, which serves as a multi-purpose facility and provides visiting WIL students with dormitory-type bedrooms, bathrooms, a communal kitchen, basic lecture rooms, a reference library, natural

history museum and laboratories. A small self-catering, four-bedroom house provides accommodation for visiting academics. Both facilities have full electricity, internet, and mobile phone connectivity.

Located on the reserve are several pre-selected sites, which Unisa academics regularly use to facilitate the WIL experiences of students. The sustaining theme for this qualitative study requires students to gain WIL experience and skills in water monitoring, using the miniSASS water monitoring method, for which the students need to prove their competence.

A perennial tributary of the Wilge River is located on the Telperion Nature Reserve. This small tributary, known as the Telperion Stream, originates from a fountain half a kilometre outside the reserve. Before it empties into the Wilge River, it flows through the reserve for almost five kilometres in a westerly direction.

Unisa academics require students to identify three miniSASS monitoring sites along any river, or naturally flowing water course, to gain the skills and experience required of them. On the reserve, these three sites are located along the Telperion Stream. Site One is located near an old and damaged earthen dam (see Figure 3.3) and is dominated upstream and downstream by an extensive bank of water tolerant grass species.



Figure 3.3: The miniSASS monitoring site one (Wilson, 2018)

Site Two is located about two kilometres into the reserve and is dominated by high embankments, some soil erosion and water tolerant grasses and sedges (see Figure 3.4).



Figure 3.4: The miniSASS monitoring site two (Wilson, 2018)

The final site, Site Three is located at the confluence of the Wilge River and the Telperion Stream. This site is dominated by a large stand of alien tree species, deep shadows, high embankments, shallow and slow flowing water (see Figure 3.5).



Figure 3.5: The miniSASS monitoring site three (Wilson, 2018)

All three sites are located some distance from the amenities of the Conservation Campus and do not have access to electricity, cell and/or internet connectivity.

3.4.2 Digital mentor (the development of a mobile application)

The study's research question aims to determine whether technology could be used to fill the gaps in the experiences of students regarding WIL mentorship. For this to be achieved a mobile application needed to be developed, and used, by a cohort of research participants. The development of the mobile application was an informed process based on the texts, which follow.

Viberg and Grönlund (2017:357) identify three considerations when designing and developing mobile technologies for distance education students. They indicate that the first feature of the design is an acknowledgment that distance education students make use of their private mobile technologies, recurrently, when engaged in learning activities on their own. Their second consideration is the use of mobile technology. Orlikowski (2000:425) confirms that mobile technology use and structure are fluid, as users select, use and adapt to specific technologies and suggests that mobile technology should be considered within the context of its use. The last consideration, highlighted by Viberg and Grönlund (2017:357) is the preference, voiced by students, to utilise their own mobile devices. Their reason for this preference was determined by the amount of time, which distance education students can devote to their studies.

Taking into consideration the identified issues faced by distance education students when seeking suitable mentorship for their nature conservation WIL requirements, the deliberations presented by Viberg and Grönlund were accepted as the supporting medium for the development of the mobile application.

Development of the mobile application used as a digital mentor was completed with the aid of basic Web 2.0 technology services. According to O'Reilly (2007:17), Web 2.0 is the next stage of development of the World Wide Web and is described as a platform spanning all connected devices. O'Reilly defines Web 2.0 applications as

dynamic, although they also take advantage of the affordances of the platform. This is achieved through user contributions, services and the remixing of data thus provided.

The application developed for this study was named the NCA eMentor. It linked the Nature Conservation Application module with the affordances of mobile technology, thereby providing all the guidance and support that might be needed by students operating at a distance. The NCA eMentor curated the basic theory pertaining to miniSASS water monitoring techniques (see Section 3.4.1), and water monitoring investigations, and specifically developed a series of video segments on the same content. Other features included in the NCA eMentor application, are an online repository of important additional resources, such as field data collection sheets, detailed process descriptions, definitions of terms, links to websites of interest, and the contact details of an academic who could address any issues not covered by the NCA eMentor application.

After an extensive and time-consuming search, the online application building services of BuildFire (<https://buildfire.com>) were selected to develop and launch the NCA eMentor. The BuildFire.com website offers an application building facility, which is free of charge and does not require the user to have code writing skills, or prior experience in application development, to create a fully functional and accessible mobile application.

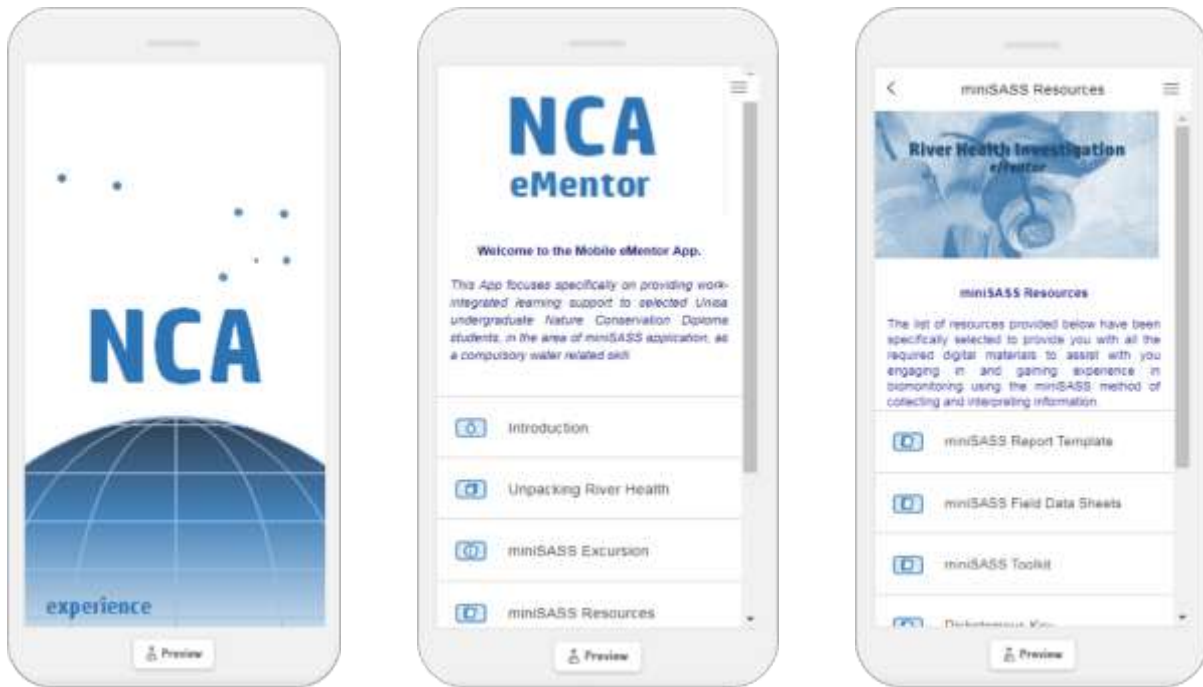
The first step in the application development process was to select the foundational android development platform. This platform was selected based on an assumption that the majority of registered students would be in possession of a device using the android operating system, as opposed to Apple devices with the iOS operating system. This assumption was justified by the discovery that all the research participants, except one, owned android devices. However, the iOS user also owned an android device, which averted the need for remedial action to accommodate that particular student.

At this juncture, a basic framework or site map (see Appendix 5) for the NCA eMentor was developed. The academic responsible for the theoretical component of this WIL activity was approached and asked to provide input and verify the content.

The BuildFire.com website offers prospective application builders a vast selection of pre-developed templates from which to choose, all of which are fully customisable with pre-developed functions. To assist prospective application builders, the pre-developed templates are loosely sorted into themes such as non-governmental organisations, church groups, small businesses and more. The basic template selected for the NCA eMentor was based on a pre-developed university-focused template.

BuildFire.com makes use of a 'dashboard' where all the available features and accessories are housed. A simple process of selecting an option and pinning it to the template is all that was required to build the application. Although the process was simple it nevertheless took time to familiarise oneself with all the features and functions. The final product was built using only a few basic features, which kept the application simple to navigate, data efficient and practical.

The application functions by means of an introductory navigation page, which guides students to the relevant information they require to complete their miniSASS investigations (see Figures 3.6, 3.7 and 3.8).



Figures 3.6, 3.7 and 3.8: Examples of the application pages: the Loading page, Introduction page and miniSASS Resources page, respectively

(Source: BuildFire.com)

All the additional information such as field-data collection sheets, data analysis spreadsheets, in-field identification kits and e-references were developed and reviewed by the assisting academic (See Appendices 7, 8, 9 and 10 respectively).

The specialised multi-media unit at Unisa was commissioned to develop a series of ten short video segments of varying length and technicality, focusing on the topic of water monitoring investigations, using the miniSASS monitoring method. A framework for the video series was developed (see Appendix 6) upon which the production, scripts and final production and editing was based. Again, the academic responsible for the theoretical component of this WIL activity was approached and asked to provide input and verify the content.

A dedicated YouTube channel was created and named NCA eMentor, intended specifically to host the ten finalised video segments. The YouTube channel enables students to access these resources independently of the mobile application, and to download them at leisure, directly onto their mobile phones (See Figure 3.9).

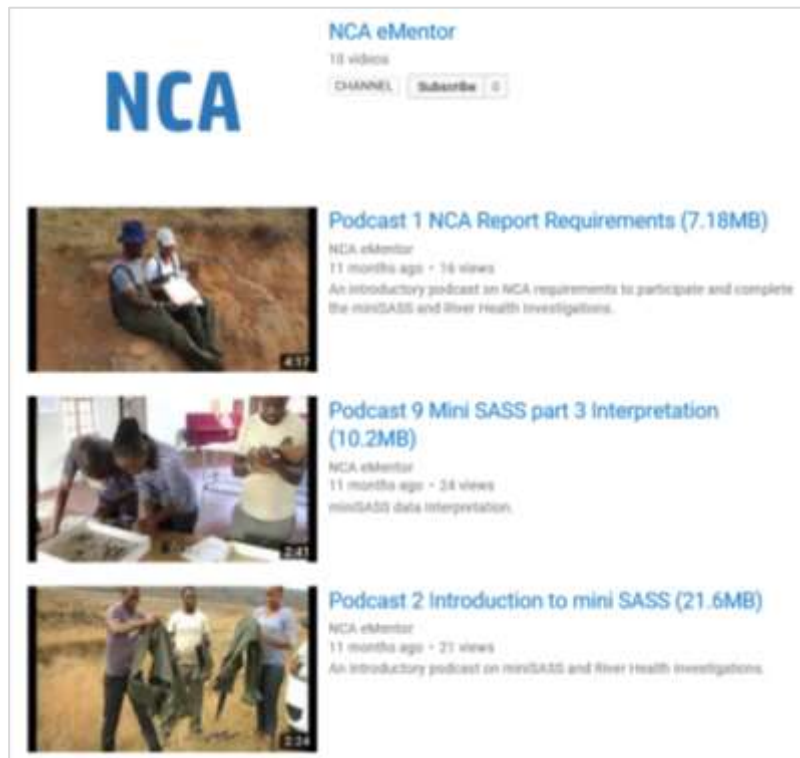


Figure 3.9: A screen shot of the NCA eMentor YouTube channel, representing three of the ten videos.

(Source: YouTube.com)

The final step of the digital mentor development was the registration with Google's Play Store of the NCA eMentor application, with its linked YouTube channel. Before the NCA eMentor become active for download by students, the application underwent a Google led verification process, which took a few days.

3.5 Research methods

This study originated from an observed and identified problem related to the provision of WIL mentorship to students at an open and distance learning higher education institution. The research methods covered below were used to probe and analyse the identified problem. Aspects such as research participant composition, their selection, data collection, semi-structured interviews, document analysis and opinion polls are addressed in detail below.

The study needed to generate comparable data and to achieve this a compulsory WIL topic was selected from the Comprehensive Topic List (see Appendix 1). The topic selected to underpin this study was the miniSASS water monitoring method. All the research participants for this study engaged in this topic and submitted a completed assignment for formal assessment (see Appendix 2). To reduce any further variables, the research participants who participated in the mentoring offered by Unisa, (cohorts one and two), were mentored using the same facilities (see Section 3.4.1), the same academic staff member, the same data collection sites and the same supportive resources. The assignment results achieved by students who participated in sector-based mentoring on this topic, (cohort three), were compared with the assignment results achieved through mentoring provided by the University.

3.5.1 Research participant composition

It is important to reiterate (see Section 1.3) that the Diploma in Nature Conservation has a small annual intake of students, in comparison with other qualifications offered by the University. In addition, the student autonomy afforded by the design of the WIL module further reduces the number of potential research participants available to participate in this study.

Sixty nature conservation WIL students participated in this study. The group of sixty was divided into three cohorts of twenty undergraduate students each (the research participants). The three cohorts were exposed to three different approaches to mentoring, on the same specific topic. The three different mentoring approaches were as follows:

- face-to-face mentoring
- digital mentoring
- sector-based mentoring.

These three approaches will be discussed in the following sections.

3.5.1.1 Face-to-face mentoring

A Unisa employed academic was selected to contribute to the study. The specific academic is a specialist in fresh water ecology and in the use of the miniSASS water-monitoring tool. Furthermore, the academic is the principle lecturer for the contributing subject, Nature Conservation Ecology III, which provides students with the theory central to this study.

The academic, who has been actively involved in assisting WIL students on the Telperion Nature Reserve since 2009, assisted with the development of the excursion programme which included a miniSASS water monitoring segment, which forms the foundation for this study (see Appendix 11).

During the first excursion with cohort one, the selected and responsible Unisa academic travelled to the Telperion Nature Reserve and assumed responsibility for implementing the miniSASS water monitoring investigation segment of the programme. The particular responsibility assigned for this segment was to facilitate the WIL process, by providing the relevant information, guidance and support necessary to enable the students to benefit from a meaningful experience. In addition, the academic ensured that the pre-developed excursion programme and, in particular, the miniSASS programme segment, achieved its set objectives.

Meeting the assessment objectives is the primary concern of the academic. Furthermore, having an intimate understanding of the prerequisite theory as well as the programme content and assigned assessments, the academic was able to adjust the mentorship engagement and experience to meet the required excursion and WIL outcomes.

All the research participants from cohort one took part in an actual miniSASS water monitoring investigation. They were able to engage with the academic at any time, concerning any issues associated with the activity. The miniSASS segment took two days to complete, which the academic considered sufficient time for acquiring the

required skills and insights to demonstrate competence in the topic's learning outcomes.

3.5.1.2 Digital mentoring

This study seeks to determine if technology can be used successfully, to fill the gaps within WIL mentoring as experienced by the students. The affordances of mobile technology were selected for the study as all WIL students already had privately-owned mobile phones, albeit with varying features and computing capacities. Thus, to facilitate this study, a formal mobile phone application was developed (see Section 3.4.2).

All the selected research participants who received digital mentoring from Unisa (cohort two) were given the Uniform Resource Locator (URL) for the NCA eMentor hosted by Google Play, one week before their excursion to Telperion took place. Early granting of student access to the application was deemed necessary to allow the students time to download and familiarise themselves with the NCA eMentor Application.

Planning of the formal excursion for cohort two to Telperion was completed with input and assistance from the same academic who had been involved in providing face-to-face mentoring for cohort one, at Telperion, a month earlier (see Section 3.5.1.1). This academic is the principle lecturer whose theory is being applied in the field by the nature conservation WIL students.

The academic did not travel to the Telperion Nature Reserve to be with the research participants but was on stand-by to receive and answer any calls made by research participants via the digital mentor. On completion of the excursion, it was noted that no calls had been made to the academic, and that the research participants in cohort two had not exercised this feature of the NCA eMentor Application.

During the excursion, the facilitator at the Conservation Campus had transported the participants to the pre-selected sites and provided them with the necessary protective

clothing and all their field data collecting equipment. All the developed resources, such as the miniSASS field data sheet (see Appendix 8), had been provided to both the face-to-face mentored students (cohort one) and the digitally mentored students (cohort two) who visited the Telperion Nature Reserve. However, no further assistance was provided to the research participants in cohort two, who were supported by means of the digital mentor, only.

All the research participants in cohort two engaged in an actual miniSASS water monitoring investigation. They formed small working groups, were able to engage with the digital mentor, and took two days to complete the miniSASS segment. Of their own accord, the research participants halted their field data collection activity when they considered they had gained the required skills and insights to complete their assignments.

3.5.1.3 Sector-based mentoring

Students in the group that received sector-based mentorship (cohort three) were those geographically distributed and perhaps isolated students who had managed to secure their own, individual, sector-based placements and mentors, to attempt the assignment on miniSASS water monitoring. This student group represents the mainstream of distance learning students and therefore the status quo for students who register for the WIL module offered by Unisa. All twenty students (the research participants in cohort three), completed their WIL requirements without any support from Unisa – no face-to-face academic mentor, no digital mentor offering a connection to an academic mentor, no excursion to Telperion, and no face-to-face interaction with other research participants. Consequently, the assignments delivered by the group receiving sector-based mentoring were assessed according to the resources and information provided by their respective sector-based mentors, only.

3.5.2 Selection of research participants

All research participants of this study were active and registered WIL module students at the time of data collection. According to Etikan, Musa and Alkassim (2016:2), the

gathering of data is a critical research function and no analysis can correct data that is collected incorrectly. Further, they describe and compare two different approaches to sampling, Convenience Sampling and Purposive Sampling, both of which are nonprobability techniques. Nonprobability sampling is considered suitable for projects with limited time and resources and which do not aim to produce results that will pertain to an entire population.

Purposive Sampling, as described by Etikan *et al.* (2016:2), is a non-random technique used by researchers to garner information from research participants, based on their experience or knowledge. Accordingly, purposive sampling was used to make the deliberate selection of research participants for the face-to-face and digital mentor groups (cohorts one and two). The selection process started with a formal advert, which was posted on the *myUnisa* student portal (see Appendix 3). The advert offered any WIL registered student the opportunity to acquire one of their compulsory skills via a group excursion *with* a mentor, both of which would be provided by Unisa. The advert described certain application conditions, including the requirement that all potential applicants be registered for the WIL module, for which they needed to acquire miniSASS monitoring experience. Students were allowed three weeks in which to apply for the excursion.

3.5.2.1 Selection of face-to-face mentoring participants

Etikan, Musa and Alkassim (2016:1) describe Convenient Sampling as non-random sampling where individuals from a particular population are selected as research participants because they meet certain practical criteria. Thus, the selection of twenty research participants who would receive face-to-face mentoring (cohort one) was based on the convenient sampling technique. Practical criteria were established, including that the applicants were registered for an NCA module and wanted to gain a miniSASS experience. The facility at which the face-to-face mentoring took place can accommodate only twenty students, which limited the number of participants selected. No further considerations or limitations that might have an impact on the submission and selection process were agreed. All the resources the students needed, in the form

of field equipment, field data sheets and laboratory facilities, were provided on their arrival at the Telperion Nature Reserve.

3.5.2.2 Selection of digital mentoring participants

Following selection of the initial twenty research participants (cohort one), the second group of twenty participants was selected, also by means of the convenient sampling technique. Unisa offered this second group the same excursion at Telperion, but with a digital mentor. This excursion was held a month after the first excursion and made use of the same facilities, programme and resources (see Section 3.5.1.2).

A second advertisement was posted on the *myUnisa* student portal, as a few positions remained open after the initial posting. The advert informed students of the research taking place and confirmed that all the necessary support structures were in place, to ensure their success.

All the digital materials and information about how to download the application onto their privately-owned mobile phones was made available to research participants (cohort two) one week prior to their departure to the Telperion Nature Reserve. This early access to the technology was to allow participants the use of the free Wi-Fi facilities offered by Unisa, and to give them enough time to familiarise themselves with the digital material and its operation.

3.5.2.3 Sector-based mentoring participants

Once again, the research participants comprising the sector-based mentorship group (cohort three) were selected according to the convenient sampling technique and assessment of the assignment they had been asked to submit. Selection was based on three practical criteria: first, that the participant gained a WIL experience based on gaining their WIL experience located within the sector and with the aid of a sector-based mentor (see Section 3.4); secondly, that the assignment they were asked to submit covered a miniSASS experience; and thirdly, that only the first twenty students

who submitted assignments would be entitled to membership of cohort three of this research study.

This group of students was not contacted for any further information. The assignment marks obtained by the group for miniSASS water monitoring was considered the standard or benchmark for the mentoring currently provided to all WIL module students.

3.6 Data collection

The study made use of qualitative data to capture and assess the experiences of research participants. According to Creswell (2014:239), multiple types of data from varied sources are required to address the identified research question and sub-questions. As mentioned previously (see Section 1.10.2), the data required for this study is linked to semi-structured interviews, document analysis and a student opinion poll conducted via Unisa's student portal, *myUnisa*.

The semi-structured interview method of data collection was selected in order to elicit the views, opinions and experiences of the research participants (Creswell, 2014:240). The second form of data collection was the analysis of a variety of documents linked directly to the topic underpinning the research. The final element of data collection was derived from audio-visual materials in the form of computer-generated messages linked to a formal student opinion poll, which generated student opinions related to mentoring in general.

As stated previously, the final element in this research project required all the research participants to submit an assignment, for formal assessment, relating to the WIL experiences within the project. Each of the research participants submitted an assignment, all 60 were marked, and the results were analysed and interpreted, using statistics. Although this is seen as quantitative data, the results endorse the qualitative nature of this study.

3.6.1 Semi-structured interviews

A semi-structured face-to-face interview was conducted in-person with each of the research participants who participated in the face-to-face mentoring opportunity (cohort one), as well as those who engaged with the digital mentor at Telperion. Consequently, a total of forty interviews were conducted. All the interviews were conducted in private and on-site, directly after completing the fieldwork. The length of the interviews ranged from 20 to 45 minutes, depending on the detail of the responses or when clarification of the questions was required. Each of the semi-structured interviews was unique, due to the diversity of the research participants and their experiences, and all of them were recorded in writing. Creswell (2014:241) supports the use of this data collection tool as it allows participants to include historical information and questions can be controlled.

A standard set of questions was compiled and presented to each participant (see Appendix 12). Care was taken not to influence or direct answers. Where a participant requested clarification on a question and where appropriate, synonyms were used to replace misunderstood words or other language concerns. In such cases, the response as recorded in writing was read back to the participant to verify if the response had answered the question, based on the clarification of synonyms and language.

The information provided (responses) frequently covered more than one question; but participants were allowed to continue speaking without interference or hindrance. Additional questions were sometimes asked although the interview data capture form provided the boundaries and scope for the questions. Before moving onto new questions, the captured information was recalled so that the participant could verify, add or change what had been captured, and confirm that it had been captured correctly.

The interview data capture form comprised two sections. The first section covered student demographic information, which was used as part of this case study; the second section covered mentoring in more detail. The data capture pages for research

participants who had engaged with the digital mentor (cohort two) were adapted slightly, to ensure that questions focused on the digital mentor, and an additional data capture page (see Appendix 13) was added, for this group only. Given the focus of the study, this was considered a necessary and useful enhancement. The data collected through the semi-structured interview process has contributed to addressing the research questions.

Upon completion of the interview process, all the interview data capture forms were recorded in single Microsoft Excel document (see Appendix 19). This particular software was chosen because it enables a simultaneous view of all the responses to a particular question. This schedule assisted also with the later process of coding the responses.

The prefix 'RP' (for research participant) was allocated to each participant together with a number (see Section 4.2.3.1). The first twenty sequential numbers were allocated to participants who received face-to-face mentoring (cohort one); the next twenty sequential numbers were allocated to participants who engaged with the digital mentor (cohort two) (see Section 4.2.4.2). The numbering process was implemented to provide the research participants with the requisite anonymity, as stipulated on the Ethics Approval Certificate (see Appendix 4).

The environment in which the interviews were conducted was welcoming and I attempted to set an informal, sharing atmosphere from the outset. All the interview questions, by design, were general and non-intrusive and intended to encourage responses from the participants without influence. The interviews and questions, together, achieved the objective of eliciting information of pertinence to this study.

3.6.2 Document analysis

According to Bowen (2009:27), the process of document analysis is systematic and involves reviewing and evaluating documents. Creswell (2014:240) supports this statement and adds that that these documents should be purposely selected, so that they will assist in the unpacking of the research phenomenon.

Bowen (2009:27) continues by clarifying that, 'documents' includes printed and electronic materials. This study drew on three different sets of documents submitted by research participants and nature conservation course students, which added meaning and provided clarity to the research process. The three document sets purposely selected for this study are the miniSASS assignments submitted by participants; the excursion evaluation forms completed by each participant on one of the two excursions to the Telperion Nature Reserve; and, finally, the responses provided by students to a general opinion poll posted on the Unisa student portal, *myUnisa*. All these documents were scoured to provide possible linkages, themes, excerpts and quotations, to corroborate the insights generated by other data that was collected and analysed.

The marked and finalised assignments on the miniSASS water monitoring method, submitted by all research participants, served as the principal documents for this study. A neutral external marker contracted by Unisa evaluated all the submitted assignments, using a marking rubric or scoring guide. This process determined each student's grasp of the key concepts, associated skills and competencies, linked to the topic. Thereafter, answers provided by a student to certain questions on the assignment was triangulated with other data provided by the student. It was important to access these documents, to assess the effectiveness of the various mentoring approaches offered.

Additional documented data acquired for this study was the batch of summative evaluation forms, completed by all WIL students who visited Telperion and engaged with the mentoring opportunity offered by Unisa. These evaluation documents revealed additional information, including impressions and insights, concerning their mentor engagement experiences.

A general online student opinion poll, open to all WIL registered students, solicited information from the *myUnisa* student portal during the time the Telperion excursions were taking place. The opinion poll (see Appendix 14) focused on four questions and intended to compare the views of students who had not taken part in the case study, in any form, with those who had participated in the project.

The opinion poll was activated (went live) as soon as ethical clearance for this study was granted (see Appendix 4) and ran for one full semester (six months). Monthly announcements via the *myUnisa* student portal encouraged students to provide their reflective contributions. All responses were considered pertinent to the study.

The identity of research participants regarding all contributions was kept strictly confidential. Unique numbers were assigned to each research participant and their identities are known only to me. The unique numbers allocated for research purposes only, link participants to the data they provided, without revealing the participant's true identity. The only data that could not be traced back to an individual originated from the student opinion poll. However, all the data was used to add depth to the understanding of the research question.

3.7 Data analysis

The study aimed to gather various forms of data from sixty Unisa students – the research participants. Management and analysis of this large amount of raw data, as suggested by Smit (2002: 66), is expected to present potentially severe data management issues. This concern is based on the need for all the qualitative research data gathered to be transcribed into volumes of comparable text. These transcribed files formed the foundation of the analysis process. Thematic analysis, according to Braun and Clarke (2006:77), is a widely applied, qualitative analytic method. The benefits offered to this study by thematic analysis are linked to an accessible and theoretically flexible approach to qualitative data analysis.

Braun and Clarke (2006:79) describe thematic analysis as a qualitative data analysis method, which seeks to identify, analyse and report themes within the data collected. They state that the method involves minimal organisation of the data but describes the data in detail. They also claim that the method requires a number of choices to be made regarding the identification of themes and sub-themes, and that this process should remain flexible. Furthermore, a theme is considered important, not because it is quantifiable, but because it captures and illuminates something of importance relating to the research question. According to Guest, Bunce and Johnson (2006:59),

a data saturation point is reached when no new information or themes are identified in the data. For this case study, saturation was achieved after the data gathered from the forty semi-structured interviews with research participants had been analysed.

For this qualitative study, data was collected from the semi-structured interviews and the documentation provided by the research participants, in the form of assignment submissions, excursion evaluation forms and digital information from the student opinion poll, including reactions and comments.

The subsequent analysis is presented together with supportive literature that describes the theoretical framework, which sustains the notion of mentorship, and Bandura's Social Learning Theory, in the next chapter.

3.8 Ethical measures

According to Baxter and Jack (2008:544), the methodology supporting qualitative case studies enables complex phenomena to be studied within their contexts. In addition, if applied appropriately, the methodology provides valuable tools for programme evaluation and research. However, the notion of ethics and ethical conduct is an essential, founding component of any research endeavour. This study was conducted at a Unisa secured WIL facility and relied on the contributions of university academics and students, all of which were in line with the terms and conditions of the Ethical Approval Certificate (see Appendix 4).

Unisa's Research Ethics Policy (2016) clearly outlines the University's expectations of a compliant researcher, in terms of moral and general ethics principles. Furthermore, the policy document outlines the purpose and scope of research ethics within the institution, as well as its commitment to ethical research (2016:1-4). As presented in section 1.16, ethics is about doing good and not placing anyone in harm's way. Unisa's Research Ethics Policy (2016) was used to guide this research endeavour and to ensure that this study is fully compliant in terms of all ethics considerations.

The study invited the participation of Unisa undergraduate students and academic staff as research participants. The College of Education Ethics Review Committee granted formal approval for the study (see Appendix 4). Further approvals were granted by the Unisa Research Permission Sub-committee, to enable data generated by the University and the student research participants, together with reflections from academic staff, to be used and referenced by the study.

Permission to conduct research on the Telperion Nature Reserve was granted by the Oppenheimer family and owners of the reserve (see Appendix 15). The collection of purposeful data provided by research participants and university academic staff was sanctioned by the signing of an informed consent form (see Appendix 16) for all direct participants in the study, together with implied consent (see Appendix 17) for those students who contributed to the opinion poll on the *myUnisa* student portal. A formal participant information sheet (see Appendix 18) was supplied to all research participants.

I am a permanent academic staff member and a sponsored student at Unisa. I am also the primary lecturer for the Nature Conservation Application module and responsible for ensuring the placement and mentorship of all registered students. Consequently, I am acutely aware that my position and situation might lead to bias and subjective notions. Every effort was made, throughout the study, to ensure that I remained unbiased and objective, particularly concerning data selection, analysis and reflection. This effort reflects the underpinnings of qualitative research, insofar as it seeks to understand context-specific phenomena, without any form of manipulation (Golafshani, 2003:600).

The use of only one computer – a Unisa provided and password-protected laptop – has maintained the integrity of all the hard copy and digital data generated by this study. A single hard drive back-up of the study documentation exists and has remained under lock and key since the outset of the study. Weekly back-ups were made to ensure that the data remained updated. A period of five years has been set aside to secure the hard and soft research data. All research participants have been reassured of their anonymity and understand that the information provided will remain securely

stored until the storage life has been reached. At this point the soft data contained on the laptop and hard drive will be reformatted and the hard copies securely destroyed.

Participants were informed of their right to withdraw from the study at any point from the outset of the interview process. This took place in a private place and required me to complete a pre-developed questionnaire form in front of the interviewee. After each response, the captured information was relayed back to the respondent for verification and or elaboration. In cases where the respondent did not understand the question, synonyms were used to replace unclear or misunderstood words.

Creswell and Miller (2000:127) state that member checking is an important part of validation and that this process shifts from the researcher to the participant. They define member checking as a process of having participants confirm the credibility of the information captured by the researcher, as well as adding their comments to the final narrative of the study. Although not a true form of member checking as described by Creswell and Miller, the instantaneous feedback, verification and adjustment process undertaken during the interview, is a meaningful contribution to the validity of the narrative presented.

Personal details of the research participants were captured, such as names and student numbers, so that the various documents could be linked during the analysis process. However, participant names, their student numbers or any other identifying agent were not revealed in the study. Research participants were informed of this commitment to, and the means of, ensuring their privacy and maintaining confidentiality.

3.9 Trustworthiness

According to Brink (1993:35), validity and reliability are keystones for qualitative research and scrupulous attention should be given to these aspects, to ensure acceptable and unquestionable research findings. He goes on to highlight various potential risks to the validity of the findings and suggests various strategies to negate or mitigate these threats. The compilation of data based on the experiences, and the

sense of their significance, acquired by nature conservation students from the deployment of various mentor models, is subjective. Hence, the study endeavours to create a holistic perspective of the experiences and insights described by students regarding activities within their WIL context.

Brink (1993: 35) highlights the issues of consistency, repeatability, and stability of the data compiled, together with the ability of the data collector –in the case of this study, the data collector is me – to collect and interpret the data accurately. It is recognised that a study of this nature requires a methodology which can yield consistent, comparable and repeatable results and in terms of which I am consistent with regard to the application of methods and the analysis and interpretation of the data.

Accordingly, the study employed various data collection strategies to ensure internal validity and to confirm that what was experienced by the research participants is a true and accurate representation or reflection of their experience. Further, the research participant groups (cohorts) were selected by means of convenient sampling (see Section 3.5.2).

The selection and use of multiple data sources and collection methods for analysis and interpretation of this study aimed to avoid the understood deficiencies and biases linked to qualitative research (see Section 3.6). Triangulation was applied and sought to validate the congruency of data collected through the employment of various data collection methods.

For this study, I was solely responsible for the collection, analysis and interpretation of the data gathered. This approach reduces any potential and associated errors and improves the ultimate accuracy and trustworthiness of the results.

An external assessor with comparable knowledge and experience in miniSASS water monitoring and result interpretation was contracted to conduct formal assessments of the assignments submitted by all three cohort groups of research participants. Prior to the commencement of this study, a marking rubric and an updated assignment

template were generated, which ensured consistency in marking and marker responses to students.

These planned rigorous techniques and methods assisted in generating findings, which can be considered unbiased, relevant, representative, trustworthy and therefore believable.

The focus of this study is on mentorship and the affordances to be gained from different mentorship approaches. Use of the underpinning focus of a miniSASS water monitoring method enabled students to participate without any negative repercussions, at the same time gaining real WIL experiences. Furthermore, the students were assessed on applied skills and understanding through their submitted assignments, which contained their data collection and interpretation. This means that the research findings are transferable, particularly to many other potential nature conservation WIL module assignments.

Judgement about the soundness of the research rests with its trustworthiness and transferability, therefore the research methodology is considered valid and the results are deemed reliable.

3.10 Conclusion

Qualitative research methodology, according to Creswell (2014:233), requires a different approach to that of scholarly inquiry. It depends heavily upon text and image data, employs unique data analysis steps, and makes use of diverse data collection methods to understand context-specific phenomena.

This chapter provided a detailed description and overview of the various aspects and components informing the research methodology for this study, beginning with a detailed description of the rationale, design and methods.

The uniqueness of the research participant group required that attention be paid to its composition and the notion of sub-cohorts was introduced. The different mentorship

approaches linked to these cohorts were discussed in detail, which also informed the selection of research participants. Context was provided for the study in the form of a study site description. Furthermore, the development process of a specific digital mentor application was presented. Twenty selected research participants used this digital tool as a mentor for their WIL miniSASS requirement.

In conclusion, emphasis was placed on a description of the data collection and analysis processes and the commitment to ethical measures. The ensuing chapter (Chapter 4) will present the results of this study in detail, linking them to the problem statement and research questions.

CHAPTER FOUR

RESEARCH RESULTS

4.1 Introduction

The preceding chapters have all contributed to establishing the foundations for this study and addressing the research question. Chapter Three introduced the research methodology with its contents of rationale, research design, research methods, data collection, data analysis and concluded with details linked to the ethics and trustworthiness of this study.

This chapter (Chapter Four) presents the findings of the analysis of the datasets, compiled from the contributions provided by the research participants. Extensive analysis of all the data linked to the semi-structured interviews, the various documents and the student opinion poll, revealed the themes and sub-themes inherent in this study. These themes and sub-themes enabled the construction of an initial thematic map as described in Braun and Clarke (2006:90).

The themes and sub-themes, which emerged from the semi-structured interviews regarding student perceptions of mentors and mentoring are introduced in the sections to follow. Further, interviews conducted with the digital mentoring cohort, only, revealed two additional sub-themes.

A document analysis was conducted following which I reviewed the evaluation forms provided by the research participants, after the completion of each of the two planned excursions to Telperion.

The thematic maps generated will be reused in Chapter Five, to assist with the development of summaries, a synthesis of the findings, highlighting conclusions and generating a list of recommendations. All the findings resulting from the analysis of the data collected are presented below.

4.2 Research findings

This section focuses on the findings generated from the data collected from the forty semi-structured interviews, the concomitant documents as identified in Chapter Three, and from the reactions and comments of research participants to the student opinion poll on mentoring.

The research findings are presented in the sections below.

4.2.1 Demographics of research participants

A total of forty research participants actively contributed to this study and formed the core of the empirical review. A further twenty students formed a cohort of students who received sector-based mentoring. Their submitted assignments, were only reviewed and compared with the results obtained by the core group of research participants. The aim of this comparison was, in part, to provide an answer to sub-question three, which was, “How do the academic outcomes achieved compare between the students who were mentored via mobile technology and those who were mentored face-to-face?”

Even with the assurances of anonymity and confidentiality, a few participants opted to withhold some of the personal information required to create a research participant profile. However, the data collected provides a good representation of the demographics for the research participants. Table 4.2 below presents the demographics for the research participants in the face-to-face cohort.

Table 4.2: Demographics of the face-to-face research participants (n=20)

Gender	Age	Employment	Other Qualifications	Placement	Mentor
9 Males	14 (21–30 Years)	4 (Full-time)	11 (None)	2 (Yes)	4 (Yes)
11 Females	0 (31–40 Years)	1 (Part-time)	3 (Cert or Dip)	9 (No)	5 (No)
	0 (Over 40 Years)	0 (Ad hoc work)	0 (Degrees)	3 (For some)	5 (For some)
	6 (Unknown age)	9 (Unemployed)	6 (Unknown)	6 (Unknown)	6 (Unknown)
		6 (Unknown)			

Source: Self compiled

Study of the Table above brings to the fore the following details for research participant profiles in the face-to-face group. Six research participants chose not to provide any personal information, which amounted to 30% of the demographic information.

The information obtained and available for analysis shows that, among the face-to-face participants, female research participants outnumbered the males, 55% to 45% respectively. The age range of the group indicated that 70% of the participants were between 20 and 30 years of age. Almost half, 45%, of all the participants indicated that they were unemployed and, by association, full-time distance education students. Regarding additional studies, 55% of the participants indicated that the nature conservation undergraduate qualification is the first qualification they have attempted. Furthermore, 45% of the participants stated that they did not have access to a WIL placement.

The percentages then show a relatively even spread of students who have secured mentors; who do not have access to mentors; and those who have ‘partial’ access to mentors, i.e. for only some of the required WIL experiences.

The Table below (see Table 4.3) presents the demographics for research participants within the digital mentor cohort.

Table 4.3: Demographics of the digital mentor research participants (n=20)

Gender	Age	Employment	Other Qualifications	Placement	Mentor
7 Males	14 (21–30 Years)	7 (Full-time)	13 (None)	8 (Yes)	8 (Yes)
13 Females	5 (31–40 Years)	4 (Part-time)	7 (Cert or Dip)	7 (No)	7 (No)
	1 (Over 40 Years)	0 (Ad hoc work)	0 (Degrees)	5 (For some)	5 (For some)
		9 (Unemployed)			

Source: Self compiled

Scrutiny of the Table above reveals the following details for research participant profiles in the digital mentor group. All twenty students contributed fully and provided all the required data.

Gender distribution among the digital mentor group showed that females outnumbered the males, again, but by a slightly larger margin, 65% to 35%, respectively. The age range of the group indicated that 70% of the participants were between 20 and 30 years of age, while one participant was over forty years of age. As with the face-to-face group, 45% of the digital mentor participants indicated that they were unemployed. This percentage is exactly equivalent to that of the face-to-face group. Regarding additional studies, 65% of the participants indicated that the nature conservation undergraduate qualification is their first attempt to acquire a qualification. The percentage of students who had secured placement and mentors was 40%; while 35% of the students indicated that they did not have access to placement and mentors; and 25% of the students claimed that they had ‘partial’ access to placement and mentors, i.e. for only some of the required WIL experiences.

In summary, the two sets of demographics presented above do not vary substantially. The next section provides a detailed discussion of the identified themes, as informed by this study’s research question.

4.2.2 Discussion of themes

As introduced above, the themes, which emerged from the data collected, through the implementation of the various data collection tools, will be discussed in relation to the research question and sub-questions. The objective for collecting and interpreting the data and identifying themes was to compare the different perceptions among students of the mentoring methods offered by Unisa.

This exploratory case study investigated the phenomenon of providing effective WIL mentorship to nature conservation students in a real-life context, in relation to the established research question, and sub-questions. Effective investigation required, first, the determination of a foundation of understanding. Accordingly, these discussions will focus on the perceptions held by research participants regarding mentorship for nature conservation WIL, as offered by Unisa.

At this juncture it is important to reiterate that three different data sets were used to generate deeper understanding of the phenomenon and the associated research questions. The first dataset was generated from the semi-structured interview, the second dataset was generated from an analysis of relevant documents, and the final dataset was generated from the reactions and comments provided by students to the opinion poll on mentoring.

Deconstruction of these various datasets produced definite themes and sub-themes, relating to the mentorship provided by the University, within the scope of this study. The results of the analyses of the various datasets will be discussed in detail below.

4.2.3 Research participants' understanding of mentorship

To gain a deeper understanding of mentoring in the context of the undergraduate nature conservation WIL modules offered by Unisa, it was necessary first to take stock of the understanding among research participants about mentoring. During the semi-structured interviews all research participants were asked to provide their definition of a mentor (see Appendix 12). The answers (perceptions) provided by the participants

addressed sub-question two of the three sub-questions (see Section 1.4.2). Thus, to address the primary research question holistically and from multiple perspectives, the congruency between perception and reality was unpacked and exposed subtle nuances between cohorts one and two, regarding the concept of mentorship.

In addition, all participants were requested to provide their understanding of mentoring (the process) and to provide additional insights into their expectations of their relationship with their mentor. The information thus acquired illuminates a number of concepts that were generally entertained by all the participants, about mentoring and its expected outcomes (see Appendix 12). Table 4.4 below lists the common themes and sub-themes identified from the responses of both the face-to-face and digital mentored cohorts. These will be discussed in more detail in this chapter.

Table 4.4: Notions on mentorship held by research participants

Theme	Sub-themes
A mentor is a person	Knowledgeable (theory and practice)
	Experienced (practice and specific)
	Qualified (formal)
Work-integrated learning	Information
	Study outcomes
Mentor traits	Service
	People skills

Source: Self compiled

Unisa’s Policy on Experiential Learning (2015:1) defines a mentor as being a suitably qualified and experienced person, located within a host organisation, who undertakes to supervise and mentor a student through his or her WIL module.

The first theme to be recognised from the information provided is that of a *mentor being a person*. All the participants in both the face-to-face and digital mentoring groups indicated that a mentor is a person. The primary research question asks if technology can function as an effective alternative to a human. It is therefore necessary to interrogate this dichotomy further. Three sub-themes emerged from this particular theme, which can be captured in three single words: knowledgeable,

experienced and qualified. The inferences contained within these sub-themes will be covered in subsequent sections.

The second theme that surfaced from the data was the topic of *work-integrated learning/academic studies*. This theme draws attention to student motivation and informs the second and third sub-questions. The second, as already mentioned, concerns student perceptions, while the third sub-question concentrated on the information and academic outcome considerations of research participants, with inputs from their mentors. Discussions of the two sub-themes developed – information and study outcomes — foregrounded by research participants, will follow once the final theme has been explored.

The third and final theme identified by the data is *mentor traits*, which links the personal qualities and people skills of mentors to the process of mentoring. In one way or another, all the research participants referred to a particular behaviour or an action performed by the mentor, during their collaborations. This theme has direct bearing on sub-questions two and three, perceptions and outcomes, respectively. The first of the two sub-themes described a particular service offered to the research participant, represented by simple phrases, for instance: to guide, to support, to assist and to help. The second sub-theme focused on people skills and included qualities such as, patience, empathy and understanding.

The *mentor traits* theme and associated sub-themes concludes the analysis of the general perceptions regarding mentors and mentorships expressed by research participants. Subsequent sections will provide a more focused account of these identified themes, as well as how the research participants related them to the two mentoring methods prepared and offered by Unisa.

4.2.3.1 A mentor is a person

As presented in Table 4.4 above, three themes with associated sub-themes materialised from the process of coding and were later merged with and into broader

themes. The appearance of these themes was enabled by scrutiny of the data collected.

Knowledgeable (theory and practice)

This sub-theme focuses on the ability of mentors to mentor WIL students in the field of nature conservation. Both cohorts of research participants mentioned or implied that a mentor is a knowledgeable person. For example, research participant seven (RP7), indicated that a mentor *“has the knowledge on a topic”* while RP1 added *“has enough information and knowledge”* to assist with unpacking the subject of nature conservation. This statement was echoed by RP29, who used the phrase *“sufficient knowledge”* and was more simply explained by RP26 as, *“who knows more than you”*.

According to the understanding of RP5, knowledge is not just needed by a student or imparted by a mentor, but is constructed through a collaborative process, when *“I know some stuff and want to verify this knowledge”*, with a mentor. However, RP5 also highlights the notion of collaboration as building knowledge and understanding. This thinking contrasts with a comment from RP29, who sees knowledge as being *“carried over to the student”* by the mentor.

While some research participants did not use the word ‘knowledgeable’ directly, they implied its presence as a key component within their perceptions about mentoring. For instance, RP8 stated that a mentor is someone, *“you can learn from”*, which implies that the mentor has the knowledge being sought by the research participant; RP40 wanted to *“gain a lot of knowledge”* from the mentor; and RP32 implied that a mentor *“ensures you follow the rules”*. This demonstrates a departure from subject or topic knowledge to the mentor’s experience or knowledge of the workplace.

Expanding the sub-theme of knowledge, RP8 claimed, *“knowledge of the topic is a requirement”*, while RP14 elaborated further and included the notion of teaching, *“teaches you to do things and you do them according to their ideas and knowledge they have”*. In a similar vein, RP29 commented, *“Teaching me the basics and a little*

bit more” while RP3 declared that a mentor, *“guides me through my studies – supports me academically”*.

Importantly, many of the research participants qualified that what they meant by ‘knowledge’ was especially practical and theoretical knowledge. This distinction is noteworthy as it shares a strong linkage with the WIL sub-theme of study outcomes. According to RP1, a mentor needs knowledge, *“in theory and experience, which I need to assist me to get the theory into practice”* or as stated by RP5, *“there is a difference between theory and how they do it in the workplace”*. Expanding on this RP13 said, *“give us the information to experience”*, which also implies the need to gain knowledge that will assist the research participant, practically and theoretically.

Experienced (practice and specific)

The second sub-theme discusses the experience in the field of nature conservation accrued by mentors. Research participants identified two different kinds of experience. The first is the conservation experience amassed by a mentor, which is especially sought by students and to which they gravitate, in pursuit of their own WIL study outcomes. This provides a strong linkage to the sub-theme of study outcomes, which connects to the WIL theme.

According to RP5, a mentor should have, *“the experience to guide you and to show you how it is done in Conservation”*, while RP8 stated that mentor experience should be shared or passed on to students. In addition, RP36 needed the mentor to share his (the mentor’s) experience so that he could, *“know more about nature conservation”*, while RP24 claimed, *“they have 28 years of experience and this was good”*, and RP25 stated simply that mentors are, *“the people with the experience”*.

A somewhat different perspective came from RP10 who said that students expect mentors to share their experience but, *“finds it better that the mentor does not cotton wool reality”*, whereas RP11 said that a mentor need not be qualified but should have the necessary experience. Adding to RP11’s comment, RP27 stated that a mentor needed, *“a bit of experience, which is both seen and done”*.

Research participants contributed additional information about experience and the sharing of this experience. This is illustrated by RP3 who said it is important for a mentor to, *“emphasise the practical side of my module”*, while RP10 indicated that, *“real work situations and no hypothetical situations”* should be shared, thus implying that mentors should share authentic experiences. In addition, RP9 requested mentors to provide more information about, *“the things we need to do in a reserve”*. This was echoed by RP12 who wanted to be shown, *“how to apply theory in practice”*.

Qualified (formal)

The last sub-theme covered in section 4.2.3.1 focused on the academic intelligence of mentors and their ability to support undergraduate WIL students seeking to apply their theoretical knowledge in the workplace.

An example of this focus comes from RP11, who looks for a mentor skilled in the field of nature conservation, while RP 10 wants a mentor, *“to have gone through the same circumstances, what the mentee is experiencing, to provide insight”*. This statement has particular relevance; all nature conservation WIL students are required to use the services of a mentor and the University prefers that the mentor is at least one relevant qualification ahead of the prospective mentee.

According to RP3 a mentor should, *“support me academically”*, thus implying that there should be a form of prolonged academic discourse associated with WIL activities. This statement is backed by RP6, who needs guidance, *“through research to complete my nature conservation application (NCA) modules”*, and by RP3 who also requires assistance to complete the WIL modules. Finally, according to RP20, a mentor should, *“guide you through the nature conservation application reports, checks and edits, corrects me where I am wrong”*.

4.2.3.2 Work-integrated learning

In Table 4.4 above, WIL was listed as one of the themes, while the notions of information and study outcomes were listed as its two sub-themes.

Information

The first sub-theme explored in this section (4.2.3.2) focused on information and the pivotal role it plays in motivating nature conservation undergraduate WIL students. Questioned about their expectations of mentoring, the majority of research participants reported a need for information to fill the gaps in their understanding.

This is well illustrated by RP1 and RP10, who both stated that they were able to ask questions and get the relevant information. RP13 put this in simple terms, *“I have the information”*. Similarly, RP3 added, *“lots of information to open up and stretch my mind”*.

This sub-theme was illuminated in many research participant phrases such as, *“I got the information I needed”* or *“I now understand the information”*. This was well summarised by RP6, who said, *“she mentored me and I got out what I needed and understand the process”* or as RP8 stated, the mentor, *“gave me all the information and I understood”*.

Study outcomes

The final sub-theme discussed in this section (4.2.3.2) highlights the students' academic motivation for participating in the WIL module and its associated activities. Archer and Chetty (2013:134), posit that, at a deeper level, students who enrol for higher education are motivated by the prospect of acquiring a tertiary qualification. At a more immediate level, as witnessed in this study, students are motivated to acquire the means to achieve their ultimate academic goal.

This underpinning motivation is clearly discernible within many of the responses from research participants. According to RP1, a mentor is there, *“to help me with nature conservation”*. RP9 adds to this statement by saying that a mentor needs to provide *“more information about nature conservation ... learn more about the things we need to do in the reserve”*. This sentiment is reiterated by RP20 who, *“would like to gain more knowledge about the work I am doing”*. Alternatively, as stated by RP35, a mentor is *“able to guide the student about his career”*. All these statements reflect the motivation presented by Archer and Chetty (2013:134), which alludes to student ambitions to acquire a qualification in a career of their choice. RP22 summarises clearly this overarching student ambition and drive, in a comment about seeking assistance from a mentor, *“who is already qualified in the field and to assist me to qualify in the same field”*.

However, on an immediate level, many of the students, specifically RP20, viewed mentors as being in a position to assist them with their module requirements, stating that a mentor guides students through their academic requirements by checking and editing reports, and correcting students when necessary. Alternately, RP24 simply states, *“to help me to do my reports”*. However, RP39 summarised this motivation well, saying, *“I was able to pass my first NCA module”*.

4.2.3.3 Mentor traits

Table 4.4 above lists *mentor traits* as one of the themes. The two associated sub-themes, which emerged from the data identify the service offered by the mentor and the people skills demonstrated by the mentor. This is the only theme to have garnered several negative comments for its sub-themes.

Service

The sub-theme of service gathered comments from all the research participants about a particular service provided by, or required of, a mentor. The overwhelming use of these ‘service words’ or ‘service phrases’ serves to highlight the importance assigned to this aspect of mentoring by research participants. Furthermore, this understanding

has a large part to play in the moulding of student perceptions of a successful mentoring relationship. Some of the more commonly used words included: guide, help, assist, support, groom, lead and teach. An example of the use of some of these service words was offered by RP4, who said a mentor is a person, *“who helps us understand and teaches us too”*.

However, the service sub-theme received some less than complimentary responses. Some research participants indicated that they had experienced challenges due to the workload of their mentors. This was adequately summarised by RP22 who stated that, *“they wanted to help but were too busy ... explained things briefly ... no time to go through things in detail”*. According to RP20, the mentor, *“was not around or does not do the topic ... refers me to others who do not help”*. These events obviously influenced the relationship between students and mentors, and the perceptions of mentors held by students.

People skills

Research participants expressed the need to comment on the people skills exhibited by some of their mentors. According to RP7 a mentor, *“created an open and honest pathway of communication”* and *“was not condescending”*, while RP4 stated that the mentor, *“never judged us”*. RP22 claimed the mentor used time well and RP8 said the mentor was well prepared.

Conversely, RP30 stated that the mentor was not helpful and *“got annoyed with all the questions”*. This sentiment was supported by RP7 who stated that there needs to be respect, patience and understanding.

4.2.4 Participants mentored by Unisa

The above section (4.2.3) – research participants’ understanding of mentorship – identified a number of themes and sub-themes from the responses provided by both the face-to-face and digitally mentored groups. As discussed, these themes and sub-

themes represent the general perception of a mentor, as held by research participants within both cohorts.

In addition, the semi-structured interview asked all research participants to provide specific information about the Unisa offered WIL experiences and mentoring on the Telperion Nature Reserve. The information received creates an opportunity to compare the 'general perception of mentoring' data (see Section 4.2.3) with that of the mentoring provided by Unisa.

The sections below will examine the perceptions of both participant groups regarding the Unisa offered mentoring on Telperion. Where possible, the same themes and sub-themes identified in section 4.2.3. were utilised, to isolate similarities or contradictions between general perceptions of mentoring and perceptions of the mentoring offered by Unisa.

Analysis of this data is important and forms part of the central focus of this study. In the following sections the sub-themes have been populated with data provided by research participants from both the Unisa mentored groups, while on their separate excursions to Telperion.

4.2.4.1 Face-to-face mentored group

A weeklong WIL excursion (see Appendix 11) to the Telperion Nature Reserve was planned and offered by Unisa, to students wishing to complete a number of activities required for the module. One of these activities was the compulsory miniSASS water monitoring assignment. The lecturer responsible for the concomitant theory was requested to manage the miniSASS programme activity and mentor the group of WIL students. Mentoring was provided in person and on-site for cohort one, and by means of a digital mentor (with the lecturer on standby at a distant location) for cohort two.

The following paragraphs present the comments shared during the semi-structured interviews on Unisa provided mentors and mentoring. Comments made by the face-to-face research participants have been curated under the same seven sub-themes,

described in section 4.2.3. These sub-themes are: knowledgeable, experienced, qualified, information, study outcomes, service and people skills.

Knowledgeable

This sub-theme focuses on the Unisa academic asked to provide the face-to-face mentoring during the miniSASS water monitoring activity at Telperion. This academic was selected since she manages the theoretical component to be explored on the excursion. The academic agreed to act as a formal university mentor for the section of the programme that focused on miniSASS water monitoring activities, only. This WIL interaction with students was conducted in person, on-site and face-to-face.

The academic provided mentoring only and was not involved in any data collection for this study. I maintained individual control of all data collection in relation to this study. For example, I conducted all the semi-structured interviews personally and oversaw the excursion evaluation. However, the academic was involved in some of the preparations linked to the excursion (see Section 3.4) and with the development of the digital mentor.

The following sections derive directly from the semi-structured interviews with the face-to-face group (cohort one) and capture the assessments by research participants of the knowledge exhibited by the mentor.

According to RP1, the mentor, "*helped to put theory into practice*", while RP5 said that the mentor had, "*a deeper knowledge of what was needed*" and also suggested that university academics should understand the theory.

Experienced

The second sub-theme exposes the experience in the water monitoring field demonstrated by the Unisa academic. According to RP8, "*a mentor is experienced but also there to assist me*". Research participant RP10 highlighted the point that university academics are connected with the field (water monitoring) and because they

understand and know what is required, academically, they are able to use this experience to, *“keep their modules relevant”* and to *“prevent students from being redundant in the workplace”*.

However, RP5 contradicts this and suggests that university academics may understand the theory, *“but perhaps not the practical, to the extent of the industry mentors who work in the field every day”*.

Qualified

This particular sub-theme focuses specifically on the intellectual expertise of the Unisa provided mentor for the miniSASS activity. The identified academic has an extensive academic career in nature conservation and particularly in ecology, of which water ecology is a part. Additionally, the participating academic has published in academic journals and is currently working to reach the highest level of academic studies. With this understanding, the following comments were provided by the research participants who engaged face-to-face with this academic at Telperion.

Participant RP11 recognised that the contributing mentor was, *“highly qualified”*, while RP10 took this further, stating, *“the Unisa lecturers are experts in the field and have a wide network within industry”*. RP4 added that, *“a lot more projects can be done with people in the field and who know what is going on in the field”*.

Service

This sub-theme focuses on the service contributed by the Unisa provided mentor, as described by the face-to-face research participants. Fifteen of the twenty research participants represented this cohort and drew attention to this aspect.

Participant RP10 indicated that the mentor engaged at a higher level by, *“providing career direction”*, while RP1 stated that the mentor *“helped”* students with their studies and was there, *“to correct you when you did it incorrectly”*. RP7 offered some insight into the service provided by the face-to-face mentor, highlighting that the programme

activity was, *“not a task but an experience ... it reminded me why I am doing nature conservation and brought the passion back to the front”*.

People skills

Research participants within cohort one shared their experiences of the people skills exhibited by the Unisa provided mentor. According to RP3, the mentor, *“understood the expectations of the students”*, while RP5 stated that the mentor, *“is engaging and open to answering questions”*. In addition, RP7 claimed that the mentor was, *“friendly and encouraging”*.

This sub-theme and the preceding sub-themes all share commonalities with the perceptions provided by the research participants, under the general understanding of mentoring (see Section 4.2.3).

Information

Comments from the research participants on nature conservation and WIL, in general, led to the emergence of this sub-theme.

According to RP1, the mentor provided, *“additional resources which aid us to gain additional knowledge”*, and continued, claiming that this was, *“useful, as they are not provided in our study materials”*. RP4 supported this sentiment, stating that, *“the information was a lot ... and when we needed it ... very resourceful”*. Whereas RP9 indicated that, *“the resources worked because it was relevant to the information we are looking for”* and, *“the mentor knows what we needed to cover the subject and provided more information to us to complete our nature conservation application [assignments]”*.

Study outcomes

Discussion of this final sub-theme focuses on academic motivation for students, and their participation in the WIL module and associated activities.

According to RP6, the face-to-face mentoring was beneficial because, *“the information was able to be collected based on the report required”*. RP6 added that being mentored by a university academic made it easier because, *“we can get out what is required”*. This was reiterated by RP3, who claimed that research participants were able to focus on the WIL module assignments since the mentor, *“understood the module requirements”*.

As with the other participants, RP7 claimed, *“I know the standards and I know they understand what we need to learn”*. This statement was supported by RP9 who said that the university mentor, *“knows what we need to cover in the modules”*. According to RP10, the university provided mentorship programme was *“specific and one-on-one”*.

Comments from RP8 provide a good summary of this sub-theme well and point to the tensions being experienced by some WIL students. RP8 said that the University's, *“focus was on teaching, while industry is focusing on jobs”*, both of which are highly sought after by students registered for Unisa's nature conservation diploma course.

Taking a slightly different route, RP11 thought that although the university-provided WIL programme was, *“quite useful”*, the selection of mentors, either sector- or university-provided, should depend on their availability to mentor. RP11 claimed that *“the university lecturers were not always available to mentor”*, however, *“if they were always available”* then they would become the preferred mentor.

Concluding this section focusing on the face-to-face mentorship provided by a Unisa academic, RP7 provided this statement, *“I enjoyed the Telperion experience”* while RP8 said, *“the mentoring made it easier, than going into the process blindly”* and RP10 said that university academics were, *“in a position and able to fill both academic and industry roles”*.

Thus, when asked to choose between a mentor from the University, or a sector-based mentor, to assist WIL students with their module requirements, ten of the fifteen

research participants selected the university-provided mentor over the sector-based mentor.

4.2.4.2 Digitally mentored group

The South African Government gazette (2014:17), directive to all institutions of higher learning who offer WIL modules within any of their qualifications, to find suitable placement and mentors for students, is a challenge for Unisa (see Section 1.7). The issue of placement has been addressed (see Section 1.7) through curriculum development and provision of a comprehensive topic list (see Appendix 1), which enables WIL students to select activities they can complete within their local community and/or surrounding environment. However, providing a suitable mentor for each geographically distributed student remains a challenge – which, ultimately, gave rise to the formulation of this study and its research questions.

Affordances emanating from mobile technology and the experience and subject knowledge of a university academic were blended to develop a mobile phone application (see Appendix 5) for use by WIL students. The academic who provided synchronous mentoring to the face-to-face cohort of research participants, was answerable in part for providing technical inputs into the development of the mobile application. The academic also provided the ‘face and voice’ for the mobile application. Thus, as described in section 3.5.1.2, the mobile application attempted to replicate as closely as possible, the nuances of the Unisa offered face-to-face mentoring process, as conducted by the Unisa academic at Telperion.

One month after the first excursion at Telperion, and the face-to-face mentoring of research participants who engaged with the miniSASS water monitoring activity, a second opportunity to participate in a University-mentored miniSASS water monitoring activity was offered. The second opportunity replaced the Unisa academic/mentor with the pre-developed mobile phone application, named the NCA eMentor.

The sections that follow will introduce the responses and the data captured from the digitally mentored research participants during the semi-structured interviews. Due to

the uniqueness of the mentoring method, new themes and sub-themes were identified within the digitally mentored group (cohort two). However, there were instances where the themes and sub-themes corresponded with those gathered from cohort one.

All twenty research participants from the digitally mentored cohort participated fully by providing responses to all the questions. In an effort to generate a contextual foundation for these unique themes and sub-themes, the information was quantified and is set out below.

Contextual information

Of the twenty research participants only one did not have access to a smart phone device, and of the mobile devices available, all used the android operating system. This validates the assumption of android use as stated in section 3.5.1.2. One of the research participants had access to both an android and an iOS based mobile device but used the android device for the WIL activities.

Mobile phones accounted for 75% of the mobile devices used by research participants at Telperion, while 25% utilised tablets for their WIL activities. One research participant utilised both a mobile phone and a tablet, and the one research participant who did not have access to either a smart phone or a tablet, utilised a laptop to access some of the information required.

There are a number of internet service providers within South Africa and the research participants made use of four, overall. The majority, 50%, of the research participants made use of a single provider, who did not provide good coverage at the miniSASS research sites. The remaining four service providers were utilised by 60% of the research participants, accepting that some participants utilise more than one service provider. The 60% was roughly divided amongst the four remaining service providers. According to the research participants, these service providers delivered good coverage in the general area, but coverage at the three miniSASS sites was poor to non-existent.

Digital mentoring required a mobile device to provide and engage with a full array of supportive resources. Accordingly, 80% of the research participants downloaded the application to their mobile phones, and 40% of the research participants downloaded the application and the video collection, which had been placed in Drop Box. Two students did not download any files but were able digitally to share the information across devices, using an app and file sharing application.

The anticipated costs of downloads and device use was considered during the initial construction of the application, yet 75% of the research participants considered these costs insignificant. However, some of the students had utilised the free Wi-Fi facilities at Unisa, prior to travelling to the Telperion Nature Reserve.

All the research participants acknowledged the value of the mobile application developed, and 100% of the cohort insisted that Unisa should continue to explore the possibilities of providing digital mentors.

Research participants provided greater detail to their responses than can be provided here. Differences in the two modes of mentoring provided required amendment of the questions for the semi-structured interview. Consequently, there was an increase in the number of identified research questions and sub-questions, unique themes and sub-themes. The information gathered illuminates a number of concepts entertained by the participants about digital mentoring and its expected outcomes. Table 4.5 below lists the common themes and sub-themes, which are discussed in more detail below.

Table 4.5: Notions on digital mentorship held by research participants.

Theme	Sub-themes
Design	Service
Applicability	Usability
	Information
	Study outcomes
Challenges	Connectivity
	Interaction
	Design

Source: Self compiled

4.2.4.2.1 Design

Research participants did not provide comments on the design of the application, other than to highlight how the design provided a service to them. Below are some of the comments they provided, under the heading 'service'.

Service

According to RP21 and RP24, the application, *"helped a lot"*, while RP34 added that, *"it helped and assisted me"*. As discussed under the face-to-face mentored group, (see Section 4.2.4.1), the services provided by the mobile application involved a number of 'service terms'. RP36 said that the application is, *"there to guide you"*, and RP27 said that the application provided *"step-by-step help"*.

A particular service not mentioned by the face-to-face mentored group was the ability to summarise or revisit past learning or experiences. According to RP22 the mobile application, *"reminds you"*, or, as RP26 said, *"it re-capped on previous practical sessions"*. These benefits were noted also by RP31, who claimed that the mobile application, *"provided better insights"*.

The final service emphasised by the digitally mentored group focused on time. According to RP28, the application, *"allowed me to work at my own time"*, while RP33 commented that the information and services delivered by the digital application were, *"available 24/7"*.

4.2.4.2.2 Applicability

Research participants provided comments on the appropriateness of the application and how it influenced or supported their WIL study requirements. Below are some of the comments provided, under the headings of usability, information and study outcomes.

Usability

The ability or usability of a mobile phone application to function as a digital mentor is the primary focus of this study (see Section 1.4) and the focus of this section. Research participants provided some insights into how they interacted with the application, which served also to address sub-question two (see Section 1.4.2).

Participant RP21 specified that the application was, *“easy to use”*, but also said that, *“it was not easy in the beginning”*, while RP23 said he/she needed, *“to use it more”*, and needed, *“to get used to it”*. However, in summary, RP21 claimed that the application was, *“easy and quick to use”*, and that it was, *“useful”*.

When assessing the application as a technology with which students are engaging, RP32 said that the application, *“is modern”*, and, *“as young people we like this”*. Furthermore, RP32 prefers the application because, *“we did not have to use Google to search information”* and said that using Wi-Fi provided access to the application, *“to get all the information”*. In support of these statements, RP33 pointed out that, *“as students, we always have our phones with us”*, and said that this assists with access to information. In addition, RP33 said that, *“the application is more immediate”*, and that it can, *“provide more current information”*.

Another aspect of usability highlighted by the students was linked to expediency and how much time the application could potentially save the research participant. For example, RP37 stated that the application was, *“easy to access”* and *“very helpful”*, and enabled the research participant to access information without having to log into the University’s student portal. This statement was qualified by RP37 claiming that the University’s student portal, *myUnisa*, was *“not stable”*. RP40 expressed concern about the ability of the application to function, *“without glitches”*.

In summary, RP39 proclaimed, *“I do not need to go far to find a mentor”*, as the application, *“provides all the information”* needed.

Information

Adding to the responses presented in the previous section, many of the research participants viewed provision of the application as their primary source of information, which could guide and assist them through their miniSASS WIL experience.

According to RP21, the application provided, *“accurate information”*, while RP25 added to this, saying, *“I got what I needed”*. RP26 stated that, *“you get a lot more information”*, and RP31 claimed that, *“you get more explicit information”*. Further, there were references to the variety of information on offer. RP33 claimed that, *“different information [is] provided”*. An example of this different information was highlighted by RP37, who drew attention to the fact that the application, *“contained all data sheets needed”*.

The linked video channel containing ten video segments also received comment from a number of research participants. RP23 said that he/she *“liked the video collection”*, while RP26, who also liked the video collection, said that he/she was, *“more of a picture person”*, alluding to a learning preference supported by the application, in particular the provision of video materials as learning resources.

In conclusion, RP39 indicated that, *“the videos [were] very helpful”*, because, *“before watching the videos I didn’t have a clue about miniSASS”*.

Study outcomes

In association with the sub-theme that emerged from the face-to-face semi-structured interviews, research participants who made use of an application as a digital mentor also considered their study outcomes.

Participant RP25 felt that the application was, *“very nice and helpful”*, in that he/she would be able to use the application, *“to do it myself”*, and not be *“reliant”*. This sentiment was supported by RP25 who said, *“If I know of its existence I would have*

used it on my own". RP28 said the application suited him/her and he/she, "*would use it to fit my own study schedule*", and "*I would have been done a long time ago*".

Another benefit to be gained from the application and mentioned by the research participants focuses on the availability of mentors and student access to mentors. According to RP22, access to the application meant that it, "*can be used when a mentor is not around*". This affordance was highlighted by RP29 who claimed it is, "*difficult to get mentors*" and that he/she was, "*worried I would not finish*", his/her studies; but having access to an application, "*makes it easier*".

In conclusion, RP22 saw the potential of the application to, "*function for other modules too*".

4.2.4.2.3 Challenges

Throughout the semi-structured interviews, the research participants highlighted various challenges they had experienced concerning their interaction with and use of the module application provided. These concerns arose under three sub-themes: connectivity, interaction and design. The following sections will raise these reservations and concerns.

Connectivity

Connectivity was the challenge cited most often and was perceived as an obstacle to extracting the full merit of the mobile application. There are two reasons for this connectivity challenge, the first of which was raised in section 4.2.4.2, in the discussion of the various internet service providers and the coverage they provide over the miniSASS study sites. Some service providers provided better coverage than others, in general, but when in the field and at the miniSASS sites, none of them provided any connectivity.

This challenge leads directly to the next issue, which is linked to the application and its initial design and setup. BuildFire.com, the Web 2.0 application-building site, makes

provision for the development of an online application, only. This limitation was anticipated, and all the research participants were requested to make use of Wi-Fi facilities to download the application, and to save all the documents to the internal memory on their mobile phones. However, not all research participants complied with this instruction. The inconvenience created by this is evident in the comments from RP32 who stated, *“no connectivity – no answers”*, followed by, *“the application is online only – the mentor is always on line”*.

The downloading of files also was listed as a challenge, but this arose mostly from the issues to do with connectivity. Initially, research participants were required to download the application, ex-situ, from the Google Play store. In this instance, RP22 claimed that he/she, *“struggled with downloads”* due to their *“file sizes”*. Other research participants listed the cost of downloads as being of concern.

In addition, in-situ connectivity challenges were reported by the research participants. They claimed they could not access the application at their research sites due to there being ‘no connectivity’; as introduced in section 4.2.4.2. This was nicely summarised by RP26 who said, *“it could work well for those students who are in towns”*.

Interaction

An example of interaction was provided by RP22, who said that he/she needs *“to ask”*, while RP24 claimed that, *“you cannot ask a question”* of an application. These comments add credence to RP23, who said that he/she, *“preferred face-to-face mentoring”*, and that he/she needed, *“a personal mentor”*, who could provide the information required. Moreover, RP27 said it was, *“easier to get info from face-to-face mentor”*, and added that there would be, *“no need to run through all the videos to get your answers”*. RP31 suggested adding, *“a chat function”* to the application. This indicates the need expressed by research participants for synchronous interaction and communication during the mentorship process.

Design

All the above sub-themes originate from the design and development of the application. This was illustrated by RP22 who indicated that the videos were, “*not embedded into the application*”, and therefore there was no, “*offline function*”. This was supported by RP24 who said that the application, “*can only be used when connected*”.

A further inadequacy with the application was highlighted by RP28, who owns an iPhone. However, this study did not develop an application to support Apple devices. Fortunately for RP28, he/she had access also to an android-based mobile phone.

4.3 Discussion of document analysis

Participant evaluations of the two Unisa offered excursions, participant miniSASS assignment submissions, and an online student opinion poll, are the three sets of documents that inform this section of the study.

Excursion evaluations

Apart from the semi-structured interviews, it was appropriate for this study to consider additional views and comments expressed by research participants who engaged with the Unisa provided face-to-face mentor and the digital mentor. The students provided these additional comments as part of the customary end of excursion evaluation. These evaluation documents provided additional information and insights not captured by the semi-structured interview.

Participant miniSASS assignment submissions

In order to address sub-question three of this study, I conducted a quantitative review of the student assignments prepared by the research participants. These assignments were compiled and submitted for assessment after the miniSASS experiences, with input from either an academic or a digital mentor.

Student opinion poll

Additional information was garnered from registered WIL students who did not engage in any miniSASS study at all, via an online opinion poll hosted by Unisa's student portal, *myUnisa*. The online opinion poll encouraged students to answer five basic questions concerning mentorship and its importance.

Presented below is a summary of the evaluations emanating from the two separate miniSASS excursions at Telperion; the outcomes from an assessment of sixty student assignments on miniSASS, thirty-six of which were completed with assistance from a face-to-face mentor or the mobile phone application; and the results of a small online *myUnisa* student opinion poll on mentorship (see Section 1.10.2).

4.3.1 Student evaluations of Telperion excursions

After each excursion to the Telperion Nature Reserve, students are requested to complete a critical evaluation of the programme, the activities and the mentoring they received. It is fitting that these documents were available for consideration as they contained additional insights not captured by the semi-structured interviews.

A summary of the evaluation comments provided after the face-to-face and digital mentorship excursions is provided below.

4.3.1.1 Face-to-face mentoring

Thirteen students provided feedback from the excursion with face-to-face mentoring, and 85% indicated that the mentor was well prepared. The same percentage of participants indicated that the mentor addressed all their questions so that they understood what was expected of them and why. Again, 85% of the participants indicated that the support materials provided helped them to understand the topic better. Furthermore, 85% of the responses indicated that the mentor made good use of examples and 92% of participants indicated that the excursion was very good, worth their while, and well worth recommending to their fellow students.

All the participants considered that the group work included in the excursion was helpful and useful, particularly with regard to sharing information, discussing issues and addressing questions. However, a few negative issues were highlighted, including reduced time to gain work experience, personality clashes and unequal contributions from group members.

A great deal of comment and attention was given to WIL placements. Students have huge expectations regarding work placements, as can be gathered from some of the statements submitted. The overarching expectation is that Unisa should provide placements, and by association mentors, for all WIL students.

Motivation for this expectation resides in time allocation. Research participants state that they have limited time in which to find a suitable placement, find a mentor, gain the experience, and draft and submit an assignment per month per WIL module. Some participants acknowledge that the Telperion Nature Reserve is a good 'work placement' option, but also acknowledge that it is not available to students distributed around the country.

4.3.1.2 Digital mentoring

A total of seventeen students chose to provide feedback on the second excursion, which concentrated on providing digital mentorship for the completion of a miniSASS water monitoring activity. When considering the preparation and suitability of the digital mentor, 82% of participants indicated that the application was well prepared and most suitable, while 71% of participants indicated it was easy to use and audible.

However, the responses varied when it came to the digital mentor answering all the questions, to enable understanding on the part of the user. The results showed that only 35% were very happy with the digital mentor, 41% were happy, while 24% stated that they were neutral on this question.

Moreover, a total of 65% of participants indicated that the support materials provided by the digital mentor had assisted them very well to understand the topic better A

further 29% indicated that the materials provided had assisted them to understand the topic. In addition, 88% of participants indicated that the excursion was very good, and worth their while, and 59% indicated that the excursion was well worth recommending to their fellow students.

The responses provided by the digital mentored group are congruent with those provided by the face-to-face mentored group. Group work within the digital mentoring group was considered by most to be very helpful and useful; participants were able to share important information, raise their questions and they had supported and assisted one another.

A few negative issues were highlighted, including bullying within the group, exclusion based on language differences, unequal treatment by fellow group members, unequal contributions by some group members and slow decision making by the group, which slowed the learning process. WIL placement featured in these evaluations also and, as introduced above, the expectation of placement and mentor allocation is huge. Participants suggested that the model provided by the Telperion Nature Reserve be replicated across all provinces, and that excursion opportunities should be provided on a monthly basis, which exceeds the existing week per month formula. One of the participants indicated that having a full-time job requires focused time for the completion of topics.

These comments highlight some of the current challenges faced by both the University and its students, regarding the provision of WIL opportunities and the acquisition of sector-based skills and experiences.

4.3.2 Student assignments

Assignments submitted by all WIL students utilise a range of specifically developed templates, enabling a competent contracted marker to utilise a predetermined marking rubric. The template used for this study (see Appendix 2) focused on the miniSASS water monitoring method. The template comprises a title, introduction, results, participation, reflective comments, representative photos, mentor details and

references. For the purposes of this study, only the introduction and results sections were marked. These two sections solicited the majority of student understanding of the theory and its application in the field.

All three mentoring methods presented in this study enabled students to attain the required miniSASS water monitoring skills and experience, following which the students developed and submitted a completed miniSASS template for assessment. Of the forty research participants who were selected and who benefited from Unisa-provided face-to-face or digital mentoring, four students did not submit an assignment and were awarded zero. The remaining thirty-six students submitted their assignments and thus contributed to the results presented below.

As discussed in Chapter Three, the first twenty miniSASS assignments received from geographically distributed students who received support from a sector-based mentor, were selected to participate in this study. This enabled comparison of the results achieved by sector-based students with the results achieved by Unisa mentored students.

4.3.2.1 Assignment introduction and marks

There was no significant difference between the three groups or cohorts (face-to-face mentoring, digital mentoring or sector-based mentoring) in terms of the marks awarded for the introduction section ($\chi^2_2 = 4.158$; $p = 0.125$).

This is determined by considering the p -value above; if the p -value is less than 0.05, the groups are considered statistically significantly different to one another. However, in this case the p -value is greater than 0.05 and thus the differences between the groups are not statistically significant.

The box-and-whisker plot below illustrates the relationship between each of the mentoring methods, in relation to marks gained for the introduction section.

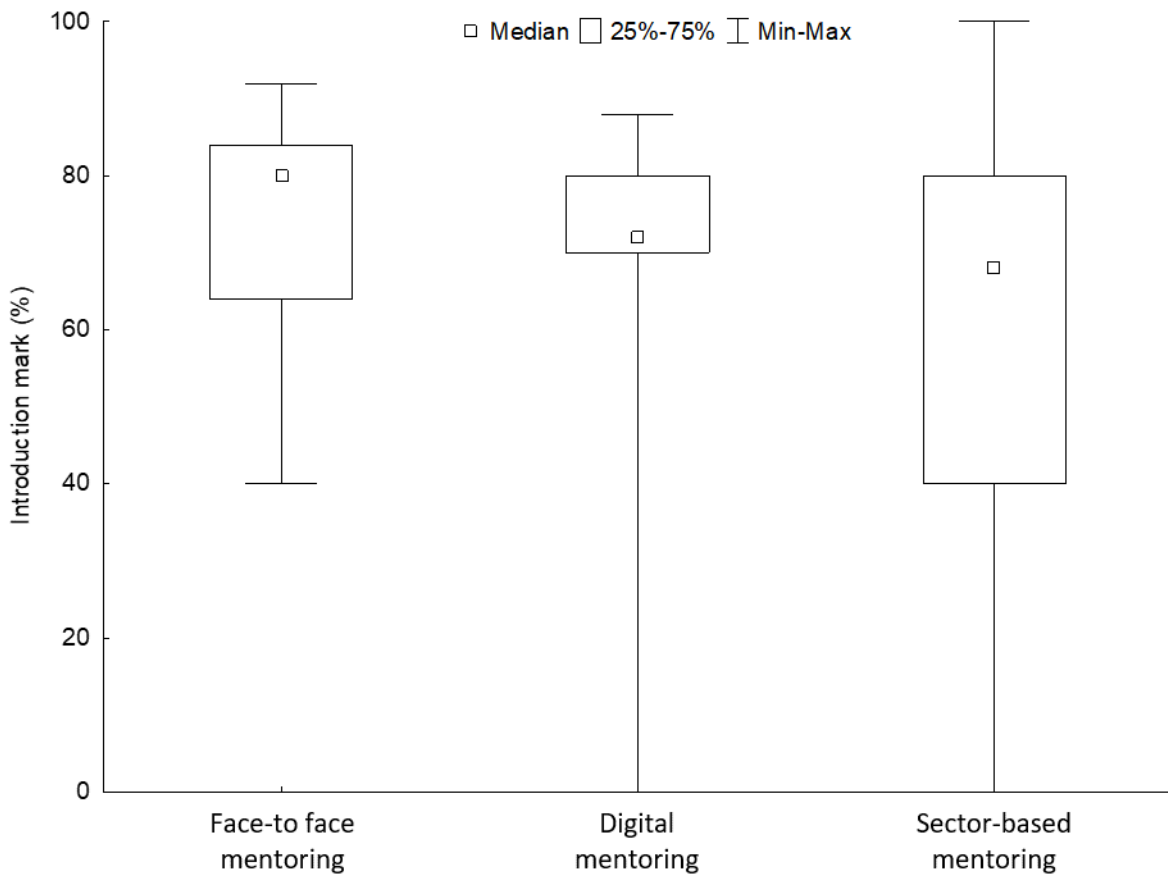


Figure 4.10: The box-and-whisker plot of the introduction section marks achieved by research participants from the three different mentoring cohorts featured in this study

(Source: Dr L Duncan)

The introduction section of the miniSASS assignment focuses on information gathered by participants related to in-field site descriptions where the water monitoring took place and on the associated general theory. The digital mentored group registered the narrowest range of marks, with a group average of 72%. The face-to-face mentored group registered the next narrowest range of marks, with a group average of 80%. The sector-mentored group registered the widest range of marks, with the lowest group average of 68%.

4.3.2.2 Assignment results and marks

Much like the marks for the introduction section, no significant difference occurred between the three groups or cohorts (face-to-face mentoring, digital mentoring or sector-based mentoring) in terms of their results section mark ($\chi^2_2 = 2.367$; $p = 0.306$). As indicated, the p-value is greater than 0.05 and thus the differences between the different mentoring groups are not statistically significant.

The box-and-whisker plot below (see Figure 4.2) illustrates the relationship between each mentoring method, in relation to the results marks obtained.

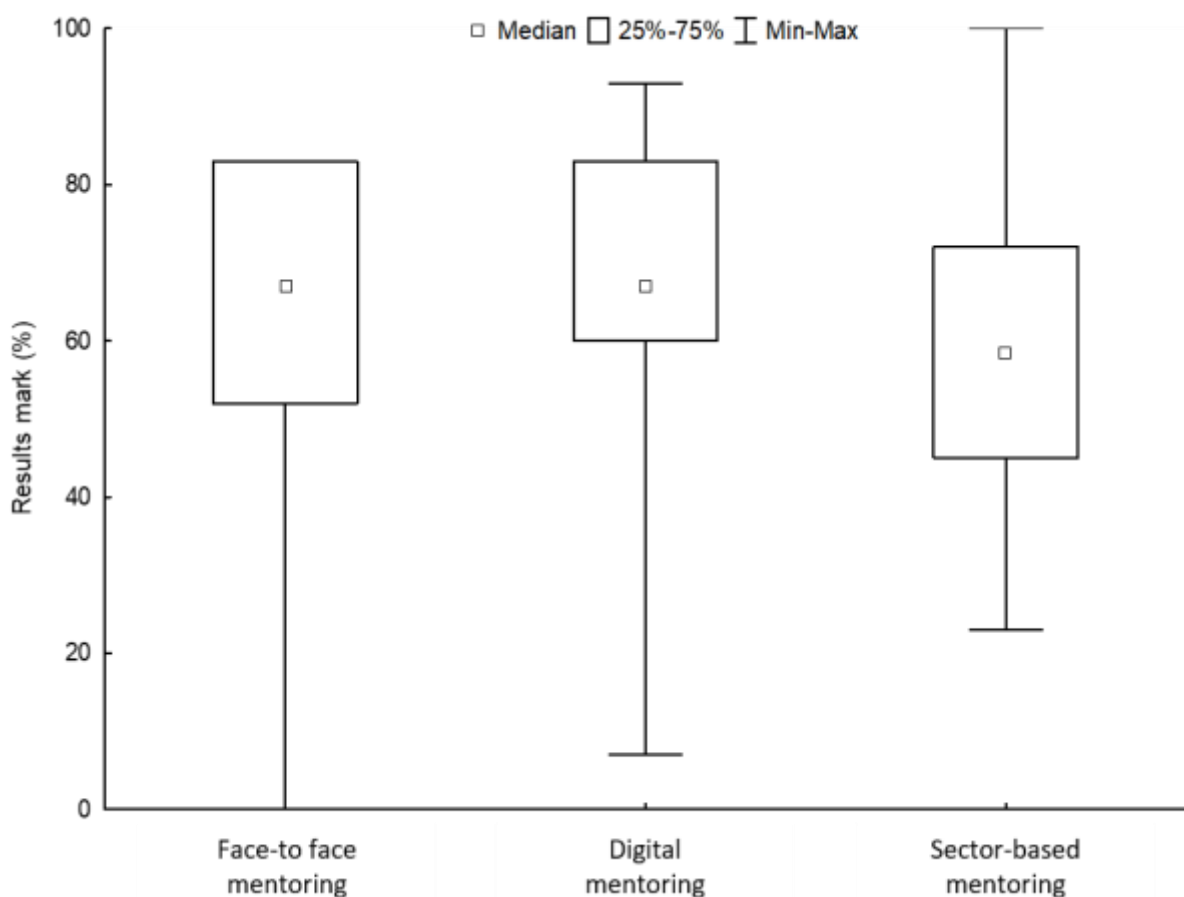


Figure 4.11: The box-and-whisker plot of the results section marks achieved by research participants from the three different mentoring cohorts featured in this study

(Source: Dr L Duncan)

The results section of the assignment template focuses more on the application of data gathering techniques and how this data is analysed and interpreted.

The digital mentoring group registered the smallest range of marks, with a group average of 69%. The sector-based mentoring group followed, with the next smallest range of marks and a group average of 60%. The face-to-face mentoring group had the widest range of marks, with a group average equal to that of the digital mentoring group, at 69%, and located centrally within the range of marks.

4.3.2.3 Assignment total marks

As with the introduction and results marks, the total marks achieved by students did not produce any significant difference between the three groups or cohorts (face-to-face mentoring, digital mentoring or sector-based mentoring) in terms of their total assignment mark ($\chi^2_2 = 2.705$; $p = 0.259$).

As indicated the p-value is greater than 0.05 and thus the differences between the different mentoring groups are not statistically significant.

The box-and-whisker plot below (see Figure 4.3) illustrates the relationship between each mentoring method in relation to the total marks gained for the assignment.

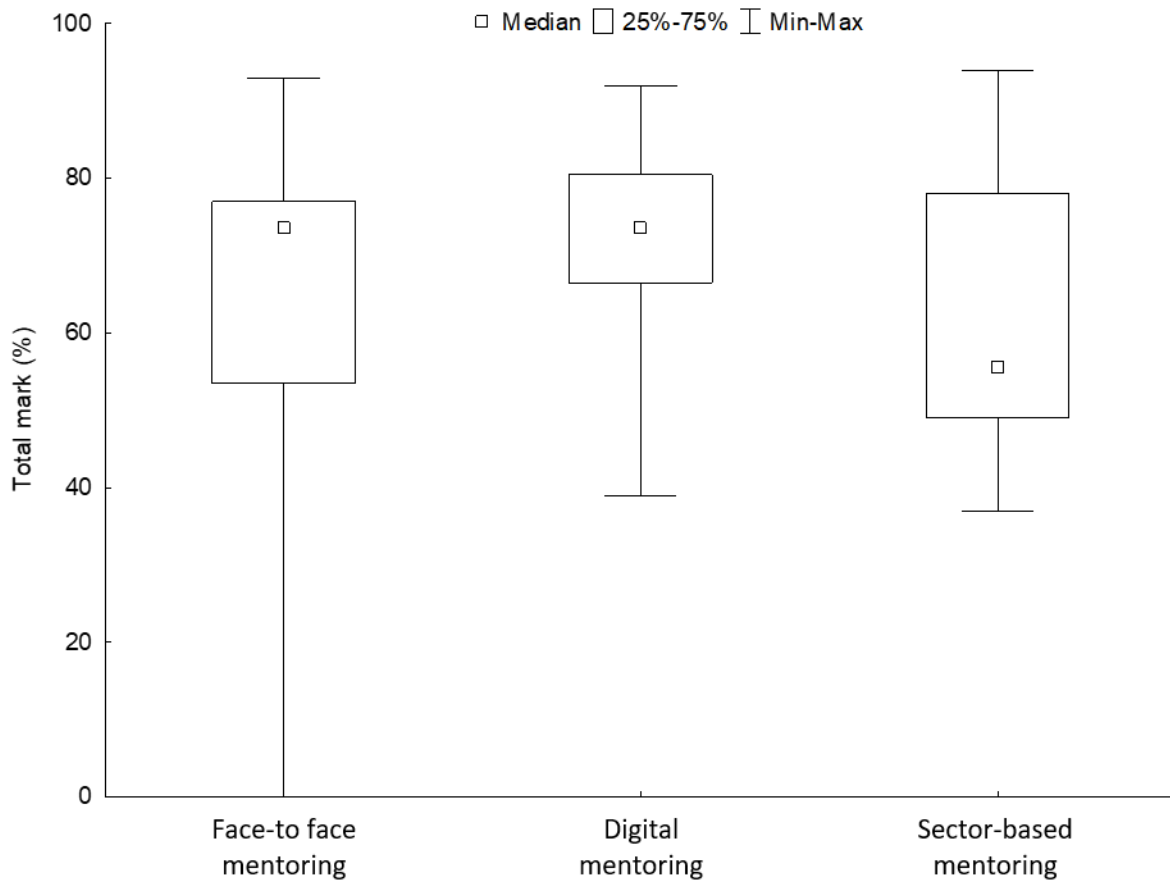


Figure 4.12: The box-and-whisker plot of the total marks achieved by research participants from the three different mentoring cohorts featured in this study (Source: Dr L Duncan).

However, there are three issues of consequence. The first issue is that no significant difference was found between the three groups' assessments. This means that if the marks are good for one of the groups, the marks will also be good for the other two groups.

The second issue concerns the average marks achieved by the three groups. The face-to-face group and the digital mentor groups achieved the same (high) average mark of 75%, which is a distinction. The sector-based mentor group achieved an average (pass) mark of 58%.

Achieving a distinction is considered a very good accomplishment. Students who obtain a distinction have proved that they understand the relevant theoretical concepts and are fully competent regarding application of the concepts in the field.

The third issue is linked to the range of final marks obtained for the miniSASS assignment. The digital mentor group registered a narrow range of marks, from just below a distinction to 80%, and the average final mark for this group fell in the middle of the range. The face-to-face mentor group achieved a slightly wider range of marks, and the average mark was located within the top 5% of the marks earned. The sector-based mentor group registered the widest range of marks, between 50% and 79%, with an average final mark of 58%.

4.3.3 Student Opinion Poll

A total of 38 registered students participated in this opinion poll, which represents around 7% of the total number of students registered for the WIL modules. The opinion poll posed five specific questions (see Appendix 14) and a summary of the information gathered by this activity is presented below.

Of the 38 participants, 53% indicated that they believed access to a suitable mentor was essential for success in their module outcomes, while 37% of the participants indicated that a mentor is only sometimes essential for academic success. When asked if they would continue with WIL activities without access to a suitable mentor, 64% indicated that they would do so. A further 22% of students stated that they would continue with WIL activities only 'on occasion'.

Given the choice between a local sector-based mentor and a university academic, the votes posted were overwhelmingly in favour of the university academic. A follow-up question provided a choice between a sector-based mentor and a podcast created by the subject lecturer. Here again, the results show that the majority of the participants (82%) selected the podcast over the sector-based mentor.

While one of the respondents provided a motivation for his responses it is important to state that this respondent is a working student with 22 years of conservation experience. He/she made extensive use of a mentor for topics for which he/she had "*no experience in that field of work*". He/she notes that, "*I would not have been able to*

complete that without a mentor". Thus, he/she believes that *"a mentor is not required for all ... but they are essential in the one you have no experience in"*.

4.4 Summary of findings

It is evident that WIL offered at Unisa poses challenges for both students and academics alike. The semi-structured interviews indicate that the student cohort is diverse and the perceptions of mentoring provided by the two Unisa mentored groups are somewhat complimentary. These views will enable the development of recommendations to aid and support all WIL students gain the skills and experience they require.

The creation of a digital mentor in the form of a mobile phone application has not previously been attempted within the context of providing nature conservation undergraduate students with WIL skills and experience. Since this mobile technology, within this specific context has not been tried, the results of this case study may well inform the University of the inert potential which this technology has to offer to work-integrated learning.

The demographics of the research participant group reveal that there is a higher ratio of female to male participants. Although no further investigation was undertaken with this information, it may still have bearing for future research. While the majority of the research participant group was under the age of 30 years, the data shows also that many of the participants are unemployed and attempting their first undergraduate qualification. Furthermore, linked directly to this study, many research participants indicated that they did not have a placement and, by association, no mentor either.

When analysed, the general understanding of a mentor among the research participants matched the definition provided by Unisa in its Experiential Learning Policy (2015:1) and research participants offered that a mentor is identified as a person. This creates a dichotomy with the research questions and provides fertile ground for the discussion to follow in Chapter Five.

Further, the sub-themes of knowledge, experience, qualifications, the provision of information, assistance with study outcomes, service provision and the underpinning personality of the mentor, were stated and explored. These important insights from the research participants are congruent with Unisa's definition, as stated above.

The study results revealed that the face-to-face mentoring provided by the University matched the general perceptions and expectations of the research participants, whereas the digital mentor group provided several diverse responses, which must be understood, based on the context of their digital or technological accrual and interaction.

According to Prensky (2001:1), students process information and think fundamentally differently from persons who did not grow up using digital technology. Thus, all but one participant had access to a smart phone and all the phones were using an android operating system. A few participants utilised tablets rather than phones. A few of the major service providers for mobile phones prevailed, but with varying degrees of success in terms of connectivity.

Several options were made available to the research participants to access the resources developed by the University. However, the majority of participants made use of only one option. The cost of downloading the application and or the resources was considered a major concern by only a few research participants. After using the application in the field as a substitute mentor, all the participants indicated that the University should continue refining and developing the digital application, for use by all students and across other nature conservation modules.

Scrutiny of the three cohorts and their assignment submissions found no significant differences between the groups. However, this situation revealed sufficient data for further deliberation in Chapter Five. In addition, the online student opinion poll garnered some thought-provoking comments, which deserve more discussion in the final chapter.

4.5 Conclusion

This chapter detailed the results emanating from the data collected from three differently mentored cohorts of research participants. The demographics were covered in detail while respecting the ethical right to anonymity of all research participants. The outcomes of the empirical inquiry were based on the semi-structured interviews, student assignment submissions and a student opinion poll, which were all summarised.

Unpacking the semi-structured interviews revealed a number of important themes and sub-themes, which were linked back to the research sub-question: *“How do students perceptions of mentors differ, between those mentored using mobile technology and those mentored face-to-face.”* Responses from research participants included their perceptions of mentors and mentoring, which were consistent with the University’s official definition of a mentor and the role of mentoring.

The digital application as a suitable alternative WIL mentor was trialled during a field excursion and discussed thereafter with the research participants who registered their general support for the application. A few challenges were encountered during the field trials, but these did not influence the students’ WIL requirements for this activity.

The academic outcomes achieved by the research participants and the sector-based students were compared as no statistically significant differences were found. However, this outcome provided an insight into the achievements of the three cohorts of students, related to the mentoring they received.

The analysis of the data revealed that this study’s underpinning theories of Bandura and Tinto are detectable in the activities and responses of the research participants. The document analysis revealed that the research participants were happy with the mentoring they received. However, the challenges as identified in the semi-structured interviews, were reiterated. Moreover, the student opinion poll highlighted the link between mentors and academic success, while also indicating that mentoring is not a

prerequisite for students. Notably, students indicated a preference for academic mentors and digital mentors over sector-based mentors.

These iterations and the result outcomes, as discussed in this chapter, have enabled me to address the first sub-question of this study, *“how can a mobile technology be designed to meet nature conservation WIL module outcomes”*.

The final chapter will focus on drawing the various discussion points together, through summaries of the supporting literature and the empirical inquiry, into a synthesis of the research findings. The limitations and delimitations will be covered and the chapter will draw to a close with recommendations as identified, and suggestions for further research.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The preceding chapter offered a detailed discussion and analysis of various datasets compiled from responses received from the study's research participants, a document analysis and responses to the student opinion poll, and presented several themes and sub-themes identified by means of thematic analysis, a qualitative data analysis method described by Braun and Clarke (2006:79)

This final chapter presents the synthesis of the research study, which focused on the phenomenon of providing effective WIL mentorship to nature conservation students. Preparation for the synthesis of this study's findings and recommendations will include a summary of the supporting literature, followed by a summary of the empirical inquiry.

These two sustaining summaries will be followed by the synthesis of the research findings. The synthesis will discuss and relate the similarities and contradictions between the literature review and the empirical inquiry. The final element of this study is the presentation of its associated limitations. The chapter will conclude with sections devoted to specific recommendations, aimed at various management levels and departments within Unisa, as well as suggestions for further research prompted by this study.

5.2 Summary of literature review

Chapter Two introduced the three theories, which buttressed this study and served as the theoretical lenses to address the research question (see Section 2.3). Within this section, a synopsis is provided of the broad context within the conservation sector, and nature conservation WIL offered by Unisa, which prompted the research question: how effective is a mobile application in providing mentorship for a nature conservation WIL experience?

This is followed by a more detailed discussion on mLearning, which explores some of its associated challenges and affordances. Furthermore, the relationships that exist between ODL, teaching and learning, support services for information and communications technology (ICT), and mLearning are covered in some detail.

Section 2.3 introduced the three theories, which served as the study's theoretical lenses. Although the study focuses on the use of a mobile application, Bandura's Social Learning Theory provides a workable framework for teaching and learning, research and practice. According to Hill, Song and West (2009:88), Bandura's Social Learning Theory is particularly well suited to technology-enabled learning.

Bandura's comprehensive Social Learning Theory, as covered in Section 2.3, identifies eight key elements which had a direct influence on this study. The first element, Bandura (1971:2) suggests, is that humans can and do learn through direct observation. This was verified by this study's engagement with face-to-face and digital mentors. Furthermore, Bandura's learning through direct observation is an essential component of mentoring. This is supported by Gershenfeld (2014:365) who states that mentoring focuses on role modelling, amongst other elements.

The second element posited by Bandura (1971:2) is the formulation of new behaviours and attitudes, acquired through practical experience or reciprocal engagement with others. This was demonstrated by the study through its research participants, who worked in groups and under experienced mentors, to acquire the experience needed.

The third and most influential element of Bandura's Social Learning Theory is the notion that people learning through modelling (1971:5). Bandura supports this notion by stating that modelling is an indispensable facet of learning. The study revealed, through the production of a series of video clips and an associated mobile application that technology can serve as a competent model, in the absence of a suitable mentor (see Section 2.3).

The study's research participants all applied to attend and participate in the university-mentored excursion to the Telperion Nature Reserve. This indicates that the students

were motivated or driven by the desire to gain the offered experiences for academic advancement. Bandura highlights such motivators as associational preferences, which refers to the reducing number of times a student requires to observe a topic to gain the required learning (1971:6). This too was demonstrated, as all selected students already knew that, by attending and participating in the offered excursions, they would gain the required experiences.

In addition, the anticipation of reinforcement (1971:9) deals with student selection processes. Bandura suggests that knowing the desired outcome, prior to engaging in an activity, will influence decisions made by students. This element is validated by the application process to participate in the study.

The final two elements that had direct influence on the study are linked to student learning styles, technology preferences, and the rehearsal of modelled responses (1971:11). These elements were included in the study through the development and use of a mobile technology and the activity requirement, which insisted that students conduct three miniSASS water quality tests at three different sites, and in doing so rehearsed the modelled responses.

The second theory selected to act as a particular theoretical lens is that of Tinto's social integration theory (1995:11) which has particular resonance to the study in that Tinto advocates the notion that students who are integrated into learning communities and where collaborative teaching strategies are used, students are more likely to succeed. This is evident through the structure and management of the excursion programme used in both the face-to-face and digital mentoring groups.

The third and final theory embraced by this study is Wilber's Integral Theory, which was used to assist with interpretation of the study's findings. Wilber (1997:71) suggests the use of four quadrants to generate a meta-perspective or a comprehensive means of viewing a particular reality, which in the case of this study is the use of a mobile application as a substitute for a face-to-face mentor.

The following sections cover perspectives related to this study. Section 2.4.1, considers the national issue of unemployment. The dismal unemployment figures for South Africa can be attributed, in part, to the lack of prerequisite skills (Pauw *et al.* 2008:45). Consequently, students apply for tertiary education in an attempt to escape the prospect of looming unemployment (Archer and Chetty, 2013:134). However, attainment of a tertiary qualification does not guarantee employment for the holder of the qualification. Pauw *et al.* (2008:45) provide evidence that suggests the unemployment of people with qualifications is on the rise.

Section 2.4.2 addresses the pressing issue of skills needs. This issue is both complicated and multifaceted. The employers of university graduates seek skills and experience, which creates a niche for higher education institutions (Hughes *et al.* 2013:265). Links are drawn between the motivation of students and the needs of the sector. Pauw *et al.* (2008:45) claim that universities do not prepare their graduates adequately for the job market. Students without previous work experience or skills stand very little chance of being employed (Jing *et al.* 2016:23).

Work-integrated learning (see Section 2.4.3) is viewed as a method for providing future graduates with required sector skills and experience. Jackson (2105:350) suggests that both the module outcomes and the inputs received by the students receive careful consideration, with which this study complied. Smith-Ruig (2014:771) links WIL to mentoring. The study explored further issues related to gradueness and work-readiness, with a view to bridging the theory-practical gap.

Section 2.4.4 contains inferences linked to mentoring and mentorship. Mentorship as a component of WIL is not a well-defined construct (Jacobi, 1991:505). Nevertheless, mentorship functions are frequently associated with academic support and role modelling. Poor academic achievements and career development can be attributed to poor mentorship (Qahtani, 2014:150), while sector expectations have grown to include teamwork, sector understanding and the ability to be instantaneously productive (Rayner and Papakonstantinou, 2015:13).

Higher education (see Section 2.4.5) provides the focus of the penultimate section of this literature review summary. Higher education is striving to produce employable graduates who have gained theoretical knowledge and vocational skills. Linking this mandate to previous sections, it is clear that the success of higher education institutions depends on their ability to provide required skills, through their WIL modules, suitable placements and supportive mentors. However, in the ever-changing educational, sector and societal landscapes, producing employable graduates requires WIL and mentorship to function equitably for all students.

This study is underpinned by mLearning (see Section 2.4.6), which provides exciting prospects for higher education and, in particular, open and distance learning. The use of mobile devices enables students to learn formally or informally, while collaborating in a group or working on their own, and also facilitates communication and interaction between students and their lecturers. In addition, mLearning promotes authentic learning and the development of learning communities (see Section 2.4.6).

However, with great prospects come certain challenges and these have been discussed and brought to the fore. The most significant and relevant challenges for this study include the following issues: inadequate information and communications technology; the incompatibility of the University's learning management systems to support the continual use of mobile devices; and the poor levels of academic skills concerning mLearning and the use of digital technology. However, the mobile phone and other mobile devices are generally recognised as convenient vehicles for communication and information sharing.

5.3 Summary of empirical inquiry

The research design and methods employed by this study are summarised within this section. The section also details the selection process and the composition of the research participants. Furthermore, a distinction is provided for each of the three cohorts of participants who contributed to this study. The section concludes with a discussion of the empirical inquiry and its findings, linked to this study.

5.3.1 Research design

As addressed in Section 3.3, the design of this research study adopted a qualitative, exploratory case study approach with which to address the identified research question and sub-questions. The uniqueness of the study focus endorses the application of an exploratory case study, which was deemed the most appropriate. The study followed a process of systematic identification, description, clarification and the construction of meaning, from the data collected. Insights gained from the data enabled a deeper understanding of the study's phenomenon, from the perspective of the research participants.

5.3.2 Research setting

This study is atypical and I deemed it pertinent to provide a contextual grounding. The data collection for this study took place during two formally planned and hosted excursions to a venue exclusively reserved for the provision of nature conservation WIL experiences. The excursions were offered to all undergraduate students who were struggling to secure suitable WIL placements and mentors.

All the research participants required a particular WIL experience and Unisa made this the focus of the two excursions. The WIL module outcomes for this particular experience required students to complete three field monitoring activities, in order to compile an assignment which described the experience acquired. The mentoring provided for each of these two planned WIL excursions differed in the method of mentorship used. The first excursion offered the face-to-face method of mentoring, while the second excursion offered use of a mobile phone application as a digital mentor.

5.3.3 Research methodology

The study included many elements, which highlighted the need to gather, store and analyse the data garnered (see Section 3.3.), to answer the research question and sub-questions. The selection of the research participants required careful

consideration and attention to detail, to ensure that the trustworthiness of the study was not tainted.

5.3.3.1 Research participant selection

A total of sixty research participants, representing 23% of all registered WIL module students, contributed to the study (see Section 3.5.1). From this group of sixty students, the first twenty students who applied and complied with the application requirements were selected to participate in the first WIL excursion (see Section 3.5.2.1). This excursion utilised the services of an academic to provide formal synchronous face-to-face mentorship (see Section 3.5.1.1).

The next twenty applicants who applied and complied with the application requirements were invited to participate in the second WIL excursion (see Section 3.5.2.2). This excursion utilised a mobile phone application, which had been developed specifically to function as a formal digital mentor (see Section 3.5.1.2). Additional resources, in the form of PDF documents, web links and a video series, were provided via the digital mentor. The video series featured the same academic who had provided the face-to-face mentoring for the first WIL excursion.

The final group of twenty students who participated in the research study represented the current status quo of the WIL module placement and mentorship challenges (see Section 3.5.1.3). These research participants found their own sector-based placements and mentors and were not interviewed, as per the preceding two groups. The assignments they submitted were assessed to determine if there were any significant differences between the three group assignment submissions (see Section 3.5.2.3). This sector-based group was selected by analysing the first twenty assignment submissions received, which made use of sector-based mentors.

5.3.3.2 Semi-structured interviews

Each research participant who participated in the university-provided mentoring, whether face-to-face or digital, was interviewed (see Section 3.6.1). All their answers

were captured, by hand, and participants could see and correct any of the information captured. Although not a true form of member checking, all participants were encouraged to ensure that “their words, their experiences, their perceptions and their suggestions”, as captured, reflected precisely what they intended.

The interviews from both research participant groups were then digitised to facilitate analysis of the data provided.

5.3.3.3 Document analysis

The principal documents for this study were the marked final assignments submitted by research participants (see Section 3.6.2). Pre-selected sections of these assignments were used to gauge each participant’s grasp of theoretical concepts and their practical applications. Summative evaluation forms completed by each participant at the end of each excursion revealed additional information, including the impressions and insights of participants concerning their mentor engagement experiences. The final set of documents utilised by the study comprised the responses submitted to a student opinion poll on mentorship (see 3.6.2).

5.3.4 Empirical inquiry findings

The findings of this study are summarised in this section of the dissertation of limited scope. The findings comprise the summaries of forty semi-structured interviews conducted with the Unisa mentored research participants. Data for this study was gathered from the semi-structured interviews, the analysis of participant assignments, the excursion evaluations and the contributions received from a student opinion poll on mentorship. All the data contributed to answering the research question and sub-questions.

5.3.4.1 Research participant demographics

Research participant demographics were discussed in Chapter Four, Section 4.2.1. The information gathered related to the topics of gender, age, employment status,

additional qualifications and access to placement and a mentor. The results draw attention to some significant considerations and reveal that the two groups do not vary substantially. The gender topic was dominated by female participants, while the majority of the participants were recorded as being between twenty and thirty years of age. Additionally, most of the participants were unemployed and for most of them, their nature conservation undergraduate study is their first attempt to acquire a formal qualification. Regarding placement and access to mentorship, the results even out equally between participants who have a placement and access to mentorship, and those who do not have these supportive arrangements.

5.3.4.2 Themes identified

Chapter Four Section 4.2.3 identified the understanding or perception of mentoring and mentorship among research participants. These insights were arranged initially as a generic understanding, and then revisited according to the two mentorship methods offered by the study.

Responses provided by the group who received face-to-face mentoring from Unisa were dealt with in Section 4.2.3.1 to Section 4.2.3.3. Three themes were identified (see Table 4.3).

The generic group of all forty research participants was asked to provide their perceptions of a mentor. The themes thus generated were the same as the those generated by the face-to-face mentored group.

The first theme is *a mentor is a person* and it has three affiliated sub-themes. The responses of research participants towards this theme highlighted their expectation that a mentor should be a physical person and should possess certain attributes needed by the participants. They asserted that a mentor should be a *knowledgeable* person in terms of theory and practice, which participants need to complete their work, and should have specific in-field *experience*, and should be a *qualified* person.

The second theme identified is *work-integrated learning*, which has associated sub-themes including the particular *information* the research participants require to complete their module assignments. The second sub-theme required the mentor to be able to assist the research participant to achieve his or her own *study outcomes* or ambitions.

The third and final theme identified *mentor traits*, for which the research participants articulated two sub-themes. The first sub-theme was linked to the *service* actions provided by a mentor such as help, assist, support, guide and teach, amongst others. Sub-theme two dealt with the way in which the mentor responded to the research participant, where words such as patience and empathy were used to describe the personal skills required by participants of a mentor.

The responses provided by the second group of research participants who engaged with the Unisa provided digital mentor, were dealt with in Section 4.2.4.2 to Section 4.2.4.2.3. Significantly, the themes identified by this research participant group differed from the first; however, the underlying concepts of information, study outcomes and service were confirmed by the second group.

The first theme identified (see Section 4.2.4.2.1) by the group who engaged with a digital mentor, was design. The theme refers to the mobile application *design* and the associated sub-theme links back to *service*. The research participants commented on the services provided by the mobile application and how it assisted them to complete the WIL tasks, successfully.

The second theme revolved around the *applicability* of the application (see Section 4.2.4.2.2). The sub-theme of *usability* was the primary focus of the research participant responses, where participants mentioned the ease of using the application and the ease of access information.

The access to information and the type of *information* was the second sub-theme to be identified. Participants stated that they were very happy with the accuracy and diversity of information provided by the application.

The third sub-theme to be identified, under applicability, was *study outcomes*. This sub-theme corresponded with the sub-theme identified by participants in the first group. The research participants who engaged with the digital mentor indicated that the application was very helpful, and allowed them to do the activity by themselves, and/or to do their WIL activities even when mentors were not available to assist. Thus, the participants indicated that the digital mentor is able to support them to achieve their study outcomes.

Using a mobile application for the first time, with only a week in which to prepare for an excursion, which relied on its efficacy, sparked debate around the *challenges* faced by research participants (see Section 4.2.4.2.3). *Challenges* thus became the third and final theme and was associated with the sub-themes of *connectivity*, *interaction* and *design*.

The single most prominent challenge was associated with the design of the application, which operated only on-line, and thus required *connectivity*. Research participants did not have access to the internet during the field-data collection sessions, which caused some frustration and confusion. The second sub-theme, *interaction*, generated a number of comments related to the inability of participants to get feedback or clarification from a person, as and when it was needed. The third sub-theme, *design*, focused on the application working off-line, with embedded information rather than linked information.

5.3.5 Document analysis findings

The findings from the document analysis are divided into responses received from each of the two university-mentored groups and are presented below.

5.3.5.1 Face-to-face mentoring

Participants indicated that the excursion mentor was well prepared and able to address all their questions related to the miniSASS water monitoring topic. They confirmed that the mentor gave understandable answers and made good use of

examples (see Section 4.3.1.1). Participants said that the support materials provided during the excursion assisted them to understand the topic better.

The majority of participants indicated that the excursion was enjoyable, worth their while and worth recommending to their fellow students. Aspects of the Unisa offered face-to-face excursion, which the participants found beneficial, were linked to the group work conducted. Participants said the sharing of information, discussions between participants, and addressing each other's questions contributed to the overall learning experience.

The issues, which negatively influenced the excursion, were linked to personality clashes and unequal contributions from individual members of the group. Some of the students indicated that Unisa should provide placement and mentors across the country, so that all its students could access the required experiences. This expectation is due, in part, to the limited time available to students in which to find a suitable placement, an appropriate mentor, and gain the experience to draft and submit an assignment per month, per WIL module.

5.3.5.2 Digital mentoring

Participants indicated that the digital mentor was well designed and prepared (see Section 3.4.2) and well suited for the work they were required to do on miniSASS. The digital mentor was easy to use and audible.

However, the participants did not reach a clear consensus on the ability of the digital mentor to provide answers to questions. The reasons for this were, mostly, the connectivity issues, and the need by some participants to engage synchronously with a human mentor. However, the majority of the participants indicated that the digital support materials provided had assisted them to understand the topic better.

The participants said the excursion was very good, worth their while and worth recommending to their fellow students (see Section 4.3). They indicated that working

in a group and using the digital mentor had been a helpful activity, as they were able to have their questions addressed and support one another.

However, as with the face-to-face mentored group, participants mentioned some challenges. These included bullying by team members, language exclusion, unequal treatment between group members, slow decision making and unequal contributions by some group members. Nonetheless, the participants emphasised that the Unisa excursion venue is a good model and should be replicated across the country.

5.3.5.3 Student assignments

All sixty research participants completed and submitted the assignment template dedicated to capturing the miniSASS water monitoring experience and the understanding gained by students. The same marker marked all these assignments. To determine the grasp by students of the associated theoretical concepts and their application, the introduction and results sections of the NCA module assignment template, which covered these aspects, were selected for further analysis. All the assignments from research participants, as represented by the marks obtained in the introduction and results sections, were statistically compared.

No statistical difference was found between all three research participant cohorts. This is relevant because it shows all three mentoring methods produce results. The results obtained indicated that the majority of participants passed their submissions.

The results pertaining to the assignment introductions (see Figure 4.10) show that the group mentored using a digital mentor achieved the narrowest range of marks, with a median mark of 72%, while the sector-based mentor group had the widest range of marks, with a median mark of 68%. The results pertaining to the assignment results (see Figure 4.11) show that the group mentored using a digital mentor again achieved the narrowest range of marks, with a median mark of 69%. The face-to-face mentored group had the widest range of marks of all the three groups, but nevertheless managed to achieve the same median mark as the group that used a digital mentor.

The overall assignment marks achieved (see Figure 4.12) showed that once again the group who engaged with the digital mentor had the narrowest range of marks, with a median mark of 75%, while the sector-based mentor group achieved the widest range of marks, with a median mark of 58%. As has been stated above, there is no significant difference between the three groups. However, many research participants who benefitted from one or the other of the two Unisa offered mentored excursions, were awarded distinctions. A few students from the sector-based mentor group also achieved distinctions.

5.3.5.4 Student opinion poll

A short five-question, general, online student opinion poll was posted on Unisa's student portal, *myUnisa* (see Section 3.6.2). Responses received from participants indicated that they consider access to and working with a mentor as an essential requirement for WIL activities. Nevertheless, many students indicated that even if no mentor was available they would attempt the WIL activity on their own. This is significant: students may feel more confident about attempting an activity without a mentor, if they could rely on having access to a digital mentor.

Participants also indicated that, given a choice, they would choose an academic mentor over a sector-based mentor (see Section 4.3.3). Given a choice between a university-developed digital mentor and a sector-based mentor, participants selected the digital mentor.

This concludes the document analysis. The following section will cover the synthesis of the research findings and will concentrate on illuminating similarities within the findings and the literature review. It will also delve into any contradictions encountered.

5.4 Synthesis of the research findings

The preceding section of this dissertation of limited scope described the summaries of the literature review and empirical inquiry. The research findings will now be discussed

and similarities and contradictions between the results and literature review will be detailed.

5.4.1 Similarities with the literature review

The literature review began with an introduction to the wider perspectives of skills shortages and the provisioning of skills within the conservation sector. The Environmental Sector Skills Plan for South Africa (2010:18) concedes that the skills development within the sector is currently uncoordinated, disjointed and re-active. Though not directly assessed as part of this study, the assignment results for the research participants who received sector-based mentoring, as presented in the findings (see Section 5.3.5.3), indicate that something is amiss; the assignment submissions show a wider range of marks being attained, while research participants who received mentorship from Unisa achieved higher marks within a narrow range.

Within the wider context, the National Skills Development Strategy produced by the Department of Higher Education and Training (2011:3) was motivated in part by the need for redress of the deep-rooted societal inequalities emanating from the apartheid era. This study falls in line with the Strategy and the Department, by fostering alternate skills development approaches through the provision of high quality digital mentoring, for students who are unable to attain the required skills due to mentors being ineffective or unavailable.

Furthermore, Unisa provides its own mentors and strategies, and hosts its own experiential and skills development activities, for students without placements or mentors. This is evident from the study's underpinning context. As already discussed (see Section 2.2.1), Unisa's diploma in nature conservation has included in its array of modules, six WIL modules. These modules are student-centred and attempt to address the issue of student placement.

Further, the findings of this study demonstrate a number of correlations with Bandura's comprehensive Social Learning Theory. Bandura (1971:2) posited that humans can and do learn through direct observation. The very nature of the WIL modules at Unisa

support this notion. In addition, the research activities supported by both the digital application and the face-to-face mentor require research participants to perform recurring actions, as part of a team. Assignment results from the three cohorts suggest that participants were able to engage and learn through observation.

Another important aspect of Bandura's theory is modelling (1971:5), which he claims is an indispensable feature of learning. This feature of Bandura's theory is evident in the study findings through the provision of academic and digital mentors. Furthermore, the digital application utilises speech, pictures, videos, distinctive persons and a variety of other resources, which assist with modelling.

Associational preferences and interpersonal attraction are both represented in the findings. The research participants applied and attended the provided excursions to satisfy a particular academic need. Their participation and assignment submissions correspond to Bandura's associational preferences (1971:6) and interpersonal attraction (see Section 2.3).

Students who received their mentoring from Unisa, either face-to-face or digital, were encouraged to work and learn in groups. This group work (see Section 4.3.1) was viewed by participants as being very helpful, particularly when they were expected to share information, discuss issues and address questions. In addition, the study design included a connection to Tinto's Social Integration Theory (1995:11). The excursions encouraged integration of the participants into learning communities, and collaborative teaching and learning strategies were employed, with good results.

Unemployment (see Section 2.4.1) is a persuasive motivator for further studies (Archer & Chetty, 2013:134). The similarities are evident in the sub-themes related to study outcomes (see Section 4.2.3.2 and Section 4.2.4.1). Research participants were encouraged, first, to participate in WIL activities, following which they were motivated to acquire the means to achieve academic success.

WIL (see Section 2.4.3) is generally accepted as an influential teaching and learning strategy within tertiary education. Hughes *et al.* (2013:277) suggests that WIL builds

capacity and employability skills for students, through being contextually grounded within their chosen career path. Parallels with this study are revealed in the assignment activities undertaken by the research participants. Students honed their application of academic understanding within the workplace, while acquiring and practicing a plethora of soft skills (see Section 4.3.1.1 and Section 4.3.1.2) sought by the sector.

According to Rayner and Papakonstantinou (2015:13), a central precept of higher education is the provision of good quality skills (see Section 2.4.4). They also emphasise that potential employer expectations of graduates have grown over the years, and now include traits such as: understanding the sector, possessing the ability to become immediately productive, being self-confident and a team player. Including WIL in the nature conservation curriculum is an attempt by Unisa to address the high quality skills needs by the sector. While the transfer of soft skills to students is not directly expected of the University, soft skills are addressed (see Section 4.3.1.1. and Section 4.3.1.2) at Telperion, during the excursions. When issues such as discrimination or exclusion are encountered, mentors use these tensions as learning and growing opportunities and help students to build their skills by dealing with them.

As stated in Section 2.4.5, students are required to gain both theoretical knowledge and vocational skills before they can graduate; specifically, for students to be deemed competent in their WIL modules, they are required to gain sector-based knowledge and skills. In order to satisfy these requirements, students need to find suitable sector placements and willing mentors. However, roughly 45% of research participants (see Section 4.2.1) indicated that they were unable to secure placements or mentors. Consequently, almost half the WIL students are at a considerable disadvantage, which, if not addressed, could place achievement of their academic qualifications at risk.

Acting in service of its students, Unisa has undertaken to host excursions to the Telperion Nature Reserve (the workplace) and to provide mentors for nature conservation WIL students. Wilson and Wilson (2015:1) stated that 53% of all graduates for the 2015 academic year achieved part or all of their WIL experiences on

the reserve, which serves to validate this endeavour. Returning to the wider perspective, the South African Government gazette (2014:17) has issued a directive to all institutions of higher learning to find suitable placements and mentors for their WIL students (see Section 1.7). While this directive has not been fully satisfied by Unisa, the results and recommendations of this research into the use of digital applications may facilitate assistance for greater numbers of students.

The affordances of mLearning (see Section 2.4.6) as an emerging and developing teaching and learning strategy shows great potential for open and distance learning. Overall, the study's findings are positive, as indicated by the observations of students who participated in the semi-structured interviews (see Section 4.2.4.2) and excursion evaluations (see Section 4.3.1.2).

Motivated and self-driven students are more likely to succeed with their studies (see Section 2.4.6), according to McConatha, Praul and Lynch (2008:15). This correlates with statements from research participants (see Section 4.2.4.2.2) about being assisted to complete their studies sooner, at their own pace and to manage their own study schedules.

5.4.2 Contradictions between the literature review and the empirical inquiry

The Environmental Sector Skills Plan (2010:17) suggests that there are few supplies of suitable skills to fill known skills gaps. This study proves that Unisa is driven to produce employable graduates, albeit at an undergraduate level, by including WIL modules into their nature conservation qualification. Furthermore, Unisa actively and directly supports students who are struggling to gain suitable conservation related experience, by planning focused excursions and providing mentors for these students.

The underpinning concept for this study as captured in the research question is to determine if a mobile application could function as a suitable replacement mentor when a mentor is not available.

Bandura suggests (1971:5) that “A good example is a better teacher than that of unguided actions”. As captured within the findings of the student opinion poll, students would generally embark upon a WIL activity without a mentor if one were not available. Thus, they are not relying on modelling to complete their activities and skills development.

Jackson (2015:350) suggests that the effectiveness of WIL affordances should be considered predominantly from an outcomes perspective (see Section 2.4.3). However, this study did not consider the potential outcomes only, but also invested considerable attention in generating the required in-puts needed by WIL students. The development of a digital application (see Section 3.5.1.2) and its additional resources is testament to this attention.

Kaliisa and Picard (2017:1) claim that mobile learning improves student and lecturer communication. Research participants who engaged with the digital mentor do not concur with the Kaliisa and Picard statement. Their responses revolved around their inability to ask questions as and when required (see Section 4.2.4.2.3), because the digital application did not include a chat function, and/or a face-to-face mentor was not available to provide the information required. Some participants said they preferred engaging with a face-to-face mentor while others (see Section 4.2.4.2.3) said the digital mentor could be accessed at any time, thus indicating that there are preferences for both mentoring methods.

According to El-Hussein & Cronje (2010:20), the proper design of mobile technologies is of paramount importance (see Section 2.4.6). They continue by claiming well designed mobile technologies can improve mobile learning effectiveness. This study revealed contradictions among responses to the effectiveness of the mobile application, based on design. Research participants said that the inability of the application to work off-line was a hindrance (see Section 4.2.4.2.3). Further, research participants cited the additional frustration of not being able to communicate synchronously with a person via the mobile application, when required. However, the assignment results (see Section 4.3.2) reflect that research participants were

nevertheless able to make use of the mobile application to compile and submit successful assignments.

5.5 Research question conclusions

The aim of this study was to determine how effective a mobile application could be in providing mentorship for a nature conservation WIL experience. The research question posed above, is formally supported by three concomitant sub-questions which are as follows:

- How best can a mobile technology be designed to meet nature conservation WIL module outcomes?
- How do student perceptions of mentoring differ, between those mentored using mobile technology and those mentored face-to-face?
- How do the academic outcomes achieved by the students who were mentored via mobile technology differ from those mentored face-to-face?

These three sub-questions are discussed individually below.

Sub-question 1:

How best can a mobile technology be designed to meet nature conservation WIL module outcomes?

The study revealed that participants who engaged in either one of the two mentoring methods were satisfied with the mentoring they received from Unisa, and, that both methods are suitable for mentoring WIL students. In an attempt to determine what worked, and did not work, for each of the mentoring methods, I presented the findings for each mentoring method, separately.

To address this complex question, I referred to the literature review and the findings of the empirical inquiry. Before a mobile technology can be built it is imperative that one embraces the WIL context and student demographics. Section 2.2 introduces the

conservation sector together with a description of its skills needs. The Department of Environmental Affairs published a document titled, Environmental Sector Skills Plan for South Africa (2010:18), which highlights the sector's skills gaps and proposes measures to address these gaps.

It is significant for this study that the Department of Environmental Affairs (2010:18) has conceded that the skills and skills development within the sector are in disarray. However, according to Rayner and Papakonstantinou (2015:13), this situation does not prevent the sector from seeking to employ graduates who have gained a number of soft skills and behaviour traits beyond those of formal academic and WIL experiences.

As stated above, participant demographics contributed rich answers to this question. A few demographic questions were included in the semi-structured interview, to glean the information required to build a general understanding of the composition of the study's participants. What emerged, as addressed in section 4.2.1, was that more than half the participants were female, the majority of all participants were between the ages of twenty and thirty years old, most were unemployed, and most were attempting their first undergraduate qualification. It is especially significant that a third of the participants did not have a placement or a mentor to support the completion of any of their WIL module requirements.

Participants who engaged with the digital mentor responded positively about the service it had provided in the field (see Section 4.2.4.2.1), as well as the additional resources and information it had enabled them to access, on-site (see Section 4.2.4.2.2),

A negative response from a participant triggered a request for suggestions to address the problem. Consequent responses were sufficiently detailed to enable the (negative) impacts to be addressed, by means of an upgraded digital application. Two major criticisms from participants (see Section 4.2.4.2.3) highlighted, first, the need to provide a mobile technology to support WIL students able to function off-line.

Participants required connectivity during their fieldwork to access information from the internet; but, due to poor network coverage, this was not possible.

The ability to download information to a mobile device and use this information off-line is a function, which can be included in an upgraded mobile application. A further suggestion, made in the field, was for Unisa to provide this information on a memory stick, prior to the excursion, for participants to load onto their mobile phones at their convenience.

The second challenge of significance, as highlighted by the participants, was the need to communicate through the mobile application with fellow students and their subject lecturer. However, a function on the mobile application, which went undetected by participants, was the “*contact us*” page. This page had been set up to enable a direct call to the subject lecturer concerned. For the purposes of this study, the subject lecturer had been forewarned of potential calls from participants seeking additional help and assistance. This function should remain a part of the services provided by the mobile application. An instant chat function is something, which the participants are comfortable to use and which can be included in an upgraded mobile application.

A contradiction exists in the suggestions from participants who need to access the mobile application and its additional resources while off-line, at the same time making use of a chat function to communicate with each other. Poor connectivity was the underlying culprit that limited use by the participants of the mobile application in the field. It was also a cause of frustration for participants regarding digital communication with one another, or with a subject lecturer, while in the field.

Sub-question 2:

How do participant perceptions of mentoring differ, between those mentored using mobile technology and those mentored face-to-face?

Jacobi (1991:505) suggests that mentorship is a fluid construct that is not well defined, while Gershenfeld (2014:365) advocates for mentorship roles and functions to be

described in detail. Further, Gershenfeld states that the mentorship functions used most frequently tend to focus on academic support, psychosocial support and role modelling. Unisa (2015:1) describes a mentor as being a suitably qualified and experienced person located within a host organisation, who undertakes to supervise and mentor a student through his or her WIL module.

A formal response to this sub-question necessitates a generic understanding of mentorship. All participants were asked to provide what they thought would be a suitable description of a mentor (see Section 4.2.3), together with their expectations of a mentor.

Responses from participants identified three basic themes, namely, a mentor is a person; the second theme identified was WIL, which participants linked to their studies; while the third theme spoke to the desired traits of a mentor.

All the participants referred to a mentor as a person (first theme) (see Section 4.2.3.1), and then qualified this person's abilities in terms of the three sub-themes. These sub-themes focused on the person's knowledge, experience and qualifications.

The second theme was identified as WIL (see Section 4.2.3.2). Two sub-themes were associated with WIL and these focused on the mentor having information needed by the participant, and being a person who was in a position to assist students academically.

The final theme focused on mentor traits (see Section 4.2.3.3), and also had two associated sub-themes; the mentor should be able to help, support or guide the student while through the WIL experience/s; and should be able to show patience, be open and honest, and be understanding of the participant's needs.

The three themes and seven sub-themes brought to the fore by the participants speak well to the Unisa provided definition of a mentor, insofar as most of the key components are listed by both Unisa and the participants. The participant perceptions of face-to-face mentoring (see Section 4.2.4.1) offered by a Unisa academic at

Telperion, do not differ from the generic understanding of a mentor. When asked if they would choose a University-based mentor over a sector-based mentor, the majority of participants selected a Unisa provided mentor.

The perceptions identified were different for the second group of participants, supported by a digital mentor (see Section 4.2.4.2). Development of the mobile application was completed by the same academics involved in the face-to-face mentoring at Telperion. Thus, the same information was provided to the participants, albeit in different formats.

Two-thirds of the digital mentor group utilised their mobile phones to download and access the information, while the remainder utilised other mobile devices. The four major providers in South Africa offered access to the majority of participants. The design of the mobile application as a digital mentor was guided by the need to provide information and model the various data collection activities. A simple mobile application does not offer sufficient functions for such activities so multiple platforms were used to store and link information. Participants were requested to download these additional resources to their portable devices prior to travelling to Telperion.

A further recommendation to participants was to make use of Unisa's free Wi-Fi facilities at its various campuses, to prevent incurring costs for the downloads. Many participants did not action these recommendations, which meant choosing to bear the download costs or choosing not to access the required information. However, all the participants saw the value of the digital mentor and strongly recommended that the University continues to explore the potential of mobile applications.

Three themes were derived from the semi-structured interviews, namely, *design*, *applicability* and *challenges*. Emanating from these three themes were seven sub-themes. These sub-themes included the topics of service, usability, information, study outcomes, connectivity, interaction and design.

Addressing the sub-question, the participants in the digital mentor group were complimentary about the design, applicability and inclusivity of their sub-themes.

Differences between the two groups became apparent when poor connectivity prevented the participants from accessing the mobile application in the field and in real time. The other significant challenge experienced by these participants was the apparent lack of a synchronous communication function within the mobile application. In conclusion, perceptions held by both participant groups regarding the two different mentoring methods were complimentary. Challenges experienced by the digital mentor group, relating to the lack of a synchronous communication function, can be addressed during an upgrade. While issues concerning connectivity cannot be solved directly, the mobile application can be developed.

Sub-question 3:

How do the academic outcomes achieved by the participants who were mentored via mobile technology differ from those mentored face-to-face?

The introduction and results sections of the assignment template captured most of the detail associated with the learning and experience gained in the field, and were used for data analysis.

Concerning the formal assessments of all research participants, the results indicated no significant difference between the two differently mentored groups (see Section 4.3.2). The information, which all the participants were required to submit, for assessment, was based on the same field data collection activity for each excursion. Indications of the learning and practical experience acquired by participants was captured on a generic assignment template (see Appendix 2).

Results of the data analysis indicate three issues of significance (see Section 4.3.2.3) for this study. The first issue relates to the “*no significant difference*” finding. Interpretation of this finding reveals that a relationship exists between the two differently mentored groups. The relationship connection is represented in the closeness of the result of the analysis, (the p-value is greater than 0.05).

The second issue of significance concerns the median achieved by the two groups. The median marks for both groups achieved a distinction (75%), which demonstrates no noticeable difference in the achievements of the two groups.

The third issue of significance for this sub-question is evident in the mark ranges achieved by the two mentored groups. Examination of the total marks achieved for the assignments (submitted by all participants) reveals that the digital mentor group scored the narrowest range of marks – between 68% and 80%. The face-to-face mentor group achieved the same 75% average (median) mark, but displayed a wider range of marks achieved, ranging between 57% and 78%.

Participants who engaged with the digital mentor (see Section 4.2.4.2.1) alluded to a particular service provided by the digital mentor, which may offer a plausible answer for the narrow mark range achieved. The notion of being able to “*recap*” or “*remind you*” about what was done is significant, and speaks to Bandura’s associational preferences (see Section 1.7.1). A further possible motivation for the narrow mark ranges is related to the provision of very specific additional resources. In Section 4.2.4.2.1, participants indicated that all the information they required was curated by the digital mentor, and that there was no need to search further afield for necessary information.

All the results reflected are of relevance to the study, in that both groups achieved, on average, good marks. In addressing the sub-question directly, results indicate that there is no significant difference between the two mentoring methods.

Primary research question:

How effective is a mobile application in providing mentorship for a nature conservation work-integrated learning experience?

This research study demonstrated that the two mentoring methods, when managed by the University, are able to produce similar academic outputs. The face-to-face mentoring results depended on the efforts of an academic who was a specialist in the

field, which underpinned the mentoring focus. The academic is a person known to the participant group who displays all the attributes identified by participants as important for any mentor.

Development of a mobile application to function as a digital mentor took time and relied heavily on the experience and knowledge of the theory or subject lecturer. The academic was also included in the production of some of the additional resources, such as the video series and the verification of related information.

Effectiveness of the two mentoring methods was shown to be similar. However, these outcomes are participant preference dependent. The mobile application can be used as an effective alternative mentoring method once the challenges, as raised by the participants, have been fully addressed.

5.6 Limitations

The study was planned and implemented according to a tight schedule. This maintained the momentum required to coincide with the University's academic calendar and the WIL module requirements of the research participants. Notwithstanding, the study has its limitations. The first limitation was linked to the composition of the two university-mentored student cohorts participating in this study. The composition of the cohorts was random and depended on the process employed for the recruitment of the study's research participants. However, this sample is not a true representative of the student body registered for the WIL modules.

Student participation and uptake of the offer to participate in a university-provided and mentored activity is influenced by a plethora of issues – time availability, family responsibility, academic progress, financial constraints, travel time, geographic location, full-time and part-time work-related issues and/or many other unforeseen commitments. Student participation in such activities is influenced by the personal circumstances of each student. Consequently, the study did not cater for those students who were unable to overcome any of these and other constraints.

The single most evident limitation was linked to the use of mobile technology in remote locations. The study required research participants to work on their mobile devices in areas with poor mobile phone network services and as such poor internet connectivity. Anticipating that this would be a potential constraint, research participants were requested to download the additional resources and video clips. Notwithstanding the access to these downloaded resources on site, some of the mobile application features were not accessible. Results indicate that this did not influence the ability of research participants to complete and pass their assignment submissions, based on their miniSASS experiences in the field. The provision of full on-site connectivity may have contributed more positively to the outcomes achieved by the research participants.

Regardless of these limitations, I believe that this study has the potential to stimulate further research into mLearning within the context of WIL and mentorship provisioning, for undergraduate students in nature conservation and beyond.

5.7 Recommendations

The research question for this study aimed to determine how effective a mobile application would be, in providing mentorship for a nature conservation WIL experience. The results revealed positive affordances when using mobile technology as an alternate to a face-to-face mentor, when no suitable mentor is available to assist WIL students.

Conducted in part fulfilment of a dissertation of limited scope, this study was endorsed by the Department of Environmental Sciences, despite it not making use of mobile technology and mLearning within the diploma in nature conservation and within any of the other qualifications and modules, the department offers.

Based on the results of semi-structured interviews and a document analysis, this study has highlighted teaching and learning areas within Unisa and within the nature conservation undergraduate diploma qualification. The recommendations to follow are

directed at academics, the Department of Environmental Sciences, Unisa and the Department of Higher Education and Training.

5.7.1 Academics

Study results show that the affordances of mobile technology can support the attainment of module outcomes. Some of the research participants indicated that they wished to see mobile applications being used by other academics and in other modules, especially those modules which present particular academic hurdles for students. Therefore, it is recommended that the findings and recommendations of this study be shared with fellow colleagues through the quarterly Department of Environmental Sciences meeting. During these meetings, staff are encouraged to share items of academic interest and importance.

In addition, an academic paper should be compiled from this study, thus contributing to an Afrocentric discourse in work-integrated learning, mentoring and mLearning. An academic poster should also be developed and presented at the annual Diamond Route Research Conference, which is planned and hosted by the Oppenheimer family and owners of the Telperion Nature Reserve. Digital copies of this dissertation of limited scope should be included in Unisa's institutional repository and distributed freely and widely.

Furthermore, academics responsible for WIL modules should make use of all formal Unisa platforms to ensure that the guiding policies and procedures for WIL and Experiential Learning embrace the use of digital technologies. In so doing, the policies and procedures will remain current and relevant to the Universities student population.

5.7.2 Department of Environmental Sciences

The Department of Environmental Sciences, like all departments and colleges at Unisa, are driven by student throughput. While the University itself is evolving to become an open distance and e-learning institution, its departments need to fully

implement, support and influence institutional policies and procedures related to WIL and Experiential Learning.

Furthermore, departments need to push more aggressively for the inclusion and use of technology in their qualifications and composite modules. This study revealed that all the research participants, and representatives of all the WIL undergraduate students, had access to and were using mobile technology, daily. Therefore, this study recommends that the Department of Environmental Sciences strategically explores the affordances of mLearning and how best it can improve throughputs.

Such an exploration will require high-level support and motivation. Therefore, the management of the Department should play a leading role in pushing for the inclusion of mobile technology, through arranging professional training workshops, upskilling academic staff and facilitating the funding required to develop, include, support and maintain such an endeavour within its qualifications.

5.7.3 The University of South Africa

The University has the policy infrastructure to encourage and support the inclusion of mLearning as a teaching and learning option. However, this policy infrastructure could be made more visible within its Experiential Learning Policy. This study revealed the potential of technology to support WIL students and this potential needs to be adequately reflected and supported in and across all of Unisa's policy and procedural documents.

Furthermore, the reliance on a rigid learning management system, *myUnisa* to facilitate student lecturer communication is restrictive. Within Unisa's Experiential Learning Policy (2015:3), a provision has been made for the provision of relevant technologies, thus accommodating the notion of technology use within Experiential Learning. However, the use and integration of mobile applications is currently not catered for by the *myUnisa* system. Accordingly, this study recommends that the University invest in expanding and/or improving its ICT infrastructure, to accommodate the inclusion and use of mobile applications in *myUnisa* and that the underpinning

policies and procedures are adapted to provide and support this inclusion. Such integration is essential to ensure that the University's *myUnisa* users and "clients" are provided with a relevant, professional, effective and efficient service, which embraces the technology preferred and used by students on a daily basis.

Funding should be allocated by the management of the University, to provide ICT support services, such as building and maintaining of academic mobile applications, and training for staff who wish to develop mobile technology driven support for students, as well as the trademarking and patenting of applications developed and used within the University.

Unisa should continue to provide qualifications that employ work-integrated learning, thus management needs to ensure that it delivers on its placement and mentorship mandate, as required by the South African Government gazetted directive (2014:17). This entails allocating funding, and formal support from top management. Hence, no WIL student should be left to complete their modules without a suitable placement and mentor. Additionally, management at the University needs to engage formally with the Department of Higher Education and Training to secure a lasting and equitable solution to the development of workplace-based skills and experience within the institution and the country at large.

5.7.4 Department of Higher Education and Training

This study was prompted in part by the South African Government gazetted directive (2014:17), to all institutions of higher learning that offer WIL modules within any of their qualifications, to find suitable placement and mentors for their students.

This directive does not come with a workable plan of action to assist WIL students to find suitable placement and the mentors they need to achieve their academic ambitions. Securing suitable placements and mentors has been left to the individual institutions of higher learning. However, this "sort yourselves out" approach by the South African Government through DHET, creates competition between institutions, which will ultimately negatively affect individual students.

For this reason, a concerted and sustained effort should be made by DHET to facilitate a fair, equitable and funded solution for the placement and mentoring requirements of all higher education institutions. This study offers a moot point for the possible inclusion of digital mentoring options.

5.8 Suggestions for further research

This study selected one nature conservation WIL topic and venue for its underpinning focus. The resultant study therefore demonstrates the potential to seek further answers from the use of mobile technology to support WIL and mentorship, where suitable placement and or mentorship is not available. Therefore, it is suggested, that the following potential further research foci are considered.

5.8.1 The use of the mobile application developed for this study by students in various locations

To enable this study into the use of a mobile application, a purposely built application was created. The venue used for the study was also used to create the additional resources, such as the video clip series. Thus, the research participants recognised the setting in the videos as being the same study site in which they were working. The questions that arise are: will this purposely built mobile application be suitable for use in other locations? and, will it produce comparable academic results?

5.8.2 The use of mobile applications to cover a variety of work-integrated learning topics

This study selected one underpinning WIL theme to inform the development of a mobile application. The study's results show that there was no significant difference between face-to-face mentored students and those who engaged with a digital mentor. The question which emerges from this situation is: *can other WIL module topics be supported by a mobile application, with similar academic outcomes being achieved by students?*

5.8.3 The use of mobile applications to mentor individual students

This study encourage cohorts of students to work in groups and to use the digital mentor to gain their WIL experiences. The affordances of this group work were highlighted by the Social Learning Theory used as a theoretical lens for this study. The question which arises is: *can the mobile application support students who do not have access to a mentor, and who are working alone, to achieve similar outcomes to those achieved by individually mentored students?*

5.8.4 Alternative assessments for effective work-integrated learning in open distance education

The study made use of a single form of assessment to determine if research participants gained their expected experiences. With the use of mobile technology and the attributes this technology offers, the question that arises is: *what alternative assessments will best suit mLearning, within the context of WIL, in an open distance education institution?*

All three suggested further research topics would contribute to a growing Afrocentric discourse, spanning the fields of work-integrated learning, mentorship and mLearning.

5.9 Conclusion

The intention of this study was to determine the efficacy of a mobile application in the provision of mentorship for students to gain nature conservation WIL experiences. Chapter Five consolidated the research study by providing summaries of the literature review and empirical inquiry, and also provided a full synthesis of the research findings as viewed through three theoretical lenses, as introduced and discussed in Chapter Two.

The similarities and contradictions exposed by the study's literature review and empirical inquiry were discussed. This chapter and this dissertation of limited scope

concluded with sections dedicated to the study's limitations, recommendations and further research suggestions.

The most serious challenge faced by Unisa nature conservation WIL students is the lack of placement and associated mentorship. This obstacle has a negative impact on the University's ability to maintain its throughput of work-ready graduates. Furthermore, the assessments of workplace based skills and experiences for students is impaired if placement and mentoring are compromised. However, this study has shown that technology can contribute significantly in reducing the reliance on sector-based placements and mentors.

Mobile phones are used by billions of people around the world for a variety of reasons, including communication and access to information. The design of the modern smartphone further expands the reach of users through a plethora of mobile phone applications. Thus, as exposed by this study, mobile applications are adaptable and pliable enough to be specifically developed to fill a very particular need. A simple template-based Web2.0 online application developer was used and the results proved most positive.

Just imagine what a team of teaching and learning professionals, supported by an ICT Department could achieve, to support nature conservation WIL students who have not been able to secure suitable placements and mentors?

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Appendices

Appendix 1 – Comprehensive Topic List:

The comprehensive topic list is a list of activities provided to registered nature conservation students at the beginning of their academic year. The list of activities are sub-divided into seven broad conservation themes namely, animal studies, plant studies, technical studies, communication studies, legal studies, water studies general administration. The water theme being the focus of this study.

Within each broad conservation theme, the listed activities are further sub-divided into compulsory topics and elective topics. Each of the broad conservation themes have a differing number or ratio of compulsory to elective topics based on their relative importance to the work-integrated learning module outcomes.

At the centre of this study is the compulsory topic of, conducting a miniSASS water monitoring study under the broad conservation theme of Water studies. This activity is further regulated by requiring potential students to have reached a particular level in their theoretical studies before they can attempt this work-integrated learning activity. The reasons for this proviso is to ensure that the potential students have already engaged with and passed the required theory and in so doing improving the students chances of succeeding in completing and submitting the required assignment.

Document appears on its own page below.

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

NOTE: This comprehensive topic list has been provided to assist you in gaining a set of 30 skills across seven conservation related themes. You are required to apply yourself fully and actively participate in each of the topics you choose. Remember, the reports you submit should reflect WHAT YOU EXPERIENCED and WHAT YOU LEARNED and not what you extracted off of the internet.

ANIMAL STUDIES

COMPULSORY TOPICS for reports: You must have done all 3 of these compulsory reports by the time you have completed your first 6 NCA modules. The topics which you must do are:

- **Animal census:** You are required to have completed or at least be registered for CVM1501 in order to do this report.
- **Population analyses:** You are required to have completed or at least be registered for CVM1501 in order to do this report.
- **Post mortem:** You are required to have completed or at least be registered for ANS2601 in order to do this report.

ELECTIVE TOPICS for reports: You must have done any 4 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:

- **Animal behaviour study OR Captive animal enrichment (you may not do both):** You are required to have completed or at least be registered for ANS3701 in order to do this report.
- **Animal husbandry:** You are required to have completed or at least be registered for ANS1501 in order to do this report.
- **Animal identification:** You are required to have completed or at least be registered for ANS1501 in order to do this report.
- **Animal rehabilitation:** You are required to have completed or at least be registered for ANS1501 in order to do this report.
- **Bird ringing:** You are required to have completed or at least be registered for CVM1501 in order to do this report.
- **Condition assessment:** You are required to have completed or at least be registered for CVM1501 in order to do this report.
- **Damage causing animals:** You are required to have completed or at least be registered for CVM3701 in order to do this report.
- **Game capture OR Attend a game auction (you may not do both):** You are required to have completed or at least be registered for CVM3701 in order to do this report.
- **Hunting OR Culling (you may not do both):** You are required to have completed or at least be registered for CVM3701 in order to do this report.

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

- **Basic animal monitoring technique:** You are required to have completed or at least be registered for CVM1501 in order to do this report.
- **Snake handling:** You are required to have completed or at least be registered for ANS1501 in order to do this report.
- **Other:** If you wish to do a topic which is not listed here, please email wilsoga@uniso.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. **NOTE:** Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.

PLANT STUDIES

COMPULSORY TOPICS for reports: You must have done all 4 of these compulsory reports by the time you have completed your first 6 NCA modules. The topics which you must do are:

- **Mechanical chemical alien plant control:** You are required to have completed or at least be registered for PSO3701 in order to do this report.
- **Fire application block burn OR Fire application fire breaks:** You are required to have completed or at least be registered for PSO3701 in order to do this report. **Note:** Seasonality will have a major impact on when you will be able to gain the experience and complete this report- so plan carefully to avoid disappointment at the end of your NCA studies.
- **Grass identification:** You are required to have completed or at least be registered for PSO3701 in order to do this report. **Note:** Seasonality will have a major impact on when you will be able to gain the experience and complete this report- so plan carefully to avoid disappointment at the end of your NCA studies.
- **Tree identification:** You are required to have completed or at least be registered for PSO3701 in order to do this report. **Note:** Seasonality will have a major impact on when you will be able to gain the experience and complete this report- so plan carefully to avoid disappointment at the end of your NCA studies.

ELECTIVE TOPICS for reports: You must have done any 3 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:

- **Biological alien plant control:** You are required to have completed or at least be registered for PSO3701 in order to do this report.
- **Basic plant monitoring technique:** You are required to have completed or at least be registered for PSO3701 in order to do this report.

Fire application block burn OR Fire application fire breaks: You are required to have completed or at least be registered for PSO3701 in order to do this report. You must have done one of these two fire types as a compulsory; so should you get the opportunity to do the other type of fire, then that one you will log as an elective. **Note:** Seasonality will have a major impact on when you will be able to gain the experience and complete this report- so plan carefully to avoid disappointment at the end of your NCA studies.

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

- **Plant harvesting:** *You are required to have completed or at least be registered for PSO3701 in order to do this report.*
- **Restoration:** *You are required to have completed or at least be registered for PSO3701 in order to do this report.*
- **Vegetation mapping:** *You are required to have completed or at least be registered for PSO3701 in order to do this report.*
- **Veld condition assessment:** *You are required to have completed or at least be registered for PSO3701 in order to do this report.*
- **Herbarium specimen collection and mounting:** *You are required to have completed or at least be registered for PSO2601 in order to do this report.*
- **Other:** *If you wish to do a topic which is not listed here, please email wilsoga@unisa.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. NOTE: Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.*

LEGAL STUDIES

ELECTIVE TOPICS for reports: You must have done any 2 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:

- **Anti-poaching:** *You are required to have completed or at least be registered for COA1501 in order to do this report.*
- **Apply appropriate legislation:** *You are required to have completed or at least be registered for COA1501 in order to do this report.*
- **Attend and report on a court case:** *You are required to have completed or at least be registered for COA1501 in order to do this report.*
- **Issuing of permits:** *You are required to have completed or at least be registered for COA1501 in order to do this report.*
- **Gather and collect evidence:** *You are required to have completed or at least be registered for COA1501 in order to do this report.*
- **Other:** *If you wish to do a topic which is not listed here, please email wilsoga@unisa.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. NOTE: Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.*

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

TECHNICAL STUDIES

COMPULSORY TOPICS for reports: You must have done this 1 compulsory report by the time you have completed your first 6 NCA modules. The topic which you must do is:

- **Soil erosion:** You are required to have completed or at least be registered for SSC1501 in order to do this report.

ELECTIVE TOPICS for reports: You must have done any 3 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:

- **Boreholes and pumps OR Plumbing (you may not do both):** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **Fence maintenance:** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **Painting:** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **Carpentry:** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **Trail maintenance:** You are required to have completed or at least be registered for COC1501 in order to do this report. *Note: Individual aspects/activities conducted within this report may not be resubmitted for another report i.e. you may not duplicate skills learnt, as this is double dipping.*
- **Routine vehicle maintenance:** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **4X4 or off road driving certificate:** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **GIS/ GPS:** You are required to have completed or at least be registered for COC1501 in order to do this report.
- **Monitor weather conditions:** You are required to have completed or at least be registered for CEC2601 in order to do this report.
- **NON-fire application fire breaks:** You are required to have completed or at least be registered for COC1501 in order to do this report. *Note: This template differs from the "Fire application fire break" template, as it does not make use of fire to create the fire break.*
- **Other:** If you wish to do a topic which is not listed here, please email wilsoqa@unisa.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. *NOTE: Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.*

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

COMMUNICATION STUDIES

COMPULSORY TOPICS for reports: You must have done this 1 compulsory report by the time you have completed your first 6 NCA modules. The topic which you must do is:

- **Present a talk:** *You are required to have completed or at least be registered for CIN1501 in order to do this report.*

ELECTIVE TOPICS for reports: You must have done any 4 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:

- **Conduct an outdoor interpretive trail:** *You are required to have completed or at least be registered for CIN2601 in order to do this report.*
- **Conduct an indoor guided tour:** *You are required to have completed or at least be registered for CIN2601 in order to do this report.*
- **Design environmental education resources:** *You are required to have completed or at least be registered for CIN2601 in order to do this report.*
- **Design an environmental education poster:** *You are required to have completed or at least be registered for CIN1501 in order to do this report.*
- **Design an environmental education programme:** *You are required to have completed or at least be registered for CIN2601 in order to do this report.*
- **Design an exhibition:** *You are required to have completed or at least be registered for CIN2601 in order to do this report.*
- **Conduct a game drive:** *You are required to have completed or at least be registered for CIN2601 in order to do this report.*
- **Cultural heritage site interpretation:** *You are required to have completed or at least be registered for CIN1501 in order to do this report.*
- **Scientific writing:** *You are required to have completed or at least be registered for CIN2601 in order to do this report. Note: You have to have been an author on a published scientific paper to be able to make use of this template.*
- **Conduct a questionnaire:** *You are required to have completed or at least be registered for CIN2601 in order to do this report. Note that permission needs to be sought first and granted from your lecturer, before embarking on this activity!*
- **Other:** *If you wish to do a topic which is not listed here, please email wilsoga@unisa.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. NOTE: Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.*

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

WATER STUDIES
<p>COMPULSORY TOPICS for reports: You must have done this 1 compulsory report by the time you have completed your first 6 NCA modules. The topic which you must do is:</p> <ul style="list-style-type: none"> • MiniSASS study: <i>You are required to have completed or at least be registered for CEC1501 in order to do this report.</i>
<p>ELECTIVE TOPICS for reports: You must have done any 1 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:</p> <ul style="list-style-type: none"> • Identify components of a catchment system: <i>You are required to have completed or at least be registered for both CEC3701 and CVM2601 in order to do this report.</i> • Identify water body pollution and corrective measures: <i>You are required to have completed or at least be registered for both CEC3701 and CVM2601 in order to do this report.</i> • Identify wetland components and wetland delineation: <i>You are required to have completed or at least be registered for both CEC3701 and CVM2601 in order to do this report.</i> • Identify wetland impacts and corrective measures: <i>You are required to have completed or at least be registered for both CEC3701 and CVM2601 in order to do this report.</i> • Other: <i>If you wish to do a topic which is not listed here, please email wilsoga@unisa.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. NOTE: Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.</i>
ADMIN / GENERAL
<p>ELECTIVE TOPICS for reports: You must have done any 3 of the topics listed below by the time you have completed your first 6 NCA modules. The topics which you may choose from are:</p> <ul style="list-style-type: none"> • Budgets and payrolls: <i>You are required to have completed or at least be registered for COC1501 in order to do this report.</i> • First Aid Certificate: <i>You are required to have completed or at least be registered for COC1501 in order to do this report.</i> • Managing camp sites / lodges and or staff: <i>You are required to have completed or at least be registered for COC1501 in order to do this report.</i> • Weapon competency and or handling: <i>You are required to have completed or at least be registered for COC1501 in order to do this report.</i> • Prepare for and manage a meeting: <i>You are required to have completed or at least be registered for COC1501 in order to do this report.</i>

NATURE CONSERVATION APPLICATION MODULES
2018 Comprehensive Topic List

- **Memorandum or monthly report:** *You are required to have completed or at least be registered for COC1501 in order to do this report.*
- **Laboratory work:** *You are required to have completed or at least be registered for COA1501 in order to do this report.*
- **General office administration:** *You are required to have completed or at least be registered for CIN1501 in order to do this report.*
- **Other:** *If you wish to do a topic which is not listed here, please email wilsoga@unisa.ac.za and we will let you know if that topic would be acceptable or not and if it is, we will then provide you with a template to complete. **NOTE: Allow enough time for the decision to be made, communicated back and if required, a template to be drawn up and posted.***

Appendix 2 - An NCA module Template:

The template provided below is just one of seventy-three variations created to capture and assess student's work-integrated learning experiences. This particular example provided, is the template students used to represent their learning and experienced gain in river health investigations.

2018 NATURE CONSERVATION APPLICATION REPORT TEMPLATE: MINISASS STUDY - Water Compulsory		
Initials:	<input type="text"/>	Surname: <input type="text"/> Student No: <input type="text"/>
Confirmation Statement:		
<ul style="list-style-type: none"> - before starting the practical experience linked to this report - before completing this report template - before submitting the completed report template online 		
I hereby acknowledge by way of a "YES" being inserted in the red block provided; that I have read and fully understood ALL the instructions provided below and that I will fully comply with them.		
IF YOU FAIL TO PROVIDE THIS REQUIRED ACKNOWLEDGEMENT IN THE RED BOX PROVIDED, THE REPORT WILL BE AWARDED ZERO WITH ON CHANCE BEING ALLOWED FOR A RESUBMISSION.		<div style="border: 2px solid red; width: 80px; height: 40px; margin: auto;"></div>
Requirements for a correct and admissible submission:		
I understand that by not adhering to all the instructions, this report will be awarded ZERO by the marker. A zero will result in an NCA module being FAILED . Remember that five completed skills, whose average is above 50%, not including a zero , are required in order to pass one NCA module.		
I understand that this report is about MY WORK EXPERIENCE and therefore plagiarism in the form of using images from the internet or the copying of written material from other sources, will result in a zero mark being awarded with no chance for a resubmission. However, where required, correct referencing is expected and allowed.		
I understand that I must have participated and have personally involved myself in the activity being reported on. If I did not actively participate in the activity and only conducted a literature review (which is not the aim of the report), then I will be awarded zero with no chance for a resubmission.		
I have checked that this is a correct submission in terms of the topics allowed, the module and assignment it is intended for. I further acknowledge that I will double check IMMEDIATELY AFTER having submitted online via myUnisa to ensure that it is in fact the correct submission and to ensure that it can be immediately corrected if need be. I understand that I will not be able to request for a cancellation from the lecturer to fix an incorrect submission and that the onus is on me the student to ensure that my submission is correct. An incorrect submission will simply be awarded zero by the marker without an opportunity to resubmit.		
I understand that the submission date is actually the very last date I can submit on and should not be seen as a target date! If submitted even 1 minute late, a zero will be awarded with no chance to resubmit. Reasons such as poor connectivity will not be accepted and students should ensure timeous submissions given where they live and their circumstances!		
If however, a student has a valid reason for submitting late , such as work, an illness, a death in the family and or any other valid reason, then they may submit the assignment within 1 month of the initial due date, after which the system will close and block the submission. A valid-reason late-submission MUST HAVE INSERTED INTO THE ACTUAL REPORT AS AN IMAGE , the relevant employer's letter or doctor's note or affidavit or death certificate, in order to be marked. If this evidence does not accompany the report, the report will simply be considered late and be awarded zero with no chance to resubmit.		
I understand that if I submit an incomplete report , it will be considered equivalent to being late and as such will be awarded zero with no chance for a resubmission.		
I understand that in order to qualify for a resubmission , I must obtain 1-49% and zeros do not qualify for resubmissions!		
Specific to THIS report: I understand that I must compare 3 sampling sites to each other i.e. conduct the miniSASS three (3) times, either three (3) times along one course way or compare three (3) different course ways. Failure to provide three (3) miniSASS data sets and to describe and interpret each independently, will result in zero with no chance for a resubmission.		

**2018 NATURE CONSERVATION APPLICATION REPORT TEMPLATE:
MINISASS STUDY - Water Compulsory**

TITLE	5 Marks
<i>Provide an explicit title for your report <u>in a single sentence</u> that contains all the key words associated with your report focus.</i>	

INTRODUCTION	25 Marks
<ol style="list-style-type: none"> 1. Introduce the reader to the importance of clean / healthy rivers and DISCUSS using literature references <u>to support your discussion</u> (Remember to cite in the body text and provide full references in the reference section). 2. Describe the area and general condition of a specific part of a river (± 100 m radius) that you have selected for the study. Focus on condition and impacts both in and around your site (this should not be more than one page). Use the miniSASS monitoring method to determine the health status of the river section you have selected. Describe what data is required or collected and how this data are interpreted. Describe how you measured the water temperature and got pH readings for all three sites Summarise your findings from all three sites by providing your informed opinion about <u>the river health status</u> of your sites. Be sure to link your opinion back to the importance of clean and healthy river systems. 	

RESULTS	30 Marks
<ol style="list-style-type: none"> Describe your sampling method in detail so that your personal involvement is clear each step of the process. (10 marks) Tabulate and interpret the findings of your three (3) data sets them – the reader should be able to relate your interpretation to the general condition of the river that you studied. (20 marks) 	

PERSONAL PARTICIPATION	10 Marks
<ol style="list-style-type: none"> Describe (not a list) what roles you played in the miniSASS study? – remember that you are required to gain and practice the various skills required to collect, analyse and interpret information about a selected watercourse. Participating on only some of the activities will impact on your mark allocation. Did you oversee (be in charge of) the monitoring project or perhaps were you only involved with a small aspect? 	

CONSTRUCTIVE AND REFLECTIVE COMMENTS	10 Marks
<i>This section of your report requires you to reflect deeply and critically on the application of theory in practice and your experiences gained as a result. In the case of this report, you need to look at river health and in particular the miniSASS monitoring method and its conservation application. Give a detailed explanation (not a list).</i>	

REPRESENTATIVE PHOTOGRAPHIC EVIDENCE	10 Marks
<i>Insert relevant and in focus photographs, no more than can fit on one page, which supports this report. Each photo must be clearly and correctly labeled with a comprehensive caption describing exactly what the photo is about. At least one of the photos must show where you are actively participating in</i>	

**2018 NATURE CONSERVATION APPLICATION REPORT TEMPLATE:
MINISASS STUDY - Water Compulsory**

<i>the experience.</i>

FULL AND VERIFIABLE MENTOR DETAILS		5 Marks
<i>Provide the information of the mentor you made use of to guide and assist you through gaining the required experience and completing this report template.</i>		
Name:		
Surname:		
Employer:		
Number of years' experience:		
Highest qualification obtained:		
Telephone / Mobile number:		
e-Mail address:		

REPORT REFERENCES	5 Marks
<i>Provide a complete reference list of all in-text references used, making use of the Harvard Referencing Style.</i>	

See page below for additional Markers Comments



Appendix 2 continues below with the markers comments pages

**2018 NATURE CONSERVATION APPLICATION REPORT TEMPLATE:
MINISASS STUDY - Water Compulsory**

NCA General Markers Comments and Student Feedback

Compliance:	Student did not fully comply with the template requirements	
Plagiarism	Plagiarism warning issued for in-text info not referenced or internet image use	
and Fraud:	Fraud warning issued for misrepresentation of experience	
General Comments:	All names of places need to have capital letters	
	Acronyms need to be written-out in full for the first time and thereafter they may used.	
	Do not use "etc", as this assumes that the marker knows what has been left out form the list.	
	All tables need to be labelled at the top and graphs / photographs need to be labelled below	
	You repeated yourself or duplicated information	
	Check your submission for typos and grammar issues before you submit it for marking	
	Find out how to write scientific names correctly	
	Do not use common names	
	You need to take more care with your work and ensure that it is correct	
	Stay focused on the topic and on providing evidence / reflect on your experiences at all times	
	Make use of additional information to add value to your own experiences, only	
	In your answers provided, you did not fully or adequately address the highlighted sections	
	You are expected to provide information about <u>YOUR experience</u> . Marks are assigned for your work, your understanding, your evidence and the results you achieved, not what you extract or adapt from the internet or other authors	
	For the mark allocation, your answers need to be <u>in-depth</u> and <u>properly supported</u> by examples and references	
	Information provided should be relevant to the question and or linked to the topic	
It is hard to believe or trust your submission as you have none or very little supportive evidence or deep reflection to substantiate your work experience		
There are texts in your report that are clearly not your own words, language or grammar.		
Title:	Your title was not explicit enough. It needed to cover the 'what', the 'when', the 'who', the 'why', and the 'how' questions.	
Introduction:	You did not address the required question fully. See highlighted part of the question.	
Results:	You did not address the required question fully. See highlighted part of the question.	
	The calculations or data provided is incorrect	
Participation:	More than a simple list of tasks conducted was expected. A deeper representation / explanation of your participation would have yielded a better mark	
Comments:	A detailed explanation and not to simply provide a list was expected. A deep reflection and extensive account of your experience would have yielded a better mark	

**2018 NATURE CONSERVATION APPLICATION REPORT TEMPLATE:
MINISASS STUDY - Water Compulsory**

Photographs	Photographs are labelled as: photographers surname, initials and date in brackets, i.e. Figure 1: Good explicit caption (B. Smart, 2017)	
	There is no need to say, "photo taken by"	
	Poor variety or diversity of photographic evidence provided	
	Poor quality photos submitted	
	Not all photos were the right way up!	
Mentors:	Photos do not support the text or provide sufficient evidence of tasks engaged with	
	Mentor information is suspect	
References:	Mentor qualifications and or experience not suited to support this topic	
	No supporting references were used, which you were required to use.	
	In-text citing incorrectly done – refer back to your tutorial letter	
	Reference list incorrectly done – refer back to your tutorial letter	
	Statements have been made without the back up of proper scientific fact and or references	
	The first time you make use of a reference with more than three authors in you need to include all their names. Only thereafter can you make use of et al	
Other:	You are expected to paraphrase any large amounts of text selected from other sources	

Appendix 3 – miniSASS Excursion Advert:

The advert provided below is the one utilised to recruit possible Telperion Nature Reserve excursion participants. If compliant, the selected students are informed of their selection and further information related to their impending participation is provided via email to them.

A miniSASS and other NCA topics excursion to Telperion with Unisa Lecturers

Dear NCA students

I would like to extend this formal offer to all NCA students who are seeking to complete their NCA Water compulsory project, with the help and assistance from Unisa. Once the miniSASS topic has been completed other NCA report topics will be focused on.

The excursion will take place between the 16th and 20th of April 2018

If you are keen to be selected and participate in this primarily water focused excursion to the Telperion Nature Reserve, please send an email to wilsoga@unisa.ac.za before 4pm LASTEST on **Wednesday 11th April 2018**.

The subject line of your email must be: **Telperion NCA Water Excursion Application April 2018**. Due to the limited number of students, which can be accommodated, no late submissions can be considered.

During the excursion, I will be focusing primarily on **miniSASS (the three sites)** but will also cover other topics after completing the miniSASS and these topics will include, **Anti-poaching, Game census** and or **Population Analysis**.

Veld Condition Assessment and **Tree and Grass Identification** will also be offered as the time for it is still good– this is around 5 reports which can be covered during this week.

Students who wish to apply and attend **MUST**:

1. Be linked to myUnisa "NCA ALL 2018"
2. Still require the miniSASS opportunity. Students, who have submitted this report in the past, will unfortunately not be considered for this excursion. I will be checking against past trackers to determine this.
3. Students MUST submit their miniSASS reports (based on the Telperion excursion) for Assignment 3 (by the 2nd May 2018) or Assignment 4 (1 June 2018) by the very latest. I will get you to sign a pledge at Telperion declaring that they will do so.

PLEASE NOTE

I am busy with my Masters Research and the miniSASS excursion and how it is mentored and the associated reports form part of this research study. The reports and their contents will be used as part of my research, however, full anonymity will be awarded i.e. your identity will be confidential and that the research will in no way impact on you working as a group, collecting data and completing the report template. The reports will be marked by the contracted marker and will be using the same marking rubric used to mark all miniSASS reports submitted. I will be using a Mobile App as a mentor for this miniSASS segment of the excursion. I have developed and populated it with all the same information you would get from me anyway. There will be no difference between a face-to-face mentor or a digital mentor.

Therefore, by applying for this excursion, I need for you to understand and agree to the terms of conditions in the above points. Selected students will be required to complete an ethics consent form and will be collected before climbing onto the bus.

If you have any concerns about the proposed research, you are more than welcome to contact me via email and or telephone (011 471 2103) before the closing date.

SOME BACKGROUND INFORMATION

The Telperion Nature Reserve is located 30 km North West of Emalaheni. If selected, I will be providing free transport for selected students from the Florida Science Campus. I will also arrange to have the transport stop off on route, at Burgers Park, to collect those students living in the Pretoria area before heading onto Telperion. This transport will return the selected students to their original pick up points on Friday after the completion of the excursion.

For those students, who have high clearance vehicles of your own, you are welcome to use them to get to and from Telperion (at your own cost). After notification of a successful application please do contact me for maps, directions to Telperion and expected times of arrival, so that we can coordinate your arrival and open locked gates for you etc.

All BASIC food, which includes a breakfast, morning tea, lunch, afternoon tea and dinner, will be provided, however, if you wish you may bring whatever comfort foods you would like to supplement your food requirements.

You will also be provided basic accommodation with hot water showers, but you will be required to bring your own bedding, bush clothes, toiletries and medication.

A detailed programme and additional information will be provided to all the successful applicants **ONLY**.

PLEASE NOTE THE FOLLOWING:

Incomplete and or sloppy applications, which do not follow the instructions as set out in this advert above, will not be considered! There are many students and few places available, so make your application count, just like a real job application!

1. The subject line of your email must be **Telperion NCA Water Excursion Application April 2018**
2. In the email, provide the following:
 - a. Your first name/s
 - b. Your surname
 - c. Your student number
 - d. Your gender (for dormitory allocation)
 - e. Which NCA modules you are registered for in 2018
 - f. Your preferred pick up point
 - g. Will you be using your own transport
 - h. Your cell phone number, so you can be contacted if required
 - i. What food you do not eat i.e. pork
 - j. Report any medical conditions you feel I may need to know about (this will be kept confidential)
 - k. A short motivation why you require / deserve such an opportunity

If you are not contacted by **4pm on Thursday the 12th April 2018**, then please consider your application unsuccessful. Please, do not resend applications or use different email addresses in a hope to be awarded a placement and please do not call or email me to confirm if you were awarded a spot or not.

And finally, if you were not successful with this application, I am planning on hosting other excursions throughout the year. I hope that this may give students from further afield an opportunity to plan trips up to Gauteng to take part in this duplicated excursion.



Remember that **ONLY** successful applicants will be contacted by return email. There are many students and while we cannot accommodate everyone at once, I do have a system where I try and distribute opportunity's offered at Telperion around, so please do not be disheartened and not apply for future opportunities which are offered. I am planning on hosting weeklong excursions every month till the end of the year.

Regards

Mr Wilson

Appendix 4 – Ethics Acceptance Certificate:

After submitting the project proposal and addressing issues raised in a rebuttal, the attached Ethics Approval Certificate was issued.

	
UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE	
Date: 2018/02/14	Ref: 2018/02/14/37586742/08/MC
Dear Mr Wilson	Name: Mr GA Wilson
Decision: Ethics Approval from 2018/02/14 to 2021/02/14	Student: 37586742
	Staff: 90187903
<hr/>	
Researcher(s): Name: Mr GA Wilson E-mail address: wilsoga@unisa.ac.za Telephone: +27 11 471 2103	
Supervisor(s): Name: G van den Berg E-mail address: Vdberg@unisa.ac.za Telephone: +27 12 429 4895	
Title of research:	
A study in open distance and e-learning work-integrated learning mentorship models	
<hr/>	
Qualification: M Ed in Curriculum and Instructional Studies	
<hr/>	
Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2018/02/14 to 2021/01/14.	
<hr/>	
<i>The low risk application was reviewed by the Ethics Review Committee on 2018/02/14 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.</i>	
The proposed research may now commence with the provisions that:	
1. The researcher(s) will ensure that the research project adheres to the values and	
	<small>University of South Africa Pretter Street, Muckleneuk Ridge, City of Tshwane PO Box 392 UNISA 0003 South Africa Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150 www.unisa.ac.za</small>

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date **2021/02/14**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2018/02/14/37586742/08/MC** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,



Dr M Claassens
CHAIRPERSON: CEDU RERC
mcdtc@netactive.co.za



Prof V McKay
EXECUTIVE DEAN
Mckayvi@unisa.ac.za

Approved - decision template – updated 16 Feb 2017

University of South Africa
Pretor Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephonic: +27 12 429 3111 facsimile: +27 12 429 4150
www.unisa.ac.za

Appendix 5 - NCA eMentor Design Framework:

Below is the framework, which informed the development of the video series used as an additional resource for the Digital Mentor.

NCA eMentor	
Welcome to the Mobile eMentor App.	
<i>This App focuses specifically on providing work-integrated learning support to selected Unisa undergraduate Nature Conservation Diploma students, in the area of miniSASS application, as a compulsory water related skill.</i>	
■	Landing page
■	Introduction
■	Unpacking River Health
■	miniSASS Excursion
■	Site Characterisation
■	Chemical Characteristics
■	Biological Components
■	miniSASS resources
■	miniSASS Report Template
■	miniSASS Field Data Sheets
■	miniSASS Toolkit
■	Dichotomous Key
■	miniSASS Groups
■	miniSASS Digital Resources
□	miniSASS Journal Article - https://www.tandfonline.com/doi/abs/10.2989/16085910409503789#.UdFRoJiGW0
□	miniSASS Web Site - http://www.minisass.org/en/
□	GroundTruth Web Site - http://www.groundtruth.co.za/
□	Water Research Commission - http://www.wrc.org.za/
□	miniSASS Mobile App - https://play.google.com/store/apps/details?id=com.sifso.codetribes.app
■	miniSASS Equipment
■	NCA eMentor Podcasts
■	Podcast 1: NCA Report Requirements (7.2 MB)
■	Podcast 2: Introduction to miniSASS (21.6MB)
■	Podcast 3: Study Site Part 1 Site Selection (20.7MB)
■	Podcast 4: Study Site Part 1 Description (21.1MB)
■	Podcast 5: River Habitat Characterization (17.0MB)
■	Podcast 6: Water Quality and Composition (21.5MB)
■	Podcast 7: miniSASS Part 1 Collection (43.1MB)
■	Podcast 8: miniSASS Part 2 Identification (5.8MB)
■	Podcast 9: miniSASS Part 3 Interpretation (10.2MB)
■	Podcast 10: Conclusion (8.6MB)
■	Glossary of terms
■	Contact information
■	MS Brand bbrand@unisa.ac.za (079 915 9427 – between 09:00 and 16:00)
■	Mr Wilson wilsoga@unisa.ac.za (011 471 2103 – between 09:00 and 16:00)

NCA

Welcome to the Mobile eMentor App.

This App focuses specifically on providing work-integrated learning support to undergraduate Nature Conservation Diploma students, in their quest to gain valuable work related experience in the absence of a suitably qualified sector provided mentor.

Introduction

Gain from the best

We understand the challenges you face in securing suitable work-integrated learning opportunities and associated mentors. Because of these challenges, we offer you a unique opportunity to learn from and engage with your subject lecturers via this App. They understand the work-integrated learning module curriculum and its outcomes. Thus, they are best suited to mentor you, as you gain the required experiences and skills.

The NCA eMentor provides you with the freedom to work at your own pace. It enables and supports you to either work as a group or on your own, at a suitable location of your choosing. Your subject lecturers assisted in the development of this App. Thus, by working through and using this eMentor, you will be able to access all the basic information and support they would have provided you in person to complete the work-integrated learning process effectively. Via this App interface, and without the physical presence of a mentor, the NCA report template can be completed on the completion of the field investigations.

Unpacking River Health

Unpacking miniSASS and River Health Investigations

In a water scarce country such as South Africa, it is of vital importance to ensure that all sources of potable water are managed and protected from degradation and pollution.

The basic aim for conducting a river health and miniSASS investigation is to assess the current health status of a selected river.

The associated objectives for a river health and miniSASS investigation are as follows;

1. To employ a simple and repeatable monitoring method (miniSASS),
2. To collect and store useable and comparable data
3. To analyse and interpret data collected as trends
4. To take informed decisions and actions based on analysed data

For more detailed information on the aims and objectives of River Health Investigations go to the links provided under miniSASS Resources and more specifically the miniSASS Digital Resources.

miniSASS Excursion

Monitoring of River Health and miniSASS Investigations

In the tabs provided below are all the descriptions, and specific aims and objectives you will need for each of the three components required as part of your River Health Investigation task. Data collected from each of these three components, when combined can assist you to create a deep and detailed description of the site and its current status. The data can also aid you with providing a reasonable interpretation of your findings. In addition, it can also be used to suggest measures for the continuation of good site management or to suggest remedial measures to improve the current management of the site you selected.

- Site Characterisation
- Chemical Characteristics
- Biological Components

Site Characterisation

Site Characterisation

This aspect of your River Health and miniSASS Investigation looks at developing a detailed description and understanding of the physical environment in and around your selected site. Please note that the person who reads your report would not have visited the site in person and therefore has to rely on the details you provide as your site descriptions. A poor description can lead to a poor interpretation on your part, resulting in a possible poor mark allocation by the marker.

A site where a River Health and miniSASS Investigation takes place, needs to be large and therefore cannot be represented by a small patch of water alone. A proper site needs to be at least a 50m radius around this site, as all the environmental issues adjacent to the miniSASS biological collection site, have an impact on this biological collection site and what you may find on the day of collection.

There are factors that arise further afield, which can also influence your biological collection site, such as effluent from a distant mine, can pollute the water.

Some of the information required you can access from the internet, but be sure to reference these sites correctly. Other information is a little harder to come by and you may need to ask someone who lives and works in the area for some information. However, there is a fair amount of information, which can be gathered directly from the site by simply looking methodically at it and taking down detailed notes.

Please Note

You will only have one chance to go to the site so make your visit count by taking detailed notes and photos to assist you later during your write up phase.

Chemical Characteristics

Chemical Characteristics

This aspect of your project looks at the chemical characteristics of the water at your study sites. Remember, that the report requires you to investigate and compare three different sites.

The two data requirements for this aspect of your report are linked to Temperature and pH (which is linked to the acidity or alkalinity of the water) of your three study sites.

Temperature is taken at least three times at each site and averaged for a site temperature. A simple pool thermometer can be used and the temperature just below the water surface is what is measured.

The second required data set is that of pH, which can be measured with the aid of simple swimming pool acid dipstick test strips. They are dipped into the water to allow the dipstick to react to the water. The dipstick is then compared with the colour variations provided on the bottle or information page insert to get the levels of acidity or alkalinity of the water.

Please note

One test per site would be sufficient.

Biological Components

Biological Components

This aspect of your project concentrates on the macro-invertebrates, which live in the river at all three sites you intend investigate.

To arrive at a 'river health score' macro-invertebrates need to be collected and identified. This is achieved by using a net to catch these invertebrates living in within the water of each of your identified river sites. Remember that not all the invertebrates live and use the same habitat within the water and as such, you need to sample and collect specimens from as many different habitats within the river. For example, on top of rocks, under the rocks, in the mud in the centre of the river, in the gravel and look for specimens even in the vegetation living within the water. The greater the diversity of habitats sampled the greater the possibility of collecting a greater diversity of organisms.

To calculate the river health score, please do refer to the miniSASS resources tab and open the miniSASS Toolkit.

Please note

To sample a site adequately, you need to spend at least 2 minutes sampling each of the identifiable water habitats for invertebrates. Also, ensure that you start your starting your sampling your selected study site downstream and work your way slowly upstream. This methodology will ensure that you always sample from undisturbed habitats.

miniSASS Resources

miniSASS Resources

The list of resources provided below have been specifically selected to provide you with all the required digital materials to assist with you engaging in and gaining experience in biomonitoring using the miniSASS method of collecting and interpreting information.

- miniSASS Report Template
- miniSASS Field Data Sheets
- miniSASS Toolkit
- Dichotomous Key
- miniSASS Groups
- miniSASS Digital Resources
- miniSASS Field Equipment

miniSASS Report Template

miniSASS Report Template

The link provided below, provides direct access to the current 2018 NCA miniSASS Report Template. Please make use this report to ensure that you collect all the required data and information for your reports. When you have an opportunity, please download the document so that you can use it while offline.

[NCA miniSASS Report Template](#)

miniSASS Field Data Sheets

miniSASS Field Data Sheets

The link provided below, provides access to a set of field data collection sheets. These data collection sheets have been specifically developed for the collection of data required for the NCA miniSASS report. When you have an opportunity, it is suggested that you download the document and have it printed off for use in the field. Please note that you are required to collect data from three separate sites and as such you will required three sets of these data collection sheets.

[miniSASS Field Data Collection Sheets](#)

miniSASS Toolkit

miniSASS Toolkit

This provided resource, recaps what has been covered by the linked podcasts, on how to identify and calculate the status of the water source you investigated.

[miniSASS Toolkit](#)

Dichotomous Key

Dichotomous Key

This document will assist you with the identification of all the aquatic invertebrates you have collected from your site. Remember it is only important to identify the organisms to a family level.

[Dichotomous Key](#)

miniSASS Groups

miniSASS Groups

This document will assist you with gaining insights into the various invertebrate families you are most likely to encounter.

[miniSASS Groups](#)

miniSASS Digital Resources

miniSASS Journal Article

This journal article has been specifically provided to you, as it describes and discusses the miniSASS methodology in great detail. This background information about the miniSASS method will assist you with the completion of your NCA miniSASS Report Template.

Please understand that the SASS5 methodology referred to in this journal article is a professional form of miniSASS and requires people to be highly skilled at collecting and identifying macroinvertebrates.

[miniSASS Journal Article](#)

miniSASS Web site

The miniSASS website is a very useful site for anyone who is interested or is planning to do a miniSASS investigation. All the information required is there or is linked to this site. Alternative resources, including videos, are accessible from this site, for those needing to make use of more than one source of information.

<http://www.minisass.org/en/>

GroundTruth Web site

GroundTruth is a company, which specialises in water research and employs SASS5 methodologies as one of its methods of gathering field data. The link has been provided to provide a context for the importance and scope of the water issues being experienced in South Africa.

<http://www.groundtruth.co.za/>

Water Research Commission

The Water Research Commission is a government institution, which has water research in South Africa as its mandate. Some of these research projects and priorities are covered by this site and could be used as supportive references within your report.

<http://wrc.org.za/>

miniSASS Mobile App

The miniSASS Mobile App, was developed as part of a citizen science initiative, where all people who conduct miniSASS investigations are invited to upload their findings to a central repository. Anyone can thus, access this information and may even chose to redo the investigation and see the change or try and determine a trend over multiple investigations at the same site over an extended period of time. It is recommended that you download this App and see for yourself how it works.

You are also challenged to use the App and to upload the information you gathered for part of your NCA miniSASS Report.

<https://play.google.com/store/apps/details?id=com.sifiso.codetribe.app>

miniSASS Equipment

miniSASS Equipment Requirements

You will be working in and around water, which presents a dangerous environment, especially for those students who cannot swim. Additionally, many of the water sources in South Africa can be potentially hazardous because of high levels of solid and dissolved pollutants. Thus, you are warned to first consider your health and safety before beginning any monitoring activities at your selected water sources.

- Personal safety equipment
- Boots or waterproof shoes or waders
- Sun hat
- Long sleeve shirts
- Sun cream
- Towel

miniSASS collection equipment

- Aquatic organism catching nets
- Buckets with lids
- Plastic tubs (ice-cream tub or ice cube trays work well)
- Magnifying glass
- miniSASS dichotomous key
- pH dipstick test kit
- Water temperature thermometer (a swimming pool thermometer works well)
- Measuring tape or 5m messaged rope (optional)
- GPS (optional)

NCA eMentor Podcasts

These ten podcasts are viewed as the main form of support for you, to ensure that you complete all the required steps and collect and all the required in field data.

Please ensure that you watch the entire podcast series in numerical order, starting with podcast 1 and ending with podcast 10. The concept of providing podcasts as a means of instruction is that it offers you, the student, a certain amount of flexibility and control over the spread at which the information provided, is engaged with.

It is suggested that you use the "pause button" to allow you time to duplicate/practice/replicate or collect what has been covered by/within each of the podcasts.

Glossary of Terms

Glossary of Terms

The following list of words are terms commonly used within River Health and miniSASS investigations. To excel in this task you need to become familiar with what they all mean.

Alluvial -	This refers to the object has been transported by means of water.
Ambient Temperature -	This refers to the outside temperature taken at around 1m above the ground and in the shade.
Bedrock -	Solid impervious rock.
Causeway -	Is a bridge which flood water flow over if needed
Channelisation -	This refers to the channel where the water flows. In many urban areas, this flow has been altered or manipulated by humans using gabions and or concrete. There is also natural channalisation such as earthen banks.
Cross-section -	This is like a slice of cake, which you can see all that has been added inside.
Downstream -	This is where the river water is heading.
Ephemeral River -	Is a river that flows only occasionally when there is very localised rain.
Gradient -	This means the slope and whether it is steep or not.
Perennial River -	Is a river that flows throughout the year.
Site Characterisation -	This refers to a full and detailed description of a particular site under investigation, to enable a reader to construct a detailed visual image of the site.
Seasonal River -	Is a river that flows only during the rainy season.
Substrate -	This refers to the ground and what it looks like
Tributary -	This refers to a smaller river, which joins to a bigger river.
Upstream -	This is where the river water comes from.

Please Note

If there are other words, you do not understand their meaning in relation to miniSASS and River Health Investigations please do feel free to contact us:

Contact Details

As you are expected to submit this compulsory miniSASS report for assignment 3 or latest 4, the contact details below are valid up until 30 April 2018 ONLY. As such, you are advised to work on your report as soon as possible to make use of the additional mentor support provided.

Please note:

It is suggested that you first consult the App and its associated digital resources as in many cases your issue is not unique and has been formally addressed in one or most of the resources provided.

For telephonic enquiries:

Ms Brand - 079 915 9427 (09:00 to 16:00 weekdays only)

Mr Wilson - 011 471 2103 (09:00 to 16:00 weekdays only)

For email enquiries (*preferred means of communication*):

Ms Brand - bbrand@unisa.ac.za (subject line must read: **Telperion miniSASS Question**)

Mr Wilson - wilsoga@unisa.ac.za (subject line must read: **Telperion miniSASS Question**)

Appendix 6 – Video Segments Design Framework

miniSASS Video Series

Monitoring of River Health and miniSASS Investigations

A series of short video segments were developed and filmed specifically for this study. A University of South Africa academic, who is also the primary lecturer for overseeing the third level water ecology theory being assessed practically, assisted with technical issues and also provided the narration for all the video segments.

An eMentor guide to conducting a miniSASS study

Background:

Students registered for a Diploma in Nature Conservation are required to complete part of their studies by gaining work-integrated learning experiences in a real work context. This is not necessarily an easy task, especially when many students do not have work experience or a developed conservation network of contacts to draw assistance from. Furthermore, the students need to rely on sector-based mentors, which may or may not be suited to providing the specialised and focused guidance and academic assistance the students are seeking.

Thus, the situation arises where some students find themselves trying to gain the required work experiences in potentially poor learning environments and with unsuitable or unqualified mentors.

Aim

To support these disadvantaged students through the provision of a digital mentor.

Objectives

- To develop a series of short video segments focusing on just one required work-integrated learning experience per video clip.
- To make use of a familiar academic as the video mentor and voice.
- To use a series of video segments as part of a suitable substitute for a poor or absent sector-based mentor.
- To make a series video segments of suitable standard and quality, which may be viewed on a smart phone or tablet.
- To produce a series of video segments small enough in file size, which could easily be emailed to or downloaded by students.
- To link and address all related questions or concerns identified with this particular student required activity in the video series.
- To provide a means for students to gain additional insights and understanding of this particular activity.

Contents

Video 1

NCA report requirements (± 2 minutes)

1. Introduction to the NCA miniSASS report template
2. Terms and conditions for a successful submission
3. Common mistakes made by previous students
4. What the markers are looking for

Video 2

Introduction to miniSASS and the importance of clean and healthy river (± 4 minutes)

1. What is miniSASS
2. Why it is important to have a clean and healthy river
3. Selecting suitable sites
4. Safety and PPE
5. Doing your study and the expectations

Video 3

Site selection (± 2 minutes)

1. Sites to do sampling (rocks and marginal vegetation)

Video 4

General study site information – site description part 1 (\pm 3 minutes)

1. Important general information – date, time, location (province), vegetation type, land use practice, other information
2. Need for a good map and representative photos
3. Specific information – name of river, GPS coordinates, hydrological type

Video 5

River habitat characterization – site description part 2 (\pm 5 minutes)

1. Visible catchment area description – human impact / animal impact
2. Bank description – erosion
3. Riparian zone description – alien plant
4. In-stream description – sand / rocky
5. Rating of condition / human impact

Video 6

Water quality and composition (\pm 2 minutes)

1. The equipment
2. Taking Ph readings
3. Taking Temperature readings

Video 7

miniSASS – part 1 collections (\pm 3 minutes)

1. The equipment
2. Process of collecting aquatic invertebrates
3. Process of treatment of caught invertebrates

Video 8

miniSASS – part 2 identification (\pm 4 minutes)

1. The equipment
2. Process of preparation for identification
3. Dichotomous key

Video 9

miniSASS – part 3 interpretation of findings (\pm 4 minutes)

1. Calculating the score
2. Interpreting the findings – inclusive of the water composition and habitat description

Video 10

Conclusion and recap (\pm 3 minutes)

1. Recap steps
2. Highlight the important aspects
3. Resources and reference list
4. Useful links / mentor details
5. miniSASS App

Total estimated time for the ten-part video series is \pm 32 minutes

Structure

- Two volunteer students will be asked to demonstrate the various processes through formal instruction provided from the mentor (academic) on site.
- Overlay text to be used to re-enforce key concepts and or requirements
- Pause function to be used throughout the series. When pause is de-activated the mentor (academic) will recap / re-explain briefly. I.e. where there are rocks in-stream you need to pick them up and look underneath for invertebrates clinging to the under surface of the rock. Try it, "Press pause now". Did you find any invertebrates? Some of the types of invertebrates you can find are ... and then continue with narration.
- Stills and additional digital footage will be provided for inclusion throughout the series.
- Visual footage filmed from drone also used / provided to create a birds eye-view and context

- Still photos with overlay graphics used.

Format

- As indicated a small file size is required
- File size must be included in title
- A versatile file formats are to be produced, i.e. MP4 and MP3
- File format should be recognised and playable by all smart phones, tablets, pads and PC's
- No RSS feed required
- Links to sites, references and additional resources would be good i.e. miniSASS app and ground truth
- Must be fully downloadable and available to be used offline
- File name to include download file size and type
- Must be fully linked to additional digital information i.e. FAQ's on this topic and field data collection sheets.

Appendix 7 – miniSASS Field Data Sheet:

In support of work-integrated learning students, a set of miniSASS Field Data sheets were developed. The benefits of using a standardised set of data sheets is that all students will gather comparable data and a mentor or marker would be in a suitable position to provide advice and guidance based on having all the students producing similar results.

miniSASS and River Health Investigations

Field Data Sheets

(adapted from Dallas, H.F., 2005 Resource Quality Services: Department of Water Affairs and Forestry)

The primary aim for the development of a set of field data collection sheets is to aid with the standardizing of the data being collected. This would include information to assist with the collection of physical, chemical and biological data at any selected site. The data collected would represent the bare minimum required to provide some indication of the condition of the flowing water source being investigated at the time when the data was collected.

With repeated investigations, at the same location, using the same methodologies and collecting the same data, a more informed interpretation can be offered concerning the site where the miniSASS and river health investigations were conducted.

The development and use of standardized field data capture forms

Aims

- To collect data about the site that could provide motivation for a particular observation
- To gather site information for future site comparisons
- To serve as a record of the site at the time of investigation

Objectives:

- To ensure that each investigation gathers the same data in the same way
- To provide and contribute to a usable dataset

River Health Investigations and Biomonitoring

COMPLETE A NEW FIELD DATA SHEETS FOR EACH SITE

Student name:		Mentors Name:	
Site name:		Date of investigation:	
Start time:		End time:	
Ambient temp:		Weather condition:	

Location Data*	
Name of property or area of investigation:	
Location map (append map):	

*Remember to include a reference where you obtained the map

Desktop Data*	
Province:	
Biome/Vegetation type where site is located:	
Rainfall at site (summer or winter):	
Mean average rainfall at site:	
Mean average high temperature at site:	
Mean average low temperature at site:	

*Remember to include all references

Site Specific Data	
River name:	
Is it a river or tributary:	
Is it perennial, seasonal or ephemeral:	
Provide GPS coordinates of site:	
Site map (hand drawn 50m radius – pg 3):	
Cross section (hand drawn central point – pg 3):	
Site elevation above sea level (central point):	
Gradient (central point):	
List any associated systems (i.e. wetlands):	
General substrate of area (i.e. rocky, sandy etc):	

Photographs (central point – four cardinal points)* plus	
Upstream (from central point):	
Downstream (from central point):	
Bank to bank (from both sides, central point):	
Specific features (list such erosion):	

*The more representative photos you take of each of the sites the better you will be able to motivate your answers through referring to the photos.

Habitat Characterization – Land-use				
Land-use (indicate presence and impact)		Within riparian zone	Outside the riparian zone	Impact on river health y/n
Agriculture	Crops			
	Livestock			
Conservation	Wildlife			
Degraded and unused	Alien plant infestations			
	Soil erosion			
	Illegal dumping			
	Other (list)			
Human Construction	Habitation			
	Roads			
	Industry			
	Impoundments (dams/weirs)			
	Others (list)			

Habitat Characterization – Human induced channel modifications				
In-channel and bank modifications (indicate presence and impact)		Upstream	Downstream	Impact on channel y/n
Construction	Bridges			
	Causeways			
	Gabion channelisation			
	Roads			
	Dams or weirs			
Natural	Earthen banks			

Habitat Characterization – Habitat integrity				
Index of habitat integrity		Score*	Motivation for score	
Water removal	Pumps or pumping			
Flood risk	Un-natural flooding			
Water quality	Clarity, odor, macrophytes			
Water flow	Modifications made			
River bed	Modifications made			
Channel	Modifications made			
Indigenous plants	Decrease of ...			
Alien plants	Presence / increase of ...			
Alien animals	Presence / increase of ...			
Erosion	Loss of stable banks			
Pollution	Presence of ...			
Other (list)				

Scoring*

0 = no impact

1 = limited impact

2 = moderate impact

3 = extensive impact

Channel Morphology						
Channel type: tick channel type indicating the dominant type(s)						
Bedrock						
Mixed bedrock and alluvial – dominant type(s)	Sand		Gravel		Cobble	Boulder
Alluvial with dominant type(s)	Sand		Gravel		Cobble	Boulder

Gravel = small stones roughly all the same size (smaller than marbles) Cobble = Stones of equal size (marble size to tennis ball size) Boulder = Large stones of various sizes and shapes to large immovable rocks

Hand-draw the aerial view of site selected (ensure you label it comprehensively)

Cross section (slice through the river) at the central point

Physical characteristics of the water				
Water Data				
Site Name:				
GPS coordinates:				
	Reading 1	Reading 2	Reading 3	Average
Temperature:				
pH: (Acidity / Alkalinity levels)				
DO ₂ : (Dissolved O ₂)**				
EC: (Conductivity)**				
TDS: (Total Dissolved Solids)**				

*Take photos of the equipment you use and include it in your report.

**If you do not have all the equipment to take all the readings, then you may only take the pH and Temperatures for the site. Remember to take at least three reading for each and average them.

The verdict about the chemical and physical characteristics of the water

miniSASS calculations

How the scoring works

1. On the table below, circle the sensitivity scores of all the identified insect groups found.
2. Add up all the sensitivity scores and add the total to the **Total Score** box.
3. Divide the total of the sensitivity score by the number of insect groups identified.
4. The result is the average score, which can be interpreted by comparing your answer to the values scales provided below.

Insect / invertebrate groups		Sensitivity score
1	Flat worms	3
2	Worms	2
3	Leeches	2
4	Crabs and shrimps	6
5	Stoneflies	17
6	Minnow mayflies	5
7	Other Mayflies	11
8	Damselflies	4
9	Dragonflies	6
10	Bugs and beetles	5
11	Caddisflies (cased and uncased)	9
12	True Flies	2
13	Snails	4
Total score		
Number of groups collected		
Average score		

How to interpret the miniSASS score

Although an ideal miniSASS site has rocky, sandy and vegetation habitats, not all habitats are always present at a chosen site. If the site selected does not have any rocky habitats use the **sandy type** category to interpret the miniSASS score. If the site does has a rocky habitat (where collection took place) then use the **rocky type** category to interpret the miniSASS score.

Ecological category (condition)	River habitat category	
	Sandy type	Rocky type
Unmodified (Natural condition)	> 6.9	> 7.9
Largely natural / few modifications (Good condition)	5.8 to 6.9	6.8 to 7.9
Moderately modified (Fair condition)	4.9 to 5.8	6.1 to 6.8
Largely modified (poor condition)	4.3 to 4.9	5.1 to 6.1
Serious / critically modified (very poor condition)	< 4.3	< 5.1

The verdict about this site

Appendix 8 – miniSASS Data Analysis Sheet:

The data analysis sheets were specifically developed to assist and enable the students to grapple with the calculations required to emerge with results which can inform management decisions. What is viewed as important here is the process and the depth of the interpretation of the results.

miniSASS Data Analysis Sheet

How the scoring works

1. On the table below, circle the sensitivity scores of all the identified insect groups found.
2. Add up all the sensitivity scores and add the total to the **Total Score** box.
3. Divide the **total of the sensitivity score** by the **number of insect groups** identified.
4. The result is the average score, which can be interpreted by comparing your answer to the values scales provided below.

Insect / Invertebrate groups		Sensitivity score
1	Flat worms	3
2	Worms	2
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4	Crabs and shrimps	6
5	Stoneflies	17
6	Minnow mayflies	5
7	Other Mayflies	11
8	Damselflies	4
9	Dragonflies	6
10	Bugs and beetles	5
11	Caddisflies (cased and uncased)	9
12	True Flies	2
13	Snails	4
Total score		
Number of groups collected		
Average score		

How to interpret the miniSASS score

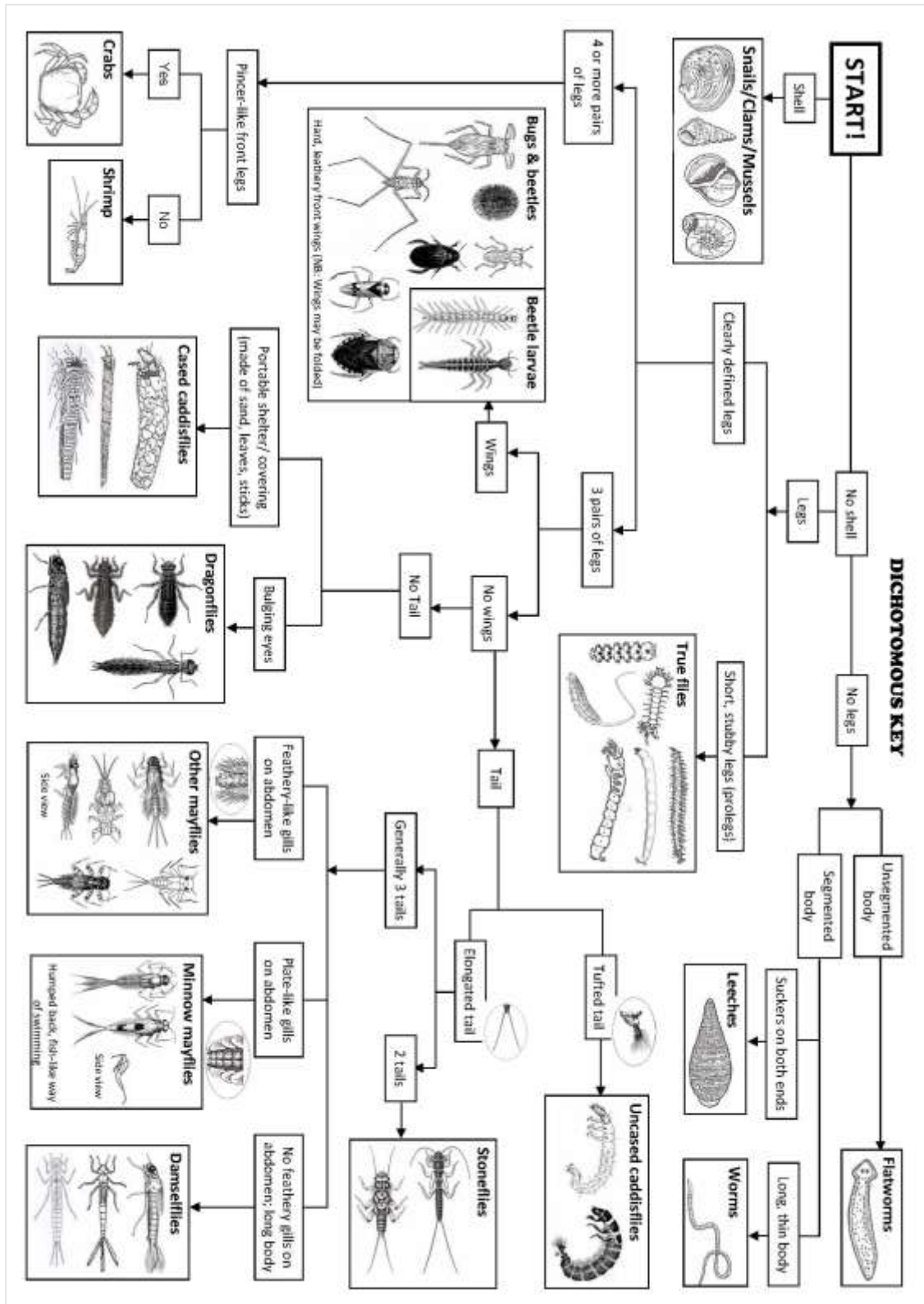
Although an ideal miniSASS site has rocky, sandy and vegetation habitats, not all habitats are always present at a chosen site. If the site selected does not have any rocky habitats use the **sandy type** category to interpret the miniSASS score. If the site does have a rocky habitat (where collection took place) then use the **rocky type** category to interpret the miniSASS score.

Ecological category (condition)	River habitat category	
	Sandy type	Rocky type
Unmodified (Natural condition)	> 6.9	> 7.9
Largely natural / few modifications (Good condition)	5.8 to 6.9	6.8 to 7.9
Moderately modified (Fair condition)	4.9 to 5.8	6.1 to 6.8
Largely modified (poor condition)	4.3 to 4.9	5.1 to 6.1
Serious / critically modified (very poor condition)	< 4.3	< 5.1

The verdict about this site (remember to bring in the site characterization issues you identified to support and add to your discussion).

Appendix 9 – In-field Identification Kits:

A series of sector produced identification keys are used to aid students with the field identification of invertebrates caught.



Flat worms

Flat worms are characterized by their flattened shape and soft bodied, worm-like form. They have an arrow-shaped head with two dorsal eyespots and are generally mottled or dark grey in colour. Flatworms move with a gliding action and are generally scavengers or carnivores.



Leeches

Leeches are segmented organisms that have very flexible bodies. When moving they expand to become long and thin, and then contract to become short and stubby. They have suckers on both ends of the body used for feeding and locomotion. Leeches are variable in colour, from grey, to red-brown and black. They swim with a fast, snaking movement and are found under stones, vegetation and debris.



Worms

Worms are long and segmented, with a cylindrical shape much like small earthworms. Their colouring is usually pink to brown. They are usually seen writhing around in debris, digesting the substrate they fed on.



Snails / Clams / Mussels

Snails are molluscs with hard shells that vary in size, shape and colour. Habitats vary, with some snails, such as limpets, clinging to rocks, whereas clams and mussels are found in sand. The more common snails move over stones and vegetation. Some snails are host to bilharzia, a serious health hazard for humans.



Images not to scale

Damselflies

Damselflies have elongated bodies generally with three broad tail-filts on the tip of the abdomen. Damselflies are carnivorous and have a mask over the lower part of the face, which hinges out to reveal a pair of pincers used to catch their prey. They are often found in vegetation growing on the edges of rivers.



Dragonflies

Dragonflies are robust creatures that are stout and have a large head and protruding eyes. Some have short legs whilst others have long legs. They do not have tails, but swim using 'jet propulsion' by forcefully ejecting water from the abdomen. Dragonfly nymphs are usually the largest organisms found in a sample and are the most powerful invertebrate predators in the water.



Bugs and Beetles

Bugs can be defined as having a flatting and sucking beak for mouthparts, and two pairs of membranous wings. Beetles on the other hand have 'jaws' and outer wings that are hardened to protect the inner wings. Some bugs and beetles are well adapted to swimming, such as water boatmen, backswimmers, pond skaters and water stinkers. Most bugs and beetles are carnivorous, but some feed on algae.



Crabs and shrimps

Crabs and shrimp form part of the order Decapoda (ten legs) and have bodies and legs hardened to form a tough shell. They have four or five pairs of legs. Their eyes that are carried on stalks and are movable. Crabs are scavengers that feed mainly on leaf litter but will feed on animals when given the chance. Shrimps are mostly scavengers or deposit feeders.



Stoneflies

The nymphs of adult stoneflies usually have two long tails and three pairs of legs, each having two claws at the tip. A characteristic feature of stonefly nymphs are the tufts of gills on the side of the body as well as gills between the two tails. Wing pads on the thorax are often dark and obvious. Some species run across the substrate very efficiently and are potent invertebrate predators. Other species are smaller and feed on plant material. Most live in well-oxygenated, clean water.



Caddisflies

The aquatic larvae of adult caddisflies have a hard head with three pairs of legs attached to an elongated, soft body. Finger-like gills on the abdomen and anal appendages can be seen with the naked eye. Some caddisflies construct portable shelters from sand grains, bits of vegetation and/or silk that are glued together to form a characteristic case shape. Most case-building types cannot swim whereas the caseless types swim freely across the substrate. Some feed on algae and detritus whereas others are predators.



Mayflies

Mayfly nymphs vary greatly in shape and size and can survive for months in the water. However, the adults only live for a day or two. In this time, adults never feed, only mating and lay eggs in the water.



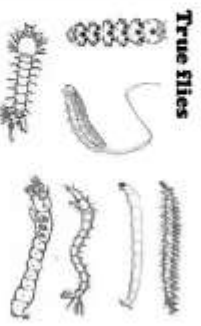
Minnow mayflies

These mayflies have a narrow head and a small, slender, but not flattened body. They have leaf shaped gills on both sides of the abdomen and two but more commonly three tails, depending on the species.



Other mayflies

Other mayflies are characterised by an elongated body, large head, well-developed mouthparts and stout legs. They live in a variety of habitats, including burrowing in mud, crawling amongst decaying leaves, and scurrying over stones in fast flowing water.



True flies

Most fly larvae have a fairly indistinct head but elaborate tail ends. They often have small, soft legs (prolegs), segmented bodies and have the appearance of maggots. Some have bristles/spines and antennae. True flies live in a variety of habitats including sand, mud and stones in fast flowing water. They can either be carnivorous or filter feeders.

Images not to scale

Appendix 10 – e-References:

A list was provided to digital mentor research participants with all the URL's for the individual YouTube videos. They could use these to view them online or to download them.

NCA eMentor Video Links

Dear Student

Some of the videos could not be loaded into your drop box because they are too large a file size. Please try and view them via the App or you can view and/or download them at the following links via YouTube.

Please note that I am aware of the names of the videos do not correspond with their labels but please follow the labels you see below.

Video 1 (7.18MB)

NCA Report Requirements

<https://www.youtube.com/watch?v=139lr8e6Qp8>

Video 2 (21.6MB)

Introduction to miniSASS

https://www.youtube.com/watch?v=42qRN_O_kv8

Video 3 (20.7MB)

Study site Part 1 Site Selection

<https://www.youtube.com/watch?v=6URu-seV9lo>

Video 4 (21.1MB)

Study site part 1 Description

<https://www.youtube.com/watch?v=D41xQRMUjKY>

Video 5 (17.0MB)

River Habitat Characterization

<https://www.youtube.com/watch?v=L7gDGbaXBx4>

Video 6 (21.5MB)

Water Quality and Composition

https://www.youtube.com/watch?v=iW_gTaA9p5Q

Video 7 (43.1MB)

miniSASS part 1 Collection

<https://www.youtube.com/watch?v=onCfRnjXiU>

Video 8 (5.78MB)

miniSASS part 2 Identification

<https://www.youtube.com/watch?v=l1G7cq8CyQ8>

Video 9 (10.2MB)

miniSASS part 3 Interpretation

<https://www.youtube.com/watch?v=Sa4pMWwc1es>

Video 10 (8.57MB)

Conclusion

<https://www.youtube.com/watch?v=LtTCYrpXvk0>

Thank you

Mr Wilson

Appendix 11 – Excursion Programme (miniSASS Focus)

The attached example programme is the draft programme used for the face-to-face mentoring excursion to the Telperion Nature Reserve. The programme is fluid and is adapted to suit conditions, for example if the temperature become unbearably hot, then activities are shuffled to accommodate the need to remain indoors until the temperature becomes tolerable again.

UNISA WIL Coordination

Excursion Programme Outline
19th to 23rd March 2018
Telperion Nature Reserve

Water Catchment Management and water quality assessment

Week programme activities:

Date	Early Morning	Late Morning	Early Afternoon	Late Afternoon	Evening
19 th	Depart to Telperion	Settle into rooms / set up for excursion	Water catchment lecture & prep	Practice sampling techniques at a site	Study site write-up / DVD on Water
20 th	Survey Plot 1	Survey Plot 2	Survey Plot 3	Capture and analysis of data	Methods write-up / DVD on Water
21 st	Grass ID and collection	Veld Condition Assessment	Veld Condition Assessment		Capture and analysis of data
22 nd	Game Census	Population Analysis / Condition assessment	Game Census	Population Analysis / Condition assessment	Portfolio report
23 rd	Tree ID and collection	Evaluation Clean/pack away	Depart for home		

Expected outcomes:

1. Water quality sites identified, named, GPS coordinates gathered and fixed point photos taken
2. Water quality testing techniques practiced
3. Species lists developed
4. Field data collected and captured
5. Tree and Grass id covered
6. Game census / condition assessment and population analysis covered
7. Conservation Campus Site cleaned up

Participants:

- G. Wilson (WIL Coordinator)
- B. Brand (Lecturer)
- 1 x Under graduate student assistant from Telperion
- A possible 20 additional students recruited from advert


Budget:

Expenses
Catering (R80.00 per person per day) = R9600.00
Equipment (expense up to R2400.00)
Transport (suitable transport for use off road at UNISA rates)

Equipment needs:	Stationary needs:
• 2 x GPS	• Scrap paper
• 1 x laptop	• Stationary toolbox
• 1 x data projector	• Replacements for kits
• Batteries and chargers	• Specimen jars and chemicals
• 2 x digital camera, cables, software and chargers	• Clip boards
• 1 x digital card reader	
• 2 x plant presses	
• 6 x Water quality test kits	
• SASS kits	• Presentation on wetland delineation
• 1 x digital microscope	• Presentation of WIL and Portfolios
• Water invertebrate observation trays	• Presentation of Scientific Writing
• Nets and scoops	• DVD on Catchment Management

Appendix 12 – Semi-structured interview data capture sheet – face-to-face:

The semi-structure interviews were conducted with the aid of this document to ensure that all the relevant questions were asked. The design and structure of the semi-structured interview data sheet was developed based on this document and adapted slightly to cover digital mentoring and not synchronous face-to-face mentoring.



Nature Conservation Application (NCA) Student Questionnaire

SECTION A - Completed by all students
(Please tick the appropriate boxes and provide additional information in full where required)

General Student Information

Your gender	Male	<input type="checkbox"/>	Female	<input type="checkbox"/>						
Ethnic group	Black	<input type="checkbox"/>	Indian	<input type="checkbox"/>	Coloured	<input type="checkbox"/>	White	<input type="checkbox"/>	Other	<input type="checkbox"/>
Your age	Under 18	<input type="checkbox"/>	18 - 20	<input type="checkbox"/>	21 - 30	<input type="checkbox"/>	31 - 40	<input type="checkbox"/>	Over 40	<input type="checkbox"/>
Your status	Single	<input type="checkbox"/>	Married	<input type="checkbox"/>						
Dependants	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	Number	<input type="checkbox"/>	Children	<input type="checkbox"/>	Family	<input type="checkbox"/>
Which province are you living in now and studying?	G	<input type="checkbox"/>	NW	<input type="checkbox"/>	FS	<input type="checkbox"/>	NC	<input type="checkbox"/>	WC	<input type="checkbox"/>
	EC	<input type="checkbox"/>	KZN	<input type="checkbox"/>						
Residence	Family	<input type="checkbox"/>	Renting	<input type="checkbox"/>	Own	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Employment	Full time	<input type="checkbox"/>	Part Time	<input type="checkbox"/>	Ad hoc	<input type="checkbox"/>	Not	<input type="checkbox"/>	Looking	<input type="checkbox"/>
Drivers licence	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Learners	<input type="checkbox"/>	Planning to take test	<input type="checkbox"/>		

General Study Information

Other Qualifications Completed	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Number	<input type="checkbox"/>	Distance	<input type="checkbox"/>	Residence	<input type="checkbox"/>
Other higher education qualifications completed	Cert.	<input type="checkbox"/>	Dip.	<input type="checkbox"/>	Ad. Dip.	<input type="checkbox"/>	P.G Dip.	<input type="checkbox"/>	Hons.	<input type="checkbox"/>
	Mast.	<input type="checkbox"/>	PhD.	<input type="checkbox"/>						
Funding for studies (Nat Con)	Self	<input type="checkbox"/>	Family	<input type="checkbox"/>	Bursery	<input type="checkbox"/>	Study loan	<input type="checkbox"/>	Other	<input type="checkbox"/>
Started Diploma	2016	<input type="checkbox"/>	2015	<input type="checkbox"/>	2014	<input type="checkbox"/>	2013	<input type="checkbox"/>	Prior 2013	<input type="checkbox"/>
Expected time of completion	1 year	<input type="checkbox"/>	2 years	<input type="checkbox"/>	3 years	<input type="checkbox"/>	4 years	<input type="checkbox"/>	more	<input type="checkbox"/>
Level of studies (mostly)	First	<input type="checkbox"/>	Second	<input type="checkbox"/>	Third	<input type="checkbox"/>	Final year	<input type="checkbox"/>		
Reason for studying Nat Con?	<input style="width: 100%;" type="text"/>									

General NCA Information

Number of NCA modules completed to date?	None	<input type="checkbox"/>	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>
	5	<input type="checkbox"/>								
Number of NCA modules currently registered for?	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>		
	5	<input type="checkbox"/>	6	<input type="checkbox"/>						
Did you have to repeat NCA modules?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>						
General reason for repeating?	<input style="width: 100%;" type="text"/>									
Do you have placement?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	For some	<input type="checkbox"/>				

Please remember that all the information you provide will be kept strictly confidential

2018 Academic Year

SECTION B - Completed by all face-to-face Unisa-mentored students

(Please tick the appropriate boxes and provide additional information in full where required)

General Mentor Information

1. How would you define a mentor?

2. Do you have a mentor at the moment?

Yes

No Why? _____

(If No, then there is no need to answer remaining questions of this section)

Only for some NCA modules Why? _____

3. How did/do you go about finding a mentor? (more than one box can be ticked)

From fellow students

Adverts posted on myUnisa

Work connections / personal networks

Directories e.g. Internet

Other _____

4. Do you have any expectations for your mentoring relationship?

Yes No Didn't think of it

5. If yes, then please list them? If no, why do you not think of it?

6. How did you find the mentoring relationship?

Very beneficial Beneficial Not beneficial at all

7. Give your reasons for your previous answer

Unisa Mentor Interaction

8. Did your expectations for your mentoring relationship change because of having a Unisa mentor?

Yes A little No

9. Provide reasons for your response to the previous question?

10. Rate and motivate your Unisa mentors' general engagement with you as a student?

None	<input type="checkbox"/>	<input type="text"/>
Sub-standard (<i>below your expectations</i>)	<input type="checkbox"/>	<input type="text"/>
Average (<i>meets your expectations</i>)	<input type="checkbox"/>	<input type="text"/>
Above average (<i>surpasses expectations</i>)	<input type="checkbox"/>	<input type="text"/>

11. Rate and motivate your working relationship with your Unisa mentor?

Not good	<input type="checkbox"/>	Why?	<input type="text"/>
Good	<input type="checkbox"/>	Why?	<input type="text"/>
Very good	<input type="checkbox"/>	Why?	<input type="text"/>

12. Did your mentor take the time to explain concepts to you, answer your questions or demonstrate things to you?

Yes No Only sometimes

13. Were the engagements with your Unisa mentor relevant to your required module activity outputs as a student?

Yes No Only sometimes

14. How does the Unisa provided mentorship compare to that of your other mentorship experiences and why?

Better	<input type="checkbox"/>	Why?	<input type="text"/>
Same	<input type="checkbox"/>	Why?	<input type="text"/>
Worse	<input type="checkbox"/>	Why?	<input type="text"/>

15. Did your Unisa mentor work with more than 1 student at a time?

Yes No

2018 Academic Year:

16. Did your mentor want / seek information about your studies? Yes No N/A

17. If yes was provided for the previous question, what information was requested and provided?

18. Do you think that the information provided influenced the mentoring relationship

For the better How?

No disemable change Why?

For the worse How?

19. Where do your mentors generally fit into the organisational hierachy and provide the position?

Entry level As what?

Middle management As what?

Top management As what?

Specialist in field As what?

20. Did you ever work on an NCA project with other NCA students? Yes No

21. If yes, how was the experience? Please elaborate?

22. Did any of your mentors provide you with additional resources to assist you with gaining the experience?

Yes No Some times

Unisa Provided Mentorship

23. What did you think of the additional resources provided by Unisa? Please elaborate?

24. Which would you prefer, a Unisa mentor or industry mentor and why?

under each other Unisa Mentor Industry Mentor

Appendix 14 – Opinion Poll Questions:

The student opinion poll questions were posted at the onset of the academic year and attention was drawn to the poll with the aid of announcements via the *myUnisa* student portal.

***myUnisa* NCA Student Opinion Poll**

Mentors and Mentoring

1. Do you see access to a suitable mentor an important contributing factor to succeed in your NCA modules?
2. Would you still participate in a work-integrated learning activity if you could not find a suitable mentor?
3. If you were given a choice to use a local mentor (LM) or have your subject lecturer (SL) act as your mentor, who would you choose?
4. If you had a choice between making use of a local mentor, (LM) and a podcast series (PS) produced by your subject lecturer, which would you choose?
5. Have you made additional comments about mentors on the NCA ALL 2018 Discussion Forum?

Appendix 15 – Research Permission from Telperion Nature Reserve:

Below is the permission to conduct research on the Telperion Nature Reserve



5th March 2018

Mr Graeme Wilson
Nature Conservation Application
Department of Nature Conservation

Dear Mr Wilson,

Thank you for your letter requesting permission to host two field excursions to the Telperion Nature Reserve with University of South Africa students as part of your study entitled A Study in Open Distance And e-Learning Work-Integrated Learning Mentorship Models, in the first academic semester of 2018.

You have my full permission and endorsement to conduct this training on the property.

We wish you well with this very important work.

With very best wishes

Dr Duncan MacFadyen

Manager: Research and Conservation
Oppenheimer Generations

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Appendix 16 – Informed Consent Form:

Below is the informed consent used in the study.



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CONSENT/ASSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the use of my academic submissions, in the form of my assignment as well as my questionnaire and study group responses.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print): _____

Participant Signature

Date

Researcher's Name & Surname (please print): _____

Researcher's signature

Date



University of South Africa
Nature Conservation
Department of Environmental Sciences
E-mail: ynsoga@unisa.ac.za
Mobile: +27 78 967 5648

Appendix 17 – Tutorial Letter Consent Message:

The paragraph provided below is an excerpt from the work-integrated learning modules tutorial letter 101/0/2018, Nature Conservation Application 1A NCA2603 Year Module Department of Environmental Sciences.

Ethics statement

All students who register for this module should take note that your lecturer may or may not require information from you for research purposes. The information required may be from the assignments you complete or additional activities your lecturer may asked you to take part in or comment on or the marks you achieved for your assignment or anything related to the teaching of the module you registered for. In all these instances, the information provided by you will not identify you in any way. Your identify will remain anonymous and the information you provide will also remain confidential. The lecturer will not use your information in any way that is unethical or does not abide by the Unisa Policy on Research Ethics. The lecturer will also apply to the College Ethics Research Committee for ethics clearance to do research on specific data from the module after which approval will be obtained from the Research Permission Sub-Committee of Unisa to use Unisa student data. Through this research, the lecturer will be able to improve and develop this module for future students. If you cannot consent to your lecturer using the information indicated above, please let your lecturer know via email.

Enjoy your time out in the working environment, work hard, make new friends and start building your conservation career.

Mr. Wilson

Appendix 18 – Research Information Sheet:

The information sheet was provided to each student research participant prior to them consenting to participate. All questions, answers or clarifications were covered because of engaging with this document.

PARTICIPANT INFORMATION SHEET

**A STUDY IN A WORK-INTEGRATED LEARNING MENTORSHIP MODEL
FOR OPEN AND DISTANCE AND E-LEARNING**

DEAR PROSPECTIVE PARTICIPANT

My name is Graeme Wilson, I am doing research under the supervision of Geesje van den Berg, a Professor in the Department of Curriculum and Instructional Studies towards a Master of Education, Open Distance and e-Learning at the University of South Africa. We are inviting you to participate in a study entitled; A study in a work-integrated learning mentorship model for open distance and elearning.

WHAT IS THE PURPOSE OF THE STUDY?

This study is expected to collect important information that could provide some answers with regards to the provisioning of mentorship for work-integrated learning nature conservation students and if technology could fill the mentoring gap in light of the scarcity of suitable and skilled mentors in the conservation field. The research project seeks to find out if technology could also be used as an alternative mentoring affordance to meet the undergraduate nature conservation work-integrated learning module curriculum outcomes in the absence of suitable and skilled sector mentorship.

WHY AM I BEING INVITED TO PARTICIPATE?

You are invited because you are a student who is currently enrolled with the University of South Africa and currently studying for an undergraduate Diploma in Nature Conservation. As one of your academic requirements, you are required to gain thirty (30) conservation related work-integrated learning (WIL) experiences. It is because you are a University of South Africa nature conservation student needing to gain these work-integrated learning experiences and that you have submitted an application to an announcement loaded on the University student portal, myUnisa, offering an opportunity to gain a few of these required experiences, that you were selected as a potential research participant.

I obtained your contact details from your email application submitted to me, requesting that you would like to be selected as one of the twenty (20) participants needing to gain the work-integrated learning experiences offered by the University of South Africa.

The research project is requiring a maximum of forty (40) student research participants to contribute to the research project. The group of forty participants will be sub-divided into two twenty student research participant sub-groups. Members of each of these sub-groups will still be required, as per their Nature Conservation Application module, to participate in and report on their work-integrated experiences irrespective if you participate in this University of South Africa offered opportunity or not.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves looking at your engagement with a mentor and if this engagement influences your ability to submit a report which reflects your experience and understanding of work-integrated learning concepts. To capture this information and experiences you have gained concerning mentors, I have developed a short questionnaire and evaluation form, which I will request your consent to provide the information sort. Two different mentoring methods will be provided (one method per sub group of student research participants) and as such, I expect a diverse range of responses from the student research participants, which I would like to capture and analyze using the data capturing tools.

To enrich my final dissertation, I will be taking random photos of student research participants working in the field engaging with their required academic work. The images captured and possibly selected

for use, would only be those, which individual students cannot be personally identified, i.e. students in a large landscape and at a distance.

In addition to these data capture tools, I will be informally observing all student-mentor interactions and recording my observations generally and without using identifiable or linking data.

The type of information I am seeking is your understanding of mentorship, how much importance you assign to the mentorship process and what preferences you may have with regards to mentorship. I will also request you to reflect very specifically on the mentorship provided by the University of South Africa and your opinions on its efficacy. I will show you the questionnaire in full if you require more detail.

As you have applied and been accepted for a five day work-integrated learning excursion, I would like to make use of at least three of these days to focus on the research project. During this time-period, I have set aside no more than 45 minutes for you to complete both the questionnaire and evaluation form. This time allocation is an estimation as some student research participants may take longer than others to complete the required data capture documents.

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

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

However, please understand that once you have contributed by providing me with a completed unidentifiable questionnaire and evaluation form, I would then consider your participation in the research project complete. At this point, the data collection process would also be considered complete and as such, you can no longer withdraw from the project. I have intentionally kept both the questionnaire and evaluation forms anonymous as I do not require or desire any personally identifiable information.

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

The underpinning aim of the research project is to assess mentorship provisioning within a work-integrated learning context. The outcomes of the research project are geared to providing insights into providing and supporting open and distance learning work-integrated learning students with improved mentoring experiences.

As such, the research project is aimed at improving mentorship provisioning over a period of time, and there will be no direct or immediate benefits you as a University of South Africa student will gain from participating in this research project. However, your valued contributions will inform possible future mentor improvement or expansion initiatives.

The research project falls within a very narrow field, of open and distance learning mentorship within a nature conservation work-integrated learning context. The outcomes will contribute to filling this gap in scientific literature and adding to the academic discourse in this field.

Sector located mentors, those not part of the research project, stand to gain from this research project through the revealing of information and student perceptions linked to work-integrated learning mentoring provided within the conservation sector.

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

There is no perceived inconvenience linked to this research project. The reason for this is that you would have had to complete the academic requirements regardless if you completed a questionnaire and evaluation form or not.

The fact that you are being provided with mentoring from the university also does not differ from any other form of mentoring you would have had to engage with.

As for insurance and indemnity, this is covered as part of visiting the Nature Reserve where the research project is being conducted.

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

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Or that your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

I, the researcher and my supervisor, will be the only two persons who will have access to the unidentifiable and traceable data you provide. I will transcribe all the information and the hard copies of questionnaires and evaluation forms will be scanned in digitally by myself. These digital documents will thus form the framework for the research analysis. The information will remain on my personally assigned computer and backed up to one external HDD in my possession and these will be securely stored under lock and key.

However, our answers may be reviewed by people responsible for making sure that research is done properly, including members of the Research Ethics Review Committee.

Please note that I do intend to make use of all of your anonymous data provided for other purposes, such as a research reports, journal articles and/or conference proceedings. Please be reassured that your anonymity will remain protected in any publication imbued with information you offered up as part of your voluntary involvement in this research project. Thus, individual research participants identity will not be revealed through written or image representation in any publication or report generated.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your questionnaires and evaluation forms will be stored by myself, as the primary researcher, for a period of five years in a lockable secure storeroom located within my work office on the University of South Africa Campus. The documents will only be revisited for future research or academic purposes. All electronic information will be stored on a password protected computer and backed up on a personal HDD which will be stored off site in a secure and undisclosed location. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. After a five-year period, the hard copy information will be destroyed through shredding while the electronic information will be deleted from my computer and HDD permanently with a relevant software programme.

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

You will not receive any payment or reward, financial or otherwise for volunteering to participate in this research project. Let it also be known, that through applying and being accepted to gain work-

integrated learning experiences offered by the University your travel, accommodation and food will be covered for the duration of the offered excursion. This coverage and student support however, is not limited or exclusive to the research project and is offered to all selected work-integrated learning students, for all monthly offered excursions. This coverage and student support is provided to ensure that volunteering students are not financially impacted or influenced, leaving all students free to engage and learn without any financial concerns.

HAS THE STUDY RECEIVED ETHICS APPROVAL

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

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

If you would like to be informed of the final research findings, please contact me, Mr Graeme Wilson on 011 471 2103 or email wilsoga@unisa.ac.za. The findings will be accessible for a period of two years.

Should you require any further information or want to contact the researcher about any aspect of this research project, please contact Mr Graeme Wilson, on 011 471 2103 or via wilsoga@unisa.ac.za

Should you have concerns about the way in which the research has been conducted, you are welcome to contact Professor Geesje van den Berg, on 012 429 4895 or via Vdberg@unisa.ac.za

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



Graeme Wilson

Appendix 19 – Transcribed participant data:

The data provided below is an example of one of the transcribed semi-structure interview and excursion evaluation. The semi-structure interview was converted from an Microsoft Excel document into a Microsoft Word document for the purposes of referencing it in this study.

Transcription of semi-structured Interview

Student Profile

Student	#	28
Type	(1=F2F, 2=App, 3=Sector)	1
Gender	(1=Male, 2=Female)	2
Age	(1 =<18, 2=18to20, 3=21to30, 4=31to40, 5= >40)	4
Employment	(1=Full, 2=Part, 3=Adhoc, 4=Not)	1
Other qualifications	(1=none, 2=cert/dip, 3=degree)	1
Do you have a mentor currently	(1=yes, 2=no, 3=some)	3

Student Perceptions

Define a mentor
A person who has a lot of specific experience and successful in the field

Expectations of your mentoring relationship
To answer my questions and provide information and be patient

Did the mentoring live up to your expectations (1=yes, 2=no)
1

Explain (previous question)
Busy people - who to approach and when but very beneficial after acceptance

Did the Mentor cover all concepts (1=yes, 2=no, 3=only some)?
1

Did your expectations about mentoring change because of having an eMentor?
I found the podcasts very helpful – at my own time – would have done it on my own – working full time. If apps available I would have been done a long time ago – only gives the basics but does not cut corners – very self explanatory and can relook at it – group used one App – others each had a role – eMentor is only your work - not influenced – take control- F-2-F can influence the outcome. Own time – taking time off is difficult - use it to fit my schedule.

Assignment Results

Introduction mark
80%

Introduction comments from marker

Only guidance over incorrect referencing. No theoretical linkages.

Results mark

83%

Results comments from marker

Technical issues related to table and figure labels. No theoretical linkages.

Total Assignment mark

82%

Appendix 19 continues on the page below.

Transcription of excursion evaluation

Part A

The podcasts were well prepared and suitable for activity

Strongly agree

The podcasts were easy to use and audible

Strongly agree

The podcasts addressed all the questions so that I understood

Strongly agree

The support materials provided helped me understand the subject better

Strongly agree

The podcasts made good use of examples to assist me understand

Strongly agree

There was sufficient time allocated for me to engage with the podcasts

Strongly agree

Part B

App Mentor

- I really liked that I could do it on my own time (stop / start)
- Rather than all in one go with a busy mentor
- Like the fact that it showed step for step the process
- I think the podcasts could have been longer
- Instead of 9 or 10 they could have been 3 or 4
- Really like all the additional PDF's given on the app.

Group work

- Enjoy doing the practical component within a group
- But enjoy doing the theory on my own
- This need was catered for

Placement

- Unisa to provide placement and mentors for a week
- To cover a few topic with undivided attention from a mentor.