

Management guidelines for the implementation of m-learning in an open distance learning model

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Dissertation submitted for the degree of Master of Education in Educational
Management at the Potchefstroom Campus of the North-West University

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October 2012

Acknowledgements

I would like to express my sincere gratitude to:

- My Heavenly Father for the strength and ability He provided me with to complete this study
- My wife Linda and daughter Carla for their love, support and inspiration. Without the support I received from them, none of this would be possible
- Dr. Herman J van Vuuren for his highly skilled supervision, patience, advice, positive attitude and many sacrifices.
- Prof Manie Spamer, for his support and expert advice in this study. This study was initiated by him. Everything I have learned about distance education in the past years is thanks to him
- Management and colleagues of the UODL for their support
- Me Hettie Sieberhagen for the language editing of this document
- Me L Potgieter and me E Theron for their assistance with the technical editing
- Mr J Pienaar for his assistance in the technical editing of the bibliography
- Dr Suria Ellis from Statistical Consultation services for guidance and analysis of the data used for this study
- Centre co-ordinators assisting in the distribution of questionnaires sent to tuition centres
- All respondents willing to share their experience, knowledge and viewpoints in this study

Abstract

Various modern communication technologies are available to higher education institutions involved in distance education to explore and implement for the effective provision of distance education programmes. The purpose of this study was to investigate the role of m-learning as part of distance education and to develop guidelines for the management of m-learning in an open distance learning model. The aims of this study are thus to determine the role of m-learning in open distance education, identifying challenges to implement m-learning as part of an open distance learning model and finally to develop generic management guidelines to implement m-learning as part of open distance education.

Quantitative research was undertaken using a survey questionnaire to acquire data for this research. The study population included students enrolled for distance education programmes at the NWU and accredited facilitators/lecturers employed by the NWU at tuition centres throughout SA facilitating distance education programmes. A total of 350 questionnaires (100 facilitators/lecturers questionnaire and 250 questionnaires for students) was sent out to all tuition centres to collect data for this research. Two different questionnaires were developed to suit the needs of each group. A total of 80.5% of completed questionnaires was returned.

The literature study of this research included concept clarifications of distance education and m-learning. The need for effective management and organizational structures for the delivery of distance education programmes utilising m-learning were investigated to gain an understanding of the complexities associated with an open distance education modus. The information from the literature study and the empirical section of this research contributed to the development of generic guidelines to implement m-learning as part of an open distance education modus.

In addition, aspects having an influence on the effective delivery of distance education programmes, were part of the questionnaires sent to respondents. These aspects included accessibility to resources utilising mobile devices, flexibility of programme delivery, affordability of programmes, interactivity between all role players in distance education and aspects that could influence anywhere and anytime learning. Furthermore, the different modes of delivering distance education programmes were explained. Challenges and barriers possibly having an influence in the delivery of distance education programmes through m-learning were included in the questionnaires sent out to respondents. Advantages

and disadvantages as well as the needs regarding the use of cell phones in the delivery of programmes were identified in order to understand the role of m-learning and identifying relevant management guidelines for the implementation of m-learning.

Evidently, a response from the questionnaires was that the quality of teaching and learning according to the perceptions of m-learning amongst both groups were of more importance to students than with facilitators/lecturers. Students expressed a need to receive more academic information on their mobile devices and the majority of students and facilitators/lecturers indicated that they prefer receiving information regarding their studies through m-learning. Accessibility, affordability, interactivity and flexibility in delivering distance education programmes were aspects of importance to both groups of respondents. Administrative and academic support and the need thereof in delivering programmes through m-learning were evident in the research. Affordability in accessing information via mobile technologies is a concern for both groups of respondents. The training of all role players regarding the skills of downloading information about teaching and learning on their cell phones is a need for both groups. Once this training need for the utilisation of m-learning is addressed, more students and facilitators/lecturers may use this user-friendly technology to communicate with one another and with institutions. M-learning could fulfil an invaluable role in the communication process of distance education and may be of great assistance to overcome needs, barriers and challenges.

Keywords

Education

Distance education

M-learning

Affordability

Accessibility

Interactivity

Flexibility

Communication

Management

Opsomming

Verskeie moderne kommunikasietegnologieë bestaan vandag wat tot die beskikking is van hoër onderwysinstellings wat ondersoek verg vir moontlike benutting in afstandsonderrig-programme. Die doel van hierdie studie is die ontwikkeling van algemene bestuursriglyne vir die implementering van mobile-leer (m-leer) as deel van die aanbod van afstandsonderrig. Die doelwitte van die studie is onder andere die bepaling van die rol van m-leer in 'n oop afstandslersisteem, die uitdagings verbonde aan die implementering van m-leer in oop afstandsonderrig en die ontwikkeling van generiese bestuursriglyne vir die implementering van m-leer in oop afstandslers.

'n Kwantitatiewe navorsingsbenadering is vir hierdie navorsingstudie benut en daar is gebruik gemaak van 'n opname (*survey*) vraelys om data vir hierdie studie in te samel. Studente, geakkrediteerde fasiliteerders by die verskillende studiesentrums en dosente van die Noordwes-Universiteit (NWU) is ingesluit in die studiepopulasie. Vraelyste is versprei na al die studiesentrums in Suid-Afrika wat al nege provinsies ingesluit het. 'n Totaal van 350 vraelyste is aan respondente gestuur (100 fasiliteerders/dosente en 250 studente). Verskillende vraelyste is ontwikkel vir elke groep met enkele aspekte wat oorvleuel het. 'n Ontvangskoers van 80.5% vir voltooide vraelyste is terugontvang vir verwerking van data.

Die konsepte en verwante sake van afstandsonderrig en m-leer het veral aandag in die vraelyste geniet. Ten einde kwaliteit programme in 'n modus van afstandsonderrig te verseker, is generiese bestuursriglyne ontwikkel vir die implementering van m-leer as 'n integrale deel van afstandsonderrig.

Verdere aspekte wat 'n invloed het op die effektiewe voorsiening van afstandsonderrig-programme is ondersoek en geïntegreer in die vraelyste van hierdie studie. Toeganklikheid tot hulpbronne deur middel van mobiele tegnologie, buigsaamheid ten opsigte van die lewering van programme, bekostigbaarheid van programme asook interaksie tussen die onderskeie rolspelers vir leer om op enige tyd en plek plaas te vind, het aandag geniet in die navorsingstudie. Die verskillende metodes vir die aflewering van afstandsonderrigprogramme is beskryf terwyl spesifieke uitdagings en hindernisse geïdentifiseer is wat die effektiewe voorsiening van afstandsprogramme kan beïnvloed. Die voordele en nadele van m-leer is verdere aspekte wat aangespreek is wat, in samehang met die vorige aspekte, 'n invloed kon hê op die bestuursriglyne wat geformuleer moet word vir die implementering van m-leer.

Wat duidelik blyk vanuit die response wat ontvang is van beide groepe van die navorsingstudie is dat die kwaliteit van onderrig en leer wat deur m-leer in afstandsonderrig

ondersteun word, van meer belang was by studente as by die fasiliteerders en dosente. Die aanduiding is dat die behoefte by studente bestaan om meer akademiese inligting te ontvang deur middel van mobiele tegnologie en dat die meerderheid studente saam met fasiliteerders en dosente verkies om gepaste en tersaaklike inligting aangaande akademiese betrokkenheid op genoemde manier te ontvang. Toeganklikheid, bekostigbaarheid, interaktiwiteit en buigsaamheid van afstandsonderrigprogramme is geïdentifiseer as belangrike aspekte by beide groepe van respondente. Verdere aspekte ter ondersteuning van effektiewe onderrig en leer in afstandsonderrigprogramme is akademiese en administratiewe ondersteuning wat as 'n behoefte wat deur die rolspelers geïdentifiseer is. 'n Bekommernis vanaf beide groepe repondente is die bekostigbaarheid van die aflaai van inligting deur middel van mobiele tegnologie. Beide groepe respondente het aangedui dat m-leer 'n addisionele sowel as alternatiewe wyse van kommunikasie bied in 'n modus van afstandsonderrig. 'n Behoefte wat aangeteken is, is dat toepaslike opleiding benodig word in die vaardighede wat individue in staat sal stel om data en inligting te bekom deur gebruik te maak van mobiele tegnologie. Deur individue te bemagtig met gemelde vaardighede sal hulle in staat gestel word om meer van hierdie tegnologieë gebruik te maak vir kommunikasie tussen alle rolspelers. Verbetering van kommunikasie is 'n belangrike oogmerk waarna gestreef word in die aflewering van afstandsonderrigprogramme. M-leer kan in hierdie eis voldoen indien alle uitdagings, hindernisse aangespreek en oorkom word.

Sleutelwoorde

Onderwys

Afstandsonderrig

M-leer

Bekostigbaarheid

Toeganklikheid

Interaktiwiteit

Buigsaamheid

Kommunikasie

Bestuur

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Opsomming

Solemn declaration of authorship

Certificate of proofreading and editing

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- Addendum B: Permission letter to facilitators, lecturers and students
- Addendum C: Information letter to centres regarding questionnaires
- Addendum D: Questionnaire (facilitators/lecturers)
- Addendum E: Questionnaires (students)

Addenda available at back of dissertation on CD-ROM.

List of Acronyms

CAPA	Computer-Assisted Personalised Approach
CoP	Communities of Practice
DE	Distance Education
DVD	Digital Video Disk
F	Frequency
HEIs	Higher Education Institutions
ICT	Information and Communication Technology
LLC	Limited Liability Company
Miic	Mean inter-item correlation
M-learning	Mobile-learning
NR	No Results
NWU	North-West University
ODL	Open Distance Learning
ODLM	Open Distance Learning Model
OU	Open University
PCs	Personal Computers
PDA	Personal Digital Assistant
PDA's	Personal Digital Assistants
SCS	Statistical Consultation Service
SCTE	School of Continuing Teacher Education
SNS	School Network Sites
SNS	School Network Systems
UK	United Kingdom
UKOU	United Kingdom Open University
UNISA	University of South Africa
UP	University of Pretoria
USA	United States of America
WAP	Wireless Application Protocol

Chapter One

Orientation

1.1 Introduction and problem statement

The management of institutions offering open distance learning (ODL) programmes relies on the most effective technologies and methodologies so as to enable students to study at a convenient time and place according to their individual needs and situations (Chang, 2002, p. 106; Silverman, 2001, p. 30). The non-residential location of students enrolled in ODL programmes is not considered as a barrier because the availability of mobile technologies, amongst other aspects, augments the distribution of much-needed programme information, irrespective of time and place. Fortino and Wolf (2007, p. 30) state in this regard that ODL programmes have fewer time and location restraints than conventional residential programmes. The timely and speedy dissemination of management and programme information, as part of a two-way communication process between students and the distance education institution is regarded as a crucial success determinant for the offering of effective distance education programmes (Gordon & Lawton, 2003, p. 75). The optimum utilisation of mobile technologies can add significant value with regard to timely and speedy communication. Because of the rapid development of mobile technologies, there is a need to explore appropriate applications to improve the delivery of ODL programmes.

An essential requirement for the management of distance education institutions is to communicate on a regular basis with all role players like students, tutors, facilitators, lecturers, administrators and support staff to manage a complex flow of programme and management information to avoid misunderstanding. The offering of ODL programmes in the modern era requires the use of contemporary methodologies like mobile learning (m-learning) which forms an integral part, not merely of the teaching and learning process, but also of the management of ODL programmes. Modern technologies are more relevant than ever in the higher education sector, as technology enables the management of higher education institutions to make further education accessible to an increasing part of the population who would otherwise not be in a position to gain access to higher education (Colazzo, Molinari, Ronchetti, & Trifonova, 2010, p. 3).

The rapid development of information and communication technologies (ICTs) and related applications in the field of education has been phenomenal in the past couple of decades, and these developments force higher education institutions (HEIs) to be creative and to explore further means and possibilities to reach ODL target groups (Ozdemir & Abrevaya, 2007, p. 1). Education managers and practitioners of

ODL institutions are challenged with a plethora of technologies to means of which manage and support the teaching and learning process in a complex distance education system. The increasing availability and ongoing advances of technologies in particular pose challenges for the management of institutions to ensure effective provision of quality academic and professional programmes. Institutions are increasingly searching for more adaptable ways and means to improve the delivery of academic programmes in a cost effective manner. The shift from traditional modes of programme delivery to more modernized instruction approaches requires specialised competencies and technologies to meet an increasing need to train and re-train stakeholders on a continuing basis (Howel, Saba, Lindsay, & Williams, 2004, p. 36).

The mentioned implications are especially of significance in the case of an open distance learning model (ODLM) which requires research based information and guidelines for the implementation of these competencies and methodologies.

Distance education as a specialised mode of delivery for higher education programmes is designed and managed to address the idiosyncratic needs of distance education students. A particular challenge in this regard is that the management of distance education institutions needs sound, reliable and situation-specific information about the application of modern technologies and methodologies like mobile learning (m-learning) for the optimal offering of a variety of distance education programmes across South Africa. This research addresses this particular need and contextualises the research problem from literature, substantiates the rationale for the research topic, describes the research process, provides an extensive and detailed data analysis and finally concludes with the formulation of management guidelines and recommendations.

The research problem is stated as a need by the management of a distance education institution in higher education for situation-specific information and guidelines to implement m-learning as part of an open distance learning model to ensure effective communication between all role players.

1.2 Literature overview

The literature overview commences with a clarifying paragraph about the concept of distance education to warrant a common understanding of terminology used in this research. The offering of academic and professional programmes by means of an open distance learning model is described, and is followed by an explanation of the concept of m-learning. The literature overview is concluded with a rationale for this research.

1.2.1 Distance education

It is logical to elucidate in the first place the concept of distance education (DE). An obvious feature and common understanding of distance education from some concept descriptions is the provision of further education and training to people far removed from residential campuses. In this regard, Keegan (1990, p. 6) views distance education as a specific form of teaching and learning which is not under constant supervision and is regarded as a form of complete programme delivery outside the conventional mode of programme offering. Sherron and Boettcher (1997, p. 1) as well as Burgess and Russel (2003, p. 291) consider distance education as the transmission of education or self-instructional programmes to geographically dispersed individuals or groups of students. Distance education is further viewed as learning programmes offered to any group of students outside the conventional mode of campus-bound education. Distance education is also seen as a practical form of education that encompasses interactive programme delivery in which the lecturer and student are separated by distance and time (Yacci, 2000, p. 1). Özad and Barkan (2004, p. 2) are of the opinion that distance education is based on a pre-produced course that is self-instructional, implying that the distance education student is enabled to master the subject matter to a greater extent by him/herself.

Based on the perspectives stated above, it can be concluded that distance education encompasses a specialised and interactive mode of instructional education executed independently by geographically dispersed students who are separated by distance and time from the education institution. The descriptive adjective of 'open' indicates to an access or admission system, which is not limited to a fixed academic cycle. In an open distance learning model, the student can gain access to the institution at anytime in the course of the year. It is thus evident that effective interaction and communication between the institution as provider of learning programmes and the student is of paramount importance for the management of distance education institutions.

1.2.2 Programme provision in distance education

Tertiary institutions make use of distance education as a specialised mode of delivery to offer a variety of academic and professional programmes that are accessible to prospective students outside the conventional mode of campus-bound education. The learning programmes for distance education are developed by higher education institutions, accredited by relevant education authorities and are in accordance with the educational needs of society at large. The unique nature of distance education makes it possible to present a variety of specialised learning programmes at higher education institutions. The favourable cost aspect and related economy of scale, due to a larger number of students that can be accommodated by means of distance education, enable more students to enrol for distance education programmes (Sharma, 2005, p. 228). Kumar *et al.* (2008, p. 17) and Handa *et al.* (2009, pp. 512-513) state in this regard that, over time, distance education has contributed significantly

to the provision of further education to the underprivileged who could not afford more costly modes of formal education. One of the advantages of distance education is the opportunity to access the formal education system in order to become more literate, economically independent and professionally developed (Handa *et al.*, 2009, p. 512). The implication is that the management of distance education institutions has to be innovative to capitalise on the application possibilities of new technologies in order to ensure quality programme delivery to all students, irrespective of place or time. This research will specifically focus on the implementation of m-learning as part of an open distance education model.

Various means for the delivery of distance education programmes exist world-wide and challenges vary extensively between developed and developing nations of the world. Technological advances associated with developed countries serve as supplemental resources to support the delivering of quality distance education programmes. As an example, distance education programmes in Japan are conveyed through sophisticated satellite broadcasting media while the delivery of distance education programmes is done through extensive Internet usage in the USA (Baggaley, 2008, p. 40). Compared to the rest of the Western World, Africa lags substantially behind in computer application and Internet availability while a vast digital divide exists between the "haves" and the "have-nots" (Ford, 2007, p. 302). The total population having access to Internet and computers for Ghana and Egypt in 2000 was respectively 0,2% and 0,7% (Ford, 2007, pp. 304,311). The inaccessibility on the African continent with regard to the Internet and computers gives rise to other mediums of communication that are appropriate for related circumstances. Mobile technologies are alternative means of communication because of application features like availability, accessibility and low cost. Largely, the technological development in the communication sector determines the application for delivering distance education programmes in innovative ways to geographically dispersed students. The use of mobile technology and specifically mobile phones has increased in Africa more rapidly than any other form of communication technology (Shrum *et al.*, 2010, p. 2). Cellular phones in particular are used on an increasing scale to provide distance education programmes in developing countries such as Africa and the Philippines (Baggaley, 2008, p. 41). It is accepted that the utilisation of technological applications not only ensures easier access to distance education programmes, but they also serve as a valuable resource for the effective management of distance education programmes (Baggaley, 2008, p. 41).

Guidance and support from the management of a distance education institution to the various stakeholders (students, tutors, facilitators, lecturers and support staff) have to be timely, relevant, appropriate and contextualised in support of self-instructed teaching and learning (Granger & Benke, 1998, p. 8). Support from the institution comes, for example, in the form of innovations because of the development of various information and communication technologies (ICTs). However, to effectively manage the delivery of DE programmes at an institution, proven guidelines and information are required for the successful implementation of appropriate technologies and methodologies like m-learning. This aspect of the research is addressed in Chapter Five of this research report.

1.2.3 Mobile-learning (m-learning)

Developments in the field of mobile technology also increase the possibilities for application in the delivering of distance education programmes. The term *mobile* is viewed as to move or to be moved easily between occupations, places of residence and social classes (Oxford English Dictionary, 2008, p. 917). In this sense, mobile-learning (m-learning) signifies that learning is likewise not confined to a static or fixed place, but is applicable to any location and anytime. Distance education information and learning matter can thus be accessed anywhere and at anytime where mobile communication technology is available (Parsons & Ryu, 2006, pp. 1-6).

M-learning includes the use of numerous types of mobile devices in the teaching and learning process with practical application value for the management and support of distance education programmes. These mobile technologies include *inter alia* mobile and portable devices such as cellular phones, personal digital assistants (PDAs), smart phones, tablet personal computers (PCs) and digital readers (Brown, 2003, p. 4; Colazzo *et al.*, 2010, p. 1). M-learning is not to be confused with electronic leaning (e-learning). M-learning is viewed as a subset of e-learning, indicating that m-learning allows programme information and material to be portable (movable, transferable) and thereby enables students to engage in anywhere-anyplace-learning or just-in-time-learning (Brown, 2003, p. 4; Motiwalla, 2007, p. 581). Colazzo *et al.* (2010, p. 1) describe m-learning specifically as the transmission of managerial, teaching and learning as well as any other related information to overcome certain challenges and barriers by making use of mobile technology. This research with regard to m-learning links to the theoretical viewpoints of (Brown, 2003; Colazzo *et al.*, 2010, p. 1).

In summary it can be stated that m-learning, as the descriptive prefix implies, entails that the process of teaching and learning and the management of this process can be supported by mobile technologies. There is however a need for practical guidelines and information to implement m-learning as part of a complex distance education management structure to avoid a costly trail-and-error approach.

Mobile devices supplement existing technologies and are flexible communication tools that allow learning possibilities to be extended beyond formal lecture rooms. Application of mobile technologies is possible in homes, remote areas and anywhere else where the student can be at a particular time (Motiwalla, 2007, p. 583). Interaction between role players in a distance education of delivery is enhanced in innovative ways by means of m-learning technology application (Liaw, Hatala, & Huang, 2010, p. 447). Mobile devices present prospect stakeholders with the prospect to send and receive programme information irrespective of location and/or time. The unlimited prospect of information-sharing enables institutional management, lecturers and students to interact without obstacles related to place and time where wireless connection is available (Motiwalla, 2007, p. 585). Beldarrain (2006, p.

143) states unequivocally that these emerging technologies have a profound impact on approaches of management, teaching and learning of distance education institutions that call for further investigation.

The further development of distance education programmes has to account for m-learning in future to permit mutual interaction between institutions (service providers) and students (clients). The utilisation of m-learning in higher education is a technologically specialised endeavour that necessitates implementation and integration according to proven and well-researched practices and guidelines.

Some advantages of m-learning are that it supports individualistic learning, promotes interactive activities, encourages collaborative learning and saves time (Liaw *et al.*, 2010, p. 450; Sharples, Taylor, & Vavoula, 2005, p. 4). Management, lecturers and students are able to interact anywhere and at anytime by means of mobile technologies to obtain relevant programme information and subject matter essential for effective programme delivery. M-learning is regarded in this sense as an essential tool for effective communication between management and all stakeholders (Seppälä & Alamäki, 2003, p. 330). The effective utilisation of mobile devices for managerial, administrative and academic purposes by the institutional management of open distance learning programmes will not only boost access to higher education for those who are excluded because of site-bound considerations, but will also improve competence in technology application. Improved access to and the use of mobile technologies are possible since considerable investments have been made in telecommunications and management information systems (Potashnik & Capper, 1998, p. 42). It can thus be inferred that the implementation of m-learning in a distance education mode requires clear guidelines for the management of distance education institutions to avoid an untested attempt that may harm academic access and progress of students. The Concise Oxford English Dictionary (COED) (2008, p. 622) defines management as the procedure or practice of managing people, resources and/or processes. Van der Westhuizen (2009, p. 45) regards the key management components to be planning, organising, leading and controlling. The key components of the management guidelines to be developed by the researcher will outline the basis of the management guidelines to be developed in this research.

1.2.4 Rationale

The utilisation of the potentialities of m-learning for management guidelines is becoming increasingly important as technological developments, application possibilities and policy issues necessitate directives for the successful implementation and use of m-learning in ODL programmes. A survey during 2003 in Finland indicates that more than 98% of university students own mobile devices (Markett, Sánchez, Tangney, & Weber, 2006, p. 282; Seppälä & Alamäki, 2003, p. 331). A local finding equivalent to the mentioned situation in Finland by the unit for distance education at the University of Pretoria (UP) indicates that 97% of students enrolled in distance education programmes have access to an entry level cell phone, while 0.8% of 9 200 of the students used in this survey had access to the

Internet (Viljoen, Du Preez, & Cook, 2005, p. 116). Mobile phone users in SA have increased from fewer than 5 000 000 in 1999 to 41 600 000 users in 2007 while less than 1% of the total African population have access to broadband Internet (Du Toit, 2011; Lewis, 2008). Van Zyl (2011) found that 80,37% of students did not have access to computers and the Internet while 90,69% of students were in possession of a cell phone. Fresen and Hendrikz (2009, p. 11) indicate that 1-2% of all students have access to the Internet while 99% of students own a cell phone. These statistics show that mobile technology is to a great extent accessible for students and this situation opens up the possibilities to explore the potential and implementation of m-learning in an open distance learning model. The remarkable increase in the accessibility of mobile technology adds a new dimension to the management, teaching, learning and support in a distance education mode of higher education provision that needs to be researched to avoid any unproven and costly practices.

New technologies are often implemented on a trial-and-error basis, without well-researched information for the management of distance education programmes (Özad & Barkan, 2004, p. 2). It is accepted that students are eager to use new technologies in their personal lives and a logical postulation is that students also have individualistic experiences and expectations with regard to the use of new technologies in the learning process (Özad & Barkan, 2004, p. 2). It is thus imperative for the management of distance education institutions to base managerial practices and education provision processes on proven and researched-based guidelines and information.

Poor or no planning at all is viewed as an indication of being a waste of money and time concerning the quality delivery of distance education programmes, hence the need for investigating the application potential of m-learning (Rovai & Downey, 2009, p. 2). In this sense, a need was expressed by the management of the School of Continuing Teacher Education (SCTE) at the North-West University (NWU) for research based guidelines and information concerning the implementation of m-learning as an integral part of the ODL programmes offered at this institution.

1.3. Research questions and aims

The following research questions were formulated as a coherent framework to demarcate the research problem (par. 1.2) in more precise and practical elements of investigation (Punch, 2009, p. 64; Thietart, 2007, p. 31).

- What is the role of m-learning in open distance education?
- What are the challenges in the implementation process of m-learning as part of open distance education?
- How do you manage m-learning as part of open distance education in a distance education institution?

The formulation of research questions enabled the researcher to state the following research aims:

- to describe the role of m-learning in open distance education
- to empirically determine the challenges in the implementation process of m-learning as part of open distance education and
- to identify and formulate management guidelines for the implementation of m-learning in a distance education institution.

1.4 Anticipated problems

The only challenge of significance to this research was in relation to the data collection process, to ensure a high return rate of completed questionnaires. The researcher is however experienced with regard to this particular aspect, having on numerous occasions had to distribute research instruments at the various tuition centres of a particular distance education institution. This aspect is described more in detail in the section of this research report that deals with the strengths and limitations of the research (par. 5.7).

1.5 Research design and methodology

The research design as an overall plan (Punch, 2009, p. 211) for this study is based on a literature study and an empirical investigation with a quantitative research design. Empirical research is useful to investigate and to make sense of phenomena of which little or nothing is known (Thietart, 2007, p. 60).

1.5.1 Literature study

The literature study for this research is regarded as a systematic, explicit and reproducible process for identifying, evaluating and synthesising the existing body of recorded work created by researchers and practitioners (Punch, 2009, p. 95). A comprehensive literature study of relevant primary and secondary sources was undertaken to describe the conceptual framework for implementing m-learning as part of an open distance education model. The following databases were explored: NEXUS, ERIC,

EBSCOhost, JSTOR, ScienceDirect Google Scholar and the Internet, and related education and management indexes were searched for research-related information. Keywords and phrases that were used for database searches were: *distance education, m-learning, mobile technology, information and communication technology (ICT) and higher education*.

1.5.2 Research design and methodology

The research design and methodology for the research is described in this section.

1.5.2.1 Research paradigm

Yates (2004, pp. 15-35) presents the following claims for quality educational research:

- Educational research is measured by its contribution to learning.
- Educational research must make sense to be usable by education practitioners.
- Educational research must be scientifically-based research.

This research was conducted with the above frame of mind. The research paradigm adopted for this research is mainly situated within the post-positivism paradigm, because of a certain awareness and acknowledgement of subjectivity. The post-positivistic paradigm is regarded as a useful paradigm for researchers who maintain an interest of positivism like quantification, yet wish to incorporate interpretive concerns of subjectivity (Maree, 2009, p. 65). In order to report on the experiences of respondents, selected open-ended qualitative questions were integrated in the quantitative research design.

1.5.2.2 Design and methodology

A quantitative approach in the form of a survey was selected as an appropriate research design and methodology to obtain relevant and valid data for achieving the aims of this research. The empirical survey aims to provide insight into a sample of a larger population (Fraenkel & Wallen, 2008, p. 15; Mouton, 2001, p. 52). The rationale for selecting a quantitative research design and survey methodology for this research is that the data collected by means of structured questionnaires enabled the researcher to determine the practices and challenges of the study population in order to implement m-learning as part of an open distance education model (research aim 2). The analysis of the data and the theoretical contributions from the literature study enabled the researcher to identify and formulate management guidelines for the implementation of m-learning as part of an open distance education institution (research aim 3 & par. 5.4).

A quantitative research approach was appropriate for this research, because this design answers questions about particular occurrences, relationships and influences among measurable or comparable variables for the purpose of explaining, predicting, and understanding phenomena (Leedy & Ormrod, 2005, p. 95). Related statistical analysis procedures were applied and the results are presented in an analytical discussion according to the research problem and aims (AERA, 2006).

1.5.2.3 Population and sampling procedures

The purpose for the selection of the study population was in close relation with the problem statement (par. 1.2) to formulate specific management guidelines and information for the implementation of m-learning as part of an open distance learning model (par. 5.4). The study population for this research consisted of three groups of which a brief description follows.

- *The North-West University (NWU) School for Continuing Teachers Education (SCTE) study centre coordinators and e-learning manager as mid-level manager*

The NWU School for Continuing Teacher Education (SCTE) manages 24 study or tuition centres across the whole of South Africa. For each study centre, a coordinator is appointed to manage the offering of programmes at a particular study centre. The NWU SCTE also appointed an expert e-learning manager for the management of e-learning activities in the school. The job descriptions, expertise and experiences of these coordinators and e-learning manager justified their selection for inclusion in this research. The study centre coordinators of each of the 24 study centres were included as respondents (24 respondents) and also the e-learning manager at the NWU SCTE (1 respondent).

- *The lecturers and facilitators*

The NWU SCTE distance education programmes are presented by lecturers and facilitators during scheduled contact sessions at the mentioned study centres. These academics are directly involved in programme delivery and were accordingly selected as respondents in this research. There are 10 to 15 facilitators per study centre and a random sampling method based on personnel numbers was used to select two facilitators per study centre (48 respondents). There are 30 lecturers at the NWU SCTE and all of these lecturers were included in this research (30 respondents). This group of distance education academics thus constituted 78 respondents in the research.

- *The students*

The students are the 'clients' of higher education institutions (HEIs) and are in the best position '*at grassroots level*' to respond about practices, experiences and expectations in order to provide the management of HEIs with relevant feedback and information so as to ensure effective communication and quality programme delivery in distance education. A random sampling technique based on university (student) numbers was used to select 10 students per study centre (240 respondents).

The study population for this research is presented in the following outline:

NWU SCTE study centre coordinators.....	24
NWU SCTE e-learning manager	1
NWU SCTE lecturers	30
NWU SCTE facilitators	48
NWU SCTE students	<u>240</u>
Total number of respondents	343

1.5.2.4 Unit of analysis

The research problem (par. 1.2) focused on the gathering of data relevant for the management at a higher education institution in relation to the implementation of m-learning as part of an open distance education provision process. The research thus concentrated on determining current practices and identifying situation-specific challenges, experiences and expectations in relation to the implementation of m-learning as part of an open distance education model. The contextual circumstances of students with regard to socio-economic and geographical aspects inevitably formed part of this research.

1.5.2.5 Measuring instrument

A structured quantitative questionnaire was developed in accordance with the theoretical framework of this research. The NWU Statistical Consultation Service recommended that the researcher consult with the managers of the three main distance education institutions in the South African higher education sector (UP, UNISA & NWU SCTE) to ensure the comprehensiveness and appropriateness of the questionnaire (par 5.2.7.2). These managers were in the best position to provide trustworthy information about managerial issues concerning m-learning applications in distance education programmes. Existing questionnaires relevant to the implementation of m-learning as part of an open distance education model were also considered for inclusion. In this regard, some relevant and appropriate questionnaires (Brown, 2003; Stroehlein, 2010; Viljoen *et al.*, 2005) were deemed

applicable since they reflect current tendencies and challenges regarding matters related to m-learning. The question items concerning the implementation of m-learning in open distance education were also, amongst other sources, based on the research of Kimball (2001), Brown (2003), Seppälä and Alamäki (2003), Georgiev *et al.* (2004), Viljoen *et al.* (2005), Beldarrain (2006), Motiwalla (2007), Fresen and Hendrikz (2009), Colazzo *et al.* (2010), Liaw *et al.* (2010) and Du Toit (2011). The questionnaire made use of a Likert type scale consisting of a four point rating scale to include either low or high response values. The Likert scale is regarded as useful for this research, because the data were gathered in a quantitative way by means of a research survey to determine the occurrence and relations of practices, challenges, experiences and expectations on a continuum (Leedy & Ormrod, 2005, p. 185).

The questionnaire consisted of mainly four sections:

- Biographical information
- Conceptual matters of open distance education and m-learning
- Accessibility and current practices in relation to m-technology
- Views, challenges, experiences and expectations with regard to m-learning as part of an open distance education model

The questionnaires were, to a certain extent, similar for the different groups of respondents. With regard to certain sections, the questionnaires differentiated where required and/or deemed necessary in order to accommodate the idiosyncratic nature of the groups.

1.5.2.6 Data analysis

The statistical analysis involved descriptive statistics in graphical and numerical ways to present and analyse the gathered data. Two-way frequency tables or cross tabulations were used to explore particular response patterns of different subgroups (Maree, p. 185; Steyn, Smit, Du Toit, & Strasheim, 2004, p. 72). Central tendency measures (e.g. the mean) were applied to describe the distribution of responses and distinctive values. The spread of the distribution (e.g. the standard deviation) was described by numerical variances to indicate the extent to which data measures tend to cluster together or are spread over the range of values (Maree, 2009, p. 188). The purpose of the descriptive statistical techniques used in this research is to organise, present and analyse the captured data meaningfully in order to understand the characteristics, patterns and relationship between the various variables of the investigation.

A multi-stage analysis applies to this research. The initial stage ensures the reliability of subscales and/or constructs by calculating the Cronbach alpha coefficient (α), while the construct validity was

assured by performing an exploratory factor analysis (principal axis analysis). The data analysis was done in collaboration with the Statistical Consultation Services of the North-West University, Potchefstroom Campus.

1.5.2.7 Reliability and validity

- **Reliability**

The reliability of measurement is the extent to which the measurement yields consistent results when the characteristics being measured have not changed (Ellis, 2009, p. 13; Leedy & Ormrod, 2005, p. 93). A sound theoretical framework based on the literature study formed the basis and first line of reliability from which the questionnaires were developed. All study centres of the NWU SCTE were included in this research. Secondly, the questionnaires were completed by a group of six similar respondents to ensure that the formulation and outline of the question items are feasible, understandable and reasonable to yield reliable responses. The initial questionnaire included sections where respondents could provide recommendations for improving the reliability and validity of the questionnaires.

- **Validity**

The validity of this research is situated in the accurate, meaningfulness and credibility of the entire research process to allow the researcher to draw meaningful and defensible conclusions from the captured data (Leedy & Ormrod, 2005, p. 97). The face validity for this research was secured by means of a pilot test to verify the different questionnaire items. The content validity was obtained from a sound theoretical framework based on the literature study and the mentioned consultations with the three managers of the open distance education institutions (par. 5.2.5). The construct validity was established by means of factor analysis (Punch, 2009, pp. 246,247) (par 3.5.4).

1.5.2.8 Ethical aspects

The researcher abided by the general and NWU's ethical requirements before the research was undertaken. The rights, privacy and anonymity of all respondents were taken into consideration and respected. Respondents were informed about the nature of the research and informed consent was obtained from all respondents. Permission for this research was obtained from the Director of the NWU SCTE, Potchefstroom Campus. Caution was exercised that no respondent experienced any unnecessary stress or embarrassment during the research. Respondents were informed that this research was voluntary and they had the right to withdraw at any stage from the research without being obliged to provide reasons for withdrawal. All findings were reported in an honest and clear manner and no information was withheld that could have an influence on the results.

1.5.2.9 Data collection procedures

The NWU SCTE has direct access to the study centre coordinators, lecturers and facilitators. Questionnaires to the lecturers were distributed and collected by the researcher because of direct accessibility. Questionnaires to the study centre coordinators were sent by couriers and the coordinators distributed the questionnaires to the relevant facilitators and students as indicated in par. 1.5.2.3. A cover letter accompanied each questionnaire, explaining the nature of the research, instructions and related ethical matters. Dates for the return of the questionnaires and for follow-up actions were set to maximise the return rate of completed questionnaires according to a set time scale.

1.6 Contribution of this research

The aims of this research focused on the identification and formulation of management guidelines and information to successfully implement m-learning as part of an open distance education model to ensure an effective communication process. The findings and recommendations may also contribute to the practices of other institutions to implement m-learning as part of their distance education programmes. Ultimately, this research could contribute significantly to the existing body of knowledge about implementing information and communication technologies (ICTs) as part of open distance education programmes in higher education.

1.7 Research focus

The subject of the research focus is viewed as appropriate and corresponds with the research entity of the Research Focus Area of the Faculty of Education Sciences being *Teaching-Learning Organisations*. The research topic is also appropriate within the NWU research niche area: *Educational technology for effective teaching and learning*.

1.8 Chapter division

The research was structurally and thematically divided into the following chapters that constitute the entire research report:

- Chapter One: Orientation
- Chapter Two: The role of m-learning in distance education
- Chapter Three: Research design and methodology
- Chapter Four: Data analysis and findings
- Chapter Five: Summary, findings and recommendations

Chapter Two

The role of mobile-learning in distance education

2.1 Introduction

This chapter represents the literature study and theoretical basis for the research that culminates in a simplified theoretical framework and deals with focused-related themes and topics about the role and nature of mobile-learning (m-learning) in distance education. It is regarded as essential for this research and in accordance with the logic of the research process to establish a sound theoretical underpinning to substantiate and conceptualise the research theme and accompanied empirical results and findings. Therefore, this chapter commences with an extensive section on relevant concept clarifications and describe related themes such as challenges, trends, myths, a brief history of distance education, modes of distance education, advantages and disadvantages. The various themes are then described in relation to specific aspects of distance education, which are the importance of communication in distance education, mobile technology, accessibility, affordability, flexibility, mobility and management obligations. The chapter concluded with a synthesis in which the interrelations are described and depicted in a diagram, which is adopted as a theoretical framework for this research.

2.2 Concept clarification

The literature on distance education reveals many definitional descriptions with various emphases and interpretations. A clear understanding of distance education as one of the main concepts of the study as well as those of m-learning, open distance learning and other related concepts is important to serve as a common point of departure and conceptual basis for this study. This section will commence with concept clarifications of distance education, m-learning and open distance learning as key concepts of this research.

2.2.1 Distance education

Many authors have defined the concept. A definition as concept description is viewed as an act to outline or to describe the meaning of a concept as a formal statement representing a clear meaning (Oxford English Dictionary, 2008, p. 376). Distance education however comprises of many components or dimensions and this study will accordingly focus on interactivity, flexibility and

communications as these components are regarded as essential determinants for the successful implementation of distance education. Examples of definitions for distance education from the more prominent exponents in the field of distance education are amongst other descriptions the following:

- Dohmen (1967, p. 9) states that distance education is made possible through all types of communication including printing, electronic media as well as other devices that can be applied over a distance to deliver programmes.
- Peters (1973, p. 206) states that distance education is the delivery of programmes over a distance and by delivering these programmes imparting skills, knowledge, attitudes etc.
- Moore (1980, pp. 16-31) states that dialogue and structure serves as the most important components for distance education to succeed.
- The opposite of distance education is 'direct' education or 'face-to-face' education: a type of education that takes place with direct contact between lecturers and students. Distance learning and distance teaching resides under distance education as both concepts form an important aspect of distance education (Keegan, 1990).
- Moore (1994) defines distance education as providing education through the printing and electronic communications media irrespective of place and time.
- Lane (1994, p. 195) defines distance education as teaching and learning taking place over a wide geographical area and relies on a wide variety of electronic and printing media.
- Keegan (1996) defines distance education as a systematically organised form of self-study in which student counselling, the presentation of learning material and the securing and supervising of students' success are carried out by a team of skilled facilitators. The delivery of distance education is made possible utilising an assortment of media, covering long distances.
- Distance education brings together the concepts distance learning and distance teaching (Keegan, 1996, p. 38).
- Gunawardena and McIsaac (2004, p. 355), Simonson *et al.* (2009, p. 9), Chang (2002, p. 106), Burgess and Russel (2003, p. 291), UNESCO (2002) and Hewitt-Taylor (2003, p. 23) view distance education as structured learning whereby student and facilitator are separated geographically through place, distance and time.
- Distance education, or distance teaching and learning, is a field of education that focuses on the pedagogy/andragogy, technology, and instructional systems design that are effectively incorporated in delivering education to students who are not physically 'on site' to receive their education (Taylor, 2006, p. 4).
- Karpenko (2008, p. 45) defines distance education as the provision of complex and quality educational services by effectively utilising technologies.
- Distance education focuses on the delivery of education programmes transferred over distance in diverse areas and regions Simonson *et al.* (2009, p. 34) state that teaching and learning

transpire in a structural and ordered way adapted to the student's circumstances while student and facilitator is separated in time, place and distance.

A chronological investigation indicates that during the 1960/70s, printing media and innovative electronic equipment are prominent in the delivery of distance education programmes (Gunawardena & McIsaac, 2004, p. 357). This type of communication media was appropriate at this time, taking in consideration the development of communications technologies and the availability thereof. Imparting skills, knowledge and attitudes formed the basis of the content for educational programmes delivered over distance by means of printing and radio methodologies. It is noteworthy that the instruction of values (attitudes) was already contained in distance education programmes during this timeframe.

During the 1980/90s, an increasing emphasis was placed on the delivering of distance education programmes over a wider geographical area using structured teaching and learning strategies. Teaching in this sense according to the lexical meaning (Oxford English Dictionary, 2008, p. 1477) is the impartation of knowledge and skills, while learning being the knowledge or skills acquired through studies and experiences being taught (Oxford English Dictionary, 2008, p. 811). The quality of teaching and learning is developed by conveying knowledge and skills in the facilitation process and using different methods and technologies in order for students and facilitators to understand concepts explained. It can thus be deduced that the imparting and acquiring of knowledge and skills over a distance was viewed as important during this timeframe. Progression and development in communication technologies during 1980-1990 such as mobile phones, Personal Digital Assistants (PDAs), Internet, interactive boards introduced media as an additional support medium and communication tools for the delivery of distance education programmes. The printing media remains the basis of communication and correspondence. Electronic media are increasingly used to expand academic support services, administration and teaching and learning strategies. More emphasis is placed on improving methods of teaching adults (andragogy) over a distance in courses other than educational programmes as the electronic media enables a broad variety of programmes to be delivered through distance education. Distance programmes other than education programmes may also be utilised to acquire skills in the workplace (Potashnik & Capper, 1998, p. 42). The concept definitions of distance education make it clear that place, time and distance became irrelevant as the diverse geographical areas were bridged by using modern technologies and communication media (Lane, 1994, p. 195). The preceding indicates that electronic and printing media are essential to convey effective teaching and learning. Limits are minimised in technology being used in distance education as advances and developments in technology will inevitably lead to the improvement of the quality of programmes delivered through distance education (Özad & Barkan, 2004, p. 6).

During post 2000, separation in time, place and diverse geographical environments was still evident in the delivering of distance education programmes (Simonson *et al.*, 2009, p. 34). Technologies and the

development thereof post 2000, made access to structured teaching and learning more likely as more devices were now being made available through which teaching and learning in distance education programmes could be delivered. Through the utilisation of technologies, a broader spectrum of programmes could be delivered. Electronic and printing media are regarded as essential to enhance the quality of delivering programmes over a distance (Allen *et al.*, 2009, p. 13).

Myths that exists regarding distance education amongst other is that only one particular technology can be utilised in the delivery of distance education programmes and that distance education is less demanding than programmes offered on-campus (Imel, 1998). Distance education should not differ from delivering of on-campus programmes. Added technologies enable more opportunities for students to access information regarding their studies.

Commonalities from the indicated definitions referred to the bridging of distances, utilising more media and including additional programmes in the system to be delivered through distance education. Analysing the different timeframes mentioned in the definitions leads to a deduction that distances became incrementally less important as modern technologies enabled communication and the delivery of education programmes more effectively.

Based on the above stated definitions the following concept description for distance education can be formulated for this study: Distance education is the teaching and learning process over distance whereby an assortment of situation-specific media, correspondence techniques, programmes, support and management structures are utilised to establish and improve communication and feedback between skilled experts from institutions and students over a wide geographical area irrespective of time, space and location. Structures feature prominently in the definition of distance education and this concept will be discussed in the following section.

2.2.1.1 Management

A management structure is defined by (Ahmed, Ali, & Khan, 2005; Dictionary.com, 2011) as a mode of organisation and the arrangements of parts, elements and constituents of an organisation. Likewise and for the purpose of this study, a management structure is also viewed as institutional procedures to manage the process of delivering of educational programmes over a geographically diverse area of which communication between role players is regarded as an important component (Gunawardena & Mclsaac, 2004; Sammalisto & Lindqvist, 2008, p. 356).

Increased technological enhancements enable improved interactivity and communication between all role players in the delivery of distance education programmes and needs to be incorporated in a functional structure. Logistics including *inter alia* the implementation of new technologies, support,

operations, communications and quality service delivery form the basis for the management of distance education (Abhiyan, 2013; Admin, 2011). The organisational structure with different levels of management and reporting back mechanisms enable the functioning of the management and operations process. Core principles of an effective organisational structure are amongst other aspects mutual respect amongst role players, clarity of roles and functions and an effective communication frameworks. Anderson and Media (2011) are of the opinion that differentiation between functional substructures with clear demarcated roles and responsibilities implies mutual respect between all levels in an organization for the locus of control and command. Diverse geographically environments and technologies are eminent factors in the delivery of distance education programmes (McIsaac & Gunawardena, 2001, p. 403). The diverse geographical environment in which the delivering of distance education programmes take place calls for proper management structures. A wider range of media in this diverse geographical environment is utilised to obtain the required outcomes in distance education programmes.

Operational structures for delivering programmes over a distance were further enhanced to improve teaching and learning at the turn of the century by utilising new technologies such as the Internet, mobile phones and PDAs (Liaw *et al.*, 2010). A proficient organisational structure establishes a functional line of communication and functionality at all levels whereby management's authority is acknowledged (Anderson & Media, 2011; Robinson, 2008). A functional organisational and operational structure enables communication, dialogue and support in delivery of distance education programmes. The structured functioning of management teams in distance education institutions supports effective communication at different levels and between all role players. This effective communication is regarded as essential for the quality delivery and sound management of distance education programmes, irrespective of the geographical area. Technological progress in especially mobile technologies enables more effective communication and accessibility in distance education (McIsaac & Gunawardena, 2001). Programmes that could previously only be facilitated through face-to-face contact could now, because of technological developments and progress, be facilitated through distance education. A growing number of students, dispersed over a wide geographical area, enrol for distance education programmes globally. This implies that functional management structures are required to effectively manage the increasing numbers (Alabi & 2012; Belcheir & Cucek, 2002; Brazil & Boef, 2009; Rushville Republican, 2011). Simonson (2009, p. 34) affirms that teaching and learning to students over a wide geographical area should be structured in order to accommodate anytime and anywhere learning.

A great sense of planning is involved when managing a distance education unit and there is a vast difference in the managing of a traditional university in comparison with a university delivering distance education programmes (Admin, 2011). Logistically, the demands are different as material and information have to be distributed over an extensive physical area. Technology had to be developed so

that more students have access to it. Kimball (2001, p. 4) and Karpenko (2008, p. 45) state that a new mindset came to sight with regard to utilising new technologies to larger numbers of students attained through distance education. The changed mindset involved more options to be utilised in the delivery of distance education programmes, which can be developed to be facilitated in a distance education mode. In order for students to have full access to teaching and learning in distance education, irrespective the location of students and facilitators, this process should however be organised and managed effectively. The teaching and learning process in distance education should be flexible as students will have to access information from anywhere and at anytime. Various types of media and technologies could be utilised such as mobile devices in order to provide distance education programmes to distant students and to improve communication between all role players. Improving communication to distance education students and affording them access to teaching and learning at anytime and place encourages flexibility in the delivery of programmes in distance education.

Based on the theoretical description above, the management of distance education can only be effective and functional when the regulation process and planning of the organisational structures of a distance education is getting the necessary attention by taking in consideration the geographical environment, academic support, administrative support, communication and technological developments to improve and augment the delivery of distance education programmes to all students enrolled for these programmes. Flexibility forms one of the components to ensure effective delivering of distance education to the individual needs and circumstances of students.

2.2.1.2 Flexibility

Flexibility forms a key component for students in the workplace to function effectively and for acquiring skills and knowledge without being hampered by barriers averting students to improve their education and qualifications. Flexibility (2011) is the modification and or adaptation of a process or object, in this case the teaching and learning process in distance education. Students should be provided with a choice of when, what and where to learn by providing them with a range of possibilities to acquire information and to use learning opportunities (ANTA, 2003). Students from a wide spectrum in society, including schools, tertiary institutions and students fully employed, rather prefer to enrol for distance education programmes, as face-to-face education are logistically and financially not accessible to all (Beldarrain, 2006, p. 139). Karpenko (2008, p. 45), Perraton (2007, p. 1) and Keegan (2005, p. 7) state that students that returns to “school” at a later stage to acquire skills and knowledge to improve education and qualifications, preferably make use of programmes offered through distance education. The reason being that not all students are able to, or could afford to return to full-time face-to-face teaching institutions as accessibility are the main concern. Various institutions and organisations utilise mobile-learning (m-learning), to overcome the challenges of limited infrastructural resources. Small or

limited infrastructures may use technological advances in order to extend support to all role players of an institution (Peters, 2007).

Distance education affords students access to higher education at different levels and assists employees keeping abreast with technological advances in the working environment and to make use of available opportunities and technologies to improve their qualifications (Guri-Rosenbilt, 2009, p. 106; Potashnik & Capper, 1998, p. 42; Sherron & Boettcher, 1997, p. 2). Full-time employment implies certain limitations regarding time in the acquiring of new skills and knowledge in the workplace. Family commitments prevent students from attending face-to-face institutions. Full-time employment and unequal access to full-time institutions are aspects considered as limitations for further education. Through distance education programmes, students have access to improve qualifications and education within the workforce enabling students access to teaching and learning anywhere for improving skills and knowledge. Distance education, with the availability of new technologies, assists with bridging limitations and improves communication between facilitators and students and increasing capacity for working students to return to “school” within the workplace at a later stage in their lives improving skills and knowledge applicable to their careers (Keegan, 1996, p. 34; Latif, Sungsi, & Bahroom, 2009, p. 2).

Flexibility in the context of distance education, means amongst other things that institutions have different modes of delivering for distance education programmes offering various technological applications for students in the workplace. Teaching and learning in distance education involve flexible programmes and convenient ways to improve skills for students within diverse geographical environments (Bates, 2011, p. 18; Brown, 2001, p. 18; Chang, 2002, p. 106; Khodamoradi & Abedi, 2011, p. 114; Silverman, 2001, p. 30). Facilitation processes are adapted and developed in a flexible manner to suit the needs of each student enrolled in distance education, deliberating and contemplating the needs and situations of students. Utilising assorted modes of delivery and combining face-to-face tuition in distance education as part of a blended mode leads to more flexibility in the teaching and learning process as affirmed by the Commonwealth (Commonwealth of Learning, 2000, p. 22). The facilitation process strives for flexibility between facilitator and student by improving communication and interaction between the student and the institution. This interactive approach is regarded as essential in distance education especially because of the location and time constraints. Interactivity in teaching and learning is an important element in distance education programmes as students can interact with all role players involved. Interactivity is crucial for the success in distance education (Yacci, 2000, p. 1). Adequate interactivity leads to more effective communication in the teaching and learning process enabling the effective delivering of distance education programmes.

2.2.1.3 Interactivity

Interactivity and effective communication is imperative for the success of distance education (Areti & Bousiou-Makridou, 2006, p. 9; Isman, Dabaj, Altinay, & Altinay, 2003, p. 12). Students must be able to communicate with the institution at anytime and place for academic and administrative support. Lim *et al.* (Lim, Fadzil, & Mansor, 2011, p. 124) clearly states that academic and administrative support forms part of a larger support structure at universities utilising m-learning. Learning support forms the basis of support for the implementation of m-learning (Naismith, Lonsdale, Vavoula, & Sharples, 2004, p. 18). Support in relation to all aspects of teaching and learning enhances communication, adding increased flexibility in the delivering of distance education programmes.

Adequate communication creates more flexibility in the delivery of distance education programmes. The diverse geographical environment in which teaching and learning occurs, requires of the student to be able to communicate and interact effectively with the institution in order for teaching and learning to be effective. Communication should be clear, appropriate and accessible. Interactivity is promoted with the implementation of modern communications technologies in teaching and learning. Accessibility causes students to interact and therefore adds flexibility that are eminent in the delivery of distance education programmes and is as important as knowledge creation and the provision of academic provisions (Singh, 2004, p. 2). Improving accessibility for students to higher education institutions enables a variety of communication devices and technologies to be utilised for the improvement of interactivity in the provision of distance education programmes. The use of more mobile technologies such as mobile devices, PDAs and mobile computing devices (tablets) increases interactivity between the relevant role players.

Continuous feedback to students regarding their progress, strengths and development areas as part of effective communication, enables interactivity in distance education. Students enrolled for distance education programmes are depending on the nature of the material to suit their needs and expectations associated with the specific challenges of distance education, which are closely linked to their idiosyncratic circumstances. Distance education is based on pre-produced courses which is self-instructional, but organised in accordance to two-way communication that takes place between student and institution (Özad & Barkan, 2004). Communication between the students and support structures is fundamental, be it academic or administrative support. Courses and modules developed for distance education should be constructed to accommodate all forms of interactive communications. Technologies should be compatible with content to be facilitated in the teaching and learning process of distance education. Interactivity utilising any means of communication technologies should add to the previously mentioned flexibility.

In the previous section, it is emphasised that the application of and accessibility to technological developments within a diverse geographical environment, improve especially communication and interactivity in distance education. Management structures for the delivering of distance education

programmes, form complex operational units in the delivery of distance education programmes. Each management unit has to function as part of a bigger whole in the teaching and learning process. Management structures in a distance education institution have to be structured to increase effective communication and interactivity on each level of the organisation. Effective communication amidst the different management units is encouraged and promoted and in accordance with clearly defined roles and responsibilities within the institution responsible for the provision of distance education programmes (Anderson & Media, 2011). Effective communication increases interactivity, improves quality of teaching and learning and accommodates the geographical diversity of students enrolled in distance education programmes. Moving away from paper-based support to electronic support is eminent and became more evident during the turn of the century (par. 2.2.1). Distance education removes barriers of learning, which otherwise would prevent individuals and groups of potential candidates to improve their qualifications or to further their education. Mobile devices are current technologies that are playing a major role in increasing interactivity between all involved in distance education, as students are able to access all info needed to assist them in their studies.

The previous section clarifies the concept of distance education while the next section explores the concept of mobile learning.

2.2.2 Mobile-learning (m-learning)

Traxler (2009, p. 1) exemplify m-learning as not merely the combination of mobile and learning. According to Traxler (2009) m-learning implicitly means mobile e-learning and its history and development have to be understood as both a continuation of conventional e-learning and a reaction to this conventional e-learning to its perceived inadequacies and limitations. M-learning is new technology applications in teaching and learning, and poses new ideas, technologies and concepts in the teaching and learning process (Cavus & Ibrahim, 2009, p. 78). An important objective of m-learning is to add flexibility in dealing with distance education programmes (Lim, Fadzil, & Mansor, 2011, p. 123). Flexibility in teaching and learning enables role players to learn at anytime and anywhere, making teaching and learning movable and adaptable to students' idiosyncratic circumstances.

In terms of distance education, *mobile* is viewed as to move or to be moved easily between occupations, places of residence and social classes (Oxford English Dictionary, 2008, p. 917). Movable communication devices are utilised for these purposes. M-learning, however can be interpreted in different ways and also different means. Different modern communication technologies are used to facilitate learning irrespective of the location (Parsons & Ryu, 2006, p. 1). Technologies hereby referred to, are various devices offering more mobility. M-learning is a manner of informal learning as no limitations regarding interactivity exists on teaching and learning with regard to location, as information is able to be accessed (Cavus & Ibrahim, 2009, p. 80). M-learning is the capacity to

have entry to and interaction with educational sources, resources, tools, study materials and information at anytime and at any place, employing a mobile communication device or appliance (GSMA, 2010 p. 6). Mobile learning results in more flexibility in distance education (Fahad, 2009; Lim *et al.*, 2011, p. 123; Rekkedal *et al.*, 2005, p. 127, 2005). Students are flexible in distance learning when the opportunity exists to access teaching and learning at anytime and from anywhere offering students more autonomy and choices in distance education (Rekkedal *et al.*, 2005). More autonomy offers students more freedom in teaching and learning as students can decide themselves when teaching and learning could take place. Introducing desktops and computers back into distance education reduces flexibility (Rekkedal *et al.*, 2005, p. 87). The advantage of introducing mobile devices into distance education enhances flexibility which makes anytime and anywhere learning possible.

Mobile communication devices include cell phones, PDAs, smart phones, tablet PCs etc., of which all are referred to as mobile computing devices (Andronico *et al.*, 2010, p. 2; Brown, 2003, p. 4; Colazzo *et al.*, 2010, p. 1; Corlett, Sharples, Bull, & Chan, 2005, p. 162; GSMA, 2010 p. 6; Keegan, 2005, p. 3; Traxler, 2007, p. 5, 2009, p. 2; Winters, 2006, p. 5). Liaw *et al.* (2010, p. 446) state that as technology develops, smaller portable devices are applied in m-learning to convey teaching and learning. The affordability and effortless use of mobile devices by students open new areas for communication such as text messaging (SMS), e-mail, and organising of ideas for teaching and learning (Corlett *et al.*, 2005, p. 162). Text messages (SMSs) have important implications for higher institutions when utilising it for administrative and academic support (Abas, Lim, & Woo, 2009, p. 51). All means of communication utilising modern and relevant communication technologies effectively, improve communication in the provision of teaching and learning within distance education.

M-learning offers students almost limitless opportunities in teaching and learning at anytime and place by using mobile devices and may substitute in some cases formal teaching and learning activities with mobile learning. The teaching and learning environment transforms frequently as teaching and learning in distance education are not bound to time and place (Attewell, 2005; Capuano, Gaeta, Miranda, & Pappacena, 2004, p. 53; Lu, 2008, p. 516; Parsons & Ryu, 2006, pp. 1-6; Sharples *et al.*, 2005, p. 2; Trifonova, 2003; Trifonova & Ronchetti, 2003, p. 1; Winters, 2006, p. 6). The notion that time and place is irrelevant in mobile learning, enables teaching and learning to be individualistic, personalised and eliminating to a great extent the judgmental issues from the process of learning as is found in more traditional education settings (Attewell & Webster, 2004, p. 15). The aforementioned statement affords mobile learning the potential of more ubiquity. Ubiquitous according to (2008, p. 1562) is the ability to be everywhere at once. Remote access from any location by means of a mobile device adds to more ubiquity (Liaw *et al.*, 2010, p. 1). An ubiquitous element to learning is added that enables teaching and learning to take place at any geographical location and at anytime. Locations where students are situated are diverse and the teaching and learning process has to be adjusted to accommodate all role

players in distance education. The environments in which students find themselves in and where teaching and learning take place, differ as the teaching and learning process progresses (Capuano *et al.*, 2004, p. 53; Trifonova, 2003, p. 1).

Another aspect for consideration is the learning styles of the different groups of students enrolled for distance education. The difference in the age of groups involved in distance learning has different needs regarding obtaining information that will benefit them in teaching and learning involvement. M-learning should adapt to the different learning styles of different age groups involved (Song & Erdem, 2011, p. 3). M-learning enables students to access learning at anytime and place. This freedom of accessibility adds more flexibility to teaching and learning. As for distance education, the learning styles for m-learning should be flexible as to allow individuals or groups to work simultaneously or separately (Baird & Fisher, 2005, p. 6).

McLean (2003, p. 2) clarifies m-learning as mobile computing meaning that the computer are still being utilised, but that m-learning is the intersection of mobile computing and e-learning. Pownell and Bailey (2001) state that mobile computing evolves in waves. The first wave of computing being large mainframe computers requiring large physical spaces to be accommodated. The second wave was the personal computer. The World Wide Web was the 3rd wave in the evolution of technology. Mobile computing and technology are viewed as the fourth wave in the evolution of computing technologies. Milrad (2003), as quoted by Cavus and Ibrahim (2009), states that e-learning is learning by utilising all types of electronic and digital tools that supports learning. M-learning on the other hand is exactly the same as computing except that with m-learning mobile electronic devices are employed in the teaching and learning process. More effective communication possibilities in teaching and learning exist through this medium. The process of teaching and learning are adapted in order to be accommodated through mobile learning. Post 2000, mobile technologies were further developed to further assist with teaching and learning in distance education increasing interactivity between role players. Teaching and learning transpires not only through tertiary institutions, but through various media and media applications such as mobile phones, PDAs, personal computers and many other electronic devices.

Distance education programmes are developed and designed in order to assist students in a diverse geographical area and diverse socio-economic status. All students are not able to afford tuition at traditionally residential universities or institutions. All students furthermore cannot afford personal computers and Internet connectivity. E-learning is not accessible to all students, depending on where they reside. M-learning is an extension of e-learning affording more students the opportunity to connect to resources and Internet. Accessibility to resources and material needed for distance education promotes and boosts interactivity. More students are able to afford mobile phones. Improved communication technologies enable students to have access to further education irrespective time and place. Limitations such as transport, tuition fees and accommodation are only but some aspects that

are overcome by students should they have access to relevant resources for their studies using mobile devices. These limitations are components that if removed, could ease the provision of distance education as students have access to further education. Ubiquity is evident in m-learning meaning that teaching and learning can be at any venue at the same time. Mobile devices add the possibility of ubiquity to teaching and learning. Mobile devices adding to the ubiquitous aspect of teaching and learning may benefit students enrolled for all distance education programmes at institutions as various means and ways can now be explored in order to convey content to students.

2.2.2.1 Teaching and learning

Teaching and learning transpires everywhere and is a lifelong activity. Teaching and learning is not only restricted to schools, colleges, and universities etc. (Sharples, 2000, p. 16). Teaching and learning transpires in any sector of society. Interaction within changing communities and everyday situations are done through utilising mobile devices (Pathmeswaran & Ahmed, 2009, p. 8). In the environment referred to, Internet access and access to other related virtual platforms are included. The ability for mobile devices and mobile technologies to further develop in order to access effortlessly the Internet and other repositories, affords more understanding to the concept on-the-go learning (Muyinda, Lubega, & Lynch, 2010, p. 38). Creating improved Internet access enhances communication in teaching and learning. Creating a mobile environment creates more communication possibilities utilising more applications in order for effective communication to take place. The more possibilities exist by which students can have access to education, more flexibility in teaching and learning transpires. M-learning improves the communication in the teaching and learning process between all role players (Fahad, 2009, pp. 14,15). Communication improves as students can have access to all resources needed for their studies. Accessibility increases interactivity. Improved communication has the potential to enhance support to students in teaching and learning. Support includes administrative and academic aspects of the distance education student. M-learning creates a mobile environment in which one moves around in time and space continuously with full access to distance education programmes. M-learning forms an extension of e-learning making learning more accessible (Brown, 2005). A clear link exists between e-learning and m-learning.

2.2.2.2 The link between mobile learning and e-learning

Teaching and learning have changed over time as students are not tied to particular locations in order for learning to be facilitated (Sharples, 2000, p. 16). Mobile learning relates closely to e-learning as both modes of teaching and learning intersect at anytime all through learning (Pathmeswaran & Ahmed, 2009, p. 1). With e-learning, teaching and learning can only take place at one fixed location with minimum of mobility. E-learning and m-learning are similar, but differs in relation to one major aspect, namely mobility (Brown, 2003, p. 4). Mobile learning is an extension of e-Learning and

materialise as an added mode of delivery utilised in the delivering of distance education programmes. M-learning adds interaction and accessibility to more resources in teaching and learning. E-learning according to Quinn (2000) as quoted in Cavus and Ibrahim (2009), is static, meaning that learning occurs at one place and location at a predetermine time. E-learning nonetheless still exists and will exist in future. Mobile learning however materialised from e-learning to equip learning with a lifelong teaching and learning process and enabling more mobile devises to be exploited with the delivering of learning content. Facilitation of teaching and learning by means of mobile devices forms and extension of e-learning. (Andronico *et al.*, 2010, p. 1; Brown, 2003, p. 1; Laouris & Eteokleous, 2005, p. 6, 2005; Winters, 2006, p. 5). Accessing resources through mobile devices adds to existing resources and material. Accessibility to more material and resources eases the teaching and learning process as students have more information that will assist them. Mobile learning is differentiated from e-learning in its ability to unlock the user from a fixed infrastructure and limited distribution (GSMA, 2010 p. 6). Trifonova and Ronchetti (2003, p. 1794) verify this point by stating that mobile learning forms a subset of e-learning meaning that e-learning possibly could transpire through mobile learning. Motiwalla (2007) confirms that mobile learning clearly intersects e-learning and that mobile learning makes learning anytime and anywhere a possibility.

M-learning is viewed as a subset of e-learning, indicating that m-learning allows programme information and material to be portable (movable, transferable) and thereby enabling students to engage in anywhere-anyplace-learning or just-in-time-learning (Brown, 2003, p. 4; Motiwalla, 2007, p. 581). Programme information and material being available through any electronic media afford students the opportunity to obtain relevant information making use of situation-specific mobile devices. Freysen (2004, p. 1) defines m-learning as a learning task and/or outcome to be achieved by means of various learning opportunities. The teaching and learning process utilise m-learning either synchronously or asynchronously. Synchronous learning refers to teaching and learning taking place at the same time at a specific location where the lecturer/facilitator is simultaneously present and asynchronous teaching is learning taking place at any pace, time and place.

M-learning and e-learning function as combined yet separate entities in teaching and learning, whereby mobile learning and e-learning supplements one another improving communication between students and role players. Personalisation of teaching and learning in mobile learning is evident. Students adapt teaching and learning appropriate to their environment and circumstances causing teaching and learning to be more informal than the traditional education approaches. Students have a need to personalise their learning experience to their situation-specific circumstances and situation. Students adapt and adjust to the process of teaching and learning in according to their idiosyncratic circumstances. Teaching and learning are not viewed as a strict and rigid formal process as students are mobile and not restricted to computers at a fixed location. With the traditional form of teaching and

learning, personalising teaching and learning is hampered while m-learning present more technological possibilities to personalise learning.

Based on the above stated definitions, the following concept description can be formulated for mobile learning for this study: **Mobile learning** is the acquiring of resources and information needed in teaching and learning, utilising a wide assortment of mobile devices and advanced communication technologies in any geographical area and time frame increasing effective communication between student and role players and introducing ubiquity in the delivering of distance education programmes.

2.2.2.3 Accessibility to mobile phones and m-learning

In order for m-learning to be applied in teaching and learning through distance education, an increasing number of students would have to have access to mobile devices. It is reported that during 2004 the number of clients registered to the GSM mobile network operator were just more than a billion. During 2008 this number was estimated at more than 3 billion subscribers (Sutherland, 2008, p. 1). In South Africa the number of subscribers to the GSM mobile network climbed from 27 million to over 30 million and it was reported by the various mobile phone networks in South Africa that the mobile phone markets in SA nears saturation, as 86 out of every 100 people were in possession of such a device by the end of 2007 (Sutherland, 2008, pp. 1,8). In some developing countries in the world, research have shown that the percentage of mobile phone per 100 people have increased up to four fold (Rashid & Elder, 2009, p. 1).

Having more access to mobile devices grants students the opportunity to interact with all role players in distance education on a regular basis. Interaction with individuals and other students demands for more mobility in order for students to communicate with others on a more frequent basis and from many different locations. Mobility is an aspect that surface at this point. In terms of distance education, *mobile* is viewed as to move or to be moved easily between occupations, places of residence and social classes (Oxford English Dictionary, 2008, p. 917). Students thus have access to teaching and learning from any place, because of the mobility of the devices they have in their possession. M-learning affords students to access teaching and learning via mobile devices at anytime and at any place (Cavus & Ibrahim, 2009, p. 80).

Mobile phones and mobile devices do not need fixed telephone lines to function. Mobility of the student and the device is the key aspect for m-learning to function. Connectivity of mobile devices requires basic linkage and infrastructure. Mobile devices have more functions than just speaking. New technologies for mobile devices enable individuals to interact in more than one way with one another. Downloading and transferring of data are made easily and more people are able to afford mobile phones than computers (Rashid & Elder, 2009, p. 2).

Fixed landlines and Internet are not available to all as the geographical environment is diverse and in some cases, fixed structures for establishing broadband Internet facilities are too expensive making accessibility difficult in some areas. For the previously mentioned reason, all students do not have access to fixed line Internet facilities and affording these services is merely impossible especially in the developing countries of the world. Infrastructures for broadband Internet lines are not possible at all locations. Costs for landlines in South Africa are very high and few can afford to install fixed lines (Parkinson, 2005, p. 20). Other possibilities and resources have to be investigated, because mobile devices can only be successful in distance education if more individuals are able to afford mobile devices and understand how these devices function in order to utilise these devices in their studies. Should more students be able to afford and have access to new communication technologies like mobile devices, an increasing number of students would be able to have access to relevant information needed for teaching and learning in distance education.

2.2.2.4 Affordability of mobile devices in distance education

Oestmann (2003, p. 3) states that more than 40% of the world's developing countries are currently subscribed to prepaid mobile services. Reason being that start-up cost for any person choosing mobile as means of communication are overall 25% cheaper than other communication media (Oestmann, 2003, p. 2). With prepaid mobile services spending are better controlled. The largest advantage to m-learning is the affordability and the portability of mobile devices (Abas, Peng, & Mansor, 2009, p. 153). Most of the developing countries in the world prefer moving directly to mobile communication services as fixed-line services are too expensive to install. Overall it can be said that mobile phones are more evident in practice than computers (Rashid & Elder, 2009, p. 2). Mobile devices are more movable and Internet connectivity is more reliable. Mobile communication devices include cell phones, PDAs, smart phones, tablet PCs etc, of which all are referred to as mobile computing devices (Andronico *et al.*, 2010, p. 2; Brown, 2003, p. 4; Colazzo *et al.*, 2010, p. 1; Corlett *et al.*, 2005, p. 162; GSMA, 2010 p. 6; Keegan, 2005, p. 3; Traxler, 2007, p. 5, 2009, p. 2; Winters, 2006, p. 5). Mobile phones and other mobile communication devices are more accessible to the lower income groups as well as the poor as calls and spending on calls can be better controlled (Rashid & Elder, 2009, p. 4).

As was discussed, it is evident that mobile communication is more accessible and affordable in developing countries and amongst the poor as spending can be better managed. In paragraph 2.2.2.3, it was mentioned that linkage of basic services and also the fact that mobile communications have more functions than fixed line services. Developing countries and individuals in the lower income groups have more value for money utilising mobile devices. Anytime and anywhere learning are becoming more of a reality as students enrolled for distance education programmes are able to access

resources and information on a more regular and frequent way. Being able to connect more frequently, adds flexibility in teaching and learning to the delivering of distance education programmes.

Institutions providing distance education programmes to a group of students in diverse geographical locations and with various income groups have to adapt the delivery of programmes to accommodate all. Making available opportunities to access all information and resources via mobile communication adds another structure of support to delivering teaching and learning in distance education programmes. Adding another means of support to distance education creates even more flexibility to the delivering of distance education programmes. Adding more flexibility may also limit attrition rates to current programmes as students receive more support and are not left in the dark. The student is now able to add another communication medium to his/her own support structure that is needed from the institution. Providing support to students in teaching and learning aims to remove hindrances that could possibly prevent students from having success in distance education. Removing more barriers in distance education enable students to be better informed regarding all processes and add a new level of openness to distance education.

In conclusion, of this section, it is deduced that m-learning affords more students the opportunity to access teaching and learning because of affordability and uncomplicated means of accessing teaching and learning in the delivering of distance education programmes. Distance education is an instructional delivery mode for which an increasing number of students enrol for. Brady *et al.* (2010, p. 151) reiterate that the distance education courses as a primary instructional delivery option in the higher education fraternity is expanding at an unprecedented pace.

Additional modern communication technologies are constantly being explored in order to afford students more opportunities to have access to teaching and learning. Social Network Sites (SNS) are an additional means of communication and interaction that can be added to assist with delivering of distance education programmes. Social Network Sites (SNS) are capable of being used in distance education in order to assist with the provision of teaching and learning.

2.2.3 Social network sites (SNS)

Social network sites (SNS) are communication technologies that enable students to communicate and share various types of information with colleagues and peers via various Internet sites (Veletsianos, 2010, p. 72). With the increasing growth of distance education the emergence and growth of social network sites (SNS) such as Facebook, Twitter, LinkedIn, Friendster, LiveJournal and MySpace has been phenomenal and widespread. Facebook, for example, registered by 2010 more than 300 million active user profiles (Brady *et al.*, 2010, p. 151).

The attractiveness and popularity of distance education and SNSs made it possible to utilise modern communication technologies with the goal of not only improving the teaching and learning process, but also the management thereof. Social interaction is about sharing of information by means of all types of media and various social networking technologies and sites (Kukulska-Hulme *et al.*, 2011, p. 30). Social network sites are a network of communication whereby individuals connect for example with one another because of some common interest (Boyd & Ellison, 2007, p. 211). Facebook, Twitter and MySpace are but a few SNSs that exist today (Boyd & Ellison, 2007, p. 211). Social network sites are viewed as additional means of communication and interaction, adding to and expanding the existing modern communication technologies. Social sites accommodates different learning styles as individuals and groups could access learning at anytime and at any place (Baird & Fisher, 2006, p. 6).

Various software tools are necessary to communicate by utilising the available social networks (Veletsianos, 2010, p. 73). Software tools are programs enabling individuals to communicate with each other and provide the possibility for increasing and exploring additional means of communication in distance education to add more flexibility to the teaching and learning process. Australia, Hong Kong, Portugal, Sweden and the UK are countries in which mobile phones are increasingly being utilised to communicate on social network sites such as Facebook, Twitter and Skype (Kukulska-Hulme *et al.*, 2011, p. 26).

Research indicates that distance education courses in particular are more successful when communities of practice (CoP) are realised and when an online social presence among students are experienced (Brady *et al.*, 2010, p. 151). The advancement of a sense of community is critically important in a distance education mode of programme delivery because students often do not get the opportunity to meet face-to-face with other students or lecturers (Brady *et al.*, 2010, p. 152). The utilising of SNS in education programme delivery provides invaluable opportunities to connect, build and sustain a learning community in a socially and educationally constructed network.

Mobile devices are for the most part being used for communication purposes. Providing students with additional means of communication such as social network sites will provide students with additional avenues improving communication. Social network sites enable distance education students in particular to have more benefits in e-learning. Firstly these benefits include being able to access content over a wide variety of Social Network Sites. Secondly, exploring new pathways of increased social communications and establishing more opportunities for teaching and learning to support more effective learning (Roblyer, McDaniel, Webb, Herman, & Witty, 2010, p. 137).

Various discussion forums and social sites exist whereby content and related information are being shared by a specific group, however this information are also available to a wider audience. Reason being that various tools for social networks currently exists (Hoffman, 2009).

An opportunity does exist for students and higher education institutions to share not only personal opinions and ideas with one another. Enough social networks as well as software tools for such discussions exist to also share education discussions and learning content. Interactivity regarding these matters are possible on SNSs. Although social network sites are not currently being used to such a large extent for educational purposes, the avenue for utilising this means exist and research indicates that this communication and interaction options need to be explored by higher education institutions (Ellison, Steinfield, & Lampe, 2007, p. 1150).

In contrast to SNS, learning management systems such as Moodle and Blackboard are valuable for the building of network capacity among students and institutions as service providers of education programmes. Interaction by means of learning management systems may be merely question and answer sessions while the use of SNSs encourages student engagement, is more user-centered rather than class-centered and encourage community building which extend learning beyond the boundaries of the classroom (Brady *et al.*, 2010). Higher distance education students need a venue or working station to connect and actively engage with other members of the class who they may have never met in person. Social presence is regarded as crucial toward establishing a community of practice and leads to reduced feelings of isolation and detachment while simultaneously encouraging student interaction and participation in distance education programmes (Brady *et al.*, 2010). While technology has the ability to overcome spatial and temporal differences, it is based on the exchange of information, which often diminishes over time. A major shortcoming in this regard is that a narrow focus on technology alone may not facilitate the crucial learning elements of engaged interaction and community building. The use of SNSs in distance education provides a popular forum for connecting with one another to construct shared understandings, to engage in collaborative discussions, to share common sources such as readings, links and video clips while information is also exchanged amongst one another (Brady *et al.*, 2010). SNSs allow students to reflect on their learning and course experiences, to address their understanding of issues as they arose and to engage with lecturers in a one-to-one environment (Hemmi, Bayne, & Land†, 2009). Given the inherent limitations of learning management systems, the use of SNSs in education settings represents a clear shift toward social and community-based web applications that cultivate and sustain programme-specific social learning networks that further heightened the acquisition of knowledge and collective intelligence (Brady *et al.*, 2010).

As both distance education and SNSs continue to grow, it is becoming increasingly more important to investigate how distance education and SNSs can be combined most effectively to enhance student learning (Brady *et al.*, 2010). In this regard, (Hemmi *et al.*, 2009) state that SNSs provide the higher education providers with possibilities to develop learning community capabilities of which the pedagogical implications are still largely unexplored with little research in this particular field of study. The utilisation of SNSs therefore demands from exponents in higher education to engage with a new

research agenda to engage with some far-reaching challenges relating to the literacy and pedagogical practices (Hemmi *et al.*, 2009).

Relevant questions in this regard are *inter alia* (Hemmi *et al.*, 2009):

- To what extent do SNSs challenge our conventional understandings of the way in which knowledge is generated and disseminated within the academy?
- To what extent do SNSs challenge the university in the age of the digital?
- Do students possess the forms of 'techno-literacy' to manage the delivery of programmes within such spaces?
- How can organisational models and frameworks be adapted to manage these new ways of learning effectively?
- What kinds of 'digital pedagogies' work best in these spaces and how are they perceived and experienced by students, lecturers and managers?

Consideration of the mentioned issues indicates that significant challenges remain for researchers in higher education that is increasingly informed by digital technologies. It is deduced that social network sites are available for students to access by means of the Internet as well as mobile devices having the capability for Internet access. Through distance education, specifically open distance learning, the geographical environment the student find him-/herself would not be a factor as teaching and learning content are accessible at any place and time through social network sites and the Internet. Distance education affords students to access any programme through modern mobile communication technologies.

2.2.4 Distance education and open distance learning

Distance education grants access to studies to all levels of qualifications by amongst other aspects interpersonal communication of face-to-face communication concentrating on anywhere and any place learning, irrespective of the separation of lecturer and student over a distance (Gunawardena & McIsaac, 2004, p. 355; Keegan, 1990, p. 3). Open distance learning focuses on removing barriers of access to learning allowing students control over their own learning. Enabling students control over their own learning, makes it possible for students to set their own objectives, structures and systems for learning at any place and time (Keegan, 1996, pp. 13,18).

Removing barriers of learning should be possible by providing students with more devices and modern communication technologies to access teaching and learning anytime and any place. Distance education and open distance learning are closely related as distance education on its own originated by means of correspondence (Timeline beta, 2011). Correspondence formed the starting point for further

communication technologies to be developed, thereby enabling better access to further education to students. Development of modern communication technologies enables more accessibility for students to embark on in teaching and learning to acquire sought after qualifications. Modern communication technologies such as mobile devices and e-learning create a more open approach whereby any student could access further teaching and learning, utilising various communication technologies. Communication and logistical barriers exist in distance education whereby not all students had equal access to resources and information for teaching and learning. To afford more students opportunities to have access to further education, limitations or barriers had to be eliminated that previously hampered these students to have access to further education. Open distance learning is consequently a further development and extension of distance learning whereby more barriers are removed in order to increase accessibility of students to teaching and learning.

2.2.5 Open distance learning (ODL)

No one definition exists for open and distance learning (Commonwealth of Learning, 2011). UNESCO (2002, p. 7) defines open distance learning (ODL) as flexible learning in all aspects of delivery, unlimited access for students to open distance learning institutions and raising constraints regarding time and place of learning. Open distance learning focuses thus on accessibility and an increased utilisation of educational possibilities, expanding the quality of education and affording learners more responsibility and autonomy on teaching and learning (Calvert, 2006). Affording learners more autonomy and responsibility, individualises the teaching and learning environment for the student and facilitators encouraging more flexibility in the teaching and learning process. Flexibility (2011) is the modification and or adaptation of a process or object, in this case the teaching and learning process in distance education. Students manage their teaching and learning situation and environment, acquiring relevant information when, how and where making use of a variety of means and devices to access information (Abrioux, 2008, p. 3). Means of access other than in person, consists mainly of modern communication devices. Open distance learning is a kind of procedure in learning that allows people to learn at anytime and place, affording more flexibility in the process of learning. In doing so, all restrictions and barriers that could potentially limit the flexibility of the provision of distance education programmes are removed to a large extent (Coffey, 1977; Dixon, 1987; Lewis & Spencer, 1986; MSC, 1984; Perraton, 2007, p. 1; Rowntree, 1996, p. 14).

Geographical, social, economical, educational and distances separating institutions and students are bridged by amongst other aspects open distance learning, supporting students and intensifying flexibility and communication between all role players as an increasingly number of electronic communication devices, including mobile devices for teaching and learning, are available (UNISA, 2008, p. 2). Open distance learning includes any provision in which a significant element of the

management of the provision of teaching and learning is at the discretion of the learner, supported and facilitated by the provider (ODLQC online, 2011).

Mikropoulos (2011, p. 11) is of the opinion that open distance learning is driven by technology and the development of more modern communication technologies to improve teaching and learning in distance education. An effective combination of new communication technology and media is essential to warrant the functionality of open and distance education (Rahman, 2011, p. 7). Communication technologies include mobile devices and computing devices. Impartation and improvement of teaching and learning by means of the improved utilisation of telecommunication form a key component of open distance learning by various institutions (SQLserver, 2011). Another procedure that is investigated in open distance learning is Telematics as a particular approach for the provision of distance education. The Oxford English Dictionary (2008, p. 1481) describes telematics as an existing branch of information technology which deals with the long distance transmission of computerised information. Telematics is a combination between telecommunication, information and multimedia technology and its services (Bouras *et al.*, 2000, p. 214). Open distance learning is an economical and affordable mode for delivering programmes in distance education. Individuals in all societies are able to access distance education as affordability and accessibility are the main drivers giving them this opportunity. High quality further education and vocational training are in demand by students through open distance learning over an extensive area (Kumar *et al.*, 2008, p. 21).

Open distance learning contemplates on imparting knowledge and skills over distance to students. Bridging the gap over distance between student and all role players in distance education forms the main focus of open distance learning as all barriers are minimised by allowing more students to have access to teaching and learning at various levels of education. Teaching and learning within an open distance learning model occur at any place and at anytime that promotes flexibility within the delivery of distance education programmes as students adapts their own teaching and learning environment.

Effective communication is regarded as a basic point of departure to triumph over barriers existing that could obstruct teaching and learning. Current developments in technologies in the communications sector enable students and all role players to bridge the distance between them. Distance serves as no limitation for effective communication to transpire as a variety of mobile devices are utilised to make distance education possible for all. Communication can only be successful by using applicable technology in all aspects of open distance learning. Mobile devices, laptops, PDAs, smart phones and tablet PCs have developed to such an extent that communication across all fields are likely enabling Internet access to be accessible. Teaching and learning do not have to be static and formal as history has shown. Through distance education, teaching and learning are not limited to occur only face-to-face on residential venues. Mobility and connectivity form a basis for open distance learning to exist

and be applied successfully in any environment. The student creates his or her own learning environment by utilising all technology options available.

Various aspects are considered when defining open and distance learning. Use of media, geographical environment, time, mode of delivery and communication media to be used will determine to what extent open and distance learning will be implemented. All the mentioned aspects form barriers in teaching and learning that could possibly have an influence on the functionality of delivering distance education programmes. Openness in the delivery of distance education programmes affects all role players in distance education. Paying more attention on implementing modern communication media in delivering distance education programmes may ensure that fewer barriers occur for all role players in higher education.

2.2.6 Challenges of open distance learning

2.2.6.1 Attrition rates and retention of students

Open distance learning presents students with fewer barriers hampering the teaching and learning process. Other than the traditional tertiary institutions having face-to-face contact with students, distance education institutions have less control over students' personal presence, because of the vast and diverse geographical environments students find themselves in. Students find it more difficult to stay focused to their studies as the teaching and learning process now takes place at their own time and pace. Teaching and learning are not limited to time and place in open distance education. Latif, *et al.* (2009, pp. 3,4) explain that the lack of discipline, time management, diverse geographical environment and motivation of distance education students plays a major role in student abandoning studies at an early stage of their studies. In order to improve the retention rate of students at open distance learning institutions, methods and needs have to be identified for improvement and to lower the attrition rates of students at open distance learning institutions.

Attrition rates of students enrolled at open distance learning institutions have to be investigated as many factors may have an influence of a high attrition rate that may be evident at an institution. Factors undoubtedly vary from institution to institution. Problems with higher attrition rates can lie with the student and/or with the institution itself (Latif & Fadzil, 2007, p. 10). Support structures offered by institutions to students may not be sufficient. Students could possibly be misinformed about the functioning of open distance learning. Both processes from the institutions and students perspectives have to be investigated in order to find solutions for the high attrition rates and improve retention of students at all open distance learning institutions. Because of more opportunities that arose in distance education, trends have to be investigated to keep in touch with the latest developments and changes for proactive planning and action.

2.2.7 Trends and opportunities in open distance learning

A growing number of students access higher education every year. Increasing numbers of students cause institutions not being able to accommodate all of these student in their normal programmes. Paragraph 2.2.1.2 has shown that not only students leaving school, but students currently employed or having permanent jobs, now also need to improve their level of education by improving knowledge and skills in the workplace. Teaching and learning are adapted to suit the circumstances of the student enrolled in distance education programmes. Howell, *et al.* (2003) identify the following trends that are evident in open distance learning:

- Modern technologies pose new challenges to the adaptation of current teaching and learning method to be implemented into open distance learning.
- More Internet accessibility is evident as these technologies are no longer restricted to the majority of students. Internet accessibility is more attainable utilising various methods and devices. Mobile communication devices are an example of devices that could possibly assist students even better for the downloading of study related information.
- A need arises for more programmes including different degrees, diplomas and certificates to be delivered through open distance learning. A reasons being that the delivery mode for each respective programme could be adapted regarding the mode and technology available.
- Ubiquity in the devices used in distance education is becoming evident and more modern mobile communication devices including cell phones and other communication media are included in the planning to improve teaching and learning through distance education.
- A need arises for students and members of the community to embark on obtaining more knowledge and skills in society to better their position within the workplace.
- Retention rates as a concern for administrators and faculty members (par. 2.2.5.1)
- Within open distance learning, students may now investigate more options and opportunities that are needed to suit their specific needs.
- Increasing numbers of students approach institutions to improve levels of education. Institutions are unable to accommodate all these students in the normal single contact mode of education.

In the above statements, it is shown that an increasing amount of opportunities and trends develop and it becomes more evident in open distance learning. Skills and new knowledge are easier accessible through open distance learning utilising new technologies and adapted processes to accommodate students in the teaching and learning process enabling them to master the courses. More opportunities to improve skills and knowledge arose giving more students the opportunities to utilise open distance

learning in order to achieve these goals. Innovative support systems for academic support and administration of students are looked at and assessed on a regular basis to improve the overall teaching and learning of students in open distance learning. Implementing modern communication methods and devices may enable students to explore more possibilities in order to have access to resources needed to improve skills and knowledge. Technology thus has to be taken in consideration and ways of implementing technologies into teaching and learning have to be applied. Increasing the application of technology in open distance learning leads to an increase in opportunities for students to enrol for programmes of choice in distance education.

Based on the above stated explanations, the following concept description can be formulated for open distance learning for this study: Open distance learning is the degree of openness determined by the removal of barriers preventing anytime and anywhere learning to occur, promoting and implementing effective communication devices and procedures to further enhance the processes in delivering distance education. This concept description is adopted for the rest of this research.

2.3 A brief history of distance education (DE)

Evidence indicating the existence of distance education dates back to the early 1700s and the focus for students enrolled in distance education programmes was to gain valuable job skills should they reside far from major centres of commerce and education. ("The Best Distance Learning Programmes: The History of Distance Learning," 2011; Jeffries, 2011, p. 1). Distance education commenced with a specific focus on adult education, predominantly female, during the early 1800s (Casey, 2008, p. 46; Nasseh, 2006, p. 1). During the early years, distance education focused on issues of education rather than issues of learning (Cook, 2011). Distance education in the United States of America originated from the early 1800s (Gunawardena & McIsaac, 2004, p. 356). Moore (2003, p. 6) states that distance education in the early years in the USA focused mainly on home schooling. Between the 1800s and 1900s activities pertaining to distance education extended beyond campuses in the USA (Nasseh, 2006, p. 1).

2.3.1 Australia

Geographical areas in Australia are very diverse ranging from densely populated urban areas to outstretch and vast semi-desert areas. Schooling and furthering education in an environment with these characteristics became a challenge. Distance education became a prominent means of schooling and education for the Australian population. Distance education in Australia dates back from the early 1900s where evidence was found of children's schooling correspondence. The university of Queensland (1911), Royal Melbourne Institute of Technology (1919) and University of Western

Australia (1921) were amongst the first tertiary institutions that embarked on distance education as a means of education provision (Mitchell, 2009, p. 143). Globally, the postal service was dominantly used for correspondence between the student and the institution.

2.3.2 Uganda

Distance education in Uganda originated in the early 1960s through correspondence and focusing on improving teacher education. Radio and television were also introduced in the facilitation of distance education programmes (Juliana & John, 2005, p. 166). Correspondence formed the core communication medium in distance education until 1969. Post 1969, radio, television and other electronic media were introduced into the delivery of programmes in distance education (Kapur, 2002, p. 185). There were also evidence of instructional films that were used since 1910 (Jeffries, 2011, p. 1).

2.3.3 Open University of the United Kingdom and India

An innovative approach incorporating a mixed media approach using text, audio and video in teaching and learning to provide distance education programmes was established when the Open University of the United Kingdom was founded in 1969 (Kapur, 2002, p. 186). Traditional universities in India did not meet the demands for interested candidates and prospective students in the country to have quality education at tertiary level. Therefore the Dr B.R. Ambekar Open University, Hyderabad was established in 1982, the Indira Gandhi Open University was established in 1985 and the Kota Open University amongst other institutions was established in 1987 (Sharma, 2005, p. 234). These were only some of a few institutions that were established in order to adhere to the growing demand in delivering quality education. The focus of the mentioned institutions in this paragraph was on distance education and specifically open distance learning as a method of accessibility by removing applicable barriers in teaching and learning to make further education a possibility for prospective students.

2.3.4 UNISA

UNISA, the oldest tertiary distance education institution in South Africa, was established approximately 130 years ago as the University of Good Hope and initially served as an examination body. In 1916, the institution was renamed as the University of South Africa (Ngengebule, 2003, p. 1; UNISA, 2009). UNISA focuses on delivering various qualifications through distance education. UNISA is the largest provider of tertiary distance education in SA. Many faculties within UNISA deliver degree and diploma programmes by means of distance education within South Africa as well as globally. The University of South Africa (UNISA) is an institution for tertiary education which, on the principles of equal opportunities, aims at providing society with academically and professionally educated men and women

who can assist in meeting the needs and aspirations of the people and economy of South Africa (Harley, 1992).

Globally distance education went through various phases in the delivery of distance education programmes as more advanced communication technologies were developed throughout the ages. All modes of delivering of distance education were initialised by the corresponding courses. All correspondence was paper based. The French model of the development of distance education reflects the same phases. Up and including the 1960s, the main focus was on paper based delivery. From the 1960s-1990s, radio and television formed the new approach to teaching and learning in distance education. From the 1990s virtual access to distance education became apparent (Xiao & Marquet, 2008, p. 584). Technological developments in the communications media became eminent, another mode developed in delivering distance education programmes was access to the Internet.

The following simplified timeline explains the development of distance education (Timeline beta, 2011):

- **1728:** First correspondence lessons by mail in 1728 advertised in the Boston Gazette (Timeline beta, 2011).
- **1800:** Postal service enables distance learning. Paper-based instruction through the postal structures is evident.
- **1858:** First distance learning degree delivered through distance education was awarded by the University of London.
- **1873:** First correspondence school in USA.
- **1911:** Australian Department of Correspondence established. Originated through the University of Queensland.
- **1957:** First educational TV programme. Sesame Street in USA was the name of the educational programme. Sesame Street is a multicultural educational programme with the focal point on educating children of all ages. The main medium for use was the television and was broadcasted to many households.
- **1960:** First distance learning in New Zealand. Massey University were the first university in New Zealand to deliver distance education programmes.
- **1969:** Open University of UK founded. The Open University of the United Kingdom (OU) was founded in 1969 (Kapur, 2002, p. 186). With the establishment of Britain's Open University, other open universities were established in Japan and America. The Open University did not only overcome teaching and learning over time and place. The Open University lifted national and international boundaries for students to enrol for various programmes through distance education (Nasseh, 2006, p. 3).

- **1969:** Founding of the Internet. Stanford Research Institute, University of California at Los Angeles, University of California at Santa Barbara and the University of Utah were the first institutions to be linked on a “network” (Marson, 1997, p. 1).
- **1970:** Telecourse task force funded. These are courses broadcasted to students by means of television, including video transmissions or direct broadcasts.
- **1971:** First US open university established. Distance education programmes offered by the University of Chicago.
- **1971:** Ivan Illich’s learning webs whereby teaching and learning not only comes about in the formal school environment. Teaching and learning transpires through different links and utilising a various number of technologies to assist with the teaching and learning process. The Ivan Illich theory’s main focus lies in “deschooling”. Using a variety of technologies to deliver teaching and learning added to distance education being more accessible and flexible in the modes of delivering various programmes.
- **1974:** German distance education university at Fern Universität in Hagen.
- **1976:** Coastline Community College becomes the first “virtual college”, broadcasting telecourses with no physical campus. 1979 – USENET was established through forums and newsgroups that are linked through the Internet whereby information could be exchanged between users.
- **1987:** NKI Distance Education in Norway starts the first fully online institution.
- **1989:** First Research in Distance Education publication.
- **1992:** CAPA (Computer-Assisted Personalised Approach) LMS was established whereby students could have individualised homework and assessment done online.
- **1994:** Two-way video conferencing developed by AT&T.
- **1996:** Task force on distance learning was established for good practice in distance education.
- **1997:** WebCT 1.0 LMS released which was a system used for e-learning whereby students could have online access to information and courses they were enrolled with at various institutions (Blesius, Kern, & Günther, 2001).
- **1998:** Blackboard Courseinfo released after merging with Courseinfo LLC.
- **1998:** Virtual University Gazette was launched as a news and views digest for online and distance education.
- **1998:** Number of online students doubles in 3 years globally.
- **2002:** Moodle 1.0 released. Moodle is an interactive information management platform, which learners could use to form their own knowledge. Moodle is a management leaning information system based on a learner-orientated philosophy (Chavan & Pavri, 2004, p. 66).
- **2003:** Quality Matters Grand Project for quality assurance of online programmes is done and ongoing and continuous improvements are assured in online courses.

- **2004:** SAKAI Project is formed. SAKAI is a Learning management system that serves as a platform where technological support are supplied to all stakeholders in distance education.
- **2009:** Online enrolments increase 21% in one year. The number of students enrolling for distance education programmes online increases at an alarming rate.

In assessing the above-mentioned timeline, three distinct phases can be identified in the delivery of distance education programmes over time, namely from paper based to television/radio broadcast to virtual and online teaching and learning by using various mobile and computing devices.

Limited technological development in communication in the early years of distance education were eminent, therefore the only effective means for providing distance education programmes was by way of correspondence. The postal service formed the foundation to communicate with students through correspondence, as it was accessible to all. Administrative support further forms the basis of service to students. Correspondence in the early years of distance education coped with the global population's need for education as overpopulation was not an issue and the demand for tertiary education was limited. The rapid escalation of the global population gave rise to a greater need for further education. Up to the 1950/60s, the written media formed the basis for distance education programmes.

Different technologies, and at a later stage, modern communication technologies were introduced in the provision of distance education programmes at a global scale. These technologies were introduced during the 1970s. As technology and communication technologies developed, the need arose to better equip all sectors of society with quality tertiary education. Skills training within the workplace became more evident. The focus during the early years was on home schooling and on the education of children in remote areas. With the introduction of broadband Internet, television, satellite and mobile phones, easier pathways to access resources became available at affordable costs to the public. Access to resources thus became a possibility and a necessity for students and academics. The postal service became more ineffective as modern electronic communication technologies developed rapidly exposing more possibilities of communication between students, lecturers and other role players at institutions offering distance education programmes. This kind of communication further became immediate without anytime delay, which is regarded as a major advantage of modern technology. The formal and traditional structures at tertiary institutions, whereby teaching and learning could only be ensued at specific times and places, could not deal with the increasing numbers of students wanting to enrol at tertiary institutions. Increased student numbers at formal institutions resulted in a move from a formal contact teaching and learning mode to a distance education mode of delivering academic and professional programmes. New and improved communication technologies enable a significant amount of courses to be delivered through distance education. Distance education programmes expanded and additional programmes developed to be offered through distance education as the need for further

education arose. The development of communication technologies globally created possibilities to incorporate 'blended learning' whereby more options exist for students to utilise a combination of online technologies and face-to-face contact sessions for studies in distance education. The period from the early 1950s transformed communication as a whole in the entirety as more communication options or modes were available for students in distance education programmes. Transforming communication led to different modes being introduced to deliver distance education programmes (Hiple & Fleming, 2011, p. 2). Institutions take in consideration their location as well as the diversity of the students regarding physical and economical elements when establishing a particular mode of programme delivery.

2.4. Modes for delivery of distance education programmes

A *mode* is the way in which something is done (Oxford English Dictionary, 2008, p. 918). In distance education, the way programmes are delivered, differs from one institution to another. Distance education is delivered by either a full contact approach (face-to-face), a combination of contact sessions and distance education (blended learning) and also by means of an online approach by employing modern communication and mobile technologies. The Commonwealth of Learning (2000, pp. 12,13) distinguishes three modes of delivery for open distance learning systems, namely single mode, dual mode and mixed mode. These modes are briefly described in the next paragraphs.

2.4.1 Single mode

Single mode open distance learning institutions include the world's mega-universities such as Indira Gandhi Open University in India and the United Kingdom Open University. Single mode open distance learning universities provide educational programmes by means of distance education, some face-to-face (classroom-based) interaction (often optional) and teaching and learning processes mediated in some way by print, audio, video, computer and online technologies (Commonwealth of Learning, 2000., p. 12). This approach concentrates on a single mode of teaching and learning. Single mode institutions is viewed in some circles as to focus mainly on the reproduction of knowledge than the development of new knowledge (Khakhar, 2001). An organisation or institution in which teaching, learning and administrative systems are designed and dedicated to the provision of open distance learning can be classified as a single mode distance education institution (Abrioux, 2008, p. 4). Study material is used repeatedly without changing content in order to recoup high costs that incurred to develop these materials (Bilham & Gilmour, 1995). Students enrolled within a single mode of programme delivery are assumed to be highly motivated and self-regulatory learners. Students in the single mode of delivery show to a large extent a great sense of self-discipline as well as minimal support from the institution in their teaching and learning endeavours.

An institution specialising in distance education, be it in distance education or having face-to-face tuition, will be considered as single mode institutions. Unisa and the United Kingdom Open University (UKOU) is an example thereof. Large capital investments are made in the development of programmes suited for single mode delivery.

2.4.2 Dual mode

A dual mode institution offers two modes, namely the traditional classroom-based method and distance education methods of delivery of programmes. In the traditional classroom-based method, an one-way communication is presumed to mostly prevails. The lecturer remains the focus of communication and is the dominating factor in the teaching and learning process. The lecturer's talk exceeds the student's talk and instruction focus on the whole class rather than on the smaller group (Relan & Gillani, 1998, p. 41). Dual mode institutions are institutions in which teaching, learning and administrative systems support both campus-based face-to-face teaching and learning, and distance education either through single or multiple structures (Abrioux, 2008, p. 4). The Open Learning Institute of the Charles Sturt University and the University of Botswana are examples of dual mode universities (Commonwealth of Learning, 2000, p. 12). Support and management structures exist for these institutions. Distance education include methods and techniques tailor made for students residing in remote areas geographically far afield from the institution offering distance education programmes. Students receive face-to-face contact as well tuition through a distance education mode incorporating and utilising new technologies in the field of m-learning, e-learning, DVDs and the Internet.

Numerous opportunities for students exist where they can enrol for distance education according to their interests at different institutions. Students may simultaneously enrol for face-to-face programmes and distance education programmes and is accordingly classified as dual mode students. Dual mode students are also seen as students enrolled for distance education programmes in which they participate academically in face-to-face contact sessions (classroom-based) and by means of a mode of distance education in which m-learning plays a significant role (Abrioux, 2008, p. 4).

2.4.3 Blended learning and mixed methods

Integrating online and communication technologies into the provision of academic programmes in face-to-face (scheduled contact sessions) as well as distance education, is generally known as blended learning. Students have various options and alternatives to communicate and participate in the teaching and learning process. Abrioux (2008, p. 4) defines *blended learning* as the amalgamation of classroom learning with technology supported learning activities including online learning conducted independently or by groups of students in the classroom or by means of a distance education mode.

The Commonwealth of Learning asserts that mixed mode institutions offer teacher-students an extensive choice of modes of study to suit their particular needs. The introducing of additional modern and mobile communication technologies furthermore encourages students to embark on a blended mode of delivery of distance education programmes as the increased use of technologies are combined with traditional distance education methods.

Open and distance education techniques, to a greater or lesser extent, as outlined by the Commonwealth of Learning (2000., pp. 12,13), include amongst other techniques:

- Independent, group-based or some combinations
- Face-to-face, mediated or some combination
- Maximises flexibility of place and pace of study
- The result of 'convergence' of face-to-face and distance modes
- Increasingly characterises organisations that were once 'single mode' or 'dual mode' (Commonwealth of Learning, 2000., p. 13).

The geographical environment, technological development and accessibility to modern technologies of the population/students within a country will aid an institution to settle on a specific mode of delivery of distance education programmes to be offered. Accessibility to resources and the availability thereof presents an institution with more potential to design more flexible distance education systems to be implemented. Students are able to adapt their study efforts to their particular circumstances. Combining face-to-face sessions with distance education (dual mode) in implementing up to date technologies will inevitably cause the transfer of new knowledge to be more sufficient, as more possibilities of acquiring new information exists. The combination of different means of providing teaching and learning offers more flexibility in the delivery of distance education programmes. Flexibility in learning is established by improving the means of communication and offering more options for students to gain access to higher education institutions. Flexibility is promoted by improving Internet connectivity, assuring broadband Internet and by implementing wireless networks. All aspects that were previously problematic.

Over decades communication developed to such an extent that more modern devices are used in providing distance education. Postal service was the initial mode for delivering distance education programmes through correspondence. As the postal service as communication medium became more unreliable globally, more sophisticated and advanced methods were developed in order to take communication to a higher level. Methods and modes employed in distance education rely on global communication tactics and technologies (Bork, 1995, p. 228). Global communication develops speedily and thus offers more possibilities to explore and acquire new knowledge. Delivery of programmes through a single mode or dual modes pose various possibilities to an institution and can only be

decided upon after careful consideration and a needs analysis among the students who the institution must serve. Distance education is suitable for some students and less suitable for other students, depending on their particular circumstances and needs. Important aspects regarding the advantages and disadvantages of distance education have to be evaluated before it is decided to embark on the delivering of distance education. Advantages and disadvantages need to be investigated to ensure the effective provision of distance education programmes.

2.5 Advantages and disadvantages of distance education

2.5.1 Advantages of distance education

According to Burgess and Russel (2003, p. 294) (quoted by Chute *et al.*, 1999; Davy, 1998; Prime Learning, Inc, 2001) distance education includes the following advantages:

- Students from a wide geographical area can be enrolled (Ghaffari & Emami, 2011, p. 89; Gharibpana & Zamani, 2011, p. 520).
- High retention rate of students and a considerable number of students are enabled to complete academic and professional courses. A high success rate of students is a direct result of added flexibility that is built into programmes as well as sufficient support structures that is put in place to ensure progress for students.
- Training of mentors and facilitators are implemented as effective and regular communication is established and sustained.
- Reducing travelling costs and time spent travelling as more technologies can be applied to assist with the training and re-training of facilitators and staff at tuition centres.
- Easier and more convenient access to learning resources and experts. Utilising modern communication technologies the availability of various devices enables easier communication to be a determining factor to access resources.
- Training activities can be realised more often, in short learning sessions that are easier to schedule and coordinate.
- Less expensive than programmes at residential institutions (Taylor, 2006, p. 6).
- More flexibility in teaching and learning methods (Taylor, 2006, p. 6).

Gharibpana and Zamani (2011, p. 520), Ghaffari and Emami (2011, p. 89) state that a wide range of audience can be accommodated through distance education. Improved networks and links are created between students having different cultures, beliefs and expectations. All individuals are automatically included in the “classroom” in which distance education is delivered. An important aspect of distance education to take into consideration is that the needs are met of students not able to attend classes.

Distance education can be as successful and even more successful as traditional classroom education (synchronous), depending on the teaching and learning approaches and technologies used (Mandic, Lalic, & Bandjur, 2010, p. 234). The majority of students enrolled in distance education programmes meet their objectives and would more easily enrol for other courses should the opportunity arises. This is because the student can continue immediately in an open learning system with his/her studies if a qualification is obtained and the student thus do not have to wait for a term or semester to pass in order to enrol for the next course (Mason, Helton, & Dziegielewski, 2010, p. 232). Enrolling whenever students want to is an advantage of distance learning offering students the opportunity to learn at their own time and place. Students set easier and attainable objectives as the student adapts teaching and learning to their own situation thereby personalising teaching and learning to individual circumstances.

2.5.2 Disadvantages and limitations of distance education

Sufficient training of students and employees in new technologies pertaining to distance education, cost of new technologies, access to current and new technologies and visionary leadership are determining factors for success in distance education (Ashby, 2011, p. 3; Beldarrain, 2006, p. 144). Negligence of any one of the preceding factors can be regarded as a serious disadvantage for the successful provision of distance education. Lack of technologies and limited access to computers is seen as negative factors in promoting distance education. Academic, cultural and technological barriers pose a problem to students enrolled in distance education (Irvan, Hannum, & De La Varre, 2010, p. 74). Academic barriers referring to large class sizes and poor support to students as well as inadequate lecturers involved in teaching and learning are regarded as specific disadvantages. Cultural barriers include lack of leadership and lack of faculty expertise. Inefficient and inadequate access to the Internet, technological limitations, computers as well as the availability of programmes and computers are technical barriers that is experienced (Irvan *et al.*, 2010, p. 74; Mason *et al.*, 2010, p. 232).

Kumar, *et al.* (2008, p. 21) and Corlett, *et al.* (2005, p. 162) indicate that distance education as well as the using of various mobile devices enable distance education to be more affordable. Affordability are to be taken in consideration as distance education affords more students the opportunity to further their education (Handa *et al.*, 2009, pp. 512-513; Kumar *et al.*, 2008, p. 17; Sharma, 2005, p. 208). The classroom utilised in distance education is becoming a virtual platform that could be established at any place and time accommodating all students irrespective their culture, economic and academic background and enabling students to access teaching and learning, study material and resources by means of a variety of technologies. However, an institution embarking on establishing a kind of virtual university to enable students to access relevant resources available to them needs a well structured and integrated computer and software system. The lacking of such a structured computer system is a drawback for a virtual platform to function effectively (Chang, 2002, p. 106).

Communication, be it paper based or electronically, plays a vital and foundational role in the teaching and learning activities of distance education programmes. Additional resources and support initiatives and mechanisms increase the accessibility to tertiary education through means of a distance education mode. Accessibility and communication are key components in ensuring success for students and institutions in distance education. The preceding key components are however dependent on the utilisation of modern and mobile technologies to accommodate and provide quality programmes to a dispersed corps of students with diverse contextual conditions.

The modern way of life causes the global society to move rapidly to a technology-driven society. Training and skill development programmes are needed to empower students and all stake holders in distance education to become technology informed and skilled users to integrate these modern and mobile resources into education to become educated and skilled citizens. Being able to communicate effortlessly, improves retention rates and throughput rates of students in distance education. Increasing opportunities for students enable them to access resources and support structures and prevent students from getting 'disorientated' in the distance education structures of an institution.

Communication and interactivity are made possible by modern communication technologies (e.g. mobile devices) and these aspects constitute a situation-specific challenge that needs to be addressed in a distance education mode. However, not all students are skilled in handling and employing modern communication technologies. Hesitancy to use modern communication technologies is a reality as a number of role players consider themselves incompetent to use modern technologies for the purpose of their studies. The more role players are exposed to modern communication technologies, the more they familiarise themselves regarding the application advantages of these technologies. Another factor is the availability and the affordability of mobile communication technology to role players. The more mobile devices that are developed and the more user friendly these devices are made, the more will students, support staff and academics be attracted to these technologies for integration in tertiary education. The evolving of mobile phones over the years and the increasing numbers of mobile devices introduced at a regular basis, shows that more students and individuals use the Internet on their mobile devices than in previous years (Smith, 2010, p. 9). It can thus be inferred that the more students are exposed in using and utilising mobile technologies, the more of them are also making use of the Internet and web browsing related actions.

Internet access is not available to all students in distance education, because student's locations being so diverse. The shortage of Internet access is caused by an insufficient infra structure for mobile technology in the area they reside in as it does not allow for broadband and even in some case normal coverage in certain areas. Limited access to the Internet and other electronic media has to be assessed and alternatives be explored and put in place to accommodate students and all other role players in distance education. Paper-based communication and the limited use of mobile

communication technologies are implemented in situations where broadband Internet is not available in remote and rural areas. The advantage that students can study at their own time, pace and in their own environment, enable the majority of students to obtain the objectives they had set out for themselves to achieve in pursuing of academic and professional qualifications. A contributing factor in this instance is that students are able to manage their own learning and create their own learning environment, which provide more structure and security to students as they are in an environment that is known to them and in which they are comfortable to study. By exposing, educating, training and giving students more access to modern communication technologies, may afford students more access to much needed resources to benefit and support their study efforts. The more resources exist, the more flexibility exists in the delivering of distance education programmes. Utilising assorted modes of programme delivery and combining face-to-face tuition in distance education as part of a blended mode, could lead to more flexibility in the teaching and learning process as affirmed by the Commonwealth (Commonwealth of Learning, 2000, p. 22). Burgess and Russel (2003, p. 294) state that distance education is far less expensive and flexible and affords students and learners more interactivity in the learning process. Teaching and learning at academic and higher education institutions are costly and a model for learning had to be developed that are flexible and more affordable to accommodate prospective candidates. Various challenges, including the implementation of innovative technologies, are eminent in distance education as the effective provision of distance education programmes depend on the flexibility of the teaching and learning process. Challenges and related opportunities associated with the mode of distance education are discussed in the following section.

2.6 Challenges and opportunities in distance education

2.6.1 Modern communications technologies in distance education

New technological developments in communication pose many challenges and opportunities to expand the provision of distance education programmes for all citizens of the country. Challenges include *inter alia* implementing new and modern communication technologies in the delivering of academic programmes through distance. Mobile communication devices offer a new challenge to students and role players to interact within the teaching and learning process. Beldarrain (2006, p. 144) and Gunawardena and Mclsaac (2004, p. 1) state that tertiary institutions have to evaluate the means and ways they implement and use new and improved modern communication technologies in distance education. By evaluating means and ways of delivering distance education programmes at a distance, higher education institutions will assist in incorporating new communication technologies in the delivering of distance education programmes and thereby overcome some of the challenges. Improved and modern communication technologies pose new challenges for institutions to adapt the modes for

delivering distance education programmes to students and all role players. Programmes, the delivery and management thereof, have to be modified in accordance with diverse environments and circumstances in order to address the needs of all role players regarding engagement in teaching and learning. Improving communication systems and support for delivering distance education programmes, will conquer time and location aspects in tertiary education as students are able to access various programmes online, utilising an assortment of modern communication devices from any place and at anytime. Devices, including mobile devices and other modern communication technologies, enable students to access resources and support structures from anywhere and any place at anytime. Mobile devices further allow students to access all resources including the Internet in order to get knowledge and other information to be able to successfully engage in the teaching and learning process (Liaw *et al.*, 2010, p. 447). Mobile and other modern communication devices lead to a high degree of personalisation of teaching and learning (Liaw *et al.*, 2010, p. 447).

2.6.2 Personalisation of teaching and learning

Personalisation of teaching and learning adds to the challenge of effectively delivering distance education to geographical dispersed students and role players. Personalisation of teaching and learning gives students the opportunity to set realistic objectives, easier attainable goals and adjusting to the diverse environment and conditions, the student participates in learning. The notion that time and place are irrelevant in mobile learning, enables teaching and learning to be individualistic, personalised and eliminating to a great extent the judgmental issues from the process of learning as is found in some traditional education settings (Attewell & Webster, 2004, p. 15). Personalisation leads to individualisation of learning content and homework posing new and realistic challenges in distance education. Each student assesses his own learning environment and therefore utilises devices suitable for individualistic circumstances into the teaching and learning process.

2.6.3 Affordability

The affordability in the delivering of distance education programmes at institutions, irrespective the location and time, is another crucial aspect to contemplate for all role players. Distance education is regarded as less expensive than courses and programmes at non-distance education (residential) institutions (Burgess & Russel, 2003, p. 294; Taylor, 2006, p. 6; UNESCO, 2002, p. 12). Hostel accommodation and full time studying are aspects not evident in distance education. Previously mentioned aspects therefore allow for teaching and learning being more affordable in distance education. Affordability of distance education affords more students from lower socio-economic societies the opportunity to register for distance education programmes. Enrolling students from a wider range from society will, by the assistance of new communication technologies, give birth to new ideas and methods of delivering distance education programmes as more variables will have to be

accounted for to support students in the teaching and learning process. Variables may include mobile technology utilised, geographical environment, support and management structures in teaching and learning, support structures in administrative aspects, modes of delivery, affordability, easier Internet accessibility and more recently developed communication technologies suitable for conveying learning content. All mentioned variables and application thereof in delivering of distance education programmes determine the success for delivering and completion of academic and/or professional programmes. The management of the process of delivering distance education programmes are especially challenging in order to manage the teaching and learning process optimally.

2.6.4 Management

Additional challenges are the development of effective management structures, systems and processes to support and regulate the institution's functions and tasks irrespective of the mode selected for the provision of academic programmes. Communication and decision-making processes are crucial for the offering of higher education programmes over a wide geographical area as sufficient support structures must be devised for the support of all role players. In order to evaluate the whole process of delivering distance education programmes, clear standards have to be set to evaluate, assess and implement the process of programme provision. Van der Westhuizen (2009, p. 44) posits that mainly four basic management tasks exist to regulate the teaching and learning process. The management tasks the author refers to are *planning, organizing, leading* and *controlling*. Effectively incorporating these management tasks into the delivering of distance education programmes, serves as a particular challenge as various variables are to be considered when implementing and managing higher education programmes through distance education. Care has to be taken to ensure good practice for programmes delivered by means of distance education. Sufficient planning and managing of programmes through distance education are eminent for effectively delivering distance education programmes (Wonacott, 2002, p. 2).

New communication technologies, personalisation of teaching and learning, management and affordability in the delivery of distance education programmes add a new frame of mind to teaching and learning. Managing the above-mentioned aspects are challenging as all variables mentioned in paragraph 2.6.2 are to be taken in consideration for the delivering of programmes over a distance to be effective. Addressing these variables and applying variables in the delivering of distance education programmes will contribute to successful programme provision. Students enrolling through distance education have different ideas and expectations from distance education as the mode of delivery and are different to the residential university student's expectations who has face-to-face and formal tuition in a full time mode of teaching and learning. Teaching and learning adapts to new possibilities of learning and improved methods of delivering in the introduction of new communication technologies, and are eminent for distance education to be effective. Various institutions currently deliver selected

programmes through distance education establishing structures in supporting this mode of delivery and the management of all resources and systems and processes in distance education is the determining competency which will lead to success or failure.

2.7 Trends in distance education

Accessibility and mobility are also viewed as key concepts in distance education. Availability of resources and easier Internet access from any location and at anytime may improve accessibility to distance education programmes. Various means exist by which resources are able to be accessed. A key component for students to have access to teaching and learning through distance education are new communication technologies developed globally to intensify globalisation in all aspects of society including teaching and learning. Bringing distance education in line with global perceptions regarding modes of delivery for teaching and learning in distance education which enable new communication technologies and information systems to assist with the effective delivering of distance education programmes (Chang, 2002, p. 106; UNESCO, 2002, p. 10). Establishing virtual universities (Casey, 2008, pp. 49-50; Chang, 2002, p. 106) and institutions involved in distance education may increase accessibility for all role players to resources set aside for use in distance education. Virtual campuses enable students to utilise the Internet and modern communication technologies for access to resources and to overcome distance and the separation of student and lecturer as barriers. Geographical dispersed environments as feeding areas for higher education are addressed to a large extent by improvement of modern and new communication technologies developed globally (Baggaley, 2009, p. 164). Development of improved communication technologies in developing countries enables students and role players to take part actively in the teaching and learning process and to increase access to resources. Intensifying globalisation allows the Internet to come to the forefront as an even larger resource to be utilised to optimum effect in distance education.

Traditionally, teaching and learning relies on synchronous learning whereby teaching and learning occur at one specific time and place, limiting students not being able to access teaching and learning on that specific time. Synchronous according to www.dictionary.com is a component like teaching or learning for example, that occurs at the same time; coinciding in time or taking place simultaneously. Institutions decide which mode of delivery they will embark on in delivering distance education programmes as suited by its infrastructure of academic and administrative support mechanisms. The more possibilities are offered to students for participation in programmes delivered through distance education, the more flexibility is evident. Flexibility of instruction enables asynchronous learning to take place whereby students can access learning at anytime and place and accordingly makes m-learning a vital element of distance education. Distance education moves towards more asynchronous learning to

be implemented into delivering distance education programmes (Baggaley, 2008, p. 42). More asynchronous learning increases flexibility in teaching and learning of distance education programmes.

Trends in distance education are identified as the implementation of more modern communication technologies as well as development of Internet accessibility and an increase in virtual campuses in the developing world. Improving accessibility to all resources enable enhanced mobility in the delivering of programmes through distance education as students then have more access to resources irrespective of time and place. Increasing accessibility presents more flexibility in the mode of delivery of distance education programmes. Distances from institutions providing academic programmes are less important as the implementation of appropriate technologies to bridge the physical distance. More advanced technologies enable students globally to use a variety of communication media and thereby became part of a global network of communication users through amongst other means social network sites (SNS). Physical distance becomes irrelevant in higher education. Academic and administrative support forms the basis for the effective provision of quality distance education programmes. Information systems as well as computer systems as part of an institution's management strategy assist with bridging the gap between student and the institution delivering programmes over distance.

2.8 Synthesis

It was established by means of definitional analysis and descriptions that the modus of distance education overcomes the barriers of distance (location) between students and institutions and allows students in an open distance education system to enrol and study at a time that is convenient for them. The preceding implies that students are able to personalise their studies because of the inherent flexibility that a modus of distance education makes possible. It was further determined that communication between students and higher education institutions is of paramount importance and determine to a great extent the success of engaging in a modus of distance education programmes for students and service providers. Communication as an integral part of distance education depends further on *inter alia* the utilisation of mobile technologies to realise all the mentioned features of distance education. Related aspects such as accessibility, affordability, interactivity and flexibility have to be accounted for and assured by the management of distance education institutions to provide maximum support to relevant role players from diverse contextual environments and situations. The providers of distance education programmes have to meet modus-specific challenges (barriers) and have to account for trends associated with distance education to realise of all of the stated matters successfully in practice, which finally relies on situation-specific management structures, systems, processes and strategies.

The afore stated argumentation is illustrated in the following diagram (Figure 2.1), which depicts the concept of distance education in relation to the context of this research. A circular and stacked shape

is particularly suitable in this case to indicate the overlapping and interrelated relationships of the various aspects of distance education as discussed in the literature study of this research.

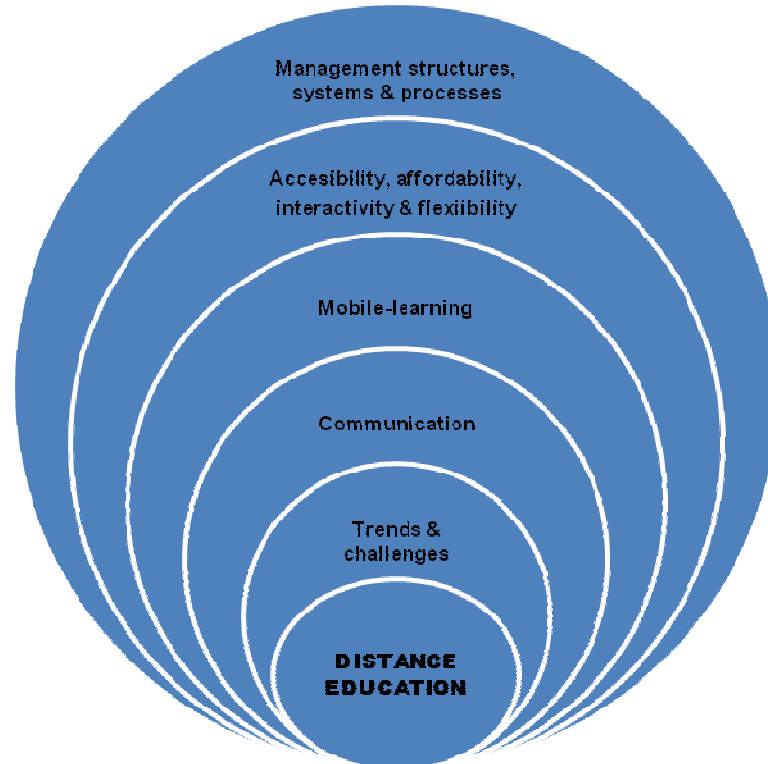


Figure 2.1: The concept of distance education in relation to contextualised aspects

The above diagram with the contextualised aspects in relation to distance education serves as a theoretical outline or framework for this research.

In conclusion, the following synopsis is accepted as a conceptual framework for this research. The subthemes of mobile learning and distance education is presented within the overarching theoretical framework of effective management principles, structures, systems and processes to support and regulate organisational operations and functions to achieve set goals in diverse contexts. The basic management tasks of planning, organisation, leading and control (p. 52) are accepted as an underpinning to deliver distance education programmes. Increased technological advancements pose challenges *inter alia* accessibility, affordability, flexibility and interactivity for management structures and systems. Clarity of roles and responsibilities, the acknowledgement of management's authority and effective communication frameworks are presented as key aspects for the locus of control and command. This theoretical reasoning is illustrated in Fig. 2.1 in which management structures, systems and processes (guidelines) encapsulates the themes of M-learning and Distance Education.

Chapter Three

Research design and methodology

3.1 Introduction

In the previous chapters, the aspects distance education, open distance learning, mobile-learning (m-learning) and management of aspects in distance education were discussed. Distance education was defined, and different modes and related aspects were discussed for delivering distance education programmes. M-learning as well as new mobile communication technologies was addressed, opening new possibilities for delivering distance education programmes. The previous chapter forms a theoretical framework for this research project. Subsequently, this chapter will present the empirical section of this research.

The research design and methodology adopted in this research is covered in this chapter. A report on the process undertaken in carrying out this study as well as shortcomings experienced during this study is presented. The questions: *how*, *where*, *what* and *why* are answered, and research procedures and decisions made are explained in this chapter.

A quantitative research design was decided upon in order to address the research problem and associated research questions. Primarily, the emphasis is continuously focused and led by the context and specific research aims of the research. The study population, and rationale for the choice and outline of the measuring instrument is motivated in this chapter. The statistical analysis techniques are described and the chapter concludes with a description of the ethical aspects and administrative procedures applicable to this research.

3.2 The context of educational research

When undertaking educational research, researchers need to take specific and related aspects into consideration (Lodico, Spaulding, & Voegtler, 2010, p. 4). Yates (2004, pp. 15-35) presents the following claims for quality educational research, and these claims were also adopted for conducting this research:

- *Educational research is measured by its contribution to learning.* The researcher is convinced of the contribution of this research to the body of knowledge about the study theme of distance education.

- *Educational research must make sense to be usable by education practitioners.* The findings of this research have trustworthy meaning and valuable and practical implications for implementing m-learning as an integral part of distance education.
- *Educational research must be scientifically-based research.* This research was conducted in accordance to the logic of research and meets the strict requirements of scientific investigation.

The research conducted aimed, amongst other aspects, to make a valuable contribution to the study field of education with a specific focus on the effective implementation of mobile communication technologies into the delivery of distance education programmes. New approaches in implementing mobile technologies in distance education were investigated. This research study was undertaken to make a significant contribution to the implementation of m-learning as part of an open distance education modus.

3.3 Purpose of empirical section

The purpose of this empirical section of the research report is to describe the research design and methodology followed in this research. The process of collecting reliable and valid data for the research problem and related research problems is described. The research questions referred to aspects related to the role of m-learning, challenges, trends, the implementation of m-learning and management guidelines in connection with a modus of distance education. Management guidelines, based on the findings of this research for the implementation of m-learning as part of the provision of distance education were compiled as part of Chapter Five of this research.

The empirical section is based on the following research themes from Chapter Two to obtain the necessary data for this study:

- a description of open distance learning and the role of m-learning as an integral part of distance education
- a clarification of the concept of any place and anytime learning
- the advantages and disadvantages of implementing m-learning
- academic and administrative support offered to all relevant role players
- the accessibility, affordability and mobility of mobile communication technologies
- flexibility of the teaching and learning process according to personalised circumstances
- managing guidelines for implementing m-learning in an open distance learning mode.

The purpose of the research is in accordance with the research problem and research aims, (par. 1.3) focusing on the implementation of m-learning in an open distance education modus. Furthermore,

management guidelines will be compiled to manage the implementation of m-learning effectively in distance education. An analysis of the data gathered facilitated and formed, with the information from the literature study, the basis of the management guidelines to implement m-learning in distance learning.

3.4 Quantitative research

All relevant components of this research including the central research problem statement, research questions and aims, literature study, data gathering, analysis and results constitute the conceptual framework utilised to conduct this research (Thietart, 2007, p. 111).

A quantitative research design was adopted and considered as relevant and appropriate to address the specific research problem of this study. Quantitative research is associated with a positivistic paradigm that originated during the late 19th century and followed throughout the 20th century as an approach to scientific inquiry (Creswell, 2009, p. 4; Fraenkel & Wallen, 2008, p. 423; Gall, Gall, & Borg, 2007; Thietart, 2007, p. 80). In this regard, Leedy and Ormrod (2005, pp. 95,96) describe quantitative research as, amongst others:

- Research that can be explained, generalised and predicted
- Positivistic research without other influence
- Focused approach research with the use of numbers
- Objective measurement instruments are used
- Research using known variables
- Follow objective research methodologies
- Findings are based on the analysis of numerical data by using statistical techniques
- Research that is representative using a large population
- Research using questionnaires or experiments.

Positivism can be described as a particular epistemology that emphasises inquiry of phenomena in reality that is based on facts without any subjective influence from researchers or respondents. The expert or inquirer and the knowledge are envisaged as separate and independent when the reality is observed and knowledge is constructed. Feelings are not taken into account with this research (Fraenkel & Wallen, 2008, p. 423; Gall *et al.*, 2007, p. 15). Therefore, quantitative research is viewed as an approach of accepting the external objective reality that does not focus on the confrontation of limitations from the social world. Quantitative research is thus seeking for objective answers on questions that focus on ways and means to improve and to understand specific aspects of reality.

According to Johnson and Onwuegbuzie (2004) the following can be views as strengths of quantitative research:

- Data collections are relatively fast
- An established hypothesis may be established before the collection of data
- Constructive theories about a phenomenon that already exists are evaluated
- A high sense of credibility is recognised by the scientific fraternity about the outcomes of quantitative research
- Precise, quantitative and numerical data are assured
- Processing of data is not time consuming
- Research results are relatively independent of the researcher.

The limitations of quantitative research are, according to the same authors, Johnson and Onwuegbuzie (2004):

- The theories used by researchers could be questioned
- Knowledge acquired by this research is in some instances a challenge to be abstracted for application in practice
- The objective quantitative nature of this methodology as well as the methods used to collect data makes it difficult account in depth for the research context — such as sensitive, individual experiences of individuals as is the case with qualitative research.

After the consideration of the above-mentioned features of quantitative research, it was decided to adopt a quantitative research design as an appropriate research approach. An empirical survey was further opted for as suitable research methodology to investigate the research problem and to achieve the related aims of this research.

3.4.1 The survey as research method

The viewpoints of the respondents are significant in relation to the purpose of this study. The survey as method of inquiry is of particular worth for scientific investigation should the researcher need specific information on a certain topic (Fraenkel & Wallen, 2009, p. 390). Additionally the survey presents the researcher with valuable numerical or quantitative explanations of trends, approaches, and/or viewpoints of a study population by investigating a sample of that population (Creswell, 2009, p. 145). The researcher has chosen the survey as method of inquiry because it is of particular value to establish topic-related occurrences, trends, comparisons and statistical relationships (Thietart, 2007, p. 173). In this research, the role of m-learning and the management thereof in an open distance education modus were investigated. Surveys in research are by and large used to gather specific information at a certain point in time amongst a certain group within a population to assess the nature and/or manifestation of

existing situations or conditions (Cohen, Manion, & Morrison, 2008, p. 205). In this research, considering current communication technologies, it was aimed to establish at a specific point in time the role of m-learning as part of distance education and management guidelines for the implementation of m-learning with the mobile technologies currently available.

Within the study population where data are collected, diversity exists regarding geographical and socio-economical status, amongst other aspects. The diversity of the above-mentioned aspects of the study population for this research will be investigated as part of the demographical section of the measuring instrument. The respondents chosen for the research form a cross-section of all the relevant role players involved in the distance education programmes of a particular higher education institution. Cross-sectional surveys collect information from a sample that was drawn from a predetermined population (Cohen *et al.*, 2008, p. 213; Fraenkel & Wallen, 2009, p. 391).

3.4.1.1 Rationale and purpose

The rationale for selecting a quantitative research design and survey methodology for this research is that the data collected by means of a structured questionnaire will enable the researcher to determine the level of views and experiences of respondents in relation to specific aspects of the phenomenon under investigation in accordance to research aims (par 3).

In order to answer questions about relationships and influences among measurables or comparable variables with the purpose of explaining, predicting, and controlling phenomena, quantitative research will be appropriate (Leedy & Ormrod, 2005, p. 94). In order to determine the management guidelines for the implementation of m-learning in an open distance learning model fieldwork was done in the open distance learning environment by means of a survey. The preceding explanations constitute the purpose and rationale for using the survey as a quantitative research design.

3.4.1.2 Strengths and limitations

In quantitative research, high measurement reliability will be achieved with a high construct validity if appropriate questionnaires are constructed and proper controls have been implemented (Mouton, 2001, p. 153). Quantitative research concerns itself with measuring and analysing in the relationship of the cause and consequence of variables in order to explore and to discover the relationships between variables, so as to make predictions (Fraenkel & Wallen, 2008, pp. 425-432). An advantage of quantitative research is that the researcher can make predictions about the possible outcome of the research as well as formulate a hypothesis even before data are collected. Quantitative research is an advantage if the researcher must predict the behaviour of a certain group of individuals, but when the question is why they behaved in a certain way, it cannot be done with the analysing and measuring of

variables. A limitation of quantitative research is that the theories and categories used will not reflect the participants' perceptions and ideas. Personal opinions and depth and the lack thereof could guide surface level analysis and data, being context specific. This aspect is regarded a limitation of quantitative research (Mouton, 2001, p. 153). A further limitation is the fact that should the researcher's questionnaires reach the respondents, the respondents could possibly interpret the questionnaires. A low return rate of questionnaires could also pose a limitation of this type of research method (Leedy & Ormrod, 2005, p. 185). Mouton (2001, pp. 103-104) gave the following guidelines in order to ensure that the questionnaire is true to its purpose:

- Prevent double-barrelled questions. These will be questions that combine one or more questions in one.
- Questions must not be vague. Clearly state what is expected from a question.
- Ensure the sequence of questions is correct.
- Make use of leading questions. These questions will lead and influence respondents to give a specific response.
- Questionnaire must not have a poor layout.
- Refrain from using sensitive and threatening questions. Including these questions could lead to respondents not answering all the questions in the questionnaire.

The researcher employed all the strategies above in order to ensure that all the data collected were handled correctly and appropriately. The only limitations of this research are the diverse geographical environment the students find themselves in and the fact that many students do not have mobile phones and devices that are connected to the Internet. This limitation was overcome by asking centre coordinators at all venues to explain the questions as well as the questionnaires to students. Questions were asked in the questionnaires so that all students with mobile phones could answer even if they do not have WAP enabled devices. This will enable more respondents to answer the questions and increase the number of questionnaires returned to the researcher.

3.4.2 The research paradigm

A research paradigm is defined as a general theory that informs most scholarships on the operation and outcomes of any particular system of thought and action (Entman, 1993, p. 56). The research paradigm that I will work from is mainly based within the post-positivism paradigm because of a certain awareness of subjectivity. The post-positivistic paradigm is regarded as a useful paradigm for researchers who maintain an interest of positivism like quantification, yet wish to incorporate interpretive concerns of subjectivity (Maree, 2009, p. 65). Post-positivism is a recent philosophy recognized by current researchers, emphasizing that the relationships between variables are influenced by factors over which the researcher has no control (Geduld, 2010; Wiersma & Jurs, 2008) In order to

report on the experiences of respondents, open-ended qualitative questions will be integrated in the quantitative research design.

3.5 The questionnaire

The researcher selected a questionnaire to collect specific data about m-learning at a distance education unit. Data collected from respondents include biographical information, conceptual matters of open distance education and m-learning, accessibility and current practices in relation to m-technology and views, challenges, experiences and expectations with regard to m-learning as part of an open distance learning model.

A structured questionnaire was used for this research whereby respondents only had to choose certain answers stated in the questionnaires and did not have to give answers of their own. Only specific responses were required by the researcher.

The researcher developed the structured questionnaire for this research in accordance with the theoretical overview stated (Baggaley, 2008) in Chapter Two. Questionnaires developed by Liu *et al.* (2010), Ally *et al.* (2010), Hashim *et al.* (2010), Wendeson *et al.* (2010), Maniar *et al.* (2007) and Chong *et al.* (2011) were taken in consideration when developing the structured questionnaire for this research.

3.5.1 Principles for developing the questionnaires

In order to acquire the desired results from the respondents the researcher must ensure that all questions are clearly formulated and organized in order for respondents to understand what is required from them (Thietart, 2007, p. 174). According to Thietart (2007, p. 174) and Leedy and Ormrod (2005, pp. 190-192) questionnaires must adhere to the following principles:

- Clear instructions on what is expected from the respondents must be set out
- Questions must be formulated in understandable, definite and uncomplicated language
- Questions must have a logical order and be short so as to prevent confusion amongst respondents
- Avoid questions that are similar to each other as this might confuse respondents
- A questionnaire must be structured so that simple questions are posed at the initial phases of the questionnaire becoming more complex towards the end of the questionnaire
- Questions must be set out in a professional and attractive way
- Needs of the researcher must be addressed in the questionnaire.

Different aspects will be covered by the questionnaire such as biographical information, conceptual matters of open distance education and m-learning, accessibility and current practices in relation to m-technology and views, challenges, experiences and expectations with regard to m-learning as part of an open distance learning model. Therefore the questionnaire will have different sections addressing these topics in the research. Each section will contain different questions relating to each specific category. A summary will be given of the outlay of the questionnaire for a general overview of the questionnaire.

3.5.2 Construction of the questionnaire

Participation of all respondents was crucial in this research as to obtain an accurate viewpoint of all involved in the research. Respondents in this research included centre co-ordinators, managers, lecturers, facilitators and students. Questionnaires were set so as to get enough feedback to assist in the managing of m-learning at a distance education unit. The different sections of the questionnaires were as follow.

Section A: Biographical information

All the questions in this section were utilised to establish the geographical and biographical diversity of the respondents. The aim of this section was also to establish the socio-economical background of the individual. This information would guide the researcher in establishing how accessible m-learning is to all included in the research.

Section B: Conceptual matters regarding to m-learning and distance education

The aim of this section was to collect information from respondents about their understanding of open distance learning and how m-learning can be utilised in this mode of delivering teaching and learning. Additionally this section informed respondents of all possibilities m-learning offers in distance education.

Section C: Accessibility and current practices in relation to m-technology and views

An important aspect in this section was to establish what type of mobile device all respondents are in possession of to assess how teaching and learning can be adapted in order to give access into all programmes delivered through distance education. The opinions regarding mobile learning were also

established. The researcher determined the attitude of respondents regarding the implementation of m-learning in distance education.

Section D: Challenges, experiences and expectations with regard to m-learning as part of an open distance learning model

In this section, the researcher established the expectations all role players have set themselves regarding the utilization of mobile devices in distance learning. Challenges and limitations were looked at as to establish how m-learning could be implemented into an open distance education modus for education programmes to be delivered more effectively. Also in this section, it was established what type of academic and administrative support structures could be put in place in order for m-learning to be managed effectively.

3.5.3 Scale

The Likert type scale will be used in the questionnaires applied for this research. The respondents' attitudes regarding mobile learning will be evaluated. The Likert scale is suitable if the attitudes of the respondents are to be investigated (De Vos, Strydom, Fouche, & Delport, 2011, p. 212; Fraenkel & Wallen, 2009, p. 124; Leedy & Ormrod, 2005, p. 185; Maree, 2009, p. 167). The Likert scale provides a range of responses to a given question or statement (Cohen *et al.*, 2008, p. 326). Various questions were asked which the respondents had to answer. Opinions and attitudes of the respondents were evident in the answers provided. Data for this survey have to be evaluated and quantified which makes the Likert scale suitable for this study (Leedy & Ormrod, 2001, p. 197). Numerical descriptors were used in this research in order to discover the respondents' attitudes and beliefs in aspects of learning that was covered by the questionnaire. Numerical descriptors indicating scale of agreement of the respondents are typical of the Likert scale (Dawes, 2008, p. 62).

A four point rating scale was used for this study in order to determine the attitudes of the respondents towards m-learning, including accessibility to these technologies and conceptualisation of terminologies regarding m-learning. The scale for this research was constructed similar to the table below and was implemented in the questionnaires sent out to the respondents.

Table 3.1: Rating scale for questionnaire

Do not agree	Disagree to some extent	Agree to some extent	Agree completely
1	2	3	4

3.5.4 Statistical analysis

Data collected from the questionnaires were organised, analysed and interpreted by means of descriptive statistical techniques. Measurements were recorded on a four-point Likert scale. The statistical analysis involved the use of descriptive statistical techniques in graphical and numerical methods to present and analyse the captured data from the survey. Two-way frequency tables and cross tabulations were used to explore particular response trends or patterns from the different subgroups (Maree, p. 185; Steyn *et al.*, 2004, p. 72). Central tendency measures (such as the mean) were applied to describe the distribution pattern of responses and values. The spread of the distribution (e.g. the standard deviation) was described by numerical variances to indicate the extent to which data measures tend to cluster together or are spread over the range of values (Maree, 2009, p. 188). The rationale for applying descriptive statistical techniques in this research was to present, organize, analyse and interpret the relevant data meaningfully in order to understand the characteristics, trends, patterns and relationships between the various variables of this research study.

Data from the questionnaire were statistically interpreted and analysed in collaboration with the Statistical Consultation Services (SCS) of the North-West University, Potchefstroom Campus. The reliability of subscales (constructs) as part of the questionnaire was determined by calculating the Cronbach's alpha coefficient (α) while the construct validity was assured by performing a positive factor analysis. These reliability measures are described in the next section.

3.6 Reliability and validity

The reliability and validity for this research were dealt with concurrently, because a principal axis factor analysis was firstly performed, which was followed by a statistical technique to determine the internal reliability of the questionnaire. The purpose of the factor analysis was to determine which question items 'belong together' in the sense that they measure the same construct or factor (Maree, 2009, p. 219).

The Cronbach alpha coefficient (α) is widely used as a reliable procedure to indicate how well various items are positively correlated to one another. A statistical method was accordingly used to calculate

the Cronbach alpha coefficient (α) to assess the internal consistency of the various question items of the questionnaire (Terwee *et al.*, 2007, p. 36). A Cronbach alpha coefficient of ≥ 0.7 indicates that the applicable questionnaire items are highly consistent, while a correlation coefficient of ≥ 0.6 is still regarded as substantial (Thietart, 2007, p. 203). A mean inter-item correlation (Miic) calculation was also done in this regard to indicate the extent of connection between the means of the various question items. A mean inter-item correlation between 0.15 and 0.55 is indicative of a practically significant correlation between items within questions posed to respondents.

A pilot study was conducted with six (6) respondents before the questionnaires were distributed for this research study. The purpose of the pilot study was to ensure that the questionnaire's format, technical layout, instructions, question formulations and time allocation for completion were clear, correct and understandable. If not, then to obtain relevant comments and recommendations from these respondents for final refinement. The respondents in the pilot group were handed a questionnaire and instructed to write critical comments on the survey questionnaire regarding the

- clarity of questions posed
- language and wording used in the survey questionnaire (comprehension of each question item)
- applicability of content regarding distance education students.

The feedback from the respondents in the pilot study contributed to and increased the reliability of the measuring instrument. All respondents commented that questions included in the survey questionnaires were clear and easily understandable. "Moodle" in question item 14 was not familiar with some of the individuals in the pilot study. The researcher afterwards added a concise sentence to this particular question item explaining the meaning of "Moodle" as an information management system in distance education. Another open-ended option was also added to question item 23 whereby respondents could provide more barriers in mobile learning. All respondents taking part in the pilot study indicated that the language and wording of the survey questionnaire as a whole were explanatory and easily understandable. Questions posed in the questionnaire were at an appropriate level for everybody partaking in the research. Respondents confirmed that this study was applicable to all variants of distance education, which would be embarked on in future, as mobile learning as well as e-learning was very much regarded by these respondents as 'the future of teaching and learning'.

The mentioned reliability and validity results of the questionnaire are presented in compliance with the different section items.

3.6.1 Questionnaire, Section B: Concept understanding

3.6.1.1 Distance education (10.1 – 10.6)

A principal axis factor analysis was performed for question items 10.1 – 10.6 (distance education), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of one (1) factor that explains 45.9% of the variance. This single factor extraction confirms that the various items are in coherence with the concept of distance education and these items (10.1 – 10.6) are thus accepted as a valid measure.

A Cronbach alpha coefficient of 0.775 was calculated for question items 10.1 – 10.6, while the mean inter-item correlation (Miic) was 0.373.

Subsection of questionnaire	Items	α	*Miic
Distance education	10.1 – 10.6	0.775	0.373

*Miic – Mean inter-item correlation

The above stated alpha coefficient (0.775) and mean inter-item correlation (Miic) for question items 10.1 – 10.6 about the concept understanding of distance education are thus accepted for further analysis and interpretation.

3.6.1.2 Facilitation of distance education (DE) programmes (11.1 – 11.3)

A principal axis factor analysis was performed for question items 11.1 – 11.3 (facilitation of distance education (DE) programmes), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of one (1) factor that explains 54.4% of the variance. This single factor extraction confirms that the various items are in coherence with the concept of the facilitation of distance education (DE) programmes and these items (11.1 – 11.3) are thus accepted as a valid measure.

A Cronbach alpha coefficient of 0.679 was calculated for question items 11.1 – 11.3, while the mean inter-item correlation (Miic) was 0.313.

Subsection of questionnaire	Items	α	*Miic
Facilitation of DE programmes	11.1 - 11.3	0.679	0.313

*Miic – Mean inter-item correlation

The above stated alpha coefficient (α) and mean inter-item correlation (Miic) for question items 11.1 – 11.3 about the facilitation of distance education (DE) programmes are thus accepted for further analysis and interpretation.

3.6.1.3 Mobile learning (12.1 - 12.7)

A principal axis factor analysis was performed for question items 12.1 – 12.7 (Mobile Learning), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of one (1) factor that explains 50.8% of the variance. This single factor extraction confirms that the various items are in coherence with the concept of mobile learning and these items (12.1 – 12.7) are thus accepted as a valid measure.

A Cronbach alpha coefficient of 0.844 was calculated for question items 12.1 – 12.7, while the mean inter-item correlation (Miic) was 0.445.

Subsection of questionnaire	Items	α	*Miic
Mobile learning	12.1 - 12.7	0.844	0.445

*Miic – Mean inter-item correlation

The above stated alpha coefficient (α) and mean inter-item correlation (Miic) for question items 12.1 – 12.7 about mobile learning are thus accepted for further analysis and interpretation.

3.6.2 Questionnaire, Section C: Accessibility to mobile technology

3.6.2.1 Patterns of cell phone usage (18.1 - 18.6)

A principal axis factor analysis was performed (table 3.2) for question items 18.1 – 18.6 (Patterns of cell phone usage), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of two (2) factors that explains 64.5% of the variance. This dual factor extraction confirms that the various items are in coherence with the concept patterns of cell phone usage and these items (18.1 – 18.6) are thus accepted as a valid measure.

Table 3.2: Principal axis factoring – Patterns of cell phone usage

Factor	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total
1	2.440	40.670	40.670	1.991	33.183	33.183	1.990
2	1.428	23.793	64.463	0.884	14.736	47.919	0.884
3	0.815	13.580	78.043				
4	0.600	10.006	88.049				
5	0.489	8.147	96.196				
6	0.228	3.804	100.000				

A Cronbach alpha coefficient of 0.690 was calculated for question items 18.1 – 18.6, while the mean inter-item correlation (Miic) was 0.236.

Subsection of questionnaire	Items	α	*Miic
Patterns of cell phone usage	18.1 - 18.6	0.690	0.236

The above stated alpha coefficient and mean inter-item correlation (Miic) for question items 18.1 – 18.6 about patterns of cell phone usage are thus accepted for further analysis and interpretation.

3.6.2.2 Academic programmes (19.1 - 19.5)

A principal axis factor analysis was performed (table 3.3) for question items 19.1 – 19.5 (academic programmes), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of two (2) factors that explains 64.4% of the variance. This dual factor extraction confirms that the various items are in coherence with the concept patterns of cell phone usage and these items (19.1 – 19.5) are thus accepted as a valid measure.

Table 3.3: Principal axis factoring – Academic programmes

Factor	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total
1	2.120	42.405	42.405	1.567	31.335	31.335	1.271
2	1.099	21.984	64.389	0.571	11.410	42.745	1.293
3	0.682	13.647	78.036				
4	0.595	11.906	89.943				
5	0.503	10.057	100.000				

A Cronbach alpha coefficient of 0.648 was calculated for question items 19.1 – 19.5, while the mean inter-item correlation (Miic) was 0.291.

Subsection of questionnaire	Items	α	*Miic
Academic programmes	19.1 - 19.5	0.648	0.291

*Miic – Mean inter-item correlation

The above stated alpha coefficient (α) and mean inter-item correlation (Miic) for question items 19.1 – 19.5 about academic programmes are thus accepted for further analysis and interpretation.

3.6.2.3 Learning approach (20.1 - 20.4)

A principal axis factor analysis was performed for question items 20.1 – 20.4 (learning approach), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of one (1) factor that explains 49.1% of the variance. This single factor extraction confirms that the various items are in coherence with the concept patterns of the learning approach and these items (20.1 – 20.4) are thus accepted as a valid measure.

A Cronbach alpha coefficient of 0.616 was calculated for question items 20.1 – 20.4, while the mean inter-item correlation (Miic) was 0.304.

Subsection of questionnaire	Items	α	*Miic
Learning approach	20.1 - 20.4	0.616	0.304

*Miic – Mean inter-item correlation

The above stated alpha coefficient (0.896) and mean inter-item correlation (Miic) for question items 20.1 – 20.4 about learning approach are thus accepted for further analysis and interpretation.

3.6.3 Questionnaire, Section D: Experiences related to mobile learning

3.6.3.1 Experiences and perceptions (21.1 - 21.10)

A principal axis factor analysis was performed (table 3.4) for question items 21.1 – 21.10 (learning approach), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of two (2) factors that explains 66.6% of the variance. This dual factor extraction confirms that the various items are in coherence with the concept patterns of experiences and perceptions of mobile learning and these items (21.1 – 21.10) are thus accepted as a valid measure.

Table 3.4: Principal axis factoring – Experiences and perceptions of mobile learning

Factor	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total
1	5.128	51.278	51.278	4.730	47.298	47.298	4.091
2	1.528	15.285	66.563	1.201	12.014	59.313	3.505
3	0.846	8.463	75.026				
4	0.711	7.113	82.139				
5	0.457	4.574	86.712				
6	0.368	3.678	90.391				
7	0.345	3.447	93.838				
8	0.298	2.982	96.820				
9	0.195	1.954	98.774				
10	0.123	1.226	100.000				

A Cronbach alpha coefficient of 0.896 was calculated for question items 21.1 – 21.10, while the mean inter-item correlation (Miic) was 0.471.

Subsection of questionnaire	Items	α	*Miic
Experiences and perceptions of mobile learning	21.1 - 21.10	0.896	0.471

*Miic – Mean inter-item correlation

The above stated alpha coefficient (α) and mean inter-item correlation (Miic) for question items 21.1 – 21.10 about experiences and perceptions of mobile learning are thus accepted for further analysis and interpretation.

3.6.3.2 Challenges of mobile learning (22.1 - 22.13)

A principal axis factor analysis was performed (table 3.5) for question items 22.1 – 22.13 (challenges of mobile learning), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of three (3) factors that explains 57.7% of the variance. This triple factor extraction confirms that the various items are in coherence with the concept patterns of challenges of mobile learning and these items (22.1 – 22.13) are thus accepted as a valid measure.

Table 3.5: Principal axis factoring – Challenges of mobile learning

Factor	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total
1	4.903	37.717	37.717	4.384	33.723	33.723	3.311
2	1.425	10.964	48.681	0.969	7.452	41.175	2.681
3	1.173	9.021	57.703	0.667	5.134	46.309	3.180
4	0.895	6.884	64.587				
5	0.796	6.126	70.713				
6	0.728	5.597	76.310				
7	0.630	4.845	81.155				
8	0.578	4.450	85.605				
9	0.487	3.749	89.354				
10	0.457	3.519	92.873				
11	0.348	2.680	95.552				
12	0.311	2.394	97.947				
13	0.267	2.053	100.000				

A Cronbach alpha coefficient of 0.835 was calculated for question items 22.1 – 22.13, while the mean inter-item correlation (Miic) was 0.290.

Subsection of questionnaire	Items	α	*Miic
Challenges of mobile learning	22.1 - 22.13	0.835	0.290

*Miic – Mean inter-item correlation

The above stated alpha coefficient (0.835) and mean inter-item correlation (Miic) for question items 22.1 – 22.13 about the challenges of mobile learning are thus accepted for further analysis and interpretation.

3.6.3.3 Barriers with regard to mobile learning (23.1 – 23.6)

A principal axis factor analysis was performed for question items 23.1 – 23.6 (barriers with regard to mobile learning), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of one (1) factor that explains 56.4% of the variance. This single factor extraction confirms that the various items are in coherence with the barriers with regard to mobile learning and these items (23.1 – 23.6) are thus accepted as a valid measure.

A Cronbach alpha coefficient of 0.775 was calculated for question items 23.1 – 23.6, while the mean inter-item correlation (Miic) was 0.373.

Subsection of questionnaire	Items	α	*Miic
Barriers with regard to mobile learning	23.1 – 23.6	0.775	0.373

*Miic – Mean inter-item correlation

The above stated alpha coefficient (0.775) and mean inter-item correlation (Miic) for question items 23.1 – 23.6 about the concept understanding of distance education are thus accepted for further analysis and interpretation.

3.6.3.4 Needs and expectations with concern to mobile learning (24.1 – 24.5)

A principal axis factor analysis was performed for question items 24.1 – 24.5 (needs and expectations with concern to mobile learning), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of one (1) factor that explains 63.6% of the variance. This single factor extraction confirms that the various items are in coherence with the barriers with regard to the needs and

expectations with regard to mobile learning and these items (24.1 – 24.5) are thus accepted as a valid measure.

A Cronbach alpha coefficient of 0.854 was calculated for question items 24.1 – 24.5, while the mean inter-item correlation (Miic) was 0.373.

Subsection of questionnaire	Items	α	*Miic
Needs and expectations with concern to mobile learning	24.1 – 24.5	0.854	0.373

*Miic – Mean inter-item correlation

The above stated alpha coefficient (α) and mean inter-item correlation (Miic) for question items 24.1 – 24.5 about the needs and expectations concerned with mobile learning are thus accepted for further analysis and interpretation.

3.6.3.5 Advantages of mobile learning (25.1 - 25.14)

A principal axis factor analysis was performed (table 3.6) for question items 25.1 – 25.14 (advantages of mobile learning), and the application of Kaiser's criterion (Maree, 2009, p. 222) resulted in the identification of three (3) factors that explains 68.9% of the variance. This single factor extraction confirms that the various items are in coherence with the barriers with regard to the advantages of mobile learning and these items (25.1 – 25.14) are thus accepted as a valid measure.

Table 3.6: Principal Axis Factoring – Advantages of mobile learning

Factor	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total
1	7.093	50.668	50.668	6.719	47.989	47.989	5.122
2	1.451	10.365	61.033	1.074	7.669	55.658	5.231
3	1.098	7.841	68.874	0.662	4.728	60.386	4.816
4	0.819	5.851	74.725				
5	0.589	4.206	78.931				
6	0.548	3.914	82.845				
7	0.470	3.355	86.200				
8	0.381	2.724	88.924				
9	0.363	2.591	91.516				
10	0.309	2.206	93.722				
11	0.247	1.764	95.487				
12	0.240	1.715	97.201				
13	0.202	1.443	98.644				
14	0.190	1.356	100.000				

A Cronbach alpha coefficient of 0.922 was calculated for questions items 25.1 – 25.14, while the mean inter-item correlation (Miic) was 0.463.

Subsection of questionnaire	Items	α	*Miic
Advantages of mobile learning	25.1 – 25.14	0.922	0.463

*Miic – Mean inter-item correlation

The above stated alpha coefficient (α) and mean inter-item correlation (Miic) for question items 25.1 – 25.14 about the advantages of mobile learning are thus accepted for further analysis and interpretation.

3.7 Study population

The population used for this study does have one thing in common, namely distance education. The individuals that were chosen in this study are all involved to a certain extent in the delivering of distance education programmes. Students enrolled for distance education programmes formed the other part of the population selected for this study. Fraenkel and Wallen (2009, p. 91) define population as a group of individuals that have at least one thing in common. That which they have in common formed the basis of the research for this study. The population of a study also refers to a larger group of people from which characteristics, opinions, behaviour and attitudes need to be identified (Creswell, 2005, p. 52).

The characteristics of a study population according to (Leedy & Ormrod, 2005, p. 205) are:

- A homogeneous group of individual units
- Population for research do have equal divisions across the strata
- Population are different proportions of a specific group if individuals
- They do have similar characteristics.

3.7.1 Study population and sampling procedure

Distance education was the common denominator for selecting the population for this study. The study population consisted of students, lecturers, facilitators, centre co-ordinators and the e-learning manager that formed part of the open distance learning unit of the North-West University in Potchefstroom. Twenty four (24) study centres in all nine provinces were purposefully identified from which the study population was compiled.

Sampling refers to the process to select a portion of the role players to form part of a study population as well as the procedure employed to extrapolate the individuals to form part of the population for the study (Creswell, 2005, p. 92; Maree, 2009, p. 79; Sarantakos, 2005, p. 153). Choosing the correct sample to form part of the population for the study are of great importance as it will influence the results of the study undertaken. Important is that the population must have the same commonalities that are related to the study undertaken (Creswell, 2009, p. 155; De Vos *et al.*, 2011, p. 226; Leedy & Ormrod, 2005, pp. 201,202).

The purpose for the selection of the study population for this research was in close relation with the problem statement (par. 1.2) to formulate management guidelines for the implementation of m-learning as part of an open distance education modus (par. 5.4). The study population for this research consisted of three groups, as described in the next paragraphs.

- *The North-West University (NWU) School for Continuing Teachers Education (SCTE) study centre coordinators in all nine provinces and e-learning manager as mid-level manager*

The NWU School for Continuing Teacher Education (SCTE) manages twenty four (24) study or tuition centres across South Africa in all nine provinces and a coordinator is appointed for each study centre to manage the academic programmes at each study centre. The NWU SCTE also appointed a expert e-learning manager for the management of e-learning activities in the institution's academic programme delivery. The job descriptions, expertise and experiences of these coordinators and e-learning manager justified their purposive selection for inclusion in this research. The study centre coordinators of each of the twenty four (24) study centres were included as respondents (24 respondents) as well as the e-learning manager at the NWU SCTE (1 respondent).

- *The accredited lecturers and facilitators at the various study centres*

The NWU SCTE distance education programmes are presented by accredited lecturers and facilitators during scheduled contact sessions at the above-mentioned study centres. These academics are directly involved in the presentation of academic programme at the centres and were thus purposefully selected as respondents in this research. There are ten (10) to fifteen (15) facilitators per study centre and a random sampling method based on personnel numbers was used to select 2 facilitators per study centre (48 respondents). There are 30 lecturers at the NWU SCTE and all of these lecturers are included in this research (30 respondents). This group of distance education academics thus constituted seventy eight (78) respondents in the research.

- *The students registered in distance education programmes*

The students are the 'clients' of higher education institutions (HEIs) and are in the best position 'at ground level' to respond about practices, experiences and expectations to provide the management of HEIs with relevant feedback and information to ensure effective communication and quality programme delivery in distance education. A random sampling technique based on university (student) numbers was used to select ten (10) students per study centre (240 respondents).

3.7.2 Distribution and return rate

The process to collect the questionnaires was structured within the ethical procedures set out by the NWU. The NWU do have direct access to all centre co-ordinators. Centre co-ordinators have direct access to facilitators and students at the different tuition centres throughout South Africa. Copies of the questionnaires were sent to the centre co-ordinators in order to distribute them to the facilitators and students. A cover letter explaining the purpose of the study was sent with every package delivered to tuition centres. Electronic copies of the questionnaire as well as the electronic cover letter were sent to the centre co-ordinators as well, should they not receive the package sent by the NWU. In the cover letter the procedure to be followed for the questionnaires was explained in clear terms.

The co-ordinators were instructed to ensure that all questionnaires are to be distributed to a pre-determined amount of students and all facilitators. All questionnaires were anonymous and the privacy of the target population for this study was respected. Protecting the identities of the study population encouraged a larger number from the population to complete the questionnaires. All individuals were informed by SMS and telephonically as to remind them to complete questionnaires at the tuition centres. All completed questionnaires were collected at the various centres by the co-ordinators and sent via courier in a sealed package to the researcher.

A number of 350 questionnaires were distributed to respondents. A total of 250 questionnaires were sent out to students and 100 questionnaires were sent out to facilitators/lecturers. A total of 282 (80.5%) completed questionnaires were returned from students (227) (90.8%) and facilitators/lecturers (55) (55%).

3.8 Ethical aspects

The researcher abided by the general research-related and NWU's ethical norms and requirements during the execution of this research. The rights, privacy and anonymity of all the respondents were respected at all times during the research process. Respondents were informed about the nature of the

research and informed consent was obtained from all respondents who participated in this research. Permission for this research was further obtained from the Director of the NWU's School for Continuing Teacher Education (SCTE) Potchefstroom Campus. Caution was exercised, amongst other ethical aspects, that no respondent had experienced any unnecessary stress or embarrassment because of participating in this research. Respondents were also informed that participation in this research was voluntary and they had the right to withdraw at any stage of the research without being obliged to provide reasons for withdrawal. All findings are reported in this research report in an honest and clear manner and no information that can have an influence on the results will be withheld. The following ethical aspects in relation to this study were adhered to (De Vos *et al.*, 2011, pp. 115-126; Leedy & Ormrod, 2005, pp. 101-102):

- The purpose and background of the study undertaken were communicated to all respondents.
- Privacy of the respondents forming part of the study population was respected.
- Voluntary participation was encouraged.
- Debriefing of participants was done at the various centres.
- All findings of the research are reported as part of Chapters Four and Five.

There were no interruptions to any official programme of the institution as the questionnaires were distributed to respondents after the scheduled contact sessions offered as part of the delivery of distance education programmes. Respondents participated out of free will. The required ethical clearance was approved by the North-West University's (NWU) ethical committee. The NWU ethical committee made sure that the research was done within the ethical measures set out by the university's ethical code.

3.9 Summary

A quantitative research design was adopted as an appropriate approach to gather valid, reliable and relevant information for this research. A positivistic paradigm formed the philosophical underpinning as research framework for this study. The type of questionnaire used as measuring instrument was discussed to ensure that true and relevant data were collected from the respondents for this research. The format and process for this research was described in this chapter including the different role players that formed part of the study population for this research. Requirements for reliability and validity and principles which formed the basis for statistical analysis were described and motivated in this chapter.

The following chapter presents the data in tables with accompanying descriptions, data analyses and interpretations strictly in accordance with the research topic and aims.

Chapter Four

Interpretation of data

4.1 Introduction

The aim of this chapter is to analyse and interpret the data collected by means of the questionnaire as discussed in Chapter Three. Two questionnaires in relation to the research were developed. The one questionnaire was developed specifically for students involved in open distance learning (ODL) programmes and the second questionnaire for lecturers, facilitators and co-ordinators involved ODL programmes. The reliability and validity of the study will be discussed in the first section of this chapter. The following two sections (section A & B) involve the interpretation of data based on the biographical information of respondents and concept clarification in accordance with the respondents' views and opinions. Section A and B thus provide the necessary background information about the respondents as well as information about the respondents' understanding of m-learning and distance education.

In sections C and D respondents' accessibility to teaching, learning, challenges, experiences and expectations was determined with regard to the utilization of mobile devices within distance education. Interpretations of mean scores, frequencies and rank ordering are presented in table format and discussed in detail as part of each subsection. Following the descriptive stage, the different question items were further analysed to identify constructs in relation to the research theme. Constructs were also ranked to understand their significance in this research. The chapter concludes with a summary of the contents of the chapter.

4.2 Results: quantitative data

4.2.1 Introduction

Descriptive statistics were used to describe the responses as gathered from the respondents in accordance with the question items from the measuring instrument. All the question items of each main question were discussed in detail because not much research has been done about the specific topic (par. 1.2.4). Each question was examined to determine if the subsequent question items constitute a theme-related construct by means of the Cronbach alpha coefficient and a factor analysis.

Quantitative data were empirically collected by this research regarding selected issues of m-learning with regard to relevant role players in an open distance learning model (ODLM) in a higher education

institution. The data collected from all tuition centres throughout South Africa (29 tuition centres), the lecturers, facilitators, centre managers and students will be presented, interpreted and discussed in the sections that follow. The students in this research are all employed educators who are enrolled with a particular higher education institution to upgrade their education qualifications as part of their in-service training and professional development (par. 1.5.2.3).

4.2.2 Section A: Biographical information

Section A, question items 1-8, aimed to gather biographical information from facilitators/lecturers and students in order to understand the background and general profile of respondents. A number of 350 questionnaires were distributed to respondents. A total of 250 questionnaires were sent out to students and 100 questionnaires were sent out to facilitators/lecturers. A total of 282 (80.5%) completed questionnaires were returned from students (227) (90.8%) and facilitators/lecturers (55).(55%) Table 4.3 summarises the responses of section A, question items 1-8.

Table 4.1: Biographical information

Item no	Question	Facilitators/Lecturers		Students	
		F	%	F	%
1	Gender				
	Male	30	54.5	39	17.5
	Female	25	45.5	184	82.5
	Total (respondents)	55		223	
Item no	Question	Facilitators/Lecturers		Students	
		F	%	F	%
2	Age group in years				
	20-29	-	-	10	4.5
	30-39	8	14.5	57	25.4
	40-49	18	32.7	130	58.0
	50-59	20	36.4	27	12.1
	60+	9	16.4	-	-
	Total (respondents)	55		224	

Table 4.1: Biographical information (*continues*)

		Facilitators/Lecturers			
Item no	Question	F	%		
3	Position as lecturer/facilitator				
	Junior lecturer	3	6		
	Lecturer	25	50		
	Senior lecturer	3	6		
	Professor	1	2		
	Not Applicable	18	36		
	Total (respondents)	50			
	NR	5			
				Students	
Item no	Question			F	%
3	Position as educator				
	Principal			4	1.8
	Deputy Principal			1	0.4
	HOD			22	9.9
	Teacher			190	85.2
	Not applicable			6	2.7
	Total (respondents)			223	
		Facilitators/Lecturers		Students	
Item no	Question	F	%	F	%
4	Teaching experience as educator				
	1-4 years	3	5.5	21	9.5
	5-9 years	1	1.8	57	25.9
	10-14 years	8	14.5	35	15.9
	15-19 years	9	16.4	51	23.2
	20+ years	34	61.8	56	25.5
	Total (respondents)	55		220	
		Facilitators/Lecturers		Students	
Item no	Question	F	%	F	%
4	Current position at tertiary institution				
	Lecturer			2	1.5
	Distance Education (DE) Manager			-	-
	Other			28	21.2
	Not applicable			102	77.3
	Total (respondents)			132	

Table 4.1: Biographical information (continues)

Item no	Question	Facilitators/Lecturers		Students	
		F	%	F	%
5	Teaching experience as facilitator/lecturer				
	None				
	1-4 years	1	1.8		
	5-9 years	15	27.3		
	10-14 years	22	40		
	15-19 years	9	16.4		
	20+ years	7	12.7		
	Total (respondents)	1	1.8		
		Facilitators/Lecturers		Students	
Item no	Question	F	%	F	%
6	Highest qualification				
	PhD	11	20		
	Master's degree	19	34.5	2	1.0
	Honours degree	12	21.8	14	6.7
	Degree	8	14.5	69	33.2
	Diploma	5	9.1	103	49.5
	Certificate			20	9.6
	Total (respondents)	55		208	
		Facilitators/Lecturers		Students	
Item no	Question	F	%	F	%
7	Previously completed course(-s) through DE				
	Yes	29	53.7	144	66.4
	No	25	46.3	73	33.6
			-		-
	Total (respondents)	54		217	
		Facilitators/Lecturers		Students	
Item no	Question	F	%	F	%
8	Population group				
	White	30	54.5	7	3.2
	Black	18	32.7	185	83.3
	Asian	5	9.1	12	5.4
	Coloured	2	3.6	18	8.1
	Other				
	Total (respondents)	55		222	
		Facilitators/Lecturers		Students	
Item no	Question	F	%	F	%
9	Area of residence				
	Rural area			105	47.9
	Urban area			114	52.1
	Total (respondents)			219	

F = Frequency

An analysis and interpretation of the biographical data according to table 4.1 are described in the following paragraphs.

- **Gender** (Question 1)

There is a relative balance in the representation of male and female respondents among the facilitators/lecturers, with male respondents being 54.5% and female respondents 45.5%. Among students, the representation of male and female responses reflect the male and female representation at primary and secondary schools to a large extent whereby 17.5% of the respondents were male and 82.5% were female. In general, more female educators than male educators are employed at schools, justifying the unequal gender distribution as tendency at schools in the South African education system. The majority of students enrolling for distance education programmes were female during the earlier years of distance education (par. 2.3). Based on the previous statement, the difference in the responses from male and female student respondents should not have any significant influence on the data collected, and consequently not on the results of this research. Based on the data presented, it is accepted for this research that the respondents were satisfactorily represented in relation to gender.

- **Age group in years** (Question 2)

Question 2 illustrates that 85.5% of facilitators/lecturers and 70.1% of students are in the age group 40 years and older. The more experienced educators would normally fall in this category because 97.3% of the respondents from the student group were teachers and school managers (question 3) while 50% of facilitators/lecturers are on the post level of a lecturer. This could indicate that educators of a higher age have realized the need to improve their qualifications because of the lack of proper training of teachers, especially for the previously disadvantaged. Distance education offers individuals the opportunity to enrol for academic and professional programmes that accommodate their idiosyncratic circumstances as all the respondents in this research were involved in the teaching profession. In Chapter Two (par. 2.2.1.2) it is clearly stated that full-time employment places certain limitations on individuals that have ambitions to further their education. The option of distance education is a possible answer to this aspect as it accommodates learning at anytime and place. A possible need arose with the older educators to first enrich themselves with the necessary skills and knowledge to empower them for their professional career and to convey these skills and knowledge to the younger generations. Younger educators possibly get more opportunities to enrol full-time or at a part time basis at tertiary institutions to further their education.

- **Position as facilitator/lecturer/educator** (Question 3)

All student respondents are employed educators who enrolled to better their qualifications and an analysis of the data indicates that 190 (85.2%) of these respondents are teachers appointed at post level 1. Half ($F = 25$; 50%) of the facilitators/lecturers are on the post level of lecturer at a tertiary institution, while 5 respondents (9%) from the facilitators/lecturers did not complete this particular question item. The facilitators/lecturers failing to complete this question probably felt that they do not want to place their anonymity at risk. From these data that indicated their level of appointment, it is evident that the majority of the respondents were actively involved in teaching and learning and like the previous question item, indicates a certain level of professional competence and experience. Being involved in teaching and learning is regarded as an advantage for this research as information is gathered from experienced respondents to improve the delivery of distance education programmes by utilising mobile devices into the management and teaching and learning process. Processes for improving managerial effectiveness and teaching and learning can be improved as relevant barriers could be identified by seasoned and experienced role players.

- **Teaching experience as educator** (Question 4 – facilitator/lecturer questionnaire)

The vast majority of facilitators/lecturers (92.7%) involved in the facilitation of distance education programmes at tuition centres have ten years or more teaching experience as an educator. The teaching experience is further strengthened by the data in that 61.8% of the facilitators/lecturers have 20 years or more experience as educators. For the purpose of this research it is accepted that the collected data are representative of respondents with extensive experience as educators and thus competent to provide related information for this research. The quality of teaching and learning in classes should not be a problem for educators as the majority of them have 10 years or more experience in teaching. The problem we face is to build this expertise and experience into the younger generation of teachers at our schools. On the other hand, the possibility exists that educators with 10 years or more experience in education are not suitably qualified to teach the specific grade or phase in their schools. Distance education provides these educators with the opportunity to upgrade their qualifications in order to improve the quality of teaching and learning in the classroom. The quality of teaching and learning is developed by conveying knowledge and skills in the facilitation process and using different methods and technologies in order for students and facilitators to understand concepts explained (par. 2.2.1). M-learning could provide opportunities for further training of students from all groups in society. Utilizing additional methods of communication will enable more interactivity and flexibility in the delivery of distance education programmes.

The respondents' experience as educators is important for this research because of the provision for a strong basis and substantiation for the data about the potential and usage of m-learning in a higher education context. In this research 'students' are referred to as students currently in the process of furthering their education through distance education programmes at the North West University (NWU).

Facilitators/lecturers on the other hand include lecturers from the open distance learning section of the NWU and facilitators who are facilitating distance education programmes from the university at tuition centres in all nine provinces across the country.

- **Current position at tertiary institution** (Question 4 – Student questionnaire)

Only 2 (1.5%) of the students that completed this question indicated that they are employed in a tertiary institution. Of the respondents, 41.8% did not respond to this question that may be indicative that the majority of student respondents that completed the questionnaire are employed as educators at primary and secondary schools. This is also evident in the responses related to the position of educators (question 3) which indicate that 85.2% of the student respondents are employed as teachers or educators at schools.

- **Teaching experience as facilitator/lecturer** (Question 5 – Facilitator/lecturer questionnaire)

Open distance learning at NWU has been implemented at NWU since 2004 (Spamer, Rabe, & Jordaan, 2007). Respondents indicated that 70.9% of them have been involved in lecturing and facilitation for more than five years. The extensive experience as facilitator/lecturer is an indication of the continuity of seasoned competency of facilitator/lecturing staff at tuition centres, adding stability to the centres' complement of staff. Experience, in particular of an open distance education mode of higher education, is indispensable to introduce new technologies with accompanying influences in methodologies, administration and managerial processes. It can be accepted for the purpose of this research that the responses are from experienced experts in the field of distance education provision who support the research goal for situation-specific information and guidelines to implement m-learning as part of an open distance learning model to ensure effective communication between all role players (par. 2.6 & 2.7). Another advantage of the considerable experience as facilitator/lecturer in distance education is that these specialised skills and knowledge could be mentored and coached to a younger generation of facilitators/lecturers in an open distance education mode.

- **Teaching experience** (Question 4 – Student questionnaire)

It was evident from the responses received from students that the majority of educators have 10 years and more experience in teaching. A total of 64.6% of students that completed the

questionnaires have more than 10 years experience in teaching. Responses received from the facilitators/lecturers indicated that 92.7% have more than 10 years experience in teaching. Both groups of respondents currently have sufficient experience to play a further role in improving teaching and learning in education. Inputs from these two groups could assist research to determine what role m-learning could possibly play in education and in distance education. The fact that the largest group of respondents have more than 10 years experience does not automatically mean that all these educators are suitably qualified. Distance education could be the answer to improve and/or upgrade the qualifications of these educators as they are spread out over a wide geographical area. Modern mobile communication methods and devices could play a role to empower these educators to further their education. Distance education offers opportunities during full-time employment for the improvement of qualifications and professional development (Chapter Two, par. 2.2.1.2). The experience and views of respondents are indispensable to determine challenges to introduce new technologies and methodologies in higher education.

- **Highest qualification** (Question 6)

The majority of facilitators/lecturers (76.3%) have an honours degree or higher qualification while in the case of the students; only 7.7% have an honours degree or higher qualification. The majority of students, namely 59.1% (123) are in possession of a diploma or certificate. The qualifications of facilitators/lecturers are indicative that expertise indeed exists among the facilitators/lecturers and that they are equipped to facilitate and train educators in distance education programmes at tuition centres. Among the respondents who answered this question in the questionnaire, 8.4% (19) of the students did not respond to this question. The possible reason why students did not complete this question is that they could feel humiliated to make their qualifications known or that they were hesitant that their anonymity would be at risk. Besides reasons mentioned above, the level of qualification of the respondents that did not respond to this question may be not at the required standard. A possible reason students did not improve their qualifications at an earlier stage could be because of time and economic restraints which hamper students to enrol with institutions to better their qualifications.

- **Previously completed a qualification through distance education** (Question 7)

Responses indicated that 53.7% of facilitators/lecturers and 66.4% of students have already completed a qualification by means of a distance education mode. Increased accessibility and flexibility (par. 2.5.1) enable more students to enrol for distance education programmes. Excellent academic resources and the availability thereof (par. 2.7) to all prospective learners are another aspect that enables more students to enrol for distance education programmes.

A total of 96.8% of respondents (students), of which 83.3% are from the black population group, completed the questionnaires. This is an indication that more individuals from the previously disadvantaged population groups have access to applicable resources and higher education institutions assisting educators in the upgrading and improvement of their professional competencies through distance education programmes. The responses received from both groups in this regard reveal that the utilisation of alternative means for improving qualifications is essential. Due to the affordability of mobile devices (par. 2.2.2.4), m-learning would afford and enable more flexibility in distance education, allowing more students access to communication with all relevant role players in higher education. Affordability (par. 2.2.2.4) and accessibility (par. 2.2.1.2, 2.2.1.3,) are viewed as key elements for the successful provision of distance education. Keeping in mind that the purpose of m-learning is among other aspects to allow more students access to distance education, the possibilities and applicability of this technology in the higher education context poses enormous challenges for institution managers to explore and implement these technologies. The mentioned challenges require expert and focussed management for the delivery of distance education programmes by incorporating appropriate technology and exploring the possibilities of m-learning.

- **Description of area of residence** (Question 8 – students)

The difference between students residing in rural and urban areas was insignificant. Students from rural areas amount for 47.9%, while 52.1% of students reside in urban areas. Place of residence is not regarded as a decisive factor that will determine if distance education is accessible to students. A key feature of distance education is that it offers equal opportunities to all students to access teaching and learning from any place and at anytime (par. 2.2.4). Programme-specific methodologies are devised to overcome geographical distances for students interested in furthering their education (par. 2.4.3). In South Africa, it could be said that methods have been devised, tailor-made and implemented by various institutions offering distance education programmes to accommodate students irrespective of the human diversity of the area in which they reside. However, rapid technology development dictates that the providers of distance education programmes have to embrace modern communication technologies that will accommodate more students from all geographical areas.

- **Population groups** (Question 8 – facilitators/lecturers, Question 9 – students)

Only 3.2% of students that completed the questionnaires were from the white population group and 54.5% of the facilitators/lecturers were from the same population group. This indicates that the majority of non-white students (96.8%) have embarked on professional development programmes or were either under- or unqualified. The legacy of the Apartheid era, which is, among other aspects, denying the majority of the population equal opportunities to further

education, might be a reason why so many of the students enrolled for distance education programmes. The imbalance of representation between the white and non-white population groups is also typical of what has happened in the history of South Africa whereby certain population groups were privileged to have easier access to tertiary education. Transformation in this regard is still needed to balance out the inequalities of the past. In this regard, the North West University is in the process of implementing transformation processes in order to afford more of the previously disadvantaged community and individuals to further their education. Affording more individuals the opportunity to educate themselves at tertiary institutions will enable more from the previously disadvantaged communities to be appointed as facilitators/lecturers. The imbalances of the past have to be addressed and rectified as a matter of priority and to effect much needed transformation.

4.2.3 Section B: Concept understanding

A four point Likert scale questionnaire was used for this section to determine the extent of knowledge and understanding of respondents on the concepts distance education and mobile learning (m-learning). The interpretation of low and high values from the recorded responses was done according to the procedure stated in par. 3.5.3. The results from the four point Likert scale of the questionnaire were merged into two main groupings to facilitate and support an analysis of more specific interpretations with reference to either low or high values. A mean score of 2.50 or higher was interpreted as of a high or positive value (agree to some extent and agree completely), while a mean score of less than 2.50 was interpreted as a low or negative value (disagree to some extent and do not agree). This specific value of reference was selected as a marker within the four point scale to serve as an indicator of either low (negative) or high (positive) values for each question item.

The aim of Section B of the questionnaire was to gather data about the respondents' understanding of distance education and mobile learning (m-learning).

The concept understanding of distance education and mobile learning (m-learning) was covered in this section of the questionnaire for both groups of respondents. The concept understanding of distance education and m-learning was conceptualized in literature (par. 2.2.1, 2.2.2) whereupon the respondents' understanding of these concepts was accordingly investigated in this research. The groups' understanding of the key concepts of distance education and m-learning is regarded as an important factor to enable the researcher to investigate the possibilities of the role that m-learning fulfils in distance education. Analysing the results of respondents enabled the researcher to establish what

the different respondents view as possible challenges to the implementation of m-learning in distance education. The development of related guidelines is a specific research aim to manage these challenges more effectively.

4.2.3.1 Concept understanding of distance education (facilitators/lecturers) (Question items 9.1 - 9.6)

To determine the concept understanding of the facilitators/lecturers regarding the concept of distance education, a questionnaire was developed (par. 3.5) to obtain the responses of both groups of respondents' regarding understanding of distance education. The table with responses below presents the data gathered from the facilitator/lecturers. It is evident from the data that all means are significantly higher than 2.50 and the responses thus indicate that respondents strongly support the various stated conceptualisation statements.

Table 4.2: Concept understanding (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
		Distance education is					1		2		3		4	
							F	%	F	%	F	%	F	%
1	9.1	the non-residential location of students	54	3.67	0.752	1	2	3.7	3	5.6	6	11.1	43	79.6
2	9.5	interactive programme delivery when students/lecturers are separated in time and distance	55	3.64	0.557	0			2	3.6	16	29.1	37	67.3
3	9.2	further education and training afar from residential campuses	53	3.49	0.846	2	3	5.7	3	5.7	12	22.6	35	66.0
4	9.3	teaching and learning that is subject to anytime learning	54	3.46	0.794	1	2	3.7	4	7.4	15	27.8	33	61.1
5	9.4	the offering of self-instructional programmes	55	3.44	0.688	0	1	1.8	3	5.5	22	40.0	29	52.7
6	9.6	pre-produced and self-instructional coursework	53	3.30	0.723	2	1	1.9	5	9.4	24	45.3	23	43.4

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **Distance education is the non–residential location of students** (question item 9.1)

The responses to this item received the highest mean score in this questionnaire (3.67). The fact that distance education is viewed as the non-residential location of students corresponds with the findings from literature (par. 2.2.1) that distance education is viewed as further education particularly suitable to prospective students residing long distances (afar) from residential universities. The distance factor creates numerous opportunities for m-learning to assist and support stakeholders (students and facilitators/lecturers) to communicate more effectively with all role players in a distance education mode. M-learning and mobile communication technologies enable easier access to resources in this regard and add more flexibility in the delivering of distance education.

- **Distance education is interactive programme delivery when students/lecturers are separated in time and distance** (question item 9.5)

The response to this item received the second highest mean score (3.64) in this subsection of the questionnaire. Increased technological enhancements in particular improve communication and interactivity in distance education (par. 2.2.1.1). Interactivity is viewed as a decisive aspect and imperative in distance education as time and location of all role players are dissimilar from each other, therefore generous opportunities have to be put in place for role players to interact with one another (par. 2.2.1.3). It can be deduced that without interactivity, role players in higher education will not be able to communicate effectively, which will have a negative effect on the quality of distance education programmes. The flexibility of the delivery of distance education programmes will also be compromised then. Interactivity between student and institution poses a strong challenge for effective communication in a distance education mode. Developing academic and professional development programmes in distance education with sufficient and purposeful interactivity features will also contribute to easing the management of distance education programmes since accessibility to much needed resources would be available to all role players since location and time issues are addressed. Accessibility is an element to promote m-learning by means of mobile communication technologies that allow learning at anytime and location, as mobility is the key element of mobile technologies. Interactivity could be increased by utilising existing mobile communication technologies more effectively in distance education. In this regard, interactivity enables students and facilitators/lecturers to communicate regularly, irrespective of location by utilizing applicable mobile communication technologies.

- **Distance education is further education afar from residential campuses** (question item 9.2)

The above-stated item received the third highest mean score (3.49). Students who enrolled for distance education programmes reside typically in a diverse geographical environment (par. 2.2.2). An obvious feature and common understanding of distance education from some concept

descriptions is the provision of further education and training to people far (distant) from residential campuses (par. 1.2.1). Among this group of respondents, it is clear that the notion of distance education as further education removed from institutions is strongly supported. Distance education enables students to enrol for programmes irrespective of their location. Modern communication technologies enable communication between role players in distance education to be without limits as new communication technologies add mobility to many of its advantages. Communication with a minimum of limits improves, among other aspects, accessibility, which is regarded as a core aspect of m-learning. Challenges to improve communication are to utilise mobile devices more effectively on a frequent basis for the delivery of higher education programmes. The role of m-learning could be strengthened to further support students for example with administrative and academic matters in the programmes that they enrolled for. Academic and administrative support is an essential part of quality programme delivery as students and facilitators/lecturers have to communicate with another concerning all aspects of distance education programmes.

- **Distance education is teaching and learning that is subject to anytime learning** (question item 9.3)

This specific item received the fourth highest mean score (3.46). The literature indicated (par. 1.2.3) that information must be available to students at anytime and any place irrespective of their location. Modern mobile communication devices such as cell (smart) phones, PDAs tablets etc. are exceptionally well suited to be utilised for these purposes. In this regard, distance education is increasingly developing into a mode of anyplace and anywhere learning (par. 2.2.2.4) since all mobile devices enable prospective and current students to have access to resources at anytime and location. The literature study also shows that an aspect surfacing evidently in distance education is asynchronous learning, which enables teaching and learning to become more flexible in the delivery of distance education programmes (par. 2.7). It is foreseen that more students, because of the benefits of interactivity, affordability and flexibility, will enrol for distance education programmes in future. Literature clearly states that the role of m-learning is to make teaching and learning more flexible as well as more accessible to all role players, irrespective of time and location (par. 2.6, 2.7). However, interactivity, accessibility and flexibility are features in distance education that pose specific challenges for students and providers of higher education programmes. Challenges are in connection with the realisation of these listed features in order to deliver quality distance education programmes. Accessibility and flexibility (table 4.13 and table 4.14) are key factors that persuade students to enrol for distance education programmes.

- **Distance education is the offering of self-instructional programmes** (question item 9.4)

This item received the fifth highest mean score (3.44). Interactivity and flexibility in the delivery of distance education programmes are emphasised more and more in the delivery of programmes by means of distance education. Respondents indicated in the questionnaire that study material prescribed, issued to and utilised by students in distance education will have to meet the demands of more self-instructional requirements.

- **Distance education is pre-produced and self-instructional coursework** (question item 9.6)

This item received the lowest mean score (3.30), but is still significantly higher than the norm of 2.50. The literature indicates (par. 2.2.1.3) that distance education is based on pre-produced course work, which is self-instructional and requires organised two-way communication between student, facilitator and institution.

The difference between the questions with the highest mean and the questions with the lowest mean score is small (0.37). This small difference in the mean is an indication that a strong correlation exists between the different concepts students consider to define distance education. Self-instructional coursework could be regarded as another challenge for institutions to assist students to personalise teaching and learning strategies to be utilised at anytime and at any place (location).

4.2.3.2 Concept understanding of distance education (students' responses) (Question items 10.1 - 10.6)

A questionnaire was developed (par. 3.5) to test the responses from students about their understanding of the concept of distance education. The table and responses below reflects the responses from the students. It is significant to note that all the means of this section are well above the set norm of 2.50, which points to a high level of agreement with the conceptual statements of the questionnaire. Each individual item is discussed after the presentation of the data in the table below.

Table 4.3: Concept understanding (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
		Distance education is ...					1		2		3		4	
							F	%	F	%	F	%	F	%
1	10.5	interactive programme delivery when students/lecturers are separated in time and distance	199	3.15	0.918	28	17	8.5	20	10.1	79	39.7	83	41.7
2	10.2	further education and training afar from residential campuses	192	3.14	0.979	35	20	10.4	20	10.4	65	33.9	87	45.3
2	10.3	teaching and learning that is subject to anytime learning	184	3.14	0.949	43	19	9.8	18	9.3	73	37.6	84	43.3
3	10.1	the non-residential location of students	185	3.08	1.037	42	26	14.1	14	7.6	64	34.6	81	43.8
4	10.4	the offering of self-instructional programmes	182	3.03	0.910	45	18	9.9	18	9.9	86	47.3	60	33.0
4	10.6	pre-produced and self-instructional coursework.	181	3.03	0.924	46	21	11.6	11	6.1	90	49.7	59	32.6

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **Distance education is interactive programme delivery when students/lecturers are separated in time and distance** (question 10.5)

This item received the highest mean score (3.15) as part of the subsection. The majority of the respondents (41.7%) agreed completely, 39.7% agreed to a certain extent, 10.1% disagreed to some extent and 8.5% did not agree to this statement. Among the facilitators and lecturers the understanding of this concept received the second highest rating (3.64) (Table 4.2). Interactivity in programme delivery is thus regarded as a priority among students for defining distance education (par. 2.2.1.2, 2.2.1.3). This particular response can also be interpreted as a potential need for interactivity in distance education programmes among students as they are spread over a diverse geographical area. Increased interactivity has the further potential to increase accessibility to

distance education programmes for students. The reason why facilitators/lecturers rated this concept the second highest could be that students are socio-economically worse off than facilitators/lecturers and that facilitators/lecturers reside in more urbanised areas where accessibility to communication resources is easier obtainable. Students need more interactivity regarding the delivery of distance education programmes in order for study resources to be accessed with ease for the betterment of quality teaching and learning. In this regard, m-learning enables more frequent communication between all role players as time, place and distance are more easily overcome by modern communication technologies. The widespread locations of students will however still be a challenge that could be conquered once new interactive communication technologies are implemented and effectively utilised for distance education purposes.

- **Distance education is further education and training afar from residential campuses** (question item 10.2)

The response to this item received the second highest mean score (3.14). Facilitators/lecturers rated this concept description the third highest (3.49) (Table 4.2). Furthermore, the literature indicates that structured learning can occur between student and facilitator/lecturer who are separated geographically (par. 2.2.1). Place and time are irrelevant (par. 2.2.1). It is possible for all role players in distance education to provide teaching and learning opportunities, irrespective where any of the role players reside.

- **Distance education is teaching and learning that is subject to anytime learning** (question item 10.3)

The response to this item also received the second highest rating (3.14). Students indicated that both question items 10.2 and 10.3 are of equal importance in the concept understanding of distance education. Facilitators/lecturers rated this concept as fourth highest in their responses received. Literature indicated that structured teaching and learning are possible over a diverse geographical area utilising situation-specific distance education methodologies and technologies (par. 2.2.1.1, 2.2.1.2, 2.2.1.3, 2.2.5). In most definitions of distance education as is referred to by the literature, it is crucial that time and location should not be a barrier in the provision of distance education programmes.

- **Distance education is the non–residential location of students** (question 10.1)

The response to this item received the third highest mean score (3.08). Facilitators/Lecturers recorded this question item their highest rating (3.67) (Table 4.2). The literature study indicates that students do not have to reside near institutions in order to have success in distance education programmes (par. 1). The phrase, any time and anywhere learning, is amplified in the provision of distance education programmes. Students move around and learn utilising various communication devices and techniques (par. 2.2.2). It is therefore deduced that location is not that important for the successful delivery of distance education programmes.

- **Distance education is the offering of self-instructional programmes** (Question 10.4)

The response to this item received the fourth highest mean score (3.03). Facilitators/lecturers rated this item fifth (3.44) (Table 4.2). Literature indicated that self-instructional programmes are important in the delivery of distance education (par. 2.2.1.3). Students ought to be allowed to learn at their own pace and therefore study material or course content should be developed in such a manner that students can continue with their studies without interruption. The possible reason why both groups rated this concept at a lower scale could be that they view this point (self-instructional) as a more challenging requirement for distance education and that aspects like time and place must not be restrictive for enrolling in distance education programmes.

- **Distance education is pre-produced and self-instructional coursework** (question 10.6)

Both groups of respondents for this item had the lowest mean score, although the score was considerably higher than the norm of 2.50. Mean scores were for facilitators/lecturers 3.30 (table 4.4) and for students 3.03. The literature study provides definitional descriptions for distance education such as specific programmes that are based on pre-produced coursework, which is self-instructional and that organised two-way communication takes place between student, facilitator/lecturer and institution (par. 2.2.1.3). In higher education, two-way communication has to be enhanced by the imperative role that m-learning plays in the provision of quality distance education programmes. Methodologies and technologies related to m-learning should facilitate all forms of two-way communication between the various role players. The key features of anytime and anywhere learning in distance education make it obligatory to account for those features in the development of academic and professional development programmes in a distance education mode of provision. Taking time and location into consideration will enable instructional designers to develop situation-specific and tailor-made course content to ensure optimum interactivity and communication between all role players in distance education. Coursework should also be designed to be self-instructional.

Table 4.4: Comparison of responses gathered from students and facilitators/lecturers regarding concept understanding of distance education

Distance education is ...	Facilitators/Lecturers (Question items 9.1-9.6)		Students (Question items 10.1-10.6)	
	Rank	Mean	Rank	Mean
the non-residential location of students	1	3.67	4	3.08
interactive programme delivery when students/lecturers are separated in time and distance	2	3.64	1	3.15
further education and training afar from residential campuses	3	3.49	2	3.14
teaching and learning that are subject to anytime learning	4	3.46	2	3.14
the offering of self-instructional programmes	5	3.44	5	3.03
pre-produced and self-instructional coursework.	6	3.30	5	3.03

A close correlation was evident between the items on this section on the concept understanding of distance education (table 4.4). Both groups of respondents are in agreement that all the items posed to them in this question are concepts closely related to distance education. The respective groups had minor differences in priorities on the different items posed to them in this question. A possible reason for this minor difference in ranking of the different groups of respondents could be that both groups have previously utilised distance education to further their qualifications and experienced the same needs during their involvement in distance education. Time and distance are aspects of distance education that were ranked high by both groups. Self-instructional coursework and offering of self-instructional programmes were not ranked high by both groups of respondents. A possible reason for this tendency is that Internet accessibility is not yet fully exploited by both groups of respondents (table 4.16). The escalating use of the Internet on cell phones and the development of higher education programmes suitable and adaptable to cell phone technology could enhance m-learning in distance education. Lowering cost of downloading data using a smart phone could open more avenues to further utilise m-learning in distance education programmes. These avenues include developing programmes students can access more frequently using their cell phones for this purpose.

4.2.3.3 Myths in relation to the concept understanding of distance education among facilitators/lecturers (question items 10.1 - 10.3) and students (question items 11.1 - 11.3)

Tables 4.5 and 4.6 reflect the responses to items seen as myths about distance education. These myth items as determined from the literature study (par. 2.2.1) were included in the questionnaires and distributed to both groups of respondents (students and facilitators/lecturers) to determine the extent it is perceived in practice. The aim of this particular section was to determine the level of agreement from the students and facilitators/lecturers with respect to the given myth statements about distance education. An analysis of the data from tables 4.5 and 4.6 shows that both groups of respondents support the definitional descriptions of distance education as portrayed in literature. Responses from the facilitators/lecturers and students will be jointly presented and discussed, since there were only three similar question items applicable for both groups.

Table 4.5: Myths in relation to concept understanding of distance education (facilitators/lecturers) (question items 10.1 - 10.3)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	10.2	saves money for universities	52	2.56	0.916	3	8	15.4	14	26.9	23	44.2	7	13.5
2	10.3	is less demanding than on-campus programmes	54	2.00	0.911	1	18	33.3	22	40.7	10	18.5	4	7.4
3	10.1	focuses exclusively on the use of one particular technology, namely the Internet.	53	1.85	0.907	2	25	47.2	12	22.6	15	28.3	1	1.9

Scale rating 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

Table 4.6: Myths in relation to concept understanding of distance education (students)
(question items 11.1 - 11.3)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
	The lecturing/facilitation of distance education programmes ...						1		2		3		4	
							F	%	F	%	F	%	F	%
1	11.2	saves money for universities	194	2.48	1.125	33	57	29.4	28	14.4	68	35.1	41	21.1
2	11.3	is less demanding than on-campus programmes	194	2.21	1.151	33	81	41.8	23	11.9	59	30.4	31	16.0
3	11.1	focuses exclusively on the use of one particular technology, namely the Internet.	192	2.06	1.062	35	83	43.2	33	17.2	57	29.7	19	9.9

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

Table 4.7: Comparison of responses between facilitators/lecturers and students regarding the myths in relation to concept understanding of distance education

	Facilitators/Lecturers (Question items 10.1-10.3)		Students (Question items 11.1-11.3)	
The lecturing/facilitation of distance education programmes ...	Rank	Mean	Rank	Mean
saves money for universities	1	2.56	1	2.48
is less demanding than on-campus programmes	2	2.00	2	2.21
focuses exclusively on the use of one particular technology, namely the Internet.	3	1.85	3	2.06

Both groups of respondents indicated according to the mean scores the same order for the questions items posed to them in table 4.5 and table 4.6. Table 4.6 indicates that the highest mean for an item in this section was 2.56, which was reported by the group of facilitators/lecturers. Both groups (table 4.7)

had the same ratings for each of the questions posed to them in the questionnaires. From six responses from this question, five were below average (2.5) which indicates that none of the respondents strongly agree regarding the stated myths. Both groups of respondents disagree to some extent that not only one means of communication (the Internet) is exclusively used for distance education programmes. It can be deduced from the responses that not only one means of technology can be used for distance education to be delivered to all role players. Self-instructional programmes delivered through other means than the Internet are thus possible for the delivery of distance education programmes. This perspective is in coherence with the literature that more than one means of communication can be used to communicate and interact with relevant role players in distance education (par. 2.2.3, 2.2.5). Table 4.2 and table 4.3 show that key role players in distance education perceive interaction over time and place as a key aspect for delivery of distance education programmes, the reason being that all role players should have access to their institution for administrative and academic support. The response both groups of respondents gave to this item is a clear indication that more than one means of communication should be explored for implementation in the delivery of distance education programmes. Mobile communication technologies are one example that could give another and valuable communication option to all role players in distance education.

Perceptions regarding the cost of distance education programmes to institutions are a statement which students and facilitator/lecturers are not absolutely sure of and may be ascribed to uncertainty about this particular aspect. It was argued that distance education programmes are more affordable to students than traditional programmes at face-to-face institutions (par. 2.5.1). However, to develop, produce and deliver media and material that is subject-specific and self-instructional for the students, has significant cost implications for higher education institutions.

The next section deals with the responses about concept understanding for m-learning and will be presented in table 4.8 and table 4.9. Both facilitator/lecturers and students were requested to complete these questions contained in the questionnaire.

4.2.3.4 Concept understanding – m-learning (facilitators/lecturers & students)

In this section of the questionnaire, both groups of respondents were asked for their concept understanding of m-learning. Their responses were recorded in table 4.8 and table 4.9. Table 4.10 compares the responses of the two groups of respondents.

Question 11.1 - 11.7 (facilitators/lecturers): table 4.8 and question 12.1 - 12.7 (students): table 4.9

Table 4.8: Concept understanding (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
	Mobile learning (m-learning) is ...						1		2		3		4	
							F	%	F	%	F	%	F	%
1	11.4	movable (not static) and flexible communication	49	3.61	0.492	6					19	38.8	30	61.2
2	11.5	studying which encompasses anywhere and anyplace learning	51	3.55	0.642	4			4	7.8	15	29.4	32	62.7
3	11.3	where place is not a barrier in the distribution of information	52	3.46	0.699	3	1	1.9	3	5.8	19	36.5	29	55.8
4	11.7	an important requirement to support the teaching and learning process in Higher Education	52	3.37	0.595	3			3	5.8	27	51.9	22	42.3
5	11.2	where time is not a barrier in the distribution of information	51	3.22	0.757	4	2	3.9	4	7.8	26	51.0	19	37.3
6	11.6	a more user-friendly means of communication	52	3.17	0.734	3	1	1.9	7	13.5	26	50.0	18	34.6
7	11.1	the immediate distribution of information.	51	3.16	0.809	4	3	5.9	4	7.8	26	51.0	18	35.3

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely
 NR – No Response

- **Mobile learning (m-learning) is movable (not static) and flexible communication (facilitators/lecturers)**

It is significant to note that all responses to the question items of this section received a mean of higher than 3.1, which is an indication of the high level of agreement or support for the statements about the concept understanding of m-learning.

The responses to the above-mentioned item received the highest mean score in this questionnaire (3.61). The majority of respondents agree completely (61.2%) and 38.8% of the respondents agree to some extent. None of the respondents responded to the scale rating of do not agree and disagree to some extent. Flexibility and accessibility are determined by the kind of devices and modes used in distance education to deliver and facilitate distance education programmes (par. 2.2.2, 2.2.1.2). More flexible communication tools are utilised in distance education to deliver and facilitate programmes (par. 1.2.3). It is estimated that 99.1% of students and 98.1% of facilitators/lecturers are in possession cell phones (table 4.14). The number of respondents in possession of cell phones could be an indication that all role players may have access to distance education at any location via the capabilities of mobile technologies. The high number of individuals in possession of mobile devices will without doubt contribute to ease the introduction and implementation of m-learning in the delivery of distance education programmes. More students prefer SMS messages to receive information regarding their studies (86.8%) (table 4.13). Receiving information regarding studies other than through postal services is a clear indication that flexibility and mobility are evident in distance education. More means and possibilities of communication are utilised. The literature is clear on the fact that m-learning offers students the opportunity to learn anywhere irrespective of time and location (par. 2.2.2). Postal services in distance education (table 4.13) still feature prominently as a means of communication, mainly because it is not as expensive as Internet access. The preference for short messaging services (SMS) is an indication that a more quick and affordable means of communication is still preferred by students and other role players in distance education (table 4.17 & table 4.18).

- **Mobile learning (m-learning) is studying which encompasses anywhere and anyplace learning (facilitators/lecturers)**

The response to this item received the second highest mean score in the questionnaire (3.55). The literature study shows that the role of m-learning's role is to make teaching and learning more flexible (par. 2.2.5), accessible (par. 2.2.1.3, 2.2.2.1, 2.5.2) and affordable (par. 2.6.3) to all role players irrespective of time and location. Accessibility, affordability and flexibility in distance education programmes are challenges that should be addressed timeously in order to manage the delivery of distance education programmes more effectively.

- **Mobile learning (m-learning) is where place is not a barrier in the distribution of information (facilitators/lecturers)**

The responses to this item received the third highest mean score in the questionnaire (3.46). Question 11.5 and 11.3 are closely related as the concept of place or location is the central theme of these questions. Literature has indicated (par. 2.2.2) that flexibility in distance education programmes will enable more means of delivery and more communication options that may be utilised in the provision of distance education programmes. Flexibility and mobility in the delivery of distance education programmes may increase enrolment since location is not regarded as a barrier for the delivery of distance education programmes as access will be available to all. Removing the barrier of location will increase mobility and flexibility in delivery of distance education programmes (par. 2.2.5). It could be concluded that mobile learning with the use of modern communication technologies will ease the delivery of programmes irrespective of the diverse geographical environment the student/facilitator finds him-/herself in. In addition, m-learning can support teaching and learning in more than one way.

- **Mobile learning (m-learning) is an important requirement to support the teaching and learning process in Higher Education (Question 11.7)**

The responses to this item received the fourth highest mean score in this questionnaire (3.37). M-learning enables students to communicate with all role players regarding education administrative and academic support (par. 2.2.1.3). Location and time are not barriers in mobile communication which is an important advantage for the rendering of administrative and academic support. Administrative support is fundamental to all students in distance education to ensure the successful completion of programmes (par. 2.3.4). Administrative and academic support utilizing various mobile devices would simplify and make communication possible between all role players. Respondents have indicated (question 11.4) that they do rate m-learning as movable and flexible to enable teaching and learning at anytime and place by employing a variety of mobile devices (par. 2.2.2.3). Not having access to modern communication technologies would be regarded as a barrier that could hamper the effective delivery of distance education programmes. Removing

communication barriers by utilizing various mobile devices would ease communication between role players (par. 2.2.4). Mobile technologies, and by intensifying its use in distance education, could improve communication in teaching and learning as this medium of communication is more accessible to the majority of students.

- **Mobile learning (m-learning) is where time is not a barrier in the distribution of information (facilitators/lecturers)**

The responses to this item received the fourth highest mean score in this questionnaire (3.22). Time and location are realities in distance education that should not be a limiting factor in the delivery of quality distance education programmes. Literature has shown that time and locations have little effect if effective communication structures and methods are in place to assist students in distance education (par. 2.2.4, 2.2.5, 2.2.6.1, 2.3.4, 2.5.1, 2.6, 2.7). Time, location and effective communication are aspects that support easier delivery of distance education programmes. Students personalise their learning experience, adapt, and adjust to the process of teaching and learning in accordance with their idiosyncratic circumstances (par. 2.2.2.2). By personalizing their learning experience, students may then determine by themselves where and when the best place and time is for teaching and learning to take place. Having access to mobile communication technologies in such case may contribute to enhance overall accessibility to a variety of resources.

- **Mobile learning (m-learning) is a more user-friendly means of communication (facilitators/lecturers)**

The responses to this item received the fifth highest mean score in this questionnaire (3.17). Cell phone users in SA have dramatically increased between 1999 and 2007 (par. 1.2.4). The more mobile devices develop because of modern technology, the more user-friendly these devices become (par. 2.5.2). Literature has also shown that increased access to social networking services on mobile devices leads to increased interaction between individuals (par. 2.2.3). The general use of these devices and technologies by individuals in everyday life may lead to their being utilised in the delivery of some distance education programmes.

- **Mobile learning (m-learning) is the immediate distribution of information (facilitators/lecturers)**

The responses to this item received the lowest mean score in this questionnaire (3.16), although it is still of a high value (>2.5). Taking into account the affordability aspect of distance education, it is clear that more modern communication technologies can be utilised, which may lead to more affordable further education by means of distance education (par. 2.6.2). Utilising more applicable technologies for communication can enable more information (academic and administrative) to be accessible to students and other role players in distance education. Social Network Systems

(SNS) enable a vast amount of information to be communicated (par. 2.2.3). It is deduced that should more options for sharing information be available to share with one another, more barriers may be eliminated that could possibly prevent the effective delivery of distance education programmes. Textbooks and other hard copies of study material are expensive to develop, produce and distribute and are not relevant for prolonged periods of time. Increasing the use of electronic devices would enable study material and content to be communicated more frequently and easily to students, irrespective of time and place constraints.

Table 4.9: Concept understanding (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
Mobile learning (m-learning) is ...							1		2		3		4	
							F	%	F	%	F	%	F	%
1	12.7	an important requirement to support the teaching and learning process in Higher Education	194	3.39	0.721	33	4	2.1	15	7.7	76	39.2	99	51.0
2	12.5	studying which encompasses anywhere and anyplace learning	195	3.30	0.810	32	10	5.1	13	6.7	80	41.0	92	47.2
3	12.4	movable (not static) and flexible communication	190	3.29	0.808	37	11	5.8	9	4.7	83	43.7	87	45.8
4	12.6	a more user-friendly means of communication	189	3.28	0.799	38	8	4.2	17	9.0	78	41.3	86	45.5
5	12.1	the immediate distribution of information	195	2.97	0.930	32	21		24		90		60	
6	12.2	where time is not a barrier in the distribution of information	190	2.94	0.982	37	19	10.0	40	21.1	64	33.7	67	35.3
7	12.3	where place is not a barrier in the distribution of information.	194	2.93	0.971	33	24	12.4	26	13.4	83	42.8	61	31.4

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely
 NR – No Response

- **Mobile learning (m-learning) is an important requirement to support the teaching and learning process in higher education (students)**

The response to this item received the highest mean score in this questionnaire (3.39). The response to this question affirms the conception that support to students in their studies through distance education is an essential component of m-learning. The facilitators/lecturers rated this concept the fourth highest mean (3.37). Both students and facilitators/lecturers rated this notion very high as an indication of almost complete agreement. The responses from students on this item (86.8%) indicate that they prefer receiving information regarding their studies by utilizing SMSs. Students possibly view support (academic & administrative) as of high importance for distance education to be successful. Students enrolled in distance education programmes in most cases reside over a wide and diverse area and therefore would need more support regarding all aspects of the programmes they registered for. An effortless and convenient way to receive support will, among other aspects, be by utilising mobile communication technologies. Challenges of m-learning would be to implement techniques or devices to assist students and other role players with this matter. Electronic communication devices, including mobile devices, offer a new challenge to students to interact directly with the teaching and learning process (par. 2.6). Interactive communication among students and with the higher education institution could provide to a great extent the support that students need.

- **Mobile learning (m-learning) is studying which encompasses anywhere and anyplace learning (students)**

The responses to this item received the second highest mean score in this questionnaire (3.30). Both students and facilitators/lecturers rated this question item second highest (Table 4.10). The students indicate that 47.9% reside in rural areas and 52.1% reside in urban areas. These responses indicate a reasonably balanced group regarding area of residence. Referring to responses received on question item 12.7, students utilise SMS technologies irrespective of their place of residence as there was a very high response rate regarding this matter. Time and location in most cases do not have any influence on delivery of distance education programmes. Mobile devices further increase flexibility and anywhere and any place learning (par. 2.2.2.2). Learning through access to modern communication technologies is perceived as portable and movable (par. 2.2.2.2). A particular challenge that exists in distance education is the diverse geographical areas where students reside without access to modern technologies. Technological developments are however escalating rapidly and mobile learning is positively affected to address this challenge and enable teaching and learning to be accessed at any place and at anytime.

- **Mobile learning (m-learning) is movable (not-static) and flexible communication (students)**

The responses to this item received the third highest mean score in this questionnaire (3.29). The mean for this question item was much higher (3.61) for facilitators/lecturers (Table 4.10) and they rated this statement as the most important item in this set of questions. The high mean for both groups reveal that both groups of respondents agree that m-learning offers movable and non-static education. Challenges regarding the mobility of teaching and learning can be overcome by utilising mobile learning and other modern communication techniques to deliver distance education programmes anywhere and at anytime.

- **Mobile learning (m-learning) is a more user-friendly means of communication (students)**

The responses to this item received the fourth highest mean (3.28). The facilitators/lecturers registered a mean of 3.17. Students rated this question item fourth and facilitators/lecturers rated this concept sixth (table 4.10). A larger group of students prefer SMS messaging (86.8%) than what is the case with facilitators/lecturers (70.9%) (table 4.13). Possible reasons for this tendency are that not all students can afford a fixed contract on their cell phone. A significant part of the students, namely 72.9% are in possession of pre-paid mobile devices, while among facilitators/lecturers only 35.3% have pre-paid mobile devices (table 4.15). An higher number of students (more than facilitators/lecturers) prefer using mobile communication (SMSs) to obtain information regarding their studies. SMS as a means of communication is more affordable to students (par. 2.2.2). In general, mobile devices and mobile communication are more affordable for students in distance education (par. 2.5.2). One of the roles of m-learning is to improve communication between all role players in distance education adding affordability and higher accessibility to this.

The use of the Internet on mobile devices within the two groups of respondents is not that significant. It is recorded that 48.4% (table 4.16) of students and 39.6% of facilitators/lecturers do not access the Internet on their mobile devices. The high cost of downloading data could be the reason for this phenomenon. However, the fact that more than 98.1% of all respondents are in possession of a cell phone indicates that this means of communication is more user-friendly, accessible and affordable than other modes of communication that currently exist.

- **Mobile learning (m-learning) is the immediate distribution of information (students)**

The responses to this item received the fifth highest mean (2.97). The mean for this concept is the lowest among facilitators/lecturers (3.16) with the lowest overall rating as well (7th) (Table 4.10). To access teaching and learning from anywhere is a larger priority for both groups than the immediate distribution of information. A possible reason may be that students first need to have access from wherever they are (geographically) before the next phase, the acquiring of information

regarding their studies, can be investigated. Success of distance education depends largely on the flexibility and accessibility students enjoy in the teaching and learning process (par. 2.5.1). Distribution of information will only be possible once all role players have access to communication. Communication challenges in distance education must be overcome in order for all role players to have equal access to related information.

- **Mobile learning (m-learning) is where time and place are not barriers in the distribution of information (students)**

These two responses had the lowest means of all the question items answered by students in this section. Question 12.2 had a rating of 2.94 while question 12.3 had a rating of 2.93, which is still higher than the average of 2.5 (table 4.9). A possible reason for the lower means and rating for these two question items could be that students do not see these two statements as separate entities that can exist each on its own. Most of the students indicate a high rating to question 12.5 (mean 3.30) that could indicate that students see m-learning as a combination of anywhere and anyplace learning. Time is not as important to students as location. Having access at any location could then assist students to access information at anytime.

- **A comparison of responses received between students and facilitators/lecturers regarding their concept understanding of mobile learning**

Table 4.10: Comparison of responses received between students and facilitator/lecturers regarding their concept understanding of mobile learning

	Rating		Rating	
Mobile learning (m-learning) is ...	Facilitators/ Lecturers	Mean	Students	Mean
movable (not static) and flexible communication	1	3.61	3	3.29
studying which encompasses anywhere and anyplace learning	2	3.55	2	3.30
where place is not a barrier in the distribution of information	3	3.46	7	2.93
an important requirement to support the teaching and learning process in Higher Education	4	3.37	1	3.39
where time is not a barrier in the distribution of information	5	3.22	6	2.94
a more user-friendly means of communication	6	3.17	4	3.28
the immediate distribution of information.	7	3.16	5	2.97

In conclusion of this section, it is evident that certain elements are prominent with both m-learning and distance education as the data captured from both groups indicate. Flexibility, time, place and mobility are the common aspects or factors identified by both groups of respondents (table 4.10) for both m-learning and distance education. Taking these factors in consideration, it could be said that m-learning's role in distance education is becoming increasingly important as m-learning will be able to bridge more challenges like distance and time which are apparent in delivering distance education programmes. The identification of these aspects could enable the researcher to set up related guidelines to ensure that these particular factors are addressed in the delivery of distance education programmes.

4.2.4. Section C – Accessibility to teaching and learning by utilising mobile learning

Section C of the questionnaire investigates the possibilities for students and facilitators/lecturers to access teaching and learning by utilising mobile devices. Respondents' accessibility to mobile devices (cell phones, PDAs, tablets etc.) and their capabilities to use these mobile devices are included in this investigation. Gathering this valuable information from respondents enables the researcher to determine the role m-learning plays in the delivery or provision of distance education programmes. Taking into consideration the usage of the different features of cell phones, challenges will then be determined that have to be considered when management guidelines are developed to assist with the effective implementation of m-learning as a key component of distance education provision. Table 4.11 and table 4.12 reflect the data that assist with this aspect of the research.

Table 4.11: Reasons to enrol for distance education programmes (facilitators/lecturers)

		Facilitators/ Lecturers
Item no	Question	F
12	According to you, what persuaded students to enrol for distance education programmes?	
	Affordability	33
	Workload	15
	Technological support	11
	Flexibility of learning	48
	Location	29
	Attending facilitation sessions in my area	18
	Other	2

Table 4.12 Reasons to enrol for distance education programmes (students)

		Students
Item no	Question	F
13	What persuaded you to enrol for distance education programmes?	
	Affordability	113
	Workload	57
	Technological support	58
	Flexibility of learning	150
	Location	47
	Attending facilitation sessions in my area	124
	Other	18

4.2.4.1 What persuaded you to enrol for distance education programmes?

Flexibility of learning and attending facilitation sessions are reasons highlighted which persuade students and facilitators/lecturers to enrol for distance education programmes (table 4.11 & table 4.12). Affordability of distance education programmes, irrespective of time and location, is also a factor that is regarded as important for choosing a distance education mode of education (par. 2.6.2). Distance education being less expensive affords more students the opportunity to further their education (par. 2.5.2). Flexibility and affordability in particular are elements that may enable more students to enrol for distance education programmes. In addition, time and location not being barriers for pursuit of further education distance education could encourage more students from all sectors of the community to enrol for distance education programmes. Being able to enrol at any stage and from any place, enables students to adapt their teaching and learning to suit them better; to be flexible in their studying according to idiosyncratic circumstances. Individualising and personalising teaching and learning methodologies are an important factor to account for in the provision of distance education programmes. Role players will personalise their teaching and learning methods in order to suit their personal time and location circumstances (par. 2.2.2). Individuals who are permanently employed and would like to further their education, will probably adapt with more ease in distance education as time and location could be managed by them to meet teaching and learning requirements and demands. In order to produce more affordable distance education programmes, students and other role players have to utilise available technologies optimally to complete their distance education endeavours. More affordable technologies enable role players to communicate more effectively and will therefore allow more student participation and involvement in teaching and learning activities. More than 94% of all respondents are in possession of a cell phone (Table 4.14) which could be an indication that cell

phones are more affordable to role players in distance education. Increasing affordability of cell phones could open up new possibilities for communication to students enrolled for distance education programmes (par. 2.2.2).

Enhancing communication between role players could only be feasible if more means and methods of communication between these role players are explored and implemented. Implementing more communication technologies and media can add more flexibility to programmes delivered through distance education. The more possibilities exist by which students can have access to education, the more flexibility in teaching and learning transpires (par. 2.2.2.1). The more flexibility exists in distance education, the more barriers that otherwise would hamper teaching and learning could be overcome (par. 2.2.5). It could therefore be said that if more modern and flexible communication methods and techniques are implemented in the delivery of distance education programmes, the more flexibility exists by which all role players can be accommodated.

4.2.4.2 Which method would students prefer receiving information regarding their studies?

Table 4.13 provides responses from students and facilitators/lecturers about their preferences on receiving information concerning their studies.

Table 4.13: Preferences for receiving study information

		Facilitators/ Lecturers	Students
Item no	Question	F	F
13 & 14	How do students and facilitators prefer receiving information regarding their studies?		
	SMS	39	197
	Moodle	27	30
	Post/Mail	22	150
	Telephone and Call Centre	15	91
	OLG Website	21	44
	NWU Website	24	22

The literature indicates that postal service has been a prominent means of corresponding with students in Australia (par. 2.3.1) and Uganda (par. 2.3.2). The timeline (par. 2.3.4) indicates that the postal service has featured prominently in the delivery of distance education programmes since the 1800s. The postal service has thus formed the foundation of communication with students throughout the ages (par. 2.3.4). The reason for postal service being a prominent feature in distance education is its

affordability. The postal service received the second most responses from students and the third most responses from facilitators/lecturers. Effective communication between various and relevant role players are regarded as a challenge to institutions to deliver distance education programmes to all students. The indication from respondents of a low rating for the Open Learning Group (OLG) and the NWU websites could be that Internet access is a problem specifically for students who reside in rural areas. Analysing the data from table 4.12 shows that affordability is a high priority required by role players for choosing distance education programmes. Sending and receiving SMSs further enhance flexibility (table 4.13) as communication is possible at anytime and place.

The role of m-learning is to establish an effective and affordable means of communication for teaching and learning purposes between all role players in a distance education setting. Short Message Service (SMS) is preferred by students to receive information regarding their studies (table 4.13). Text messaging, among other means of modern communication methods, is accessible from anywhere and at anytime. Mobile devices and cell phones are accessible to anyone and are becoming more affordable for more people (par. 2.2.2.4).

4.2.4.3 How many respondents own a cell phone and what packages are they subscribed to?

It is considered an important aspect for this research to obtain information about cell phone ownership patterns among participants, because of the vital role this kind of technology plays in m-learning. Tables 4.14 and 4.15 portray some elementary data on this matter.

Table 4.14: Cell phone ownership

Item no	Question	Facilitators		Students	
		F	%	F	%
14 & 15	Do you own a cell phone				
	Yes	52	98.1	217	99.1
	No	1	1.8	2	0.9
	Total (respondents)	53			

Table 4.15: Cell phone subscription

Item no	Question	Facilitators		Students	
		F	%	F	%
15 & 16	Cell phone package subscribed to				
	Pre-paid	18	35.3	151	72.9
	Contract	33	64.7	56	27.1
	Total (respondents)	51		207	

Literature has shown that cell phone ownership globally and in South Africa has drastically increased since 2004 (par. 2.2.2.3). Increased ownership in mobile devices will enhance the use of these devices and this trend will probably lead to more application possibilities in a variety of life situations. One aspect in this regard is to investigate the potential application of cell phone technology in higher education e.g. to support m-learning. The main function of cell phone use in distance education is for academic and administrative support in which interactivity plays a significant role. Interactivity or the two-way transfer of information between, in this case, the student and the institution, is a feature imperative for distance education to succeed (par. 2.2.1.1). It is evident in table 4.15 that the majority of students are subscribed for pre-paid packages on their cell phones. Literature has shown that of the developing countries in the world, 40% (par. 2.2.2.4) are subscribed to pre-paid services mainly because it has lower start up costs and individuals can easily migrate between service providers and packages. The aspects of affordability and accessibility can be seen as the reason for this phenomenon (table 4.15). M-learning's role in distance education is thus becoming more obvious as communication and interaction are viewed as the basis for the offering of distance education programmes and the assumption that these aspects may enable more accessibility and flexibility in the delivery of these programmes.

4.2.4.4 Frequency of connecting to the Internet via cell phone

Evidently, downloading data on cell phones is not done frequently among both facilitators/lecturers and students (table 4.16). As is indicated in table 4.11 and table 4.12, affordability is a crucial element for all role players in distance education. It could be concluded that if accessing data and the cost of downloading data become more affordable, all role players would be able to communicate via Internet services. Although downloading data is made more user friendly through the use of cell phones (par. 2.2.2.3), it still is a costly exercise and hence not accessible to all. Distance education institutions have to explore more creative and alternative means via the Internet which students can download using their cell phones that is more affordable. Alternatives to be considered are *inter alia* repository sites (Moodle) where much of the data are already downloaded on this information management platform.

Students who access this information management site don't have to download large amounts of data. Data on these kind of sites have to be more compatible and adapted for mobile device usage. In this regard, mobi-sites (Internet sites specifically designed for mobile technology) for distance education may enable easier management and access control for higher education institutions. Guidelines are however needed for the development and implementation of these sites to be, among other aspects, supportive for the management of distance education programmes. Students are also in need of guidance and support in the effective use of the mentioned information management sites to complete their distance education programmes successfully.

Table 4.16: Frequency of connecting to the Internet via cell phone

		Facilitators		Students	
Item no	Question	F	%	F	%
16 & 17	How often do you connect to Internet via cell phone				
	Not at all	21	39.6	104	48.4
	Once per week	5	9.4	42	19.5
	Twice per week	5	9.4	26	12.1
	1-5 minutes daily	8	15.1	8	3.7
	5-15 minutes daily	5	9.4	13	6.0
	15-60 minutes daily	3	5.7	5	2.3
	More than one hour daily	6	11.3	17	7.9
	Total (respondents)	53		215	

The patterns of cell phone usage for both groups of respondents are required in order to determine the role m-learning and mobile devices could play in distance education. Determining the patterns of use of the respondents enabled the researcher to determine challenges that are to be addressed in the offering of distance education programmes. Management guidelines need to be drafted that will enable m-learning to be managed in order for all role players to benefit in the delivery of distance education programmes. Summarised in table 4.17 and table 4.18, the patterns of cell phone use of the two groups of respondents are reflected. A comparison of the patterns for cell phone use of both groups of respondents is presented in table 4.19. To determine how cell phones could be utilised in distance education programmes, the researcher had to assess the patterns for cell phone use among both groups of respondents.

4.2.4.5 Patterns of cell phone use among facilitators/lecturers and students

M-learning can only be implemented in distance education once the patterns of use of respondents have been assessed. Table 4.17 and table 4.18 reflect the responses of both groups regarding their patterns of cell phone use. A comparison of responses between students and facilitators/lecturers regarding patterns of cell phone use is presented in table 4.19.

Table 4.17: Patterns of cell phone use (Facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
Patterns of cell phone usage							1		2		3		4	
							F	%	F	%	F	%	F	%
1	17.2	I use my cell phone for sending SMSs.	55	3.58	0.712	0	1	1.8	4	7.3	12	21.8	38	69.1
2	17.1	I only use my cell phone for making calls.	55	3.38	0.952	0	5	9.1	3	5.5	13	23.6	34	61.8
3	17.6	Any other?	14	2.86	1.351	41	4	28.6	1	7.1	2	14.3	7	50.0
4	17.3	I access the Internet on cell phone.	54	2.48	1.193	1	16	29.6	11	20.4	12	22.2	15	27.8
5	17.4	I download data on my cell phone via the Internet.	54	2.20	1.139	1	20	37.0	13	24.1	11	20.4	10	18.5
6	17.5	I use my cell phone to log a problem with the institution.	53	1.81	1.039	2	28	52.8	13	24.5	6	11.3	6	11.3

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- I use my cell phone for sending SMSs (facilitators/lecturers)**

The responses to this item received the highest mean score in this questionnaire (3.58). Text messaging is an affordable way to communicate and could thus be implemented in teaching and learning in distance education (par. 2.2.2). Both students and facilitators/lecturers indicated that affordability and flexibility are elements essential to distance education (table 4.11 & 4.12). Implementing m-learning into distance education is a challenge in its own (par. 2.6) as modern communication technologies will only be utilised by role players if it is affordable and flexible.

Short message services (SMS) are a good starting point for communication between all role players in distance education. Verbal communications, postal services, SMSs, etc., add to the flexibility in the delivering of distance education programmes.

- **I only use my cell phone for making calls (facilitators/lecturers)**

The response to this item received the second highest mean score in this questionnaire (3.38). It is obvious from the gathered data that making calls and dealing with text messaging on cell phones are recorded as the major patterns for use in this group of respondents (table 4.17 & table 4.18). Contract packages among facilitators/lecturers are much higher (64.7%) than among students (27.1%) (4.15). The majority of students (72.9%) are on pre-paid packages indicating that affordability in making calls and SMSs are priority to them (table 4.15). Low Internet usage (table 4.16) and data download can be contributed to either ignorance, costs or that all teaching and learning material are not yet available on mobile devices. The management of m-learning material by electronic means can only be done once accessibility to all material in this particular mode is available to all role players. Should accessibility be realised to all role players – then the role of m-learning in distance education could be drastically enhanced.

- **Accessing Internet on cell phones, using cell phones to log a problem with the institution and downloading data on cell phones (facilitators/lecturers)**

All three the abovementioned aspects received the lowest mean ratings in this section of the questionnaire.

1. Access Internet on cell phones (mean 2.48)
2. Download data on cell phones using the Internet (mean 2.20)
3. Using cell phones to log a problem (mean 1.81)

Although mobile devices have the ability to assist students with downloading information (par. 2.2.7.1), it could be a very costly process. Cell phone users can control calls and cost of calls more effectively (par. 2.2.2.4) with their pre-paid packages. With pre-paid services, students can control their usage of airtime. Affordability stays the crucial element that has to be addressed for m-learning to feature more prominently in a distance education mode. Fixed landlines for Internet are not available in all areas, making Internet inaccessible for large parts of the population (par. 2.2.2.3). Mobile devices with Internet access enable information to be downloaded at any place and time, enabling the download of academic related material and management information more appropriate for distance education purposes (par. 2.2.7). An additional negative aspect regarding the use of mobile devices in distance education could be ignorance regarding downloading of data and the utilising of m-learning in distance education. More guidance from management as well as instructions on how data can be used effectively will enable m-learning to feature more prominently

in distance education. Usage of and combining m-learning within the teaching and learning process poses challenges to all role players. Accessibility and affordability in this regard are the driving force for m-learning to be effective in the delivery of distance education programmes.

Table 4.18: Patterns of cell phone use (Students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
Patterns of cell phone usage							1		2		3		4	
							F	%	F	%	F	%	F	%
1	18.1	I only use my cell phone for making calls.	207	3.61	0.686	20	5	2.4	9	4.3	47	22.7	146	70.5
2	18.2	I use my cell phone for sending SMSs.	206	3.55	0.756	21	5	2.4	18	8.7	42	20.4	141	68.4
3	18.6	Any other?	40	2.55	1.260	187	13	32.5	5	12.5	9	22.5	13	32.5
4	18.3	I access the Internet on cell phone.	196	2.23	1.174	31	77	39.3	37	18.9	42	21.4	40	20.4
5	18.5	I use my cell phone to log a problem with the institution.	196	1.90	1.100	31	105	53.6	30	15.3	37	18.9	24	12.2
5	18.4	I download data on my cell phone via the Internet.	193	1.90	1.075	34	98	50.8	41	21.2	30	15.5	24	12.4

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **I only use my cell phone for making calls (students)**

The response to this item received the highest mean score in this questionnaire (3.61). Landlines may be too expensive to afford with limited usage potential (par. 2.2.2.3) and consequently force individuals to opt for a more affordable option regarding mobile communication. Mobile communication devices has a 25% lower start-up cost (par. 2.2.2.4) and this aspect of affordability makes cell phone communications more attractive for the majority of the community.

- **I use my cell phone for sending SMSs (students)**

The responses to this item received the highest mean score in this questionnaire (3.55). Student respondents expressing a strong opinion regarding making calls and dealing with text messages (SMS) as a usage pattern for their mobile devices. Affordability may again be the key element that contributed to this particular tendency. Table 4.19 reflects the comparison of patterns for cell phone use among facilitators/lecturers and students. The tendency between both groups is similar as making calls and sending/receiving SMSs feature prominently within the two groups.

- **Accessing Internet on cell phones, using cell phones to log a problem with institutions and downloading data on cell phones (students)**

All three the abovementioned aspects received the lowest mean scores in this section of the questionnaire.

1. Access Internet on the cell phone (mean 2.23)
2. Using the cell phone to log a problem (mean 1.90)
3. Download data on my cell phone using the Internet (mean 1.90)

Students reflect a lower mean regarding downloading data on cell phones. This could be an indication that among lower income groups, the downloading of data is experienced as a costly challenge. Cost implications in the use of mobile devices are mainly linked to making calls and sending and receiving text messages.

In order to integrate m-learning into distance education programmes, patterns of use of mobile devices have to be determined in order to strategise how m-learning may be implemented and applied as an integral part of distance education. To effectively manage m-learning in distance education, tendencies or patterns of usage of mobile devices have to be assessed and appropriate structures, systems and processes have to be put in place to provide administrative and academic support to all role players in distance education. In this research, it was evident that SMSs and calls utilising cell phones were prominent as the main usage pattern by students and facilitators/lecturers.

As is reflected in table 4.19, data usage and download had the lowest mean rating with both groups of respondents. By changing the format of data, students could be enabled to download programme information from the Internet sites, and by making it more affordable, students may be encouraged to utilise m-learning to a larger extent in distance education. Social network sites that avail free applications to mobile devices could be used by role players to share and even deposit relevant programme information on these sites. Learning communities are promoted and established through among other aspects social network sites (par. 2.2.3). Through these

communication sites, information is shared more freely and at a lower cost, making learning through m-learning more affordable. Social network sites (SNS) can be accessed by utilising cell phones. The viewpoints regarding the use of mobile technologies in academic programmes could indicate the direction that may be followed in the implementation of mobile technologies in distance education.

Table 4.19: Comparison of responses received from students and facilitators/lecturers regarding patterns of cell phone use

	Rating		Rating	
Patterns of cell phone use	Facilitators/ Lecturers	Mean	Students	Mean
I use my cell phone for sending SMSs.	1	3.58	2	3.55
I only use my cell phone for making calls.	2	3.38	1	3.61
Any other?	3	2.86	3	2.55
I access the Internet on my cell phone.	4	2.48	4	2.23
I download data on my cell phone via the Internet.	5	2.20	5	1.90
I use my cell phone to log problems with the institution	6	1.81	5	1.90

4.2.4.6 Viewpoints about the use of mobile technologies in academic programmes (facilitators/lecturers)

In this section of the questionnaire, facilitators/lecturers were prompted to express their viewpoints regarding the use of mobile technologies in academic programmes for distance education.

Table 4.20: Viewpoints about the use of mobile technologies in academic programmes (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
Academic programmes utilising mobile technology will assist me to ...							1		2		3		4	
							F	%	F	%	F	%	F	%
1	18.3	provide academic-related information timely	55	3.51	0.605	0	1	1.8			24	43.6	30	54.5
2	18.4	communicate more effectively with the students and facilitators	54	3.50	0.637	1			4	7.4	19	35.2	31	57.4
3	18.2	be more flexible in my teaching methodology	54	3.30	0.644	1	1	1.9	2	3.7	29	53.7	22	40.7
4	18.5	integrate the Internet into my teaching methodology	55	3.29	0.712	0	1	1.8	5	9.1	26	47.3	23	41.8
4	18.1	enhance my teaching practice.	55	3.29	0.629	0	1	1.8	2	3.6	32	58.2	20	36.4

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **Provide academic related information timely**

The responses to this item received the highest mean score in this questionnaire (3.51). This item reflected the importance for the facilitator/lecturer to provide academic information timely to students as one of the most important aspects of m-learning (par. 2.7). Academic and administrative support to students is crucial in distance education (par. 2.2.2.1, 2.2.7). Academic barriers exist in teaching and learning whereby either class sizes are too big, or teaching and learning in general are of a low standard (par. 2.5.2). The high rating that facilitators/lecturers gave to this item signifies a need among facilitators/lecturers to use m-learning as a means not only to supply academic support, but also administrative support. Academic support will be more costly as data will have to be downloaded from information platforms or databases by students. Accessing the Internet received the lowest rating in this section (table 4.20 & table 4.21). In table 4.19 both groups of respondents indicated that downloading data as well as Internet usage had the lowest mean scores. A challenge that exists for m-learning is to investigate what type of

academic information the respondents referred to. Once the academic content to be conveyed has been established, m-learning's role will be more clearly defined in the delivery of distance education programmes as the type of information to be sent to students timeously will be in a format easy accessible to students.

- **Communicate more effectively with students and facilitators**

The responses to this item received the second highest mean score in this questionnaire (3.50). Communication forms an essential component of distance education between all role players (par. 2.2.1, 2.2.2.1). Implementing modern communication media in distance education will contribute to enhance communication effectiveness in distance education (par. 2.2.1) as various forms of communication are investigated and implemented. The more communication possibilities exist that could be utilised in distance education, the more flexibility will be evident in the delivery of programmes which will be to the benefit of students (par. 2.2.1.2). Time and place should not be a barrier in distance education as distance education is defined as the delivery of programmes through distance, irrespective of time and place (par. 2.2.1). Removing communication barriers to distance education could only be done by implementing modern communication technologies such as versatile mobile devices. More than 98.1% of all respondents are in possession of a cell phone (table 4.14). Start-up costs for cell phones are 25% lower than with fixed Internet and telephone lines (par. 2.2.2.4). Communicating with all role players utilising cell phones is more effective because of the affordability and flexibility cell phones add to the mode of distance education. It is noticeable in this section of the questionnaire that communication is prominent in delivery of distance education programmes. Geographical diversity should not be problematic when students enrol for distance education programmes as modern communication technologies assist with the removal of barriers that may estrange students from institutions of distance education. Facilitators/lecturers focus more on communication while students' attention lies with learning at their own pace and convenience (table 4.21). Facilitators/lecturers possibly find themselves in an environment with ample communication possibilities or technologies, which would not necessarily be the case with students. The importance of communication in distance education is an aspect students must be informed of and guidelines for improving these communication structures must be developed and applied at all levels for the delivery of distance education programmes. This aspect is of particular interest to the management and leadership in charge of distance education institutions to ensure the offering of quality service to students with respect to all aspects of a distance education programme.

- **More flexibility in teaching methodologies**

The response to this item received the third highest mean score in this questionnaire (3.30). A larger percentage of facilitators/lecturers (53.7%) (table 4.20) had consensus that more flexibility is

needed in teaching and learning. Implementing modern communication technologies in teaching and learning of distance education programmes could be as successful as traditional classroom education (par. 2.5.1). Modern communication technologies could offer all role players in distance education equal opportunities to access resources and communicate more frequently with the institution they are enrolled with. Lifting barriers that would hamper communication in all aspects would give distance education students as much advantage, if not more, than traditional classroom teaching. M-learning combined in teaching and learning will primarily be contributing to more effective communication between all role players in distance education. Increasing communication and introducing more means of communication already add to more flexibility in the delivery of distance education programmes over a diverse geographical area. Geographical diversity is a challenge of its own in distance education because in some cases only cell phone reception is available. Using this aspect as a starting point, communication should include basic content to inspire students and lecturers to utilise modern communications on a more regular basis in teaching and learning. M-learning is made possible through the introduction of electronic resources such as the Internet and information management platforms.

- **Integrate the Internet into my teaching methodology**

The responses to this item received the second lowest mean score (3.29). Although this item was rated second lowest, the rating is still significantly above the average (2.50) rating for this section. This could be an indication that facilitators/lecturers see the need to utilise and apply more modern communication methods in teaching and learning. The literature indicates that towards the turn of the century more modern communication technologies will be implemented and utilised in teaching and learning endeavours (par. 2.2.1.1). Improved Internet access may lead to improved communication in teaching and learning (par. 2.2.2.1). The high rating for this item could be an indication that facilitators/lecturers realise that the Internet integration in teaching and learning is inevitable, but the aspect of affordability and cost of downloading data are regarded as stumbling blocks for integration into teaching and learning. Table 4.17 is a clear indication from respondents that Internet usage by means of cell phones received a low rating (2.20). The only possible cause for this could be the affordability aspect. All means of communication should be accessible to all role players, irrespective of geographical diversity and economic background of individuals to utilise and implement m-learning successfully into distance education. Once accessibility to resources and affordability of distance education programmes have been bridged, the Internet could possibly be integrated more frequently into the delivery of distance education programmes.

- **Enhance my teaching practice**

This item (18.1) received the same rating as question 18.5 in the questionnaire (3.29). This rating is significantly higher than average (2.50) and clearly indicates that m-learning could enhance teaching practice. Resources and the accessibility to it could be the reason why this item rated the lowest. Teachers do agree to the fact that m-learning enhance teaching practice, since this item received a higher than average rating. Managing m-learning will have to take accessibility to resources into account when deciding what role m-learning must play in delivery of distance education programmes.

4.2.4.7 Viewpoints about the use of mobile technologies in academic programmes (students)

In this section of the questionnaire, students were prompted to express their viewpoints regarding the use of mobile technologies in academic programmes for distance education.

Table 4.21: Viewpoints about the use of mobile technologies in academic programmes (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
Academic programmes utilising mobile technology will assist me to ...							1		2		3		4	
							F	%	F	%	F	%	F	%
1	19.2	learn at my own pace	200	3.49	0.716	27	7	3.5	5	2.5	71	35.5	11	58.5
2	19.1	learn at my own convenience	197	3.46	0.627	30	2	1.0	8	4.1	84	42.6	10	52.3
3	19.3	attain academic-related information in the shortest time	189	3.30	0.743	38	6	3.2	14	7.4	86	45.5	83	43.9
4	19.4	communicate more effectively with my lecturer / facilitator	201	3.24	0.866	26	13	6.5	21	10.4	71	35.3	96	47.8
5	19.5	access the Internet via mobile phone.	195	2.90	1.089	32	35	17.9	21	10.8	68	34.9	71	36.4

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **Learn at my own pace**

The response to this item received the highest mean score in this questionnaire (3.49). Distance education affords students to enrol at anytime irrespective of the location they reside in. Distance education presents students with the option to learn at anytime. Anytime and anyplace learning individualises and personalises teaching and learning (par. 2.2.2.2, 2.8, 2.6.2). Time and location are seen as barriers in education. Removing barriers of time and location will enable students to learn at their own pace. Learning at their own pace and removing barriers that hamper accessibility to further education is also known as open distance learning (par. 2.2.4). M-learning's role in any mode of delivery of distance education should be to augment communication between all role players in distance education so as to afford students the possibility to access teaching and learning at anytime and place. It is evident in the responses from students that mobile technologies allow more freedom in accessing learning at anytime and place.

- **Learn at my own convenience**

The responses to this item received the second highest mean score in this questionnaire (3.46). This item links closely with the item regarding learning at own pace that received the highest mean score. Learning at your own pace and learning at your own convenience could be described as individualising and personalising learning. The most important aspect to consider when managing teaching and learning at a distance education institution is to set guidelines in which the aspect of personalising learning is to be addressed on a regular basis.

- **Attain academic-related information in the shortest time**

The response to this item received the third highest mean score in this questionnaire (3.30). Academic and administrative support is decisive in delivering distance education programmes (par. 2.7). Students must be able to communicate with the institution regarding support at anytime (par. 2.2.1.3). Both forms of support must be available to students at anytime. The responses to this item in the questionnaire indicate that a need exists for students to receive further academic support and feedback regarding students' academic progress and academic content. Support mechanisms for administration and academic support to students are important aspects that need to be ensured and well managed.

- **Communicate more effectively with my lecturer/facilitator**

The responses to this item received the fourth highest mean score in this questionnaire (3.24). This item did not receive the highest mean score but lies well above the average of the scale provided (2.50). Effective communication between all role players is a crucial element for distance education to succeed. Communication enhances flexibility in distance education regarding support (par. 2.2.1.2) as students should be able to communicate frequently with all role players.

Furthermore, effective communication in distance education encourages interactivity (par. 2.2.1.2). Interactivity is inevitable as students need administrative and academic support in programmes delivered through distance education. Interactivity is enhanced by introducing various mobile technologies and modern communication techniques. The communication process improves as more communication technologies are introduced in the delivery of distance education programmes (par. 2.2.1.3). Mobile devices are more affordable than other means of communication (par. 2.2.2). Only when communication channels are accessible and affordable to all role players could it enhance not only effective communication, but also the delivery of distance education programmes. In managing m-learning within distance education, communication should form a basic element in designing and delivering distance education programmes.

- **Access the Internet via mobile phone**

The response to this item received the lowest mean score in this questionnaire (3.24). Literature has shown that within an open distance learning mode, Internet accessibility is more attainable through introducing more modern communication devices to assist with communication and the provision of distance education programmes (par. 2.2.7). However, table 4.16 indicates that Internet usage on mobile devices is low because of the high cost of downloading data via cell phones. Affordability and flexibility are important for distance education students, as new technologies making these aspects possible in distance education will drastically improve communication between all role players.

4.2.4.8 Personal skills regarding mobile learning (facilitators/lecturers/students)

In this research the role of m-learning in distance education is investigated to determine the challenges that m-learning could pose for the implementation in distance education. The effective implementation of m-learning requires reliable information about how many of the role players have cell phones, and in addition to that, what the patterns of usage of cell phones by all role players are. In table 4.17 and table 4.18, it was established what the patterns of usage are for cell phones among the respondents. Not less than 94.5% of respondents own cell phones. According to the feedback in table 4.13, respondents have indicated that they prefer communication via SMS informing them about information regarding their studies. Respondents' feedback regarding the reason they enrolled for distance education was that teaching and learning are more flexible when enrolling for distance education programmes (table 4.12). Flexibility in distance education allows for different modes of delivery to be utilised in delivering distance education programmes as well as implementing various technological applications in the delivery of programmes (par. 2.2.1.2). Both groups of respondents have indicated that making calls and sending text messages by using cell phones are the modes of communication they prefer. In order to determine how to implement m-learning in distance education, the related skills

of respondents have to be assessed in order to determine how m-learning will effectively be implemented into the delivery of distance education programmes. In the next group of items, the skills of respondents in relation to mobile technology were established to determine the skill level, challenges and needs in this regard.

Table 4.22: Personal skills regarding mobile learning (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	19.2	If required, I will acquire skills for learning via mobile technologies.	55	3.56	0.601	0	1	1.8			21	38.2	33	60
1	19.4	The institution must provide mobile technologies to lecturers/facilitators in distance education facilitation.	54	3.56	0.572	1			2	3.7	20	37.0	32	59.3
3	19.1	I can picture myself to teach/facilitate by utilizing applicable mobile technologies.	55	3.25	0.775	0	2	3.6	5	9.1	25	45.5	23	41.8
4	19.3	I know how to integrate a variety of technologies in teaching/facilitating.	55	3.05	0.756	0	1	1.8	11	20.0	27	49.1	16	29.1

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **If required, I will acquire skills for learning via mobile technologies (facilitators/lecturers)**

The responses to this item received the highest mean score in this questionnaire (3.56). It is deduced from the feedback received for this item that respondents are positive towards learning new skills to improve their learning via mobile technologies, although the majority of the respondents only utilise cell phones for making calls and sending SMS messages. Exposing role players to more features of mobile technologies could assist with acquiring new

skills in this area that is part of nearly everybody's daily life. Literature has shown that implementing and utilising new technologies is indispensable if progress and development is sought after (par. 2.2.1.1). It could be said that new and improved communication in distance education is inevitable as new communication technologies are all around us and available to all. Before new technological applications are to be utilised in teaching and learning, new skills have to be acquired. Improved skills regarding new communication technologies will enable improved communication. It can thus be concluded that skills training in new communication technologies, specifically mobile technology usage, is regarded as a prerequisite before m-learning can be implemented in the delivery of distance education programmes.

- **The institution must provide mobile technologies to lecturers/facilitators in distance education facilitation (facilitators/lecturers)**

The responses to this item received the same mean score in this questionnaire as item 19.2 (3.56). Communication is a core element to ensure the effective delivery of distance education programmes and may be enhanced by the increased exposure to modern communication technologies (par. 2.2.1.1). Distance education students are separated in time and space from the institution responsible for the delivery of distance education programmes. Increased Internet accessibility is available to students because there are options for devices available that could be utilised for these purposes (par. 2.2.7). The availability of mobile technologies to role players could eventually lead students and other role players in distance education to access the Internet more frequently. The more students are exposed to mobile technologies the more they will access the Internet and associated applications (par. 2.5.2). Institutions could (and some already have) develop mobi-sites whereby students can access the institution's website, which is specifically designed for mobile technology in order to obtain information needed for their studies.

- **I can picture myself to teach/facilitate by utilising applicable mobile technologies (facilitators/lecturers)**

The responses to this item received the third highest mean score in this questionnaire (3.25). This item had a reasonable high mean score, considering that the average mean score for the items in this question was 2.50. Referring to the first two items in this section, it is clear that facilitators/lecturers are of the opinion that skills are needed to apply mobile technologies into teaching and learning. Should the mean for the items in this section be low, it could be an indication that there is no interest in obtaining skills and utilising mobile communication technologies in teaching and learning. Respondents recorded a high response rate to this item and it is clear that respondents can identify with the new mobile technologies available to them.

Accessibility and affordability are however still a challenge that will determine to a large extent how mobile technologies will be implemented into teaching and learning.

- **I know how to integrate a variety of technologies in teaching/facilitating**

The responses to this item received the lowest mean score in this questionnaire (3.05), although still higher than the average of 2.50. According to literature, distance education can be defined as teaching and learning taking place over a wide geographical area, relying on a wide variety of electronic and printing media (par. 2.2.1). The availability of a variety of means and ways of communication enables interactivity, which may lead to effective communication between all role players. Regarding the rating of the items in this question item, it is evident that skills as well as the provision of new mobile technologies are priorities when integrating mobile technologies into teaching and learning. Integrating new mobile technologies into teaching and learning has the potential to enhance distance education programme delivery as interaction and communication are more effective when utilising these new mobile technologies. A particular challenge in distance education will be to devise an action plan to create accessibility for all role players on an equal basis for all to link with the institution offering distance education programmes.

Table 4.23: Personal skills regarding mobile learning (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	20.2	If required, I will acquire skills for learning via mobile technologies.	204	3.30	0.706	23	5	2.5	14	6.9	99	48.5	86	42.2
2	20.1	I can picture myself to learn by utilising applicable mobile technologies.	207	3.22	0.794	20	11	5.3	14	6.8	100	48.3	82	39.6
3	20.4	My background and economic circumstances enables me to make use of mobile technologies for learning.	202	2.98	0.834	25	13	6.4	33	16.3	101	50	55	27.2
4	20.3	Learning via mobile technologies will require much effort.	202	2.88	0.919	25	22	10.9	33	16.3	95	47.0	52	25.7

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **If required, I will acquire skills for learning via mobile technologies (students)**

The responses to this item received the highest mean score in this questionnaire (3.30). This item also received the highest mean score with the facilitators/lecturers. The mean score among students is slightly lower because students could be uncertain of what is available in mobile technologies to utilise in teaching and learning. Both groups of respondents are in accord about the statement that mobile technologies will contribute to flexibility in teaching and learning (table 4.11 & table 4.12). Literature indicates that the more affordable new communication technologies becomes, the more students will have frequent access to information (par. 2.2.2.3). The following related aspects are highlighted by the previous sections.

- Affordability and flexibility of mobile technologies as well as the type of subscription packages students use, determine to some extent the pattern of use of mobile technologies among role players in distance education. The data in table 4.15 show that 72.9% of student respondents indicate that they are subscribed to pre-paid packages on their cell phones.
- There is a need for students to have flexibility in teaching and learning, even more than affordability.
- Cell phones are mainly used for making calls and sending SMS messages (table 4.13 table 4.19).

The need exists for students to acquire skills for learning via mobile technologies as they have stated this in the responses to the item posed to them. This need has to be addressed as a challenge on how accessibility and affordability of mobile technologies will be addressed to empower role players with these skills. A possible solution on the short term could be to design mobi-sites whereby students can have access to the institution's website, even if they are not in possession of a computer. They could access this site specially designed for mobile technology by using cell phones. By developing a site that students can have access to and which they can relate to their teaching and learning experience, will amplify the role that m-learning can play in the provision of distance education programmes.

- **I can picture myself to learn by utilising applicable mobile technologies (students)**

The responses to this item received the second highest mean score in this questionnaire (3.22). According to the responses received from this item students are willing to acquire new skills regarding mobile technologies as well as utilising mobile technologies to augment their learning. Mobile technologies strengthen communication and access to resources (par. 2.2.1.1). Being able to learn by means of mobile technologies will empower students to access teaching and learning at anytime and place. The central role of m-learning is to enable students to access content and

support irrespective of time and location. The challenge for institutions will be to develop content suitable for mobile technologies to enable students and role players to access these data in time. This aspect has further implications for the management of institutions as service providers to develop management guidelines to ensure effective systems and processes for delivering a complex service in the education sector.

- **My background and economic circumstances enables me to make use of mobile technologies for learning (students)**

The responses to this item received the second highest mean score in this questionnaire (2.98). Institutions consider location and economic elements before deciding on a mode of delivery for their programmes (par. 2.3.4). The classrooms used in distance education are becoming a virtual platform that could be established at any place and time accommodating all learners irrespective of their culture, economic and academic background, enabling students to access teaching and learning opportunities, study material and resources by means of a variety of technologies (par. 2.2.5, 2.5.2). Respondents indicate in their feedback that cost could have an influence on the use of mobile learning in distance education. If students were not able to afford mobile technologies, accessibility to resources would be restricted or not even possible. Affordability in the delivery of distance education programmes is a crucial factor to account for (par. 2.6.2). Before m-learning can be introduced into distance education, it is important that the cost implication to students be assessed to know if they will be able to afford the information to be downloaded for study purposes.

- **Learning via mobile technologies will require much effort (students)**

The responses to this item received the lowest mean score in this questionnaire (2.88). The response to this item was just above average (2.50). A reason for this state of affairs could be uncertainty as well as ignorance on how to utilise mobile technologies in distance education for study and academic purposes. Informing students regarding the advantages of mobile technologies will be a challenge that must be addressed before implementing mobile technologies.

4.2.5 Section D: Challenges, experiences and expectations with regard to mobile learning

4.2.5.1 Experiences and perceptions of mobile learning among facilitators/lecturers and students

Respondents' perceptions regarding m-learning were evaluated in this section. The aim of the questions respondents answered was to determine how the different groups experienced the use of m-learning in distance education. Determining each group of respondent's preferences, a strategy could be developed to address the challenges that each group faces. The role of m-learning among the different groups was determined in order to address the needs of each group regarding m-learning separately. The same guidelines and management tools cannot be applied to both groups as the use of m-learning differs among the different respondents. Table 4.26 in this section draws a comparison of the responses received from students and facilitators/lecturers regarding their experiences and perceptions of mobile learning.

Section D of the questionnaire comprises of question 20.1 - 24.14 (facilitators/lecturers) and question 21.1 - 25.14 (students).

Table 4.24: Experiences and perceptions of mobile learning (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
		Mobile learning ...					1		2		3		4	
							F	%	F	%	F	%	F	%
1	20.6	provides reminders of due and other important dates	55	3.75	0.440	0					14	25.5	41	74.5
2	20.1	improves access to further learning	55	3.55	0.538	0			1	1.8	23	41.8	31	56.4
2	20.8	allows the utilisation of text messaging for academic purposes	55	3.55	0.571	0			2	3.6	21	38.2	32	58.2
4	20.4	enables access to academic content via cell phones	55	3.45	0.603	0			3	5.5	24	43.6	28	50.9
5	20.5	enhances administrative support via cell phones	55	3.40	0.655	0			5	9.1	23	41.8	27	49.1
6	20.7	provides flexibility in the learning process	55	3.38	0.561	0			2	3.6	30	54.5	23	41.8
7	20.9	provides more freedom for personal learning styles	55	3.29	0.712	0	1	1.8	5	9.1	26	47.3	23	41.8
8	20.2	improves the quality of teaching	55	3.20	0.704	0			9	16.4	26	47.3	20	36.4
9	20.3	improves the quality of learning	54	3.19	0.702	1			9	16.7	26	48.1	19	35.2
9	20.10	facilitates a more effective means of the learning process.	54	3.19	0.729	1	1	1.9	7	13.0	27	50.0	19	35.2

- **Mobile learning provides reminders of due and other important dates (facilitators/lecturers)**

The responses to this item received the highest mean score in this section of the questionnaire (3.75). It is clear that in the facilitators/lecturers' responses to this item, planning in the teaching and learning formed a large part of the facilitators/lecturers' responses. The facilitators/lecturers comprehend the importance of the application potential of cell phones in administrative and academic support. The literature indicates that administrative and academic support forms the basis of communication in distance education (par. 2.2.1.3). This perspective is also of importance for management purposes to make sure that quality service and support are provided to students who are the 'clients' of the institution. The leadership and management of education institutions as service providers also need to be on forefront of development with regard to mobile technologies and the application possibilities of such technologies in the education sector.

- **Mobile learning improves access to further learning and allows the utilisation of text messaging for academic purposes (facilitators/lecturers)**

The responses to both of these items were the same. The mean score was the second highest (3.55). The literature states that mobile devices are designed to be user-friendly and can thus be operated by most people with relative ease. Increased exposure to mobile technologies may open up new avenues for communication such as text messaging, email and various forms of social media that develop at a rapid pace (par. 2.2.2, 2.2.3) and could be applied in teaching and learning. M-learning will not only serve as mere administrative support to role players, but will assist students and other role players with academic support to improve the quality of teaching and learning. M-learning could assist in improving the quality of teaching and learning whereby additional material could be downloaded by means of mobile devices. The data indicates (table 4.13) that students prefer receiving information regarding their studies by, among other aspects, means of text messaging (SMS). Although the majority of respondents do not download information (table 4.16) on their cell phones because of the costs involved, a need does exist to investigate affordable options for role players to download administrative and academic information on their mobile devices.

- **Mobile learning enables access to academic content via cell phone (facilitators/lecturers)**

The responses to this item received the third highest mean score in this questionnaire (3.45). The responses to this item link with the previous item whereby the respondents expressed the view that m-learning could expand access to teaching and learning opportunities. The item that had the highest rating in this section augmented the notion that administrative support is an important element to be considered in m-learning.

- **Mobile learning enhances administrative support via cell phone (facilitators/lecturers)**

The response to this item received the fourth highest mean score in this section of the questionnaire (3.40). Administrative and academic support to students forms the basis of communication in distance education (par. 2.7). M-learning allows role players to access information and content at anytime and place using mobile devices.

- **Mobile learning provides flexibility in the learning process (facilitators/lecturers)**

The responses to this item received the fifth highest mean score in this section of the questionnaire (3.38). Literature states that mobile devices that include mobile communication devices such as cell phones, PDAs, tablets, mobile computers etc., allow more flexibility in distance education than fixed personal computers that restrict the mobility of students and facilitators/lecturers (par. 2.2.2.2). Mobility and movable devices afford students and other role players in distance education to take teaching and learning with them, irrespective of location. More exposure to mobile communications could thus enhance communication and interaction between role players in distance education.

- **Mobile learning provides more freedom for personal learning styles (facilitators/lecturers)**

The responses to this item received the fifth highest mean score in this part of the questionnaire (3.29). M-learning affords students the opportunity to access teaching and learning at anytime and place (par. 2.6.1). Accessibility to learning at anytime will enable students to personalise and individualise teaching and learning as students can set their own goals, which are more achievable (par. 2.6.2). Personalising learning will enable students to learn at their own pace. The situation that students determine their own pace is more attainable through the use of mobile communication devices. Enabling students to access the Internet more frequently by means of mobile technology for purposes of study will only be possible if more exposure is given to role players to applicable technologies. Challenges such as affordable Internet access to students via mobile devices have to be addressed.

- **Mobile learning improves the quality of teaching (facilitators/lecturers)**

The response to this item received the sixth highest mean score (3.20). Increased interactivity between role players in distance education enhances communication (par. 2.2.1.3). M-learning increases communication between all role players (par. 2.2.2.1). Introducing more modern communication technologies into teaching and learning could assist with introducing new knowledge and ideas that could improve the quality of teaching and learning. The new knowledge and old traditional means of teaching can be combined to form a new strategy for teaching and learning. The role of m-learning will be to create opportunities for students to introduce mobile communication technologies into all aspects of learning they find themselves in.

- **Mobile learning improves the quality of learning and facilitates a more effective means of the learning process (facilitators/lecturers)**

The responses to these items received the lowest mean score (3.19). Although these two items received the lowest mean score of the items in this section, it is an indication that the respondents in this group have a strong view regarding the role m-learning could play in distance education as well as in teaching and learning. This stance underpins the importance of the role of m-learning in the teaching and learning process. The lack of skills to utilise cell phones, particularly for teaching and learning, could be a contributing factor why respondents gave that item a low rating in this section although they do realise that m-learning could assist effectively in teaching and learning.

The following data in table 4.25 represent the experiences and perceptions of students about m-learning.

Table 4.25: Experiences and perceptions of mobile learning (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
Mobile learning ...							1		2		3		4	
							F	%	F	%	F	%	F	%
1	21.1	improves access to further learning	197	3.53	0.619	30	1	0.5	10	5.1	69	35.0	117	59.4
1	21.2	improves the quality of teaching	199	3.53	0.673	28	2	1.0	14	7.0	60	30.2	123	61.8
3	21.3	improves the quality of learning	199	3.52	0.665	28	3	1.5	10	5.0	66	33.2	120	60.3
4	21.6	provides reminders of due and other important dates	196	3.47	0.667	31	4	2.0	7	3.6	77	39.3	108	55.1
5	21.7	provides flexibility in the learning process	192	3.45	0.629	35	2	1.0	8	4.2	83	43.2	99	51.6
6	21.9	provides more freedom for personal learning styles	196	3.35	0.719	31	4	2.0	16	8.2	83	42.3	93	47.4
6	21.10	facilitates a more effective means of the learning process	194	3.35	0.690	33	3	1.5	15	7.7	88	45.4	88	45.4
8	21.8	allows the utilisation of text messaging for academic purposes on cell phones	195	3.34	0.731	32	5	2.6	15	7.7	84	43.1	91	46.7
9	21.4	enables access to academic content via cell phones	193	3.21	0.824	34	12	6.2	13	6.7	90	46.6	78	40.4
10	21.5	enhances administrative support via cell phone.	192	3.17	0.808	35	10	5.2	19	9.9	92	47.9	71	37.0

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **Mobile learning improves access to further learning and improves the quality of teaching (students)**

The responses to these items received the highest mean score (3.53). It is clear in the responses received from both groups that the perceptions with regard to mobile learning differ to some extent. Students perceive mobile learning totally different than facilitators/lecturers. In table 4.26, students rated their perceptions of mobile learning different from the perceptions of facilitators/lecturers. Students respond that mobile learning could improve teaching and learning while the facilitators gave these items a low rating (8 & 9). The reaction of the students regarding this item could be that the area students reside in was the determining factor why they chose these items as important. The diverse geographical areas they reside in require students to have access to teaching and learning at anytime. Resources are not readily available in all areas and require of students and educators to explore more avenues to improve teaching and learning. M-learning affords the ability to download information irrespective of their location and may enable them to employ this information to enhance their teaching and learning.

- **Mobile learning improves the quality of learning (students)**

The responses to this item received the second highest mean score (3.52). Considering the responses on the items that received the highest rating in this section, it is apparent that mobile learning could enable teaching and learning to be accessed by students. Improving the quality of learning will transpire to the integration of a wide variety of technologies and methods in the delivery of programmes in distance education (par. 2.2.1). Mobile technologies enable students to access learning at anytime and place. More frequent access to communication technologies is closely linked to improved communication and interactivity. Improved communication could lead to improve the quality of teaching and learning in distance education. M-learning should serve as an additional means of communication in delivery of distance education as students are geographically dispersed over a wide area. Higher accessibility to resources could improve the quality of learning in all programmes.

- **Mobile learning provides reminders of due and other important dates (students)**

The responses to this item received the third highest mean score in this questionnaire (3.47). The facilitators/lecturers recorded the highest mean score for this item. This is an indication that administrative support and academic support by employing mobile technologies are both decisive in the delivery of distance education programmes. The literature states that effective communication is imperative in distance education (par. 2.2.1.3). Improving communication will occur when additional methods and technologies are integrated in distance education. The focus during the delivery of distance education has to be on administrative and academic support as this may increase interactivity and accessibility to resources in the provision of programmes.

- **Mobile learning provides flexibility in the learning process (students)**

The responses to this item received the fourth highest mean score in this section of the questionnaire (3.45). Both groups of respondents rated this item quite the same. Flexibility should actually be rated the highest as more methods and technologies are implemented in distance education the more flexible the teaching and learning process will be in accordance to the idiosyncratic circumstances of the individual student. A possible reason why this item did not receive a higher mean could be that role players are not knowledgeable regarding all methods and technologies that will enable more flexibility in the delivery of programmes. Students do have cell phones but do not have the know-how to implement these technologies into the programmes they are registered for. Based on the responses gathered from this section of the questionnaires it can be deduced that the relevant role players have a need to improve teaching and learning as well as administrative and academic support. Proper guidance and training regarding the use of mobile technologies can enable more students to access resources and support mechanisms. This access will further improve communication and the quality of teaching and learning.

- **Mobile learning provides more freedom for personal learning styles (3.35) and facilitates a more effective means of the learning process (3.35) (students)**

The responses to these items received the fifth highest mean score in this questionnaire (3.35). The notion exists that time and place are to a large extent irrelevant in mobile learning to enable teaching and learning to be individualistic, personalised and to eliminate the judgmental issues from the process of learning as is found in traditional education settings (par. 2.2.2). Personalising and individualising learning provides more freedom for teaching and learning to take place at anytime and location making the learning environment more suitable or situation-specific for all role players. Personalisation is another aspect of m-learning that could improve flexibility in the delivery of distance education programmes.

- **Mobile learning allows the utilisation of text messaging for academic purposes on cell phones (students)**

The responses to these items received the fifth highest mean score in this questionnaire (3.34). The facilitators/lecturers rated this item much higher than the students (table 4.26). Both groups of respondents (table 4.13) indicate that SMSs should be considered as a means of communication to be employed increasingly in the provision of distance education programmes. Text messaging (SMS) could be used to serve as administrative support initially and then gradually be incorporated as academic support to improve the quality of teaching and learning. Improving the quality of teaching and learning is closely linked to improved communication and therefore needs to be utilised to its full extent. Communication in an academic environment can only be enhanced if

more suitable methods and technologies are implemented in the delivery of distance education programmes. Text messaging (SMS) is for instance such communication technology that could enhance teaching and learning in distance education (par. 2.2.2).

- **Mobile learning enables access to academic content via my cell phone (students)**

The responses to these items received the sixth highest mean score (3.21). Both groups gave a reasonably high mean score for this item and it could be an indication that accessing academic content on cell phones is a significant aspect of distance education and the delivery of programmes that have potential for further investigation. Exploring the possibility of accessing academic content must be affordable to all role players. Affordability to download academic information could be the other reason why students did not rate this item higher. Students would rather make use of text messaging as a means of communication, because it is a more affordable way of communication.

- **Mobile learning enhances administrative support via cell phones (students)**

The responses to these items received the lowest mean score in this section (3.17). Information improving teaching and learning is regarded as more important to students (table 4.26). The reason may be that students in distance education need sufficient and specialised academic support to complete programmes successfully they are registered for. Academic support seems to be a higher priority for students than for facilitators/lecturers. The possible reason administrative support received a low rating could be that sufficient administrative support is given to respondents that completed the questionnaires, but a need exists for more academic support in delivering of distance education programmes.

Table 4.26: Comparison of responses received from students and facilitators/lecturers regarding their experiences and perceptions of mobile learning

	Rating		Rating	
Patterns of cell phone use	Facilitators/ Lecturers	Mean	Students	Mean
Provides reminders of due and other important dates	1	3.75	4	3.47
Improves access to further learning	2	3.55	3	3.52
Allows the utilisation of text messaging for academic purposes	2	3.55	8	3.34
Enables access to academic content via cell phone	4	3.45	9	3.21
Enhances administrative support via cell phone	5	3.40	10	3.17
Provides flexibility in the learning process	6	3.38	5	3.45
Provides more freedom for personal learning styles	7	3.29	6	3.35
Improves the quality of teaching	8	3.20	1	3.53
Improves the quality of learning	9	3.19	1	3.53
Facilitates a more effective means of the learning process	9	3.19	6	3.35

The high mean reflected in the response for this question between both groups affirms the perception that m-learning could materialise as an additional means of communication and facilitate interaction between role players in distance education. The items in this question were in relation to administrative and academic support to students in distance education. It is evident that the students rated the quality of teaching and learning as highest in their response while facilitators/lecturers viewed administrative support as the highest mean in their response. The literature indicates (par. 2.2.2) that text messages have a higher impact at higher institutions when utilising it for administrative support. From this question item, it can be deduced that from the institution's side (facilitators/lecturers) administrative support, utilising SMSs, is the first choice of communication to students. Students also indicated in table 4.13 that they prefer SMSs to communicate to them information regarding their studies. Quality of teaching and learning is a lower priority to facilitators/lecturers than administrative support. Strengthening the communication on administrative support could later lead to improving and establishing a better academic support system through m-learning.

4.2.5.2 Challenges related to the use of mobile learning

Challenges exist that must be accommodated if m-learning is to be implemented into a mode of distance education. One of the tasks of m-learning will be to improve communication in the effective delivery of distance education programmes. Improving communication between role players will add more flexibility as well as allow students to take part actively in teaching and learning, irrespective of their location. Both groups of respondents completed questionnaires suited to their situation. The responses regarding the challenges of m-learning are recorded in table 4.27 and table 4.28.

Facilitators/lecturers - Questions 21.1-21.13

Students - Question 22.1-22.13

The literature points out the following challenges in the delivery of distance education programmes:

- New technological developments in communication (par. 2.6.1)
- Personalisation of teaching and learning (par. 2.6.2)
- Affordability in the delivery of distance education programmes (par. 2.6.2)
- Development of a management structure for the mode of delivery chosen for distance education programmes (par. 2.6.4).

Table 4.27: Challenges related to the use of mobile learning (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings									
							1		2		3		4		5	
							F	%	F	%	F	%	F	%	F	%
1	21.5	I will make use of relevant mobile technologies to access teaching and learning information.	54	3.74	0.732	1			3	5.6	14	25.9	31	57.4	6	11.1
2	21.9	I would like to know more about the use of mobile learning.	55	3.71	0.629	0	1	1.8	1	1.8	12	21.8	40	72.7	1	1.8
3	21.1	The use of new mobile technologies will be to the benefit of my teaching.	54	3.61	0.656	1			1	1.9	23	42.6	26	48.1	4	7.4
3	21.4	Mobile technology provides more possibilities to obtain course content on various platforms.	54	3.61	0.685	1			2	3.7	21	38.9	27	50.0	4	7.4
5	21.3	Sufficient cell phone reception in my area.	54	3.59	0.880	1	2	3.7	3	5.6	15	27.8	29	53.7	5	9.3
6	21.10	If possible, I will make an effort to provide study material via mobile technologies.	55	3.58	0.786	0	1	1.8	3	5.5	18	32.7	29	52.7	4	7.3
7	21.13	More information of distance education programmes can be sent via mobile technologies.	55	3.56	0.977	0	3	5.5	3	5.5	16	29.1	26	47.3	7	12.7
8	21.2	The modus of	54	3.54	0.926	1	1	1.9	4	7.4	23	42.6	17	31.5	9	16.7

		mobile learning is affordable.														
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Table 4.27: Challenges related to the use of mobile learning (facilitators/lecturers)
(Continues)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings									
9	21.6	Mobile learning engagement will enable the students to prepare more effectively for contact sessions.	55	3.51	0.920	0	2	3.6	3	5.5	22	40.0	21	38.2	7	12.7
9	21.11	Some assessment activities can be conducted via mobile technology.	55	3.51	0.900	0	2	3.6	2	3.6	24	43.6	20	36.4	7	12.7
11	21.12	Communication through mobile technologies is more reliable than the postal service.	55	3.49	0.940	0	2	3.6	6	10.9	15	27.3	27	49.1	5	9.1
12	21.8	The introduction of mobile learning will lower the cost of studying.	55	3.22	1.031	0	3	5.5	8	14.5	25	45.5	12	21.8	7	12.7
13	21.7	Mobile learning has the potential to substitute contact sessions to a large extent.	55	2.69	0.998	0	8	14.5	14	25.5	20	36.4	13	23.6		

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely, 5 = Don't know

The item with the lowest mean score in this questionnaire (table 4.27) was that m-learning has the potential to substitute contact sessions to a large extent (2.69). Contact sessions are a system whereby facilitators/lecturers facilitate modules from distance education programmes according to a fixed timetable at various tuition centres. Attending contact sessions for distance education programmes is not compulsory in many cases and this arrangement differs between various institutions. Students may attend these contact sessions in the region and town of their choice.

Affording students an additional means of understanding and learning content in teaching and learning adds more flexibility to the offering of distance education programmes. Contact sessions whereby facilitators/lecturers do face-to-face teaching adds flexibility and a perceived higher level of interaction to the delivery of distance education as students have more opportunities to engage with content and interact with peers and lecturers involved in the teaching and learning process.

The responses from the facilitators/lecturers (table 4.27) point towards the important role m-learning could play in the delivery of distance education programmes. Excluding item 21.7 of this questionnaire, the lowest mean for this section was 3.22 (item 21.8) and the highest mean for this section was 3.74 (item 21.5). Mobile technologies could play a significant role in the delivery of distance education as facilitators/lecturers have a strong opinion on utilising these technologies in their academic practices. Item 21.5 was the response with the highest mean (3.74) and convey a strong indication that m-learning could lead to overcome some challenges as well as provide easier access to teaching and learning. Literature is in agreement with the previous stance and states that those who utilise modern communication technologies may have easier access to teaching and learning (par. 2.7). Further accessibility of mobile communication technologies will add more flexibility to delivering distance education programmes as role players in distance education will have additional means of communication and accessing resources. The literature indicates that new technological developments have to be accounted for application in distance education (par. 2.6.1). New communication technologies in distance education could provide students and other role players more accessibility and add more flexibility in delivering distance education programmes. More flexibility in delivery of programmes allows for access to resources and support from any location and at anytime. The responses to item 21.9 show that increasing knowledge is needed by the respondents on how to utilise m-learning. In order to understand m-learning, one must understand the role mobile technologies could fulfil. The facilitators/lecturers indicated that knowledge and training is needed to understand m-learning. M-learning can only be successfully implemented into distance education once all role players understand the functioning of these technologies. The responses to the majority of items in this section indicate the importance of m-learning and the utilisation thereof, a necessity in delivering distance education programmes, as accessibility is an important aspect of delivering situation-specific distance education programmes.

The responses to items 21.5, 21.9 and 21.1 of the facilitators/lecturers' questionnaire indicate that facilitators/lectures perceive that m-learning should be integrated in the delivery of distance education programmes. Literature states that delivery modes for distance education must be adapted when new technologies are available (par. 2.2.7). A need for training in mobile technologies is evident for facilitators/lecturers in order to implement m-learning effectively in distance education programmes.

Responses to items 21.4 and 21.10 indicate that respondents agree that various possibilities exist for data and information to be downloaded, which includes *inter alia* study material and other support material that could assist with studies. However, downloading information on mobile devices is expensive as respondents do not download information on a regular basis on their cell phones (table 4.16). A need exists to explore alternative avenues that could make downloading of information on cell phones more affordable. A starting point to enable all role players to exploit mobile technologies more frequently will be to supply students with memory cards on their mobile devices containing all academic material and supporting notes. Administrative and further academic support will be provided by means of a variety of communication channels (telephone, email, tutorials, cell phones etc.) with special focus on text messaging (SMS) as students have indicated (table 4.13). Text messaging (SMS) is a more affordable means of communication to all role players as they can control the usage thereof. The affordability and effortless frequent usage of text messaging (SMS) will open new areas and possibilities for interactive communication (par. 2.2.2).

The aspect of affordability of m-learning among facilitators/lecturers is much lower than the need for training of skills related to the implementation potential of m-learning. The mean rating for these two aspects was 3.54 and 3.22 respectively. Although the respondents have a strong stance regarding the affordability of m-learning, training in the implementation potential of mobile technologies was rated higher. A possible reason for this tendency could be that the majority of facilitators/lecturers (64.7%) have fixed contracts on their cell phones (table 4.15) and are not as concerned about accessing data on their cell phones as data are included in their package.

The first online assessment of material/work was done in 1992 using a computer (par. 2.3.4). Academic assessments receive a lower rating (3.51) from respondents. Sufficient training is needed for all role players for assessment to be done via mobile technology. A need exists among facilitators/lecturers to acquire more study-related information and the use thereof in distance education. The need could be the skills involved in the use of cell phones/m-learning in distance education. Training of all aspects needs to be planned and implemented in order for m-learning to be implemented and integrated more effectively in distance education.

The following table (4.28) represents the data about challenges related to the use of mobile learning from the students.

Table 4.28: Challenges related to the use of mobile learning (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings									
							1		2		3		4		5	
							F	%	F	%	F	%	F	%	F	%
1	22.9	The introduction of mobile learning will lower the cost of studying.	190	3.64	0.712	37	3	1.6	9	4.7	50	26.3	120	63.2	8	4.2
2	22.1	The use of new mobile technologies will be to the benefit of my tertiary studies.	197	3.63	0.856	30	6	3.0	9	4.6	58	29.4	102	51.8	22	11.2
3	22.6	Mobile learning engagement will enable me to prepare more effectively for contact sessions.	190	3.54	0.774	37	4	2.1	9	4.7	70	36.8	95	50.0	12	6.3
4	22.12	Communication through mobile technologies is more reliable than the postal service.	186	3.53	0.943	41	8	4.3	14	7.5	57	30.6	86	46.2	21	11.3
4	22.10	If available, I will make an effort to obtain study material via mobile technologies.	188	3.53	0.811	39	4	2.1	12	6.4	67	35.6	91	48.4	14	7.4
6	22.11	Some assessment activities can be conducted via mobile technology.	188	3.50	0.978	39	8	4.3	16	8.5	64	34.0	74	39.4	26	13.8

Table 4.28: Challenges related to the use of mobile learning (students) (continuous)

Ran k	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings									
6	22.5	I will make use of relevant mobile technologies to access teaching and learning information.	195	3.50	0.802	32	4	2.1	13	6.7	73	37.4	92	47.2	13	6.7
8	22.8	The introduction of mobile learning will lower the cost of studying.	186	3.39	1.086	41	14	7.5	18	9.7	62	33.3	65	34.9	27	14.5
8	22.2	Mobile learning is affordable.	194	3.39	1.058	33	12	6.2	23	11.9	62	32.0	71	36.6	26	13.4
10	22.4	Mobile technology provides more possibilities to obtain course content on various platforms.	198	3.37	0.913	29	6	3.0	22	11.1	81	40.9	70	35.4	19	9.6
10	22.13	More information regarding my studies need to be sent via mobile technologies.	186	3.37	0.967	41	12	6.5	15	8.1	66	35.5	79	42.5	14	7.5
12	22.7	Mobile learning has the potential to substitute contact sessions to a large extent.	187	3.27	0.969	40	12	6.4	22	11.8	68	36.4	74	39.6	11	5.9
13	22.3	I have sufficient cell phone reception in my area.	187	3.26	1.126	40	21	11.2	21	11.2	50	26.7	79	42.2	16	8.6

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely, 5 = Don't know

Affordability of m-learning for students recorded the highest mean score (3.64) as indicated in table 4.28. According to literature (par. 2.5.2), affordability enables more students to enrol for distance education programmes. Affordability of distance education programmes is perceived to be a major stumbling block for all role players in distance education (par. 2.6.3). The data from table 4.21 and 4.22

support the view that affordability and flexibility in distance education are aspects that influence all role players largely to enrol or not for distance education programmes. In the responses received from students in item 22.8, students indicate that m-learning could lower the cost of studying. Implementing m-learning into distance education programmes may improve communication between all role players as well as to assist with accessing resources at anytime and from any location. Students indicate in their responses that a need exists for them to obtain study material via mobile technologies. Obtaining material by means of mobile devices will enable more flexibility in the delivering of distance education programmes.

Reliability of mobile communications for students receive a high mean score (3.53) among students that completed the questionnaires (table 4.28). This item indicates that cell phones are the only reliable means of communication in the majority of instances as no fixed telephone lines and Internet access exists in some regions where students reside in remote areas. Students have indicated that text messaging and the postal services are the only means of communication that is preferred (table 4.13) or that students rely upon to communicate effectively. Students enrolled for distance education need reliability regarding communication, irrespective of where they reside, since communication determines to a large extent the successful completion of academic programmes. Facilitators/lecturers gave this item a lower rating (3.22). Facilitators/lecturers possibly reside mostly in urban areas and have the ability to communicate with more devices. Students of distance education on the other hand reside mostly in rural areas and cell phones are their only modern means of communication.

In table 4.27, the facilitators/lecturers indicate that contact sessions could not be separated from m-learning in distance education as they possibly supplement one another. The students on the other hand indicate a strong view that m-learning could substitute contact sessions at the various tuition centres. It could be deduced that the reason for this opinion among students could be that students reside too far away from tuition centres and that their only means of communication in most cases is to rely on mobile technology. However, in table 4.28, students indicate that m-learning will prepare students much better for contact sessions they attend. Information regarding dates, times and other relevant information regarding contact sessions could improve the quality of contact sessions as a whole. Students will not attend the wrong sessions and modules if information is communicated to them correctly and in advance. Being in most cases students' only means of communication with institutions, confirms the importance that study material and accessibility to all resources should be planned and developed by management in such a way that all role players could benefit from these.

Training needs in mobile technologies and application in an academic setting is one of the responses received from respondents. However, affordability of the use of m-learning serves to be a priority among students. Training students in different applications of m-learning in distance education studies will empower them to deal with flexibility and accessibility in resources and administrative support.

Table 4.28 reflects the responses that 79% of students indicate that they have sufficient cell phone reception in their area. This notion affirms that implementing m-learning into distance education programmes will benefit all role players as effective communication is made possible, irrespective of time and location.

Obtaining course content from various information management platforms such as the institutions' website as well as from *Moodle* did not draw a lot of attention from respondents (table 4.13). Both groups of respondents indicate that training is necessary to employ more features of mobile technology for the sake of optimum engagement in academic endeavours. Should both groups be more informed (such as training) about the usage and possibilities regarding the integration of mobile technology in their studies, more individuals would be capacitated to access academic materials and content.

It is deduced from the two groups of respondents that some factors are indicative for m-learning to succeed in distance education namely affordability and accessibility to technologies and resources to be used in the delivery of distance education. New technologies are demanded by respondents and may increase flexibility in the delivery of distance education programmes. M-learning has the potential to afford students and role players to personalise their studies as they are able to learn at anytime and at any place.

4.2.5.3 To what extent do you agree or disagree with the following barriers to mobile learning?

For m-learning to be implemented in the delivery of distance education programmes, possible barriers that could hamper this process have to be identified and addressed to afford role players equal access to distance programmes. Removing barriers will add more flexibility in the delivery of distance education as more alternatives exist for students to access academic and support structures in distance education. The responses regarding the challenges of m-learning are recorded in table 4.29 and table 4.30.

Facilitators/lecturers - Questions 22.1-22.6

Students - Question 23.1-23.6

Table 4.29 To what extent do you agree or disagree with the following barriers to mobile learning (facilitators/lecturers)?

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	22.5	It is expensive to download relevant (academic) data.	55	3.11	0.786	0	3	5.5	5	9.1	30	54.5	17	30.9
2	22.3	Affordability to connect to the Internet.	55	3.07	0.900	0	3	5.5	11	20.0	20	36.4	21	38.2
2	22.4	Technology quickly becomes outdated.	55	3.07	0.836	0	3	5.5	8	14.5	26	47.3	18	32.7
4	22.2	Accessibility to the Internet.	55	3.04	0.881	0	3	5.5	11	20.0	22	40.0	19	34.5
5	22.1	Affordability of mobile technologies, e.g. cell phones.	55	2.95	0.756	0	3	5.5	8	14.5	33	60.0	11	20.0
6	22.6	Any other barriers?	9	2.89	1.453	46	3	33.3			1	11.1	5	55.6

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

Literature indicates that new technologies and mobile devices to a large extent assist to download information and data (par. 2.2.3, 2.7). The facilitators/lecturers' responses about the cost involved to download information was a mean of 3.11, which was the highest for this particular section. Coinciding with this response was the affordability to connect to the Internet that had a mean of 3.07. Affordability is a significant factor in relation to distance education in order for all to have access to further education (par. 2.5.2). Enrolling for distance education programmes is more affordable than courses that are presented full-time at residential institutions (par. 2.6.3). More important to facilitators/lecturers is the high cost to download information from the Internet by means of mobile devices. Accessibility to the Internet is of more importance to facilitators/lecturers than the affordability of mobile technologies. Accessibility and the assistance to all role players regarding academic support are viewed as priority for this group of respondents. A possible explanation for this reasoning is that facilitators/lecturers have contract cell phones (table 4.115) and therefore already have access to the Internet which includes in most cases the availability of data as part of a subscription package. In some instances, subscription packages have unlimited access to calls and information downloading. The downloading of information is pricey although easier accessible by facilitators/lecturers because of the type of contract they have on their cell phones. The respondents in this group are of the opinion that technologies change at a

fast pace. It could be said that new technologies could afford more individuals easier access to the Internet and downloading of information.

Examples regarding new technologies and software available are social network sites (SNS) that are now accessible by most of the mobile devices today, even the entry-level devices. Social network sites (SNS) are communication technologies and applications that enable students to communicate and share various types of information with colleagues and peers via various Internet sites (par. 2.2.3). All types of information are available to be shared among people with similar interests. Such a social network site is for example Twitter®, whereby open communication is more readily available and information shared freely with invaluable potential for application in an academic setting.

Table 4.30: To what extent do you agree or disagree with the following barriers to mobile learning (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	23.5	It is expensive to download relevant (academic) data.	187	2.97	0.950	40	18	9.6	33	17.6	73	39.0	63	33.7
2	23.6	Any other barriers?	68	2.88	0.939	159	6	8.8	15	22.1	29	42.6	18	25.0
3	23.2	Accessibility to the Internet?	185	2.85	0.983	42	25	13.5	30	16.2	78	42.2	52	28.1
4	23.1	Affordability of mobile technologies, e.g. cell phones.	188	2.76	1.020	39	34	18.1	24	12.8	84	44.7	46	24.5
4	23.3	Affordability to connect to the Internet.	188	2.76	1.010	39	30	16.0	34	18.1	76	40.4	48	25.5
6	23.4	Technology quickly becomes outdated.	187	2.60	1.054	40	40	21.4	35	18.7	71	38.0	41	21.9

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

The responses from students regarding the downloading of academic data are similar to those of the facilitators/lecturers (table 4.31). The majority of students have pre-paid packages on their mobile

devices (table 4.15) whereby students have better control on their usage. The literature states that with pre-paid contracts, individuals have control over their spending on calls and other features available on their cell phones (par. 2.2.2.4). Students are not that much concerned about the rapid changing of technologies, possibly because their main criterion for communication will be the most affordable means. They would automatically choose the most affordable mobile device and package when purchasing a cell phone. Affordability is the one aspect that could determine the accessibility to resources and support in distance education programmes.

Students had a much lower item rating than facilitators/lecturers for this item. The possible reason for this low mean for students could be that they do not access the Internet regularly on their cell phones (table 4.16). This pattern of cell phone use does not automatically exclude the use of Internet on their cell phones. A more affordable means of downloading information for example will enable more individuals to access the Internet to download course material and support assistance.

Table 4.31: Comparison of responses received between students and facilitators/lecturers regarding agreeing and disagreeing with the barriers associated with m-learning

	Rating		Rating	
Patterns of cell phone use	Facilitators/ Lecturers	Mean	Students	Mean
It is expensive to download relevant (academic) info.	1	3.11	1	2.97
Affordability to connect to the Internet.	2	3.07	4	2.76
Technology quickly becomes outdated.	2	3.07	6	2.60
Accessibility to the Internet.	4	3.04	3	2.85
Affordability of mobile technologies, e.g. cell phones.	5	2.95	4	2.76
Any other barriers?	6	2.89	2	2.88

The data recorded in table 4.31 reflect one aspect that both facilitators/lecturers and students agree on, namely the cost of downloading information. Besides “Any other barriers?” students indicated in their responses that accessibility and affordability regarding m-learning are aspects that need to be addressed in the delivery of distance education. Accessing the Internet using cell phones (table 4.16) by facilitators (60.3%) and students (51.5%) reveals the fact that the Internet usage by both groups of respondents is on average 55.9%. This average suggests that the Internet is accessed by students frequently, but responses have shown that downloading of data is expensive and seen as a barrier in implementing m-learning into distance education (table 4.30). Table 4.22 and table 4.23 clearly state that definite skills are needed from both groups of respondents to utilise m-learning optimally in distance education. Table 4.28 further illustrates that m-learning lowers the cost of studies and is generally viewed as a benefit to tertiary studies. On the other hand, tables 4.24 and 4.25 clearly state

that m-learning improves access to further learning. Taking all these aspects in consideration, a need is identified from both groups of respondents in this research for m-learning to feature more prominently in the delivery of distance education programmes. Affordability, accessibility and skills regarding the use of cell phones in distance education are challenges that should be addressed for the provision of distance education programmes to succeed. Adding more flexibility, the delivery of distance education programmes may be of assistance in removing various barriers hampering delivery of distance education programmes (par. 2.2.5).

4.2.5.4 To what extent do you agree or disagree with the following needs and expectations concerning mobile learning?

The role of m-learning is to assist all role players to use m-learning in distance education. The assistance is about the provision of support in different areas such as academic and administrative matters. To determine how the support must be structured, it is necessary to determine the needs and expectations the different role players have concerning m-learning. Only when the needs and expectations have been evaluated and addressed, could a structured management and support system be developed to assist all role players in dealing effectively with distance education programmes. The responses regarding the needs and expectations concerning m-learning are portrayed in table 4.32 and table 4.33.

Facilitators/lecturers - Questions 23.1 - 23.5

Students - Question 24.1 - 24.5

Table 4.32: To what extent do you agree or disagree with the following needs and expectations concerning mobile learning (facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	23.4	To provide more administrative information via mobile technologies, e.g. cell phones.	55	3.45	0.662	0			5	9.1	20	36.4	30	54.5
2	23.3	To provide more academic information via mobile technologies, e.g. cell phone.	55	3.44	0.536	0			1	1.8	29	52.7	25	45.5
3	23.5	More guidance to utilise mobile technologies for the enhancement of my teaching practice.	51	3.41	0.536	4			1	2.0	28	54.9	22	43.1
4	23.2	Increased accessibility to mobile technologies.	55	3.31	0.540	0			2	3.6	34	61.8	19	34.5
5	23.1	Communicate more frequently with the students.	55	3.29	0.533	0			2	3.6	35	63.6	18	32.7

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **To provide more administrative information via mobile technologies, e.g. cell phones (facilitators/lecturers)**

The responses to this item received the highest mean score in this particular section (3.45). Literature affirms that communication in distance education is decisive and imperative for the successful delivery and completion of distance education programmes (par. 2.2.1.3). Administrative and academic support is two aspects of communication in higher institutions that enhance teaching and learning in the provision of distance education programmes (par. 2.2.1.3, 2.2.2). Table 4.17 and table 4.18 further affirm that administrative information has to be provided

by employing mobile technologies as they have indicated that cell phones are mostly used for text messages and making calls.

- **To provide more academic information via mobile technologies, e.g. cell phone (facilitators/lecturers)**

The responses to this item received the second highest mean score (3.44). The difference between the mean score of question items 22.4 and 22.3 is 0.01. Administrative and academic support is the most important need and expectation indicated by the facilitators/lecturers. According to the literature, academic and administrative support expands the application possibilities of mobile technologies (par. 2.2.1). Mobile devices enable individuals to move around (par. 2.2.2), while still being able to carry out certain tasks. Being able to move around must not be a factor that influences the delivery of distance education programmes negatively. The aforementioned implies that the teaching and learning processes are not to be hindered in any way. Moving around with mobile devices enables anytime and anywhere learning to realise. Administrative and academic support is a need identified in the delivery of distance education programmes. Implementing more mobile communication technologies into distance education can improve communication. Improving communication will enable more interactivity between all role players. One possibility to improve communication is obtained by integrating more technologies (par. 2.2.2). Improving communication may enhance academic and administrative support as more communication and interactive activities are being implemented by institutions.

- **More guidance to utilise mobile technologies for the enhancement of teaching practice (facilitators/lecturers)**

The responses to this item received the third highest mean score (3.41). Table 4.33, table 4.22 and table 4.23 all indicate that a need exists for all role players to acquire relevant skills to use mobile technology effectively in teaching and learning. The acquisition of the required skills in using mobile technology optimally and effectively in distance education, will probably improve academic and administrative support as more frequent communication is possible between role players.

- **Increased accessibility to mobile technologies (facilitators/lecturers)**

The responses to this item received the fourth highest mean score (3.31). It is evident from table 4.14 that all role players have more than sufficient access to mobile technologies as more than 98.1% (table 4.14) of all respondents are in possession of a cell phone. Respondents indicated that m-learning enables students to learn at their own pace and at their own time (table 4.21). Being able to learn at any pace and at anytime, leads to a high degree of personalisation concerning a teaching and learning approach. Any place and anytime learning will enable

students to access teaching and learning more frequently at a time that suits their idiosyncratic circumstances. More quality teaching and learning may then occur which is a key aim of distance education providers. Facilitators/lecturers are able to communicate more frequently with students if access to mobile technology is more accessible to role players.

- **Communicate more frequently with students (facilitators/lecturers)**

The responses to this item received the lowest mean score (3.29). The difference between the highest and the lowest mean in the items of this section is 0.16, which indicates that a strong correlation or coherence exists between the different items in this section. It is thus deduced that all items in this section are much dependent on one another. High accessibility to mobile technologies creates a demand for skills training in order to utilise cell phones more effectively in academic programmes. A need for skills training in mobile technologies was exposed in the previous sections and such training will enable more interaction between role players that is to the benefit for the completion of academic programmes. Interaction in administrative and academic support relies on accessibility to mobile technologies and skills training. Interaction in distance education is a tool that enables students and facilitators/lecturers to improve access to resources and other support structures.

Table 4.33 To what extent do you agree or disagree with the following needs and expectations concerning mobile learning (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
1	24.5	More guidance to utilise mobile technologies for the enhancement of my tertiary studies.	192	3.26	0.705	35	5	2.6	14	7.3	99	51.6	74	38.5
2	24.4	To receive more administrative information via mobile technologies, e.g. my cell phone.	195	3.25	0.735	32	6	3.1	16	8.2	96	49.2	77	39.5
3	24.2	Increased accessibility to mobile technologies.	189	3.21	0.735	38	7	3.7	14	7.4	100	52.9	68	36.0
4	24.3	To receive more academic information via mobile technologies, e.g. my cell phone.	194	3.19	0.739	33	6	3.1	20	10.3	100	51.5	68	35.1
5	24.1	Communicate more frequently with the university.	194	3.18	0.778	33	9	4.6	17	8.8	98	50.5	70	36.1

Scale rating 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **More guidance to utilise mobile technologies for the enhancement of my tertiary studies (students)**

The responses to this item received the highest mean score in this section of the questionnaire (3.26). Among students, a need is identified to acquire the necessary skills to understand and implement mobile technologies in teaching and learning activities. Lacking some skills with the

application of mobile technology for academic purposes could be a reason why smaller numbers of students effectively download or use their devices for information regarding their studies. Affordability is another aspect that also contributed to the small percentage of respondents using m-learning in their studies (tables 4.11, 4.12, 4.16). Table 4.10 clearly indicates that m-learning is seen by students as learning that supports higher education. Both groups of respondents in this research state that they view m-learning as being learning that takes place at any location. Learning at any location adds more flexibility to the teaching and learning process. The role and challenge for m-learning to function effectively in delivery of distance education programmes, as indicated by literature (par. 2.2.2, 2.2.7), including the responses from questionnaires, was that m-learning must be accessible, affordable, and flexible to all role players. An additional challenge will be to train all role players regarding the skills for applying and maximising the potential of mobile technology effectively in the delivery of distance education programmes.

- **To receive more administrative information via mobile technologies, e.g. my cell phone (students)**

The responses to this item received the second highest mean score (3.25). The literature indicates that all information and resources must be accessible to students to further support teaching and learning in distance education (par. 2.6.1, 2.7). Furthermore, it was indicated in literature that sufficient administrative support as well as support regarding teaching and learning should be accessible to role players in distance education. More support creates further accessibility to teaching and learning, irrespective of location and time. Text messaging (SMS) has a very high impact for administrative support to students and role players (par. 2.2.2). The previous viewpoint is affirmed by the responses from respondents in table 4.13 that text messaging (SMS) is the preferred method for students and facilitators/lecturers to receive information regarding their studies. Making use of this valuable means of communication that all role players prefer, may further enhance communication and interaction between students and all other role players involved in the delivery of distance education programmes.

- **Increased accessibility to mobile technologies (students)**

The responses to this item received the third highest mean score in this questionnaire section (3.19). For this research, both groups of respondents, the students (99.1%) and facilitators/lecturers (98.1%) (table 4.16), indicate a high number of persons possessing cell phones. This tendency is affirmed by literature that the number of individuals having cell phones has drastically increased in all parts of the world (par. 2.2.2.3). This rise in cell phone accessibility will inevitably enable m-learning to play a vital role in the delivery of distance education. The challenge for integrating m-learning in distance education programmes will be for more students to

access relevant academic and administrative information by means of mobile technologies. Increased accessibility expands the flexibility of programmes delivered through this mode.

- **To receive more academic information via mobile technologies, e.g. my cell phone (students)**

The responses to this item received the fourth highest mean score (3.17). The responses from the students and facilitators/lecturers (table 4.32 & 4.33) indicate a different need regarding information received via m-learning on their cell phones. Among facilitators/lecturers a greater need exists for administrative and academic support. A possible reason for this response from this group is that they possibly have the skills to obtain such information from their cell phones. From the data from the students that responded to this question, it is clear that the skills required to implement m-learning as part of administrative and academic support are of a main concern to students. It is deduced that should students be trained more often in acquiring skills to use m-learning more effectively, access to resources utilising cell phones and other modern communication technologies could be enhanced.

- **Communicate more frequently with the institution (students)**

The response to this item received the lowest mean score in this particular section of the questionnaire (3.16). Both groups of respondents indicate (table 4.13) that they prefer receiving information regarding their studies via text messages (SMSs) and post/mail. Cell phones and post/mail seem to be the most reliable form of communication with institutions that these specific role players prefer.

The difference in the mean value of the item with the highest mean and the lowest mean in this question is 0.08, which is an indication that there is a close correlation between the items that students responded to in this section. Access to cell phones will allow more individuals to communicate more frequently with institutions regarding administrative and academic support. Only the need of the different groups of respondents differs. Facilitators/lecturers focus more on administrative support while students would like to improve the academic support available to them (par. 4.26). None of these items in both groups of respondents can function without the other. It is clear from the responses from both groups (tables 4.32 & 4.33) that a high degree of coherence exists among all items in the groups. Their priorities differ to some extent, but that may be because of skills that are required from some groups regarding the use of cell phones and the need for implementing m-learning. If students have the necessary skills to make use of m-learning and mobile devices, more advantages will be evident in the required application of m-learning in distance education.

4.2.5.5 Advantages of m-learning

In order to determine the role of m-learning in distance education, the advantages of using m-learning in the delivery of programmes have to be identified. Once the advantages of m-learning have been identified, related challenges should also be identified and described in order to implement m-learning into the delivery of distance education programmes.

The responses regarding the advantages of m-learning are recorded in table 4.34 and table 4.35.

Facilitators/lecturers - Questions 24.1 - 24.14

Students - Question 25.1 - 25.14

Table 4.34 To what extent do you agree or disagree with the following advantages related to m-learning? (Facilitators/lecturers)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
		The advantages of m-learning are that ...												
1	24.4	alternative means of communication are possible	55	3.51	0.505	0					27	49.1	28	50.9
1	24.5	networking is expanded amongst all role players in distance education	55	3.51	0.540	0			1	1.8	25	45.5	29	52.7
3	24.3	technological advances are utilised in education	55	3.42	0.567	0			2	3.6	28	50.9	25	45.5
4	24.1	increased opportunities are possible to access formal education	55	3.40	0.564	0			2	3.6	29	52.7	24	43.6
5	24.7	sharing of teaching and learning experiences becomes more evident	55	3.29	0.685	0	1	1.8	4	7.3	28	50.9	22	40.0
6	24.9	administrative support to students is improved	54	3.24	0.751	1	1	1.9	7	13.0	24	44.4	22	40.7
7	24.10	academic support to students is improved	55	3.18	0.696	0	1	1.8	6	10.9	30	54.5	18	32.7

Table 4.34 To what extent do you agree or disagree with the following advantages related to m-learning? (Facilitators/lecturers) (Continuous)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
7	24.14	inactive students can be motivated to resume their studies	55	3.18	0.669	0	1	1.8	5	9.1	32	58.2	17	30.9
9	24.2	further education is more cost effective	55	3.16	0.739	0	2	3.6	5	9.1	30	54.5	18	32.7
10	24.13	teaching and learning time is saved	55	3.13	0.721	0	2	3.6	5	9.1	32	58.2	16	29.1
11	24.12	collaborative learning is supported	55	3.09	0.752	0			13	23.6	24	43.6	18	32.7
12	24.8	distance education programmes are more effectively managed	55	3.07	0.716	0	1	1.8	9	16.4	30	54.5	15	27.3
13	24.11	Individual learning styles are supported	54	3.02	0.812	1	2	3.7	11	20.4	25	46.3	16	29.6
14	24.6	technologies become increasingly affordable.	55	3.00	0.793	0	4	7.3	5	9.1	33	60.0	13	23.6

Scale rating 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- **The advantages of m-learning are that alternative means of communication are possible and networking is expanded amongst all role players in distance education (facilitators/lecturers)**

The responses to both these items received the highest mean score in this section of the questionnaire (3.51). Literature states that different means of communication are available to the delivery of distance education programmes (par. 2.2.1). Making use of the various means of communication in the delivery of distance education programmes may in the same manner lead to improved communication and interaction. The more possibilities there are to access resources and to interact with role players, the more it will enable networking and flexibility in the delivery of distance education programmes. M-learning enables students to learn at anytime and location (par. 2.2.2). Distance education affords students the opportunity to access teaching at anytime and at any location (par. 2.2.1.3). It is deduced, like many times in previous sections of this research, that m-learning and distance education have one aspect in common, namely anytime and any place learning. Interactivity between all role players and institutions employing m-learning enables mutual linkage between role players as clients and institutions as service providers. Networking is encouraged between individuals as resources and information is shared and

accessed. Through communication with various individuals, more skills regarding the use of mobile devices and technology are shared which is beneficial for all.

- **The advantages of m-learning are that technological advances are utilised in education (facilitators/lecturers)**

The responses to this item received the second highest mean score (3.42). Distance education offers students increased access to higher education as well as to technological advances as more technologies are utilised to assist with access to teaching and learning (par. 2.2.1.1, 2.2.1.2). Employing technological advances lowers the cost of infrastructure and the provision of support to all role players (par. 2.2.1.2). Affordability is one aspect or challenge that needs to be addressed in order for more individuals to access distance education. In order to lower costs, technological advances could be implemented on a broader scale. Both groups of respondents indicated that m-learning would benefit them in their academic efforts. Tables 4.22, 4.23, 4.27 and 4.28 indicate that a need exists to incorporate m-learning in education, but that in some cases lack of the skills for working with these technologies hamper students.

- **The advantages of m-learning are that increased opportunities are possible to access formal education (facilitators/lecturers)**

The responses to this item received the third highest mean score in this section (3.40). Students from a wide spectrum in society, including schools, tertiary institutions and students who are permanently employed, rather prefer to enrol for distance education programmes, as face-to-face education on residential campuses is logistically and financially not accessible to all (par. 2.2.1.2). Skills training in the workplace has become a necessity (par. 2.2.7, 2.3.4, 2.2.1.2), but not all individuals can afford face-to-face teaching on a full-time basis. Distance education became a more viable option for many individuals in the workforce to further their education. Utilising m-learning could become in this instance an invaluable methodology to make studying in distance education mode possible. The challenge of improving education while fully employed is met and overcome to a large extent through distance education and implementing modern technologies to make communication and interactivity possible.

- **The advantages of m-learning are that sharing of teaching and learning experiences becomes more evident (facilitators/lecturers)**

The responses to this item received the fourth highest mean score (3.29). This item closely links with item 24.5 in this section. The group responded with a high mean regarding the sharing of teaching and learning amongst all role players. Through sharing of information, many aspects regarding and pertaining to teaching and learning are shared - unintentionally in most cases, as social networks are utilised by some individuals to communicate with one another. Social

networking entails specialised platforms that could be integrated in the sharing of information and ideas between role players in distance education. Through the social network sites (SNS) various media can be shared among individuals with common interests (par. 2.2.3). Social network sites are viewed as additional means of communication and interaction, adding to and expanding the existing modern communication technologies. Cell phones with Internet capabilities have access to these social network sites. Having access to social networks enables students to personalise teaching and learning by accessing information at anytime and place, thus personalising teaching and learning in accordance with their idiosyncratic circumstances (table 4.23).

- **An advantages of m-learning is that administrative support to students is improved (facilitators/lecturers)**

The responses to this item received the fifth highest mean score (3.24). The literature indicates that all information and resources must be accessible to students to further support teaching and learning in distance education (par. 2.6.1, 2.7). Students have access to institutions irrespective of time and location if enrolled for distance education programmes (par. 2.2.5). Administrative support is the basis of support to students (par. 2.3.4). Integrating modern communication technologies into distance education enables communication on a regular basis, as anytime and anyplace communication is important. Effective communication enhances support to all role players.

- **The advantages of m-learning are that academic support to students is improved and inactive students can be motivated to resume their studies (facilitators/lecturers)**

The responses to both these items received the sixth highest mean score (3.18). Academic and administrative support is of equal importance to all role players (par. 2.2.1.3). Responses from the two groups of respondents have shown that the type of support needed is dependent on certain aspects (table 4.32 & 4.33). With facilitators/lecturers (table 4.32), the need for administrative and academic support is seen as primary needs and expectations for m-learning. A need (table 4.33) is expressed by students for acquiring skills to better understand and operate cell phone technology. Affordability of utilising the Internet on their cell phones is a determining factor that is to be addressed in order to further improve support to students and other role players. Enhanced support is imperative and an essential aspect for higher institutions to motivate students to progress in their studies or even to resume uncompleted efforts. Not all students can afford face-to-face teaching and learning and therefore opt for a more affordable and accessible option to further their education. Distance education is chosen because of its affordability and easy access to learning opportunities. Both groups of respondents have indicated that affordability and flexibility in the delivery of distance education programmes (tables 4.11 & 4.12) are key factors why they have enrolled for distance education programmes. The more affordable option for

students to communicate is by making use of text messages (SMSs) and postal/mail services (table 4.13). Affordability to communicate and being able to communicate at anytime and location will enhance students' motivation to continue with their studies. Students and facilitators/lecturers gave this aspect nearly the same rating (table 4.36). The respondents from both groups indicated that m-learning must be an alternative means of communication between all role players (table 4.36). Offering more options and technologies for role players, especially students, to communicate with institutions' will further motivate students to complete their studies or to resume uncompleted studies.

- **An advantage of m-learning is that further education is more cost effective (facilitators/lecturers)**

The responses to this item received the seventh highest mean score (3.16). Further education for persons employed in the workforce full-time is difficult as time is limited and face-to-face tuition is not always possible owing to work or career obligations. Furthering education on a full-time basis is further costly in time and finance. Distance education provides potential candidates with the opportunity to enrol for education programmes on a part time basis (par. 2.2.1.2). Open distance learning is more economical and affordable than other means available to further education (par. 2.2.5). Using or integrating mobile technology in further education enables frequent communication between all role players and is regarded as an important advantage. Affordability and the freedom to use mobile devices at anytime open new possibilities for communication. The literature also indicates that mobile devices used in m-learning add to the efficiency of distance education being more affordable in further education (par. 2.5.2). One of the functions and roles of m-learning is to provide affordable service and accessibility to resources to all role players in the delivery of distance education programmes. Affordability as an element of further education could be measured by the means of communication which is chosen by the majority of the respondents. The responses from both groups (tables 4.11 & 4.12) indicate that affordability is the main reason why respondents enrol for distance education programmes. Both facilitators/lecturers and students prefer SMSs to receive information regarding their studies (table 4.13). Text messaging (SMS) is a more affordable means of communicating for all respondents who took part in this research.

- **The advantages of m-learning are that teaching and learning time is saved (facilitators/lecturers)**

The responses to this item received the eighth highest mean score (3.13). The facilitators/lecturers are obviously not sure if m-learning will be able to save time in their teaching and learning efforts. Students on the other hand, give this item a higher mean score (table 4.36). Students enrolled for distance education programmes are all employed full-time, which demands

more and frequent communication with the institution. Time is saved when utilising m-learning as students can personalise their learning experiences and take part in teaching and learning whenever it is suitable for them (par. 2.6.2).

- **The advantages of m-learning are that collaborative learning is supported (3.09) and distance education programmes are more effectively managed (3.07) (facilitators/lecturers)**

These two items received the ninth and tenth highest mean respectively. These two items are discussed simultaneously as collaborative learning can only be successful once it is managed correctly. Accessibility to the Internet using cell phones and other mobile devices enables individuals to access social network sites (SNS) which are platforms whereby information can be shared with various individuals or groups (par. 2.2.3). Examples of SNSs is Facebook®, Twitter®, MySpace®, LinkedIn®, Friendster®, LiveJournal® etc. Literature indicates that individuals can share information with selected groups or individuals. Managing SNSs and other relevant platforms information is shared on will require the four basic management tasks, namely planning, organising, leading and controlling (par. 2.6.4). Managing students over a wide geographical area has to accommodate anytime and anyplace learning whereby students and other role players are able to share information regularly (par. 2.2.1.1). Putting management structures in place will enhance communication and flexibility in the delivery of distance education programmes. A possible reason why respondents rated collaborative learning lower (table 4.36) could be that skills are needed to access SNS and other information management platforms and both groups are ignorant regarding the use of these types of interactive sites.

- **An advantage of m-learning is that individual learning styles are supported (facilitators/lecturers)**

The responses to this question item received the second lowest mean score (3.02). Ignorance regarding how learning styles are supported, is evident in the responses from this group of respondents. A possible reason for this ignorance could be that not many individuals from this group are actively downloading information from the Internet or even logging on to the Internet, which is in coherence with the data from table 4.16. Another reason why the facilitators/lecturers rated this item low, could be that they are not aware of information that can be accessed by means of mobile devices. M-learning adapts to learning styles of individuals and groups as information is available to everyone especially through social network sites (par. 2.2.3). An advantage of m-learning is the personalisation of learning whereby students can adapt their time and location of learning according to specific and individual circumstances (par. 2.6.1). In m-learning teaching and learning can take place at anytime and at any location, irrespective of the geographical area of an individual. Adapting learning styles through m-learning could improve communication on all levels.

- **An advantage of m-learning is that technologies become increasingly affordable (facilitators/lecturers)**

The responses to this item received the lowest mean score (3.00). Literature however indicates that m-learning and cell phones are a more affordable means of communication because many applications are available to use on mobile devices (par. 2.2.2.4). M-learning is thus a more affordable and economical option in distance education programmes. Furthermore, the start-up cost for mobile devices is 25% lower than other forms of communication networks (par. 2.2.2.4). The role of m-learning is to be a more affordable means of communication for distance education. Lower start-up costs for m-learning as well as means whereby a person can control spending are important for use in the delivery of distance education programmes.

Table 4.35: To what extent do you agree or disagree with the following advantages related to m-learning? (students)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
							1		2		3		4	
							F	%	F	%	F	%	F	%
		The advantages of m-learning are that ...												
1	25.4	alternative means of communication are possible	189	3.39	0.656	38	3	1.6	9	4.8	89	47.1	88	46.6
2	25.7	sharing of teaching and learning experiences become more evident	193	3.35	0.700	34	5	2.6	10	5.2	90	46.6	88	45.6
3	25.9	administrative support to students is improved	194	3.33	0.751	33	6	3.1	15	7.1	82	42.3	91	46.9
4	25.13	teaching and learning time is saved	196	3.32	0.704	31	5	2.6	12	6.1	94	48.0	85	43.4
4	25.10	academic support to students is improved	194	3.32	0.749	33	7	3.6	12	6.2	87	44.8	88	45.4
6	25.14	inactive students can be motivated to resume their studies	194	3.31	0.719	33	3	1.5	20	10.3	84	43.3	87	44.8
7	25.8	distance education programmes are more effectively managed	194	3.28	0.753	33	6	3.1	17	8.8	87	44.8	84	43.3

Table 4.35: To what extent do you agree or disagree with the following advantages related to m-learning? (students) (Continuous)

Rank	Item no.	Question	n	Mean	Std Dev	NR	Scale-ratings							
8	25.3	technological advances are utilised in education	184	3.27	0.701	43	5	2.7	12	6.5	96	52.2	71	38.6
9	25.11	personal (individual) learning styles are supported	190	3.26	0.759	37	7	3.7	15	7.9	89	46.8	79	41.6
10	25.12	collaborative learning is supported	189	3.25	0.764	38	7	3.7	16	8.5	88	46.6	78	41.3
10	25.1	increased opportunities are possible to access formal education	192	3.25	0.759	35	7	3.6	16	8.3	91	47.4	78	40.6
12	25.5	networking are expanded amongst all role players in distance education	191	3.23	0.779	36	9	4.7	14	7.3	93	48.7	75	39.3
13	25.6	technologies becomes increasingly affordable	193	3.12	0.851	34	10	5.2	29	15.0	81	42.0	73	37.8
14	25.2	further education is more cost effective.	191	3.09	0.878	36	15	7.9	20	10.5	88	46.1	68	35.6

Scale rating: 1 = Do not agree, 2 = Disagree to some extent, 3 = Agree to some extent, 4 = Agree completely

NR – No Response

- An advantage of m-learning is that alternative means of communication are possible (students)**

The response to this item received the highest mean score in this section of the questionnaire (3.39). In table 4.36, the responses of both groups of respondents are the highest for this item. It is evident that alternative means of communication are viewed as a need in delivering distance education programmes. More means of communication could add more flexibility in the delivery of distance education programmes. Communication is imperative in distance education (par. 2.2.1.3) and all types of communication can be implemented in distance education (par. 2.2.1). Improving communication could further contribute to improving interactivity between the various role players in distance education programmes. Enabling students to access more than one means of communication will contribute to enhance flexibility as students can access resources at anytime and from any location. Accessing resources and teaching and learning anytime enables the students to personalise learning styles and approaches. M-learning assists with overcoming barriers that would otherwise hamper the teaching and learning process in distance education. In

the development of distance education programmes, added means of communication will have to be accommodated in order to offer all role players additional means of communication.

- **An advantage of m-learning is that the sharing of teaching and learning experiences becomes more evident (students)**

The responses to this item receive the second highest mean score (3.35). A possible reason students give this item a high mean score could be that a need exists with students to communicate more frequently with institutions regarding academic and administrative support. Students possibly reside mostly in diverse geographical areas and do not have the means to visit the institution more frequently in person. Other means of communication should be investigated in order to enable students more access to institutions. Students have indicated that they prefer receiving information regarding their studies by means of mobile devices and postal services (table 4.13). Communication utilising cell phones and other mobile/portable devices leads to increased flexibility and more effective communication between all role players. The role of social network sites (SNS) is evident as modern communication technology application that could further assist with sharing information and content with other role players. Social networking is accessible by using mobile technologies. Sharing of teaching and learning activities by employing m-learning and modern communication technologies enable students to get “closer” to the institution whereby sharing of teaching and learning experiences is promoted and realised.

- **An advantage of m-learning is that administrative support to students is improved (students)**

The responses to this item received the third highest mean score (3.33). Students respond with a higher mean value than facilitators/lecturers. The reason facilitators/lecturers gave this item a lower mean score, could be that the needs of facilitators/lecturers are not the same as students' as facilitators/lecturers are merely facilitating modules, while students rely on administrative and academic support. Mobile devices are an important communication medium that is preferred by students (table 4.13). Students prefer communication that is affordable and flexible (table 4.11, 4.12). The most reliable means of communicating is text messaging (SMS) and the use of postal services. A possible reason for SMS being in this position may be that this is an affordable way of communicating on the one hand and on the other hand it is a form of communication students prefer to receive information regarding their studies. Students can better control the usage of cell phone use. Academic support received the fourth highest mean score among students (3.32). Administrative and academic support is essential for all role players as students gave these options a relatively high mean score (tables 4.32, 4.33 & 4.35). M-learning plays a more prominent role in the provision of distance education programmes as frequent and reliable communication is required for students to receive information regarding their studies from the

institution. Students can access information at anytime and location. The only problem with m-learning is the lack of skills from both groups of respondents to effectively use the available mobile technology to access relevant information on the Internet.

- **An advantage of m-learning is that inactive students can be motivated to resume their studies (students)**

The responses to this item receive the fifth highest mean score in this questionnaire (3.31). Students who are inactive in their studies may ascribe this to a lack of academic and administrative support regarding their studies. Accessibility to the institution for this support may be a contributing factor. Introducing m-learning in distance education programmes adds another mode of communication as students are now able to communicate at their own time and pace from any location. The responses from table 4.9 support the notion that students understand m-learning as a user friendly means of communication as well as a means of communication rated high whereby support utilising mobile technologies is valued. Students view m-learning as an important means of support in distance education programmes as various types of relevant information could be shared using m-learning. Capacitating students with an option to use m-learning in their studies will enable them to stay in touch with role players and to access information and resources to assist with their studies.

- **An advantage of m-learning is that distance education programmes are more effectively managed (students)**

The responses to this item received the sixth highest mean score (3.28). M-learning enables students to communicate more frequently with institutions responsible for delivering distance education programmes. Regular communication with students e.g. continuous reminders, enables institutions to keep track of progress of students enrolled for programmes. Inactive students or students at risk can be identified more effectively and they can be contacted in time about matters regarding their progress. Utilising text messages to communicate with institutions enables students to inform institutions in time should aspects of their studies hamper progress. In this way, inactive students could be identified and their situations could be managed in order to assist with either academic or administrative support.

- **An advantage of m-learning is that technological advances are utilised in education (students)**

The responses to this item receive the sixth highest mean score (3.27). Par. 2.2.1 describes that the quality of programmes improves when additional and appropriate technologies are implemented in the provision of distance education programmes. M-learning, as modern communication technology, offers further means and ways for administrative and academic

support to students. Offering more options for communication adds flexibility to the mode of delivery. Introducing m-learning into distance education programmes adds flexibility regarding anyplace and anytime learning (par. 2.2.2). Technological advances enable students to have added access to teaching and learning. The affordability of mobile technology enables more students to utilise these technologies in their studies.

- **An advantage of m-learning is that personal (individual) learning styles are supported (students)**

The responses to this item received the seventh highest mean score (3.26). An advantage of m-learning is the personalisation of teaching and learning whereby students can adapt their time and location of learning (par. 2.6.1). According to table 4.36, students are more receptive to different learning styles as m-learning enables teaching and learning to take place at anytime and location. The different age groups involved in distance learning have different needs regarding obtaining information that will benefit them in teaching and learning. The use of m-learning could be adapted to suit the different learning styles of different age groups involved (par. 2.2.2). M-learning could assist individuals to develop their own learning styles as this is determined by time spent on the task and the location of residence.

- **An advantage of m-learning is that collaborative learning is supported (students)**

The responses to this item received the eighth highest mean score (3.25). The sharing of information is a need identified by students and facilitators/lecturers (tables 4.22 & 4.23). Information could be shared between students among themselves, between students and facilitators, or between all role players and institutions. It is clear from tables 4.22 and 4.23 that the sharing of information is rated high by both groups of respondents. A lack of skills on downloading of information as well as the cost for downloading could be possible reasons why students do not access information that could assist them in their learning efforts. The total percentage of students using the Internet via mobile technologies, irrespective of duration of use for students (51.5%) and facilitators (60.3%), is reasonably high (table 4.16) considering that downloading of information is costly. It is deduced that Internet access by means of mobile technologies could establish m-learning as a more stable and affordable means of support.

- **An advantage of m-learning is that increased opportunities are possible to access formal education (students)**

The responses to this item also received the eighth highest mean score in this questionnaire (3.25). Students employed full-time are able to access further education by enrolling for distance education programmes while being employed. Modern communication technologies as well as mobile technologies enable students to access teaching and learning opportunities irrespective of

age and location. M-learning forms an extension of institutions delivering distance education programmes as the learning style and the accessibility are determined by the student. Mobile devices serve as a main communication medium with institutions regarding administrative and academic support. The role of m-learning is to enable students' access to resources irrespective of location and time constraints.

- **An advantage of m-learning is that networking is expanded among all role players in distance education (students)**

The responses to this item received the ninth highest mean score (3.23). There is a difference in the rating between the two groups of respondents. The facilitators/lecturers recorded a high mean score to this item, while the students rated this item low (table 4.36). Possible reasons for the difference in responses between these two groups of respondents could be that the term networking is not an established concept with students than it is with facilitators/lecturers. Facilitators/lecturers possibly make use of a wider variety of communication technologies to interact with stakeholders. Students on the other hand, have limited access and in some cases nothing but a cell phone to communicate with the rest of the world. This limited exposure to more modern communication technologies and the lack of skills using these technologies, could be the reason why networking is not ranked high with students.

- **An advantage of m-learning is that technologies become increasingly affordable (students)**

The responses to this item receive the second lowest mean score in this questionnaire (3.12). Although the responses to this item were low with both groups of respondents, literature indicates that affordability is a determining factor that convinced students to enrol for distance education programmes (table 4.11 & 4.12). A greater need exists for role players to access academic and administrative information (table 4.32 & 4.33). The majority of students (99.1%) and facilitators/lecturers (98.1%) according to table 4.14 own cell phones, and now that the majority are in possession of cell phones, other needs are identified that could assist with the teaching and learning process, such as Internet access and access to study-related resources.

- **An advantage of m-learning is that further education is more cost effective (students)**

The responses to this item received the lowest mean score in this questionnaire (3.09). Further education, specifically regarding people in full time employment, should be affordable to those who qualify for higher education programmes. Not all students can afford full-time studies at institutions and therefore must choose an affordable yet effective means of improving their education. Affordable means of communication (m-learning) provides students opportunities to access resources and to communicate with all role players regarding support and academic guidance.

Students do not have to attend face-to-face lectures and therefore determine their own style of learning that saves unnecessary costs.

Table 4.36: Comparison of responses received between students and facilitators/lecturers agreeing and disagreeing with the advantages related to m-learning

	Rating		Rating	
Patterns of cell phone use	Facilitators/ Lecturers	Mean	Students	Mean
Alternative means of communication are possible.	1	3.51	1	3.39
Networking is expanded among all role players in distance education.	1	3.51	12	3.23
Technological advances are utilised in education.	3	3.42	8	3.27
Increased opportunities are possible to access formal education.	4	3.40	10	3.25
Sharing of teaching and learning experiences becomes more evident.	5	3.29	2	3.35
Administrative support to students is improved.	6	3.24	3	3.33
Academic support to students is improved.	7	3.18	4	3.32
Inactive students can be motivated to resume their studies.	7	3.18	6	3.31
Further education is more cost effective.	9	3.16	14	3.09
Teaching and learning time is saved.	10	3.13	4	3.32
Collaborative learning is supported.	11	3.09	10	3.25
Distance education programmes are more effectively managed.	12	3.07	7	3.28
Individual learning styles are supported.	13	3.02	9	3.26
Technologies become increasingly affordable.	14	3.00	13	3.12

4.3.5.6 Comparison of responses received between students and facilitators/lecturers agreeing and disagreeing with the advantages related to m-learning

Both students and facilitators/lecturers view m-learning's advantages as an additional means of communication. Additional means of communication add flexibility as opportunities exist for role players to communicate. The more possibilities exist to access teaching and learning, the more flexibility is made possible in distance education programmes (par. 2.7). Each group of respondents prioritised different advantages although they all agree that m-learning is an invaluable means of

communication, assisting with the successful completion of distance education programmes. Aspects such as time, academic and administrative support and sharing of information seem to be a need among students. The difference in prioritising advantages could be an indication of a difference in the needs of each group of respondents with respect to m-learning.

Responses related to the management of m-learning indicate that management guidelines are needed to effectively manage m-learning. Facilitators/lecturers' views about the affordability of technologies are negative. The perception thus remains with both groups of respondents that new technologies are not that affordable. Affordability is one aspect of m-learning enabling more students to access resources and communication with ease (table 4.11 & table 4.12). Respondents view m-learning as more of an advantage than a disadvantage as the mean scores from both groups in this question were not lower than 3.00. These responses present an indication for further investigation into m-learning's role in distance education.

4.4 Summary

This chapter started with a description of the biographical detail of the two groups of respondents (facilitators/lecturers and students) who participated in this research. It was noteworthy that the majority of the students that participated in the research were females (82.5%) (table 4.1). This reflects the current situation and gender distribution of teachers employed at schools across SA. Among the respondents, facilitators/lecturers (94.5%) and students (64.6%) have 10 years or more experience in teaching (table 4.1). The relatively high age of the group of respondents could have an effect on the acquisition of skills necessary to operate modern and mobile communication technologies. The younger generation of teachers could be more hands-on with new technologies than their older counterparts in the profession. Furthermore, it was established that 98.1% of facilitators/lecturers and 99.1% of students are in possession of personal cell phones, which indicates that these respondents are accessible by means of mobile technology.

Moreover, the concept clarification of distance education and m-learning was posed to the respondents to establish their understanding of the two concepts. Among both groups, a close correlation existed of their understanding of distance education as an above average mean was recorded. Interactive programme delivery, as part of distance education where students and lecturers are separated in time and location, was the first priority of students and the second priority for facilitators/lecturers. This response reveals that both groups of respondents view this aspect as important aspect of distance education as well as an additional means of communicating with relevant role players in distance education. Additional to this response, the students' concept understanding of mobile learning reflected that they also see m-learning as a means to support teaching and learning in Higher Education.

Facilitators/lecturers agreed that m-learning encompasses anywhere and anyplace learning. It was evident in this research that administrative and academic support was considered important among the different groups of respondents. Among facilitators/lecturers, administrative support is viewed more important than academic support. Sufficient and effective administrative support by utilising m-learning could lead to more academic support being introduced into the delivery of distance education programmes.

All respondents indicated that they prefer receiving information regarding their studies through their cell phones, giving m-learning a considerable role to play in the delivery of distance education programmes. The role of m-learning in distance education becomes more evident during the analysis process of the responses gathered from the respondents. Affordability of using cell phones for their studies as well as the flexibility of the teaching and learning process, are aspects of importance that respondents indicated. Challenges exist for m-learning to succeed because students are often separated from institutions they are enrolled with. Time and location are challenges to be addressed in order for distance education programmes to be successfully implemented. M-learning could play a significant role to enable effective communication between all relevant role players to assist with additional means of accessing support and teaching and learning activities.

Although students indicated that academic support by means of m-learning could enhance the quality of teaching and learning, the lack of skills with both groups of respondents, regarding the skills in using modern communication technologies was identified. Training in skills regarding the use of mobile technologies is an urgent need to be addressed in order for m-learning to be implemented and managed effectively as part of a modus of distance education. M-learning could be added as an additional means of communication in distance education in order to enhance communication and interactivity in higher education programmes.

The results from the quantitative responses indicated that the main contributors to utilising m-learning in distance education are affordability of technologies, interactivity between all role players in distance education, flexibility of programmes offered through distance education to accommodate personal learning styles and circumstances and being able to access teaching and learning from any place and at anytime. A response causing concern revealed a lack of skills among both groups regarding the use of mobile technologies in accessing support material in distance education programmes.

The findings and recommendations for this research are discussed in the next chapter.

Chapter Five

Summary, findings and recommendations

5.1 Introduction

The aim of this chapter is to present an overall summary as well as the findings and recommendations of the research study. The purpose of the research was to determine the role of mobile-learning (m-learning) in an open distance learning mode in higher education and the challenges that m-learning poses for the implementation in distance education. The chapter also provides a summary of findings revealed by the acquired data in Chapter Four. The final chapter attempts to explain the manner in which m-learning could be managed in a distance education mode of delivery. Lastly, recommendations are formulated in relation to this research and for further research relating to the implementation of m-learning in an open distance education institution.

The research questions for this research were (par. 1.3)

- What is the role of m-learning in an open distance learning model?
- What are the challenges in the implementation process of m-learning as part of an open distance learning model?
- How do you manage m-learning as part of open distance education in a distance education institution?

These research questions will, amongst other aspects, be dealt with as part of the chapter content.

5.2 Overview of the research

The context, the problem statement as well as the motivation for the research were outlined as part of Chapter One. The literature overview was done in four parts to substantiate and contextualise the research problem. The sections for the literature overview were distance education, programme division in distance education, m-learning and the rationale for the implementation of m-learning in a distance education mode of delivery. Chapter One was further used to state the purpose of the study. The research design and methodology, an explanation of the contribution of the research as well as ethical considerations also formed part of Chapter One.

Chapter Two formed the overall theoretical framework and basis for this research. In this chapter, an extensive description was provided of what existing literature states about the nature and role of mobile-learning (m-learning) and the management thereof in a distance education mode of delivery. The description started with an explanation of the concept of distance education, which comprises, amongst other aspects, components of management structures, flexibility in delivery and interactivity in the provision of distance education programmes. A further description followed about managing m-learning in distance education. Chapter Two concluded with a deliberation on the subject of management guidelines for m-learning and challenges thereof for the management of distance education institutions.

Chapter Three dealt primarily with the research design and methodology and accordingly focused more on the empirical part of the study. This chapter commenced with the contextualisation of educational research and stated the purpose of the empirical section. The research design of a quantitative approach was described and specific research survey methodology was explained and motivated. Subsequently, all the aspects of the questionnaire were discussed. The descriptions included subdivisions such as principles for developing a questionnaire, construction of the questionnaire as well as reliability, and validity issues. The statistical data analysis procedures were also described. This chapter closed with a description of relevant administrative procedures and ethical matters applicable to the study.

The statistical data that emerged from the questionnaires, which had been completed by the respondents, were subsequently analysed and interpreted in correlation with the identified research problem and topic as part of Chapter Four. This was done by means of table presentations with rank orders, frequencies, standard deviations and mean scores. The findings of the research were discussed as the final part of the research report.

5.3 Discussion of research findings

This section of the research concludes with the findings in accordance with the research aims of the study (par. 1.3). Findings of this research are based on both the literature and the empirical study.

Research aim 1: To describe the role of m-learning in an open distance education model

To determine the role of m-learning in distance education, the availability of mobile devices amongst the target group had to be determined. The role and interactivity between the two research foci of m-learning and distance education were investigated. Related concepts such as interactivity, affordability

flexibility, accessibility and communication were addressed and the interdependence amongst these concepts was determined in the context of a distance education mode (par. 4.2.3, 4.2.3.1, 4.2.3.2, 4.2.3.4, table 4.11). Other components in relation to distance education such as the provision of support and communication were also discussed and analysed as factors with an impact on the effectiveness of the delivery of educational programmes over distance (par. 4.2.3.4, 2.2.1.3). The fundamental roles of the previously mentioned concepts are acknowledged in this research with the conclusion that the effective fulfilment of these roles is closely linked to the effective delivery of distance education programmes.

The vast majority of students (99.1%) and facilitators/lecturers (98.1%) have their own cell phones (par. 4.2.4.3) (table 4.14). Cell phone ownership has increased four fold after 2007 (par. 2.2.2.3). Increased cell phone ownership offers more possibilities for mobile technology to be utilised in more areas of society, especially in the teaching and learning dimensions of distance education programmes. Added means of communication in distance education increase m-learning's role in the delivery of distance education programmes.

It was argued in the literature study and empirical section of this research that distance education and m-learning are two concepts that are closely associated with one another. Mobile learning is regarded as an appropriate means to enhance in particular access to and communication in distance education programmes. Time, location and communication technologies are elements that add flexibility and interactivity in the delivery of programmes in distance education.

A distance education mode and m-learning are further associated with the delivery of distance education programmes which are not dependent on aspects such as time and location (par. 4.2.3.1 & par. 2.2.1). The crux of m-learning has to do with engaging in study activities anywhere and anyplace (par. 4.2.3.4). Distance education programmes are offered over a wide and diverse geographical area (par. 2.2.1) with the assistance of a variety of technologies and modes of delivering programmes. Respondents indicated that they perceive m-learning as flexible and movable (par. 4.2.3.4) because location is not a prime factor for students to take part in teaching and learning activities. Flexibility provides opportunities for students and role players to have a choice in the way they take part in the teaching and learning process (par. 2.2.1.2). Having a choice in deciding the mode of delivery, irrespective of time and location, adds flexibility and interactivity to the delivery of distance education programmes (par. 4.2.3.1). Without interactivity, the flexibility in the delivery of distance education programmes will be compromised (par. 4.2.3.1). Interactivity together with effective communication is imperative for the successful provision of quality distance education programmes in higher education (par. 2.2.1.3). Without interactivity between role players, insufficient communication may be experienced which will obviously impact negatively on the successful completion of academic programmes. Effective communication in distance education is further enhanced through interaction

between all role players. It is thus imperative in the offering of distance education programmes by higher education institutions (par. 2.2.1.3, par. 4.2.3.1).

Supporting students in teaching and learning is an essential element of m-learning that plays a key role in distance education (par. 4.2.3.4). Support in this sense refers to amongst other aspects administrative and/or academic support. The integration of modern communication technologies and modes enhances ways for the delivery of academic programmes and increases the flexibility in the delivery of distance education programmes.

The use of mobile devices makes a more affordable means of communication possible to relevant role players (par. 2.2.2.4), enabling more people to have access to the higher educator sector for improving their academic and professional qualifications. Affordability and flexibility (par. 4.2.4.1, table 4.11) are regarded as the foremost reasons for a distance education mode as an option for tertiary study. The application of mobile devices enables numerous opportunities for role players, not only to access teaching and learning programmes, but to complete these programmes with continuous guidance and support via mobile technologies. The most affordable and user-friendly ways for role players to communicate with, are text messages (SMS) and postal services (par. 4.2.4.2, table 4.13). Affordability enables more accessibility to teaching and learning. The success of distance education largely depends on the flexibility and accessibility students have in the teaching and learning process (par. 2.5.1, 2.7.2). Increased accessibility to teaching and learning is possible when affordable means of communication are available in the delivery of distance education programmes. M-learning affords more individuals the opportunity for academic and administrative support.

The key findings in relation to research aim 1 about the role of m-learning can be summarised by defining m-learning and distance education as concepts that are closely associated with each other. Communication is central to both concepts. M-learning enables role players in distance education to interact more regularly with one another utilising affordable means of communication (e.g. SMS), irrespective of time and location. Accessibility to resources and flexibility in delivery of programmes are concepts in m-learning that enhance communication between all role players in the delivery of distance education programmes. Interaction between role players enables m-learning to enhance communication, further improving administrative and academic support to students.

Research aim 2: To empirically determine the challenges in the implementation process of m-learning as part of an open distance education model

The description of the role of m-learning in conjunction with the responses from the empirical study enables the identification of certain challenges to consider when implementing m-learning in distance education. The use and integration of modern communication technologies and the implementation thereof are challenges posed in the offering of distance education programmes (par. 2.6.1, par. 2.2.7). Interactivity as mutual communication between student and institution and *vice versa*, accessibility to tertiary education and flexibility in the teaching and learning process to accommodate idiosyncratic circumstances are further challenges to account for in distance education (par. 4.2.3.1). The mentioned challenges are viewed as important attributes to keep in mind for the effective delivery of distance education programmes.

Affordability of access to tertiary education is an added challenge for the provision of distance education programmes (par. 2.6.3). User-friendly mobile devices and related software programmes such as mobi-sites are technologies that have great potential to overcome these challenges (par. 2.5.2, 2.6.1). Research furthermore indicated (par. 2.2.4) that open distance learning affords students the opportunity to control the teaching and learning process as removed barriers such as time and location allow individuals to personalise their teaching and learning approach in distance education (par. 2.6.2). Guidelines to improve the quality of teaching and learning in accordance with modern technological trends and individual needs should be taken into account as this was an opinion highly rated by students in this research (par. 4.2.5.1). Affordability is seen by respondents (students) as a priority for access to tertiary education; especially the affordability of mobile technology because of its important role to facilitate continuous communication in a distance education mode (par. 4.2.5.2). Although the literature indicates (par. 2.6.3) that incorporating m-learning in the teaching and learning process is affordable, the respondents (students) indicated that m-learning should be more affordable and concurred that m-learning could benefit them immensely in their tertiary studies (par. 4.2.5.2). The affordability of m-learning is evident (table 4.13) as both groups of respondents (students and facilitators/lecturers) indicated that they prefer receiving information regarding their studies by means of text messages (SMS). This is an indication that m-learning is a more affordable means of communication to all role players involved in distance education (par. 2.2.2.4). The downloading of information via mobile devices, however, is still costly for both groups of respondents (par. 4.2.5.3), indicating that accessing teaching and learning could be problematic.

A need for students was identified as a challenge to receive administrative and academic support by means of mobile devices (par. 4.2.5.4). Academic and administrative support form part of a larger support structure at higher education institutions and an approach of m-learning is regarded as a viable option for rendering much needed support to all role players without the barriers associated with time

and location. The integration of m-learning in support structures of institutions enables frequent communication between role players, encouraging interactivity in delivering distance education programmes. M-learning thus affords everyone in higher education an additional means of communication (par. 4.2.5.5) by making more options possible. Although both groups of respondents indicated that downloading information using mobile devices is a costly exercise, alternative options should be explored in order to access information more frequently and less costly.

The sharing of teaching and learning experiences is an increasing need that arises from involvement in academic programmes, and role players in distance education can benefit to a large extent by utilising m-learning for the mentioned purposes (more with students than with facilitators/lecturers) (par. 4.2.5.5). Social network sites (SNS) enable those involved in academic programmes to share information regarding teaching and learning by means of all types of modern communication technologies and devices (par. 2.2.3). The use of social network sites (SNS) could enhance the delivery of distance education programmes amongst peers (par. 4.2.5.3, 2.2.3) and further assist with sharing more information at affordable rates. It is worth to mention that certain skills and cost implications to obtain information, academic or administrative, is a challenge according to the respondents (table 4.27, table 4.28, par. 4.2.5.3).

The key findings in relation to research aim 2 about the challenges in the implementation of m-learning as part of an open distance learning model can be summarised as investigating the sharing of quality teaching and learning experiences amongst all role players utilising modern communication technologies. An added challenge addressed by respondents was to improve quality of teaching and learning by enhancing administrative and academic support using m-learning.

Research aim 3: To identify and formulate management guidelines for the implementation of m-learning in distance education

In order for communication to be effective in the delivery of distance education programmes, a functional organisation structure with situation-specific management positions, systems and processes has to be put in place to operate and regulate the effective delivery of all programmes (par. 2.2.1.1). A distance education mode in higher education requires distinctive management guidelines for students, facilitators/lecturers, administrators and managers (par. 4.2.5.1) as the needs, roles and expectations of these different groups are diverse. It is imperative that an organisation and management structure is followed, which suits the mode of delivery chosen by the institution (par. 2.6.4). A proficient organisational structure establishes functional lines of accountability and communication at all levels whereby management's authority is acknowledged (par. 2.2.1.1). The management guidelines in relation to research aim 3 of this study are described in the following section.

5.4 Guidelines for managing m-learning in distance education

Resulting from the previous sections and research aims, this section presents guidelines for managing m-learning in distance education. The management guidelines were developed by taking into account the literature study and the data analysis from the empirical part of this research.

- In order for teaching and learning to be facilitated as part of a distance education model in a geographical diverse area, an approach of **anywhere and anytime learning** should be adopted and structured by the management of education providers to accommodate all role players (par. 2.2.1.1, par. 2.4.3, table 4.1). Such an approach can function as a point of departure for managerial tasks and strategies in the provision of higher education. The majority of students in distance education are in possession of mobile devices (table 4.14, par. 2.2.2.3), which makes the implementation of m-learning in a distance education model essential. As further motivation, it can be stated that the number of students who make use of online services, doubles globally every three years (par. 2.2.3).
- **Text messaging** (SMS) (table 4.13) is a preferred method of communication to distance education students in higher education. Managers of higher education institutions have to consider this aspect in their management structures, systems and processes to enable an open communication system between all role players involved. Students in this research prefer to receive information regarding their studies by means of text messages (SMSs) (par. 4.2.4.2, table 4.13). As communication technologies develop, an increasing number of mobile devices (such as smart phones and tablets) are introduced into the consumer market with immense application potential and value for m-learning to be integrated in distance education (par. 2.2.2).
- The management staff of distance education institutions in higher education needs to be aware of new mobile technologies available and the relevance to distance education by especially taking into consideration the diverse geographical areas students reside in. A **needs analysis** could determine the type of devices available and needed by the various role players in distance education. A structured needs analysis by management will to a great extent eliminate a haphazard or trial and error approach. The mobile technology which is available, as well as affordability will largely determine the support services that management of distance education providers will introduce in line with the needs of role players.
- Situation-specific **variables** such as diverse residential areas and different age groups of students have to be considered when assessing the type of devices needed for m-learning in distance education (par. 2.6.3). Different age groups of students have different needs for access

to teaching and learning and if m-learning is integrated into distance education, it has to suit the different learning styles of learning of individuals and age groups (par. 2.2.2, 4.2.5.1, 4.2.5.5 table 4.34, table 4.35). Management has to contemplate all relevant variables to develop a situation-specific management strategy for the implementation of m-learning as part of distance education.

- **Affordability** of technology to implement m-learning as an integrated part of distance education is a priority for effective and regular communication about all relevant administration and academic matters (par. 2.5.2, par. 2.2.2.4, table 4.11, table 4.12). The issue of affordability is a key factor to be reckoned with by the management of distance education institutions for the implementation of m-learning as part of distance education.
- A main purpose of m-learning is to allow a high degree of **interactivity** between all role players involved in distance education in order to improve mutual **communication** (par. 2.2.1.1, par. 2.2.1.2, par. 2.2.1.3, table 4.34, table 4.35). Interactivity via mobile technology enables students, administrators, facilitators/lecturers, management and service providers to share relevant information and content more frequently, thereby enhancing overall communication. In this sense, management may consider a wider variety of communication means and communication devices to be made available to enhance communication and interactivity in distance education (par. 2.2.3, par. 2.2.4, par 2.2.5, table 4.36, par.4.2.5.5).
- An anywhere and anyplace teaching and learning approach by means of m-learning as part of the provision of distance education programmes enables **flexibility** in accordance with the idiosyncratic circumstances of individual students (table 4.8, table 4.9, table 4.3, table 4.4, table 4.1, par. 2.2.2, par. 2.2.2.1, par. 2.2.2.2, par. 2.2.2.3, par. 2.2.2.4, par. 2.2.3, par. 2.2.5). The aspect of flexibility is regarded as an important advantage associated with distance education and therefore management has to consider all relevant tools, devices, systems, procedures and actions to improve flexibility in the delivery of distance education programmes (par. 2.2.1.3, par. 2.2.2, par. 2.2.3, par. 2.2.5, table 4.11, table 4.12, table 4.33, table 4.34).
- **Social network sites** (SNSs) enable role players in distance education to share relevant information and teaching and learning experiences from any location and at anytime via specialised social and educational constructed networks (par. 2.2.3, table 4.36, table 4.34). The management of distance education entities could investigate or explore the utilisation of SNSs as part of m-learning to enable more role players in distance education to share applicable content and experiences of teaching and learning through distance education.

- Accessible and affordable **downloading of information** via mobile devices is regarded as imperative for the implementation of m-learning as part of distance education (par. 4.2.4.4, par. 4.2.4.5, table 4.16, par. 2.2.2.3, par. 2.2.7). A need was established among students and facilitators/lecturers to receive and download information to assist them with their studies (table 4.33). Management of higher education institutions has to keep up with trends and modern technology development for integration into academic and support programmes for the benefit of students.
- The continuous provision of **academic and administrative support**, irrespective of time and location, is essential for the successful completion of distance education programmes (table 4.24, table 4.26, par. 4.2.5.1, par. 4.2.5.4, par. 2.2.2, par. 2.2.1.3). Interactive communication between role players is an outstanding feature of this particular aspect. Continuous support to registered and prospective students is an invaluable feature for service providers in higher education and management is accordingly obliged to put tailor-made support services and programmes in place.
- Skills **training** regarding the use of mobile devices for the effective implementation of m-learning in the teaching and learning process is also regarded as an important recommendation (table 4.32, table 4.33, table 4.34, table 4.35, par. 2.5.2). A need exists within both groups of respondents in this study for training and skills to further enhance capabilities to use modern communication technologies to specifically assist with studies related to distance education programmes.
- Custom-made **management structures, systems and processes** have to be put in place to regulate the total process and all components related to distance education programmes. One aspect, the focus of this research, namely m-learning, has to be part of these management structures, systems and processes (par. 2.2.1.1, 2.6.4).

The mentioned guidelines envelop all possible aspects that could have an effect on the effective delivery of distance education programmes. Addressing and applying the proposed guidelines will assist with proper management in delivery of programmes ensuring that all role players are accommodated in the delivery of distance education programmes. The common goal for m-learning is enhancing communication and interaction between all role players.

5.5 Synthesis

Managing matters of m-learning in distance education is imperative when taking into account the involvement of students, facilitators/lecturers and other role players. M-learning is an important aspect in distance education to embrace and to be utilised to good effect in a distance education mode.

The focussing of attention on m-learning may develop an awareness of the fact that many options and accompanying choices exist to make distance education and further education accessible, flexible and affordable, to promote interactivity and enhance communication between all role players involved. Developing skills amongst role players to utilise modern mobile communication technologies allows for improved communication and innovative ways to overcome challenges associated with distance education. Effective organisational and management structures will also be an advantage for the implementation and sustainment of an m-learning initiative as part of distance education to be available at anytime and location.

5.6 Recommendations

The following recommendations are proposed.

Effective communication between all role players involved in distance education is a crucial aspect to be accounted for by the managers of distance education institutions (par. 2.2.1.1, 4.2.4.7). Innovative means of communication have to be explored and implemented in distance education to improve, among other aspects, flexibility (par. 2.2.1.2) in the provision of programmes. Modern mobile technologies are readily available to enhance communication in the delivery of distance education programmes. A key aspect and necessity for the successful provision of distance education is effective and regular communication, irrespective of time and location. The aforementioned leads to the recommendation that institutions involved in distance education must explore all possibilities to ensure **communication** by means of appropriate media and technologies of which mobile devices form an important part (par. 2.2.2, 4.2.4.8).

Modern mobile communication technologies enable communication between role players at anytime and any location as the main characteristic of these devices are their mobility. **Mobility** enables students and facilitators/lecturers to take actively part in the teaching and learning process, irrespective of time and location (par. 2.2.2.3, 4.2.5.1). This research has indicated that the majority of respondents are in possession of mobile devices (par. 4.2.4.3, table 4.14) that enables communication at anytime and from any location. Increased interactivity adds more flexibility in the delivery of programmes in distance education. A recommendation is thus made that management of distance education

institutions should determine how many of the role players are in possession of appropriate mobile devices with an accompanying strategy to ensure accessibility to such devices and technologies.

An aspect that featured prominently in this research was the difference in age amongst the respondents (table 4.1). The majority were experienced educators with different learning styles and needs for skills development (par. 4.2.2, table 4.1). A recommendation is made to implement m-learning as part of an open distance education to enable individuals the opportunity to adopt their own style of learning according to their idiosyncratic circumstances (par. 4.2.5.5). A **needs analysis** has to be undertaken to determine skills levels and to provide the required training.

Accessibility to quality services is regarded as a common need among people. Administrative and academic support to all role players is accepted as an essential requirement for the provision of distance education programmes (par. 2.2.1.1, 2.2.1.3, 2.2.2.1, 2.2.7, 4.2.3.1, 4.2.4.7, 4.2.5.5, 4.2.5.6, table 4.34, table 4.35). Students and other role players are dependent on accessible means of communication to link regularly with institutions they are enrolled with to obtain relevant information and to receive the support they needed. A recommendation is made in this regard to ensure that the implementation of m-learning as an integral part of distance education must enable **accessibility** to continuous administrative and academic support (par.4.2.5.1, 4.2.5.2, 4.2.5.5).

The **management** of m-learning poses a challenge to all role players and institutions involved in the delivery of distance education programmes. An effective and situation-specific system to manage affordability, flexibility, accessibility and interactivity is crucial for the successful implementation of m-learning, and it is a recommendation of this research to account meticulously for the mentioned fundamental aspects. These aspects form part of the core requirements for distance education to succeed.

In conclusion, to the recommendation section for this research, it is **recommended** that management structures, systems and processes of institutions involved in the provision of distance education have to be adapted to encompass the following aspects:

- Continuous administrative and academic support
- Improving the quality of teaching and learning in distance education utilising modern communication technologies
- Increasing the availability of mobile technologies
- Assistance to enable affordability of mobile technologies
- Enhancing accessibility to resources for teaching and learning purposes
- Contributing to the flexibility of programme delivery

- Continuously improving communication between all role players in the delivery of distance education programmes
- Providing skills development and training for students and facilitators/lecturers to utilise m-learning optimally.

5.7 Recommendations for further research

The purpose of this study was to determine the role of m-learning and to develop management guidelines for the implementation of m-learning in an open distance learning model. The challenges for implementing m-learning were also identified and discussed. With all the previous in mind, it is recommended that further research could be undertaken with the following potential topics as possibilities:

- Affordable means to download relevant information from the web utilising mobile devices for educational purposes
- Effective academic and administrative support to distance education students within a diverse geographical environment by means of mobile technologies
- Establishing and sustaining networks by utilising m-learning as part of distance education
- The role and integration of social network sites in distance education
- Enabling and supporting different learning styles by means of mobile technologies in distance education programmes
- The use of mobile communication technologies in distance education in developed and developing countries

5.8 Limitations and strengths of the research

The researcher acknowledges the following limitations that might be applicable to this research. Appropriate strategies were however employed to minimise the effect of these potential limitations on the results or outcomes of the research. The possible limitations are *inter alia*:

- Respondents in this research only had to indicate if they possess a cell phone. The type of cell phone or mobile device should also have been determined to establish the potential, capacity and format to download relevant information from the Internet.
- Information that also could have been collected is the average amount of money the students with pre-paid packages spend on airtime during a month to establish the scope or range of information downloaded from the Internet.

- Measurements were put in place to minimise any distracting factors that could disturb the focus and attention of the respondents while completing the questionnaires

Strengths associated with this research are listed as:

- The response rate of 80.5% (par. 4.2.2) of completed questionnaires is regarded as acceptable to support the validity and reliability of the research.
- Respondents from all 36 tuition centres throughout SA completed the questionnaires for this research. No centres were excluded from the research and students from all geographical areas participated in this survey.
- Facilitators/lecturers and students the aforementioned centres were chosen as respondents and two separate questionnaires were developed in order to obtain both groups' responses concerning the implementation of m-learning in distance education.
- Skills of respondents and ownership regarding cell phones were established.
- Questionnaires were anonymous, giving each respondent the opportunity to answer all questions with honesty and sincerity.
- All age groups were included in this research to establish a true reflection of needs and advantages of m-learning as experienced by a broad profile of respondents.

5.9 Conclusion

This study outlined the role of m-learning in an open distance learning model as well as the challenges that role players have to overcome in distance education programmes presented in diverse geographical areas. Various issues related to communication were also addressed with a focus on improvement by utilising mobile technologies. Aspects in the context of distance education with specific relevance to communication such as affordability, accessibility, flexibility and interactivity were analysed and described to indicate the potential for m-learning implementation. The aforementioned aspects associated with an open distance education mode have to be managed effectively to ensure high quality programme delivery to the clientele of students. Hence, management guidelines, based on the literature study and empirical survey, were formulated for the implementation of m-learning as an integral part of distance education.

Recommendations were finally compiled to assist the various role players in distance education to understand the role and challenges of m-learning in distance education and to improve particular aspects of communication by considering appropriate mobile technologies. Finally, the study aims to contribute towards the effective management of m-learning in the delivery of distance education programmes in an open distance learning mode.

5.10 Reflection on the research

When reflecting on the research there are a number of issues that arose. Mobile communication technologies are rapidly changing and improving. More and affordable means of communication are developed in a short period of time and are still developing at an alarming pace. This makes more options available to all kinds of service consumers and providers with far reaching implications for those in the higher education sector. This research sensitises those involved in education to keep up with these developments and to explore all possible applications in the education profession.

This research places some emphasis on skills development with respect to students and facilitators/lecturers in the use of mobile technologies to maximise interaction between all role players. The previous statements boil down to the utilisation of m-learning to play a more significant role in the delivery of distance education programmes. The researcher took pleasure in conducting the research and experienced it to be tremendously enriching.

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SURVEY QUESTIONNAIRE

MANAGEMENT GUIDELINES FOR THE IMPLEMENTATION OF M-LEARNING IN AN OPEN DISTANCE LEARNING MODEL

NORTH-WEST UNIVERSITY POTCHEFSTROOM

Questionnaire number			
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Indicate your response with an **X** in the applicable frame. Please ask the facilitator/co-ordinator to explain questions should you not understand them.

SECTION A: BIOGRAPHICAL INFORMATION

For example:

<i>Male</i>	X <i>(if you are male)</i>
<i>Female</i>	

1 Gender?

Male	1
Female	2

2 Age group in years?

20-29	1
30-39	2
40-49	3
50-59	4
60+	5

3 Current position as educator?

Principal	1
Deputy principal	2
HOD	3
Teacher	4
Not applicable	5

4 Current position at tertiary institution?

Lecturer	1
DE Manager	2
Other _____	3
Not applicable	4

5 Teaching experience?

0-4 years	1
5-9 years	2
10-14 years	3
15-19 years	4
20+ years	5

6 Highest qualification?

Master's degree	1
Honours degree	2
Degree	3
Diploma	4
Certificate	5

7 Have you previously completed a qualification through distance education?

Yes	1
No	2

8 Description of area of residence?

Rural area	1
Urban area	2

9 Population group?

White	1
Black	2
Asian	3
Coloured	4
Other (specify) _____	5

SECTION B: CONCEPT UNDERSTANDING

This section gathers data of your understanding of the concepts **distance education** and **mobile-learning**. Indicate the extent of your understanding according to the scale provided.

Complete the following questions as indicated in the example below:

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
#	<i>Distance education is teaching and learning not on a campus.</i>				X (if this is your response)

10 Distance education is ...

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
10.1	the non-residential(off-campus) location of students.	1	2	3	4
10.2	further education and training afar from residential campuses.	1	2	3	4
10.3	teaching and learning that are subject to anytime learning	1	2	3	4
10.4	the offering of self-instructional programmes.	1	2	3	4
10.5	interactive programme delivery when student and lecturer are separated in time and distance.	1	2	3	4
10.6	pre-produced and self-instructional coursework.	1	2	3	4

11 The facilitation of distance education programmes ...

11.1	focuses mainly on the use of one particular technology, namely the Internet.	1	2	3	4
11.2	saves money for universities.	1	2	3	4
11.3	are of a lower quality than programmes delivered on-campus	1	2	3	4

12 **Mobile learning (m-learning) is ...**

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
12.1	the immediate distribution of information.	1	2	3	4
12.2	where time is not a barrier in the distribution of information.	1	2	3	4
12.3	where place is not a barrier in the distribution of information.	1	2	3	4
12.4	movable (not static) and flexible communication.	1	2	3	4
12.5	studying which encompasses anywhere and anyplace learning.	1	2	3	4
12.6	a more user-friendly means of communication.	1	2	3	4
12.7	an important requirement to support the teaching and learning process in Higher Education.	1	2	3	4

SECTION C: ACCESSIBILITY TO TEACHING AND LEARNING BY UTILIZING MOBILE LEARNING

Complete the following questions by means of an **X** in the frame of your choice.

- 13 What persuaded you to enroll for a distance education programme? (Choose 3 possibilities in this question.)

Affordability	
Workload	
Technological support	
Flexibility of learning	
Location	
Attending facilitation sessions in my area	
Other?:	

14 How do you prefer receiving information regarding your studies? (Choose 3 possibilities for this question)

** Moodle is a computer program whereby students can receive all required study information*

SMS	
Moodle *	
Post/Mail	
Telephone and Call Centre	
OLG website	
NWU website	

15 Do you own a cell phone?

Yes	1
No	2

16 Cell phone package subscribed to?

Pre-paid	1
Contract	2

17 How often do you connect to the Internet via your cellphone?

Not at all	1
Once per week	2
Twice per week	3
1-5 minutes daily	4
5-15 minutes daily	5
15-60 minutes daily	6
More than 1 hour daily	7

Based on your related competency and skills, answer the following questions as shown in the example below.

		<i>Do not agree</i>	<i>Disagree to some extent</i>	<i>Agree to some extent</i>	<i>Agree completely</i>
	<i>I am eager to make use of new mobile technologies.</i>				<i>X(if this is your answer)</i>

18 Patterns of cell phone use

		<i>Never</i>	<i>Seldom</i>	<i>Often</i>	<i>Regularly</i>
18.1	I only use my cell phone for making calls.	1	2	3	4
18.2	I use my cell phone for sending SMSs.	1	2	3	4
18.3	I access the Internet on cell phone.	1	2	3	4
18.4	I download data on my cell phone via the Internet.	1	2	3	4
18.5	I use my cell phone to log a problem with OLG/NWU.	1	2	3	4
18.6	Any other?	1	2	3	4

19 Viewpoints about the use of mobile technologies in academic programmes.

Academic programmes utilising mobile technology will assist me to ...

		<i>Do not agree</i>	<i>Disagree to some extent</i>	<i>Agree to some extent</i>	<i>Agree completely</i>
19.1	learn at my own convenience.	1	2	3	4
19.2	learn at my own pace.	1	2	3	4
19.3	attain academic-related information in the shortest time.	1	2	3	4
19.4	communicate more effectively with my lecturer / facilitator.	1	2	3	4
19.5	access the Internet via mobile phone.	1	2	3	4

20 Personal skills regarding mobile learning

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
20.1	I can picture myself to learn by utilizing applicable mobile technologies.	1	2	3	4
20.2	If required, I will acquire skills for learning via mobile technologies.	1	2	3	4
20.3	Learning via mobile technologies will require much effort.	1	2	3	4
20.4	My background and economic circumstances enables me to make use of mobile technologies for learning.	1	2	3	4

SECTION D: CHALLENGES, EXPERIENCES AND EXPECTATIONS WITH REGARD TO MOBILE LEARNING

Complete the following questions as indicated in the example below:

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
#	<i>I am committed to new technologies.</i>				X (If this is your response)

21 Experiences and perceptions of mobile learning.
Mobile learning ...

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
21.1	improves access to further learning.	1	2	3	4
21.2	improves the quality of teaching.	1	2	3	4
21.3	improves the quality of learning.	1	2	3	4
21.4	enables access to academic content via my cell phone.	1	2	3	4
21.5	enhances administrative support via my cell phone.	1	2	3	4
21.6	provides reminders of due and other important dates.	1	2	3	4
21.7	provides flexibility in the learning process.	1	2	3	4
21.8	allows the utilization of text messaging for academic purposes on my cell phone.	1	2	3	4
21.9	provides more freedom for personal learning styles.	1	2	3	4
21.10	facilitates a more effective means of the learning process.	1	2	3	4

 Please note that the scale of this question differs from the rest of the questionnaire.

22 Challenges related to the use of mobile learning.

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely	Don't know
22.1	The use of new mobile technologies will be to the benefit of my tertiary studies.	1	2	3	4	5
22.2	Mobile learning are affordable.	1	2	3	4	5
22.3	I have sufficient cell phone reception in my area.	1	2	3	4	5
22.4	Mobile technology provides more possibilities to obtain course content on various platforms.	1	2	3	4	5
22.5	I will make use of relevant mobile technologies to access teaching and learning information.	1	2	3	4	5

(Question 22 continues)

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely	Don't know
22.6	Mobile learning engagement will enable me to prepare more effectively for contact sessions.	1	2	3	4	5
22.7	Mobile learning has the potential to substitute contact sessions to a large extent.	1	2	3	4	5
22.8	The introduction of mobile learning will lower the cost of studying.	1	2	3	4	5
22.9	I would like to know more about the use of mobile learning.	1	2	3	4	5
22.10	If available, I will make an effort to obtain study material via mobile technologies.	1	2	3	4	5
22.11	Some assessment activities can be conducted via mobile technology.	1	2	3	4	5
22.12	Communication through mobile technologies is more reliable than the postal service.	1	2	3	4	5
22.13	More information regarding my studies need to be sent via mobile technologies.	1	2	3	4	5

23 Do you experience the following statements as barriers with regard to mobile learning?

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
23.1	Affordability of mobile technologies, e.g. cell phones.	1	2	3	4
23.2	Accessibility to the Internet.	1	2	3	4
23.3	Affordability to connect to the Internet.	1	2	3	4
23.4	Technology quickly becomes outdated.	1	2	3	4
23.5	It is expensive to download relevant (academic) data.	1	2	3	4
23.6	Any other barriers? _____	1	2	3	4

24 To what extent do you disagree or agree with the following needs and expectations concerning mobile learning?

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
24.1	Communicate more frequently with the university.	1	2	3	4
24.2	Increased accessibility to mobile technologies.	1	2	3	4
24.3	To receive more academic information via mobile technologies, e.g. my cell phone.	1	2	3	4
24.4	To receive more administrative information via mobile technologies, e.g. my cell phone.	1	2	3	4
24.5	More guidance to utilise mobile technologies for the enhancement of my tertiary studies.	1	2	3	4

To what extent do you disagree or agree with the following advantages related to m-learning?

25 **The advantages of mobile learning are that ...**

		Do not agree	Disagree to some extent	Agree to some extent	Agree completely
25.1	increased opportunities are possible to access formal education.	1	2	3	4
25.2	further education is more cost effective.	1	2	3	4
25.3	technological advances are utilised in education.	1	2	3	4
25.4	alternative means of communication are possible.	1	2	3	4
25.5	networking are expanded amongst all role players in distance education	1	2	3	4
25.6	technologies becomes increasingly affordable	1	2	3	4
25.7	sharing of teaching and learning experiences become more evident	1	2	3	4
25.8	distance education programmes are more effectively managed.	1	2	3	4
25.9	administrative support to students is improved.	1	2	3	4

25.10	academic support to students is improved.	1	2	3	4
25.11	personal (individual) learning styles are supported.	1	2	3	4
25.12	collaborative learning are supported.	1	2	3	4
25.13	teaching and learning time is saved.	1	2	3	4
25.14	inactive students can be motivated to resume their studies.	1	2	3	4

This is the end of the questionnaire.

Thank you for your time and co-operation to complete this questionnaire.

Outline of questionnaire

Section A.....(9 items)

Biographical information 1 – 9

Section B.....(16 items)

Concept understanding 10.1 - 10.6 Distance education
11.1 - 11.3 Facilitation of DE programmes
12.1 - 12.7 Mobile Learning

Section C.....(20 items)

Accessibility to mobile technology 13 – 17 Accessibility
18.1 – 18.6 Patterns of cell phone usage
19.1 – 19.5 Academic programmes
20.1 – 20.4 Learning approach

Section D.....(48 items)

Experiences related to mobile learning 21.1 - 21.10 Experiences and perceptions
22.1 - 22.13 Challenges
23.1 - 23.6 Barriers
24.1 - 24.5 Needs & expectations
25.1 – 25.14 Advantages

Total items of questionnaire: **93**
