THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN OPEN DISTANCE AND E-LEARNING ENVIRONMENT

By

SIMONPETER OLUNIYI OGUNSINA

Submitted as per the prerequisite for the degree of

MASTER OF EDUCATION

In the subject

TECHNOLOGY EDUCATION

At the

University of South Africa

SUPERVISOR: PROF M.Z. RAMOROLA

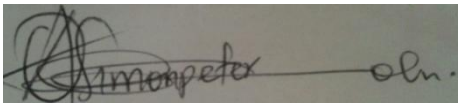
2020

DECLARATION

I SIMONPETER OLUNIYI OGUNSINA therefore assert that this dissertation is my very own work and that all repositories cited have been recognized by appropriate references.

03-08-2020

Date



ACKNOWLEDGMENT

I will like to articulate my genuine appreciations and gratitude to Prof M.Z. Ramorola, my overseer, whose supervision and acumen transformed my inquiries into the most compensating event of my life. Above all, glory be to omnipotent God who has conceded me the opportunity and privilege to attain this academic height.

ABSTRACT

Technological advancement has changed the way things are done in this era. Instructing and erudition process in conventional and Open Distanced and e-Learning (ODeL) is no exception, thus, creating a stint in the manner in which educators educate and the manner wherein students learn. This dissertation focusses on the role of ICT in ODeL environment. Guided by the transactional distance theory and the rhizomatic learning, this study tried to investigate the role of ICT in ODeL environment. The design was to investigate: (a) The effectiveness of ICT tools for instructing and learning; (b) whether ICT boost learning interaction; (c) foster flexibility; (d) supports the students to make decisions; and (e) allows students to connect learning in ODeL.

The study utilized a blended techniques approach, and data was congregated through a questionnaire and interviews. A sample of 52 registered postgraduate students in the master of education (M.Ed programme) and seven lecturers within the College of Education were purposively and conveniently selected in the study. The survey questionnaire comprised of 53 question items for students, and 48 question items questions for lecturers. The questionnaire for both students and lecturers also had open-ended questions. Considering distance learning, it was difficult for the researcher to administer a questionnaire using any other method except the online tools. The congregated data was analysed utilizing descriptive and inferential statistics.

The outcomes revealed that the integration of ICT in ODeL environment was effective and enhanced the educational process, promote interaction, foster the flexibility of the education programmes, support student autonomy and allow students to connect with different learning nodes. It was established in the study that ICT in ODeL has helped in transforming the education process. The study recommends that the institution should avail ICT facilities and provide users with high speed Internet. The institution should also make provision for technical support to users. Furthermore, both students and lectures should be armed with relevant technological know-how and dexterities.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

ODeL	Open Distance and e-Learning
ICT	Information and Communication Technology
SPSS	Statistical program for social science
ISTE	Institute of Science and Technology Education
RPSC	Research Permission Sub-committee
MDGs	Millennium Development Goals
UKOU	United Kingdom Open University
CMC	Computer-mediated communication
WWW	World Wide Web
UNISA	University of South Africa
M.Ed	Master education
CEDU	College of education
QIs	Question items

CHAPTER ONE

BACKGROUND AND CONTEXT OF THE STUDY

1.1. INTRODUCTION

The teaching and learning process have witnessed massive changes ever since the introduction of Information and Communication Technology (ICT). Along this line, the crucial role of ICT in education is been recognized daily (Adesote & Omojeje 2011:102), where higher institution of learning retorted to universal, societal, political, technological and learning research vogue. In their views, (Kudinov, Kudinova, Aitov, Kadi, Bannikova, and Voronkova 2018:1285;; McAndrew, Taylor and Clow 2010:2) assent that the new education conceptual models and technological transformations (such as ICTs, e-learning, mobile devices) bid the pathway for the transformational swap in teaching and learning. This is further upheld by, Treadwell (2015) who notes the following shift in open distance and e-learning (ODeL) environment and states:

> Learning context moves from a historical framework to a more personal framework. Access to learning is now changing from the traditional five days every week to day in and day out, which implies learning access for anyone, anytime, anywhere; and teaching approach is transforming from the conventional "sage on a phase" to a "guide" in constructivist learning (p.12).

Given the ideas, the shift will indeed convalesce the excellence of teaching and learning, just as research in traditional and ODeL (Yusuf 2005:316). Similarly, literature (Baharuldina, Jamaluddina & Shaharoma 2020:29; Noor-Ul-Amin 2013; Sethy 2008; Carneiro 2007; Dela Pena-Bandalaria 2007; Al-Ansari 2006) has indicated the benefits of technology in instructing and erudition. In the 21st century where teaching and learning is digitalised, students are not passive listeners anymore, instead they take charge of their own learning by engaging in proactive construing, encrypting and deciphering anywhere, anytime (Kahl & Venette 2010). Also, in (ODeL) setting, students play huge roles in their own learning process: they can share vast range of their skills and knowledge with others through ICT (Dela Pena-Bandalaria 2007:4).

This chapter gives a short outline of the acquittance of ICT to education globally. After that brief, information about South African context regarding higher education and the developments in integrating ICT into ODeL education will be discussed. It likewise gives information about the general aims and intents of the inquiry, just as the exposition of the study chapters.

1.2. BACKGROUND OF THE STUDY

South Africa like many evolving nations faces several challenges identifying with the incorporation of ICT in instruction and erudition, especially in an ODeL environment. Education in South Africa is guide by an ICT policy, 'The White Paper on e-Education of 2004' which recognised the need to integrate ICT in schools (Department of Education [DoE], 2004). The policy demands that all education institutions (from schools to higher institutions of learning) in South Africa have the responsibility of assimilating ICT into educating and erudition, and this ought to have been done in 2013. This demand could not be attained due to challenges such as connectivity, absence of proper proficient advancement, and shortage of technology resources (Ramorola 2018).

This study took place at the University of South Africa (UNISA), a leading ODeL institution in Africa. Informed by the policy, (Department of Education [DoE], 2004), UNISA has witnessed unprecedented changes as it moved systematically from one developmental phase to another (Tatkovic, Ruzic & Tatkovic 2006; Fozdar & Kumar 2007). The University was established in 1946, and the mode of teaching and learning was through postal communication with little proximity (face-to-face) contact. Printed materials or resources augmented by face-to-face tutorials were majorly used. However, the advancement in technology opened up the requirement for a progressively adaptable framework. In 2008 UNISA formulated and introduced an ODeL Policy, which is creating a shift in focus for teaching and learning to incorporate technology and multimedia interaction (UNISA 2008:5). The policy identifies the use of technologies like phone, hypermedia CDs and DVDs, audiovisual conferencing, SMSs and MMSs via mobile phones, email and discourse gathering or visit office via myUnisa

for educational purposes. These were suggested to give new pathways for corroborating instructing and learning in ODeL.

1.3. PRELIMINARY FICTION REVIEW

This segment gives a fundamental literature review, which will be briefly discussed in Chapter Two. Currently, the use of technology-based forms of education such as the live-broadcasting of lectures and video conferencing has opened new approaches that could foster teaching and learning in an increasingly refined manner (Sethy 2008:34). The impact of ever-changing technology in instructing and erudition in ODeL environment has been a main discussion in the schooling sector as of late' (Chetty 2012:1) and the incorporation of ICT has transformed instructing and learning through generations of the ODeL (Tatkovic, Ruzic, & Tatkovic 2006:4). These generations are presented in Table 1.1. It has been noted from Table 1.1 that South Africa like any other developing countries (e.g Zimbabwe, Nigeria, Ghana and Namibia) have used only the first and second generations of ODeL and at a push for ODeL third generation. The pedagogy of the said two ODeL generations was mainly based on asynchronous exchange of materials.

Asynchronous exchange means that students received printed materials and they also replied their mails in written format (Ferreira & Venter 2011:2). Whereas, synchronous exchange is a continuous correspondence whereby members are oblige to be online simultaneously (Panagiotakopoulos, Lionarakis & Xenos 2003:4; Akir 2006:32). Both the developing and developed nations find it difficult to keep abreast with the rate at which technology is developing (Ferreira & Venter 2011:3). Although, higher institutions of learning in developing countries make efforts to integrate diverse forms of multimedia, the expected results are not always met (Ibid). The use of ICT should not just readdress specified didactic concerns; it must aim at narrowing digital divide and foster democratisation of education (Dela Pena-Bandalaria 2007:1).

Currently, utilization of technology-based forms of education such as the live-broadcasting of lectures and video conferencing has opened new approaches that could foster teaching and learning in a more refined way (Sethy 2008:34).

Table 1.1: Different eras of Open Distance and e-Learning Education

(Adapted from Fozdar & Kumar 2007:3)

Era	Exemplary	Provision technology
First era	Email exemplary	Print
Second era	Multi-media exemplary	Print, acoustic tapes, audiovisual tapes, computer-based learning, intelligent audiovisual
Third era	Tele-learning exemplary	sound tele-conferencing, audiovisual -conferencing, sound-graphic-correspondence, broadcast TV/Radio
Fourth era	adaptable learning exemplary	Communicating sight and sound online, web-based access to www assets, computer intervened broadcastings
Fifth era	Smart adaptable learning exemplary	Intelligent sound and sight online, web based access to www assets, computer interceded correspondence, utilizing mechanized rejoinder schemes, ground breaking access to institutional procedures and assets

Moreover, various authors (Wagner 2001; Flecknoe 2002; Garrison, Anderson & Archer 2003:115) have identified the roles of ICT in education. One of the major ideas of using ICT in education, particularly in the ODeL setting, is to foster educating and erudition process (Libbrecht & Goosen, 2016:218; Chickering & Ehrmann 1996:2).

In any case, the employment of ICT in schooling was alienated into two genres, namely: ICTs for Education and ICTs in Education. ICTs for education is used to ICT products that are principally produced for teaching-learning purposes (Noor-Ul-Amin 2013:1), while ICTs in education comprises of every broad part of ICT that are used in educating-learning process (Ibid). This notion in the context of this study would mean that ICT can foster unbiased delivery of teaching and learning resources by merging open distance and face-to-face contact tactics, hence furthering the efficacy of teaching and learning process. In Carneiro's (2007) thoughts,

> ICT could enhance lifetime learning, creating openings for uninterrupted skills development and personal and/or social improvement in the workplace, and help in broadening teaching competences (p.159).

Brown (2003:2) reported that ICT has the capacity of developing, stimulating, and deepening skills for teaching and learning. These incorporate among others development and upgrade of the nature of instructing and erudition (Wagner 2001:47); varying instruction and erudition process by appending components of verve to instructing and learning situations (Angadi 2014:518); improve educating practice (Flecknoe 2002:271); facilitate the attainment of basic skills, and enriching teachers training just as expanding student inspiration and commitment (Garrison, Anderson & Archer 2003:114).

Furthermore, Chickering and Ehrmann (1996:2) said the assimilation of ICT in educating and erudition can bolster "great trainings" such as promoting energetic learning, providing speedy response, emphasising time-based tasks, impacting high expectations and appreciating different fortes and learning pathways. In support of this notion is Al-Ansari (2006:792) who reported that ICT has the capacity of developing, stimulating, and deepening skills. It likewise helps in rousing and drawing students to learn, ICT aids them to interface school experience to work practices, making fiscal

feasibility for futures workers. With the end goal of this study, the above discussed ICT roles are also relevant because the application of ICT tools such as videos, podcasts, simulations and so forth enhance knowledge dissemination through online discussions (e.g. social networks, content based talk applications, texting, virtual study halls, and so on.) and evaluation techniques (e.g. MIT's iLab, e-portfolios).

ICT as well has the budding of fostering concerted effort of teaching and learning environments in respects to students-to-student' interactions, interactions among staff, collaborative design of teaching and learning materials, formation of databases and information centres and multiparty delivery of courses and programmes (McAndrew, Taylor & Clow 2010:245). Also, Lau and Sim (2008:19) unveiled that educational use of ICT can foster intense learning, and as well afford educators the opportunity to attend well to individual needs of students.

1.4. THEORY UNDERPINNING THE STUDY

Barton (2005) accentuated that 'learning is unfathomably unpredictable and thus there a few theories which attempt to clarify the learning process' (p.23). Most likely, no single theory can give all the ripostes, and after some time varying hypotheses have swayed classroom run-through to a more prominent or lesser degree (Child 1993:91). Be that as it may, the utilization of ICT in ODeL for instructive purposes relied greatly on a variety of teaching and learning theories. For this reason, the educating and learning theories underpinning this study was transaction distance theory and rhizomatic learning, which are discussed in the next section.

1.4.1. Transactional Distance Theory

Transactional distance theory is the mental and communication cosmos (Moore 1993:22), that exists between teachers and students as suggested by the context and nature of roles played by individuals within the context. The theory is operational in all didactic styles contemporarily utilize in higher education, such as up close and personal learning, mixed learning or web-based learning (Larking & Jamieson-Proctor 2013:437). Additionally, the transactional distance theory is podium on three intertwine variables: the program structure, the teacher and student dialogue and the degree of student autonomy (Moore 1993:22). Deliberative teaching tactics are sited between the program

structure and dialogue, while student autonomy is an independent variable (Moore 1993:23).

As indicated by Moore (1993:26), structure communicates the unbending nature or adaptability of the programmes, educational goals, teaching procedures, and evaluation techniques. The excellences of the structure rely greatly on how cautiously these variables are coordinated. Dialogue is the collaboration among instructor and their student. For this situation, the instructor gives instruction and the student replies, the student asks question and the teacher replies (Moore 1993:23). Even though interplay of words and actions are vital to initiate a dialogue, there are differences between interaction and dialogue which is described as positive interaction, Intentional, helpful and esteemed by each party (Moore 1993:24). Referring to student autonomy Moore (1993:31) acknowledges that at last the students as opposed to the educator determine the objectives, the erudition encounters and the assessment choices of the erudition programme.

Moore (1993) further unveiled that there is a connection between discourse, structure and student's autonomy. In his words he attested that, the more noteworthy the structure and the smaller the discourse in a program, the further autonomy the learners have to isometrics (Moore 1993:27). On the other hand, Gokool-Ramoo (2008:7) said that there exists an inverse rapport between the program structure and dialogue, this means that the higher the program structure the smaller the room for discourse, communication and the arrangement of significance in the instructing and learning process.

1.4.2. Rhizomatic Learning

Rhizomatic perspective is one such alternative that embraces the multiplicity of learners and learning (Dillon 2016:90). In this regards Bussey, Bjurström and Sannum (2010:1) argued that there is no beginning or end for the rhizome learning, it is processed as a cultural code, multiple and fractal in nature. A rhizome can be thought of as consisting of a lot of conditions which take into consideration different, non-various leveled passage and leave focuses in information portraya and elucidation (Deleuze & Guattari 1987:5).

Given these ideas, Cormier (2008:3) over and above the formal settings of the classroom, there are limitless ways of generating knowledge because of emerging technologies. This section gives a synopsis of literature review which will be briefly discussed in chapter two.

1.5. STATEMENT OF THE PROBLEM

The University of South Africa is at its transition state, migrating from the second generations towards the third and fourth generation of ODeL education where teaching and learning is offered through technological tools and devices. More so, the myUnisa institutional learning management system (LMS) provides a variety of technology tools intended for scholastic coordinated effort and study related interaction (UNISA 2008:8). This framework was created to bridge the learning difficulties as far as time and separation. Despite the accessibility of the learning management system, it has been observed that most students still lean toward paper-based learning. There is a number of written assignments still sent by post and delivered to lecturers' offices for marking instead of submitting them as pdf documents to be marked online using j-router, an online marking tool.

Furthermore, some of the lecturers still visit regional offices to offer contact discussion classes, whereas online tools such as video conference could be used. Given these problems, it is not yet clear whether the use of ICT has since its inception improved teaching and learning in ODeL setting. This creates a gap that needs investigation. Based on this point of view, the main question of this study emerged.

1.5.1. Central inquiry

The principle question was:

What is the role of ICT in ODeL environment?

1.5.2. Sub-questions

Given the primary research question, the accompanying inquiry questions will assist in addressing the study problem:

1. How effective are the ICT tools for instructing and learning in ODeL context?
2. To what extent have ICT promote student-content interaction, lecturer- student interaction and student-student interaction?
3. How do ICT foster the flexibility of the education programmes in ODeL?
4. To what extent has ICT supported the students to make decisions about learning activities, goals, and evaluation methods in open distance and e-learning environment?
5. How do ICT allow students to connect from one learning node, activity or information to another?

1.6. PURPOSE OF THE STUDY

The motivation behind this inquiry was to explore the role of ICT in ODeL environment.

1.7. AIMS AND OBJECTIVES OF THE STUDY

This study plans to decide the role of ICT in ODeL. Given the aim of the study, the following objectives will help with responding inquiry question:

1. To sightsee the effectiveness of ICT tools for instructing and learning in ODeL context.
2. To reconnoiter whether the ICT promote student-contents, lecturer-students and students-students interaction.
3. To explore whether ICT foster the flexibility of the education programmes in open distance and e-learning.
4. To examine whether the ICT supported the students to make decisions about learning activities, goals, and evaluation methods in open distance and e-learning environment.

5. To explore whether ICT allow students to connect from one learning node to another.

1.8. SYNOPSIS OF THE RESEARCH DESIGN AND METHODOLOGY

Here, a framework of the manner in which the inquiry was done is given. This covers the research paradigm, research methods, research design, study populace and sample, data compendium strategies and data analysis. A full portrayal of the plan and techniques for this study is given in Chapter 3.

1.8.1. Research Paradigm

Bhattacherjee (2012:17) described research worldview as the 'plan and lead of research model by our psychological models or casings (belief system) of allusions that we use to compose our thinking and perceptions'. The two popular standards are quantitative and qualitative research worldview. According to Creswell (2003:8), quantitative), quantitative methods "advance the relationship among variables and pose this in terms of questions or hypothesis", while qualitative researchers tend to use open-ended questions so that participant can express their views" Creswell (2003:9). Also, Bhattacherjee (2012) said:

> The quantitative researcher is viewed as a feature of the social marvel, and her particular job and association in the study procedure needed to be clarified during data analysis.
>
> In contrast, the qualitative researcher require to take a nonpartisan or unprejudiced position throughout the data gathering and analysis processes and guarantee that her own predispositions or assumptions do not pollute the idea of abstract derivations got from qualitative research (p.105).

Given the above discussion and in line with Bhattacherjee 2012 & Creswell 2003), the present researcher employed pragmatism research paradigm, because it allows the researcher to take a non-partisan or fair minded position throughout the data compendium and analysis processes and guarantee that individual inclinations or biases does not pollute the research findings.

1.8.2. Research Methods

Leedy and Ormrod (2005:12) portray research methodology as 'the overall procedures employed by the researcher to fulfil the research objectives, which could possibly influence the selection of research instruments used by the researcher for data compendium, manipulation, clarification and presentation'. To accomplish the objectives of this research, the researcher espoused a mixed method research approach Creswell (2003:21), to congregate and analyse data. A mixed method inquiry provides several approaches to inquiry dependent on the succession of the methods of data compendium and the level of significant assented to every strategy (Creswell 2003:241). As indicated by Creswell (2003:22), a mixed strategies configuration is helpful to catch the best of both quantitative and qualitative methodologies. Considering the above, a concurrent nested mixed technique approach was utilized for this investigation. This implies that both quantitative and qualitative data collection was done simultaneously.

1.8.3. Research Design

As per Bhattacherjee (2012:35) a research configuration is a complete arrangement for data assortment in an experiential inquiry. This implies that a research configuration is the procedure for conducting the research. The present researcher used pragmatism research paradigm design. As indicated by Creswell (2003:12), a pragmatism research paradigm design configuration is helpful to catch the best of both quantitative and qualitative approaches. Creswell (2003:12) said 'Pragmatism researcher is not committed to any one system of philosophy and reality'. "This applied to mixed methods research in that inquirers draw liberally from both quantitative and qualitative assumption when they engage in their research" (Creswell 2003:12), Considering the above, pragmatism research paradigm approach was utilized for this investigation. This implies that both quantitative and qualitative data collection was done simultaneously.

1.8.3.1. Study Populace and Sample

Bhattacherjee (2012:65) defined populace as all 'creatures or entities (entity of analysis) with the virtues related to phenomenon under investigation. The entity of analysis could be a creature, crowd, connotation, country, entity, or whatever additional component that you wish to draw reasonable surmising around. The study populace in this inquiry

was UNISA postgraduate students in the Master of Education programme (M.Ed) and lecturers within the College of Education.

Leedy and Ormrod (2005:144) define sampling as the systematic ways of choosing participants like, people, objects, and other non-human resources such as printed resources, electronic archives, and various media resources from which data will be collected for the study. Considering the above description and for this study a List-Based Sampling (LBS) frame was utilized. According to Couper (2000:489) this sampling frame can be conducted just as one would for a traditional survey using a sampling frame. It generally begins with a edge or rundown of those with Web access. Given this, the sample of this study was 52 students in the M.Ed. programme and seven lecturers from the UNISA College of Education.

1.8.3.2. Data Collection Strategies

Since the research took place in an open distance and e-learning environment, it was difficult or even impossible for the investigator to collect data using a head-on interview. As such, the researcher settled for online data collection approach via the Internet (Ahern 2005:3).

The researcher designed the online survey using a SurveyMonkey computer software. SurveyMonkey is a web-based poll planning application that permits clients to design studies and to gather and analyse rejoinders from anticipated crowds and supply investigators with numerical data on the studies conducted. To administer the online survey, a questionnaire was sent to respondents via mylife platform (an e-mail address the university gave to all her registered student for academic use communication and correspondents) of the university's learning management system (LMS). The e-mail contained a request to partake in the study and the link to access the web-based questionnaire (see Appendix A and B).

1.8.3.3. Data Analysis

As indicated by Levine (1997:1) information itemization is a wide range of strategies that aid explain realities, discover designs, create clarifications, and test theories. This

alludes to the procedures that the pollster must embrace after data assortment, which could typically prompt the findings or results of the inquiry. Since the inquiry utilized a mixed techniques approach, two sets of data were collected and itemized statistically (quantitatively) and thematically (qualitatively). The statistical responses from the participants were coded, and entered on Microsoft excel, and itemized using Statistical Package for Social Sciences (SPSS) software (see Appendix E). and the frequency distributions, percentage and T-test was calculated. Then again, the open-ended questions participants asked were analysed thematically following the procedures as recommended by Bhattacherjee (2012:119). This section will be fully discussed in chapter three.

1.9. SIGNIFICANT OF THE STUDY

Previous studies conducted on ICT in open distance and e-learning institutions have concentrated on blockades to learning (e.g. Ferreira & Venter 2011), challenges and possibilities of ICT-improved instructing and learning (Pityana 2009; Rao 2011; Chetty 2012), ICT and ODeL (Olusola & Alaba 2011), compelling utilization of ICT for education and learning (Noor-Ul-Amin 2013; Angadi 2014) and so on. However, no study has been led to research the role of ICT in ODeL context, especially in South Africa. This gap in literature is what this study looked to address.

Truth be told, the variables in this study make it unique and therefore important in complementing the body of knowhow. This suggests that the centrality of this inquiry lolls in the verity that it adds to the group of knowledge concentrating on ICT in pedagogy.

The discoveries of this inquiry will be of extraordinary advantage to higher education stakeholders in ODeL and conventional institutions both in public and private settings; it will help them in formulating useful strategies and legitimate rules for the incorporation of ICT in instructing and learning. Strategy architects in the schooling subdivision can as well make crucial choices that are pragmatic and well-informed dependent on the discoveries of this inquiry.

1.10. ETHICAL ISSUES

Bhattacherjee (2012:136) said that ethical consideration is the pollster's duty to ensure the human privileges and interests of the participants in the study. Before any inquiry can be completed at the University of South Africa certain prerequisites must be conformed to. Firstly, the pollster requested for ethical permission and endorsement was granted from the ethics review committee of the institute of Science and Technology Education (ISTE) where the researcher was a registered student (see Appendix D). Secondly, was to request permission to access the institution's facilities from the institution's Research Permission Sub-committee (RPSC), which was also granted (see Appendix E). The RPSC also gave the researcher permission to gain access to a list of academics and mylife e-mail addresses of M.Ed. students from the College of Education. Thirdly, the respondents were sent consent letter (see Appendix C) to be read and to consent for participation in the inquiry.

Partakers were educated that their involvement in this study was carefully deliberate and they may stop whenever by showing so earlier or during the study. Furthermore, it was made explicit to them that the data collected through the closed and open-ended online survey would be utilized to riposte the study questions. More importantly, participants were informed that the investigation does not include any reasonable danger, and accordingly there is no arrangement for renumiration of any sort for taking part in it.

In light of the above, all information obtained from the sources in this study, was manage in certainty. This implies that participants' answers were strictly maintained and managed by the researcher and his supervisor only, the following procedures were followed: First, data coding, data entry and data analysis was done. Second, no participants' name appeared on any reports utilized during the discussion sessions for secrecy. Third, the data was stored in a zip folder. Lastly, the information will be stockpiled for a retro of five years, thereafter; the documents will be for all erased.

1.11. LIMITATIONS

There are few perceived confinements to this dissertation. This inquiry only presents pictures of a cluster of UNISA lecturer and students' insights on the role of ICT in ODeL context. It doesn't profess to have caught and related the whole reality about UNISA lecturers and students' recognitions on the problem under inquiry. The sample was limited to registered M.Ed. students and lecturers from UNISA College of Education in 2017 that decided to complete the online questionnaire.

The first restriction of the study was that it relied on responses provided by participants at their convenient time and from different locations. Misconception of the survey question or participants' issues could influence the nature of the information. Since the online questionnaire was depended on the partakers possess observations, the outcome may be one-sided because of their own convictions and comprehension about the construct under study.

Secondly, the online survey was sent via the e-mail to 654 student and 194 lecturers at UNISA's College of Education. Only 52 students and seven lecturers completed the online survey. It is not possible to assume that these 57 students and seven lecturers were representative of the 602 students and 187 lecturers who did not respond. That could be problematic in interpreting the mean and frequency. This reality confines the generalisation of the result. It would for the most part be accepted those 52 students and seven lecturers from UNISA, College of Education were too little a populace sample to enable the outcome to be illustrative of all students and instructors in the entire institution.

Thirdly, regarding survey instrument, lecturers and students' perceptions and experiences on the role of ICT in ODeL were estimated utilizing a Likert-scale format. Participants may translate the scale uniquely in contrast to each other, for instance, one individual's '1' may be identical to another's '3' and still someone else's '2'. They may reply as indicated by what they felt was anticipated for them as partakers, and sordid ripostes on feeling towards the issue under study.

Lastly, there was a likelihood that the instrument utilized in this inquiry was not delicate enough to sufficiently discourse the inquiry questions. To overcome this limitation, open ended inquiries were likewise posed. The pollster believed that the inductive data together from the open-ended inquiries would represent the information that could help compare the responses gave by the partakers to the questionnaire. Ostensibly, to obtain in-depth sympathetic and clearer representations of the role of ICT as a instructing and learning tool in ODeL context, open ended questions might help in the analysis of the participants' instructing and learning process, just as their experience and perceptions in using ICT.

1.12. ELUCIDATION OF LEXES

This segment defines various lexes utilized in this inquiry. They include terms such as ICT, teaching, learning, ICT tools, open distance and e-learning, survey monkey computer software. In this definition, each term is provided followed by a descriptor as shown below:

Term	Description
ICT	Varieties of machineries that are utilized to transfer, process, hoard, make, show, offer, or give-and-take information by electronic means (Dighe 2006:189).
Teaching	A multifaceted mental ability that involves solving a problem in comparatively unconducive and dynamic setting (Dijkstra 1991:20).
Learning	A process whereby learners construct, arrange and relate individual knowledge and skills (Niess 2012:2).
ICT tools	Software that makes it possible to use computers to perform tasks that are planned and decided by the users (Fuglestad 2004:439).
Open Distance and e-Learning	A multi-dimensional ideal planned for crossing over the time, topographical, financial, public and correspondence detachment among learner and organization, learner and scholastics, students and courseware, and students and earls (UNISA 2008:2).
SurveyMonkey computer software	A web program and facilitating webpage that empowers an individual to build a study for usage on the web (Waclawski

2012:477) .

1.13. EXPOSITION OF THE STUDY

In this section an explanation of what each chapter is about is provided.

Chapter One introduced the foundation of the inquiry. This was trailed by the literature review and the theory supporting the inquiry. The problem declaration, intentions and intents of the inquiry were exhibited. A synopsis of the inquiry plan and technique, significance of the study, and ethical issues were briefly explained. This was trailed by the study limitations and clarification of terms. Finally, the exposition of the study was provided.

Chapter Two contains an audit of the related writing that was sorted out and organized regarding the primary research question and sub-questions. The reason for this audit was to investigate the role of ICT in ODeL. Finally, the theories of ODeL were provided.

Chapter Three spotlights on the research methods utilized in the study. Firstly, the research paradigm which followed pragmatism research design was given. This was trailed by the inquiry strategies utilized in this inquiry. It was explained that this inquiry utilized mixed method. A portrayal of the inquiry configuration was presented. Also, the inquiry design was presented which focused on issues of research setting, populace and sample and information assortment. The chapter addresses issues of validity and legitimacy of the instruments. Finally, the ethical issues were provided.

Chapter Four presented the quantitative and qualitative upshots of the inquiry. The upshots were offered according to the study groups (students and lecturers) and for each instrument used. Quantitative results were presented first and thereafter qualitative findings followed.

Chapter Five presented the findings, followed by the conclusion and recommendations.

1.14. CONCLUSION

This section depicted the foundation to the inquiry. In doing this, a brief discussion about ICT was provided. The literature review, theory underpinning the inquiry, the problem articulation, aims and intents of the inquiry, synopsis of the inquiry plan and approach were provided. This was trailed by the clarification of the centrality of the study. The chapter also included issues relating to ethics. In dealing with ethical issues, it was indicated that permission to carry out the investigation was provided. Furthermore, it was indicated that participants were promised that all data got were information was managed in certainty; no participant's name showed up on any records utilized during the discussion sessions for confidentiality purposes. Finally, the chapter covers the inquiry limitations, delineation of lexes, and the exposition of the inquiry. The chapter that follows gives a survey of related literature.

CHAPTER TWO

LITERATURE REVIEW

2.1. INTRODUCTION

The intention of this inquiry as portrayed in chapter 1 (Section 1.7) was to probe and examine the role of ICT in ODeL environment. Therefore, this chapter detailed a thorough review and amalgamation of literature and research identified with the extant inquiry. Firstly, given that this inquiry penciled on and reached out past work on ICT in education, this review of literature summarises past research in this field. Secondly, as the inquiry undertaken concentrated on the role of ICT in ODeL environments, writings identified with the assimilation of ICT and its effects on teaching and learning was analyzed. Thirdly, this research also focused on the theoretical framework for open distance and e-learning environment, literature relating to theoretical framework used in ODeL and its impact was examined.

2.2. INFORMATION AND COMMUNICATION TECHNOLOGY

Globally ICT is used to described various ways in which microprocessor technologies have infiltrated our lives in aspects; such as education, entertainment, economy, labor and households (Florian & Hegarty 2004:2). In other words, and as Florian and Hegarty (2004) opine, ICT consciously and unconsciously impacts different aspects of our lives in an unprecedented manner. In this view, Tinio (2003, p.4) defines ICT as the 'assortment of different high-tech apparatuses and assets utilized to convey, and to make, promulgate, hoard, and oversee data.' These know-hows comprise computers, the web, spreading technologies (radio and television), and mobile phone and so on. In the words of Tinio (2003) ICT is,

> A tool and instrument for consideration based on its potency and does not only refer to computers and the internet, but also comprises of orthodox technologies which has been in use over time, which include telephones, radios, television, and other related technology devises sparsely used for educational purposes (p.3).

In a similar tone, Kennewell, Parkinson and Tanner (2000:1) delineate ICT as the wide scope of devices and strategies identifying with web-based equipment and programming; for coordinated and broadcast communications; to data sources, for example, CD-ROM and the web; and to related technologies, for example, robots, audiovisual conferencing and computerized TV. The above definition is further echoed by, Loveless and Ellis (2001) who said, 'ICTs are variety of technologies that fluctuate broadly inside and between subject areas, areas of utilization and settings (p.2). The above definitions clearly portray the true meaning of ICT from its inherent stance devoid of any tweaking.

Given this definition, the international communities arose to fathom the best ways to harness the promise of ICT in other to bring about effectiveness and proficiency in the educational sector. However, In England and Wales, ICT alludes to a theme of the domestic educational plan, thus, can incorporate equipment, programming and systems, all of which have inferences for both instructing and learning (Florian & Hegarty 2004:8).

2.2.1. The Role of Information and Communication Technology in Education

The global response to technological advancement has an astounding influence on every facet of life (Brosnan 1997:29), creating opening for unavoidable invention of technologically driven global economy, stirred by information, and further propelled by skills (Tinio 2003:3). The deployment of ICT in instructing provides instructors access to a myriad of methods and approaches of improving learning objectives (Jordan 2011:4). Above and beyond supporting a student focused methodology, ICT usage also builds critical thinking aptitudes, inquiry skills, (Barak 2013:2; Chickering & Ehrmann 1997:4), ICT integration fosters learning; as well as making teaching and learning effective (Bar-Yossef, Ben-Hur, & Klieger 2009:1). The development of this ever-changing technology has a significant affects the quality and objective of educational institutions.

Although the affluent impact of ICT on education has not been fully identified globally, nevertheless we cannot undermine its crucial roles in transforming all sectors of life, especially education. This is further echoed by wealth of research, for examples, Rusten (2010:208) said the utilization of ICT as of now enables students to learn in manners not some time ago conceivable. Also, Antifaiff (2000:3) reported that ICT if properly used can permit student timely access to information, analyse the information and synthesis the information, and present it professionally. ICT if used appropriately, have the potentials of changing the content paradigms and pedagogies that are key to educational reform in the 21st century (Lowther, Inan, Strahl & Rose 2008:198). In the same vein, Bar-Yossef et al (2009:5) and Kolikant (2010:2) sustain that the use of ICT increases students' drive, promotes higher order intellectual skills, access to a wider curriculum by teachers and enhances method of teaching. They also, said ICT provide educators and students access to significant and unfathomable quality information via communication and teamwork with fellow educators and students (Nelson, Christopher & Mims 2009:1).

Literature (Hennessy, Harrison & Wamakote 2010:41; Carrasco & Torrecilla 2012:1) further accentuated that the use of ICT for teaching and erudition is strongly linked with educational achievement and student success. In addition, more recently, literature (Gioko 2012:1) believed that the role of ICT in schooling are countless in the way such that the utilization of ICT by teachers reinforce their work in quite a lot of ways; to be specific study hall conveyance, making resources for teaching and helping with organization.

In light of the above, Hsu and Kuan (2013:28) argue that collaboration through ICT is incredible among teachers, because it enables them to learn different integration approaches from one another. They are required to utilize ICT on regular schedule in the classroom (Hsu & Kuan 2013:25). Simultaneously, Students who are using ICT for learning causes are likely to be open to learning novel ideas that are thought-provoking and as well enhancing learning (Chudgar 2013:2). In this thought, research by Carrasco

and Torrecilla (2012:1), reported that consistent utilization of ICT by students tend to better their feats.

Moreover, the utilization of ICT by students helps them to become deep rooted students; for instance, they will continue learning further than official time of exposure to didactic engagement (Jordan 2011:7).

Rusten (2010:209) demonstrated that compelling utilization of ICT in schools, have the potency of enhancing instructing and erudition, boosting educator proficient advancement, fostering far-reaching educational reforms, enriching school and municipal collaborations, as well as improving administration of schools. It can foster development of teachers and students competency required in 21st century (Bransford, Bown, & Cocking 2000:206). ICT can foster accessibility to education and as well enhance educational quality (Tino 2003, p.4; Angadi 2014, p.519). Jones and Knezek (1993, p.702) also reported that adoption of ICT in education is mainly to enhance the effectiveness of the procedures. In Rustin's (2010) words,

> The utilization of ICT in schooling can fast-track learning, afford the underprivileged the opportunity to access education, enrich process of teaching, improve administration of schools and classrooms, push for pedagogical advancement, and enhance individual learning (p.209).

This is an indication that ICT equips and allows students to assume liability for their own learning process, which is impossible in the conventional learning paradigms (Simataa 2015:32). Moreover, research has also revealed that the utilization of ICT in schooling can enhance memory retention, foster inspiration and greatly increase knowledge (Dede 1998:200). Forcheri and Molfino (2000:53) further confirmed this by saying that ICT if properly used 'could support corporative learning, like role playing, solving problem in group and projects articulation'. Schank, (2005:1) indicated that ICT can transform how student learn. Also, Rifkin (2000:2) argued that ICT enables the development of affluent systems of communication and interactions between individuals.

This implies that, ICT broaden lecturers and students' abilities, foster interaction (Levin & Wadmany 2008:234), and their appropriate use of ICT can transform classroom rules and roles (Breuleux, Laferriere & Bracewell 1998:3). To further support the argument above, Barrus (2010) stated that,

> Students use information and communication technologies for research purposes, creating PowerPoint presentations, completing various tasks like word processing whereas teachers, also use the technology for processing students' scores, analyzing it and recording it and collaborating with colleagues, interacting with one other, as well as sharing information with their students (p.1).

Barrus (Ibid) further described ICT as contemporary instruments for both students and teachers proficiency. According to Manali (2008:1) ICT could act as ingenious and trustworthy information reservoirs, and in their usefulness permit ground-breaking and collaborative ways of processing and presenting data. The potentials of this new technology were made possible by application packages like, Corel draw, PowerPoint, and so on, that could be used by teachers for teaching purposes (Manali 2008:1). Furthermore, Manali (Ibid) maintains that ICT can be effective teaching aids because of their multi-media properties that can make delivery and presentation of instructions very appealing and interesting to students. In his view, Manali states that,

> Recording and sparing data for future use was every case too extreme and a tedious action in the olden days; exhibiting data in progressively effective ways was also another migraine for educators who were by one way or another restricted to definite instruction techniques which may have demonstrated unappealing to the students (Manali 2008, p.1).

On this note, ICT attends well to all issues enumerated above in the most expedient, time-effective, cost effective, and highly attractive to students with little or no energy required.

All that is required is the person's ability to spare data on the computer, use application software for example, PowerPoint, USB, cloud storage, Blaze and lot more applications and programmes to show report.

Additionally, Miller, Martineau, and Clark (2000:230) pinpoint that ICT is also utilized in instruction and learning to equip students with quality values. The value is believed to enhance students' performance. ICT can support students' training through the enrichment of cognitive skills, analytical thinking skills, access to information, measurement and creative skills (Ager 1998:4). Louw, Muller, and Tredoux, (2008:41) assert that ICT will make a huge difference if used for curriculum delivery.

In support of the above, Becta, (2003:11) identified that ICT supply student with prompt and precise comments. In other words, educational use of ICT can foster intense learning, and as well afford educators the opportunity to attend well to individual needs of students (Lau, & Sim 2008:9). Tinio (2003:3) further concerted this argument when he said that all ICT tools such as radios, televisions, and the apparently new technologies like computers, the internet and so on, were viewed as effective tools that can transform educational sector. The view also holds that ICT can help foster access to schooling, reinforcing the significance of schooling in the informative society, and advancing didactic excellence by, making instruction and learning, more appealing and effective process linked to real life if properly used.

2.3. OPEN DISTANCE AND E-LEARNING

Globally easy-access to education is the topmost priority, whereas education has become indispensable mediator of globalisation (Olusola & Alaba 2011:69). Consequently, the global network and governments everywhere throughout world have a revamped dedication to ensure that education is open to all. According to Olusola and Alaba (2011:69) the aim is to address educational imbalances, destitution, hunger and a

significant level of hardship in educational endeavors so that Millennium Development Goals (MDGs) can be attained. To meet these objectives, consideration and priority has been given to ODeL. This objective steered the establishment of open colleges, virtual colleges, correspondence schools, external inquiry, colleges of the Air, Correspondence courses utilizing the postal service, and so forth. Far back in the 19th century, correspondence institutions, open distance and e-learning universities created academic openings to various clients that for one reason or the other could not enroll in conventional universities and were-left unattended to.

In 1969 the United Kingdom Open University (UKOU) was set up which was the first Open University, since then ODeL institutions have witnessed astounding growth worldwide. Nevertheless, the educational system of ODeL is not only known for its top-quality but is consistently exclusive to conventional head-on instruction and learning. In addition, since its commencement, the ODeL has proved to be cost-effective, ODeL is as well perceived as a means whereby people can attain their learning amidst their working and other engagements (Bakari, Mbwette, & Salaam 2010:12).

In light of the above, Tatkovic et al (2006:4) explain that ODeL education has experienced three stages. During the first stage, distribution of printed learning material/resources by mail was mainly used, and it concurred with ODeL education first generation as pinpointed by Fozdar and Kumar (2007:3). Face-to-face contact was limited, and communication was through writing. In the second phase, the process was refined using postal communication together with sound/video signals (e.g. telephones, radio, and television). Yet interaction was partial, and communication was primarily one-way. This phase also agreed with Fozdar and Kumar (2007) second generation of ODeL education. The combination of the first and second generation of distance education where printed material was used in combination with audio-visual material, remained the most widely used modality in most ODeL institutions; especially in developing countries. The third phase ensued from technological evolution. This was described by the utilization of one mode and multi-interface correspondence (composed material, television, audiovisual session, computer webs, electronic mail, internet, computer meeting, class work with direct interaction).

However, in the fourth and fifth generations teaching, and learning has been conveyed from real classroom into a computer-generated classroom that is multifaceted in nature (Fozdar & Kumar 2007:3). It involves tele-learning using video and satellite broadcasting as well as innovative technology such as computer umpired communication, internet learning and portal access unique to each university (Ferreira & Venter 2011:4). Lecturers are never again the primary source of information, and learning is more student focused (Tatkovic et al 2006:1). Fozdar and Kumar (2007:1) maintain that students can now use electronic resources to study and to do assignments and multimedia resources are used in interact with other students. Students ought to have the option to utilize diverse media to speak with each other and with lecturers. ICT- subsidized instruction and learning has helped overcome the corporeal separation among instructors and students and has encouraged the adaptable conveyance of schooling a good way off, anywhere, anytime (Fozdar & Kumar 2007:1). The growth of open distance education is mostly due to technological developments.

2.3.1 Learning in ODeL Context

Noor-Ul-Amin (2013:3) is of the opinion that teaching methods in ODeL is all about delivery of well-organised instructions, accompanied by various collaborations with content that consolidate acquisition of knowledge. The current learning model as proposed by Duffy and Cunningham (1996:3) is centered on the opinion that learning process should be about knowledge construction rather than knowledge acquisition. Furthermore, the instructions should be such that they facilitate construction of individual knowledge not a means of transmitting knowledge. On the same note, is Lebow (1993:5) who opines that the learning method is known for knowledge construction and not memorization of facts. Thus, the integration of ICT in ODeL has greatly transformed how learning takes place. Over the years, the conventional teaching and learning approach was developed across teachers designing and directing students into sets of instructions to realise certain learning outcomes. The use of ICT makes transactional distance learning possible through its support and resource-based

provision, student-centred approach (Libbrecht & Goosen, 2020:2), as well as relating content to practice.

Concisely, the utilization of ICT in ODeL for learning purpose can influence knowledge construction in all facets and as the number of students using ICT for learning increases, the higher the significant effect will be (Angadi 2014; Noor-Ul-Amin 2013). As divulged by Noor-Ul-Amin (2013:4) teachers create essential and connecting with learning encounters for their students, purposely employing ICT to upgrade learning.

Additionally, lecturers must initiate and stir student erudition and originality, plan and develop digital erudition and evaluation knowledge, exhibit how to work and learn in the digital age, advance and develop accountable digital society as well as engage in specialist training and lecturer guidance (Adams, Samat, & Samah, 2018:2; Mohamed, Abdul Razak, & Zuraidah, 2019:42). The teachers provide the students with appropriate learning skills to construct individual knowledge, systematically adopting ICT as a method for advancing instruction and learning. Pupils find learning attractive, and the self-reliant enquiry that can be fostered using ICT (Noor-Ul-Amin 2013:4).

2.3.2. ICT Tools Use for Instructing and Learning in ODeL

This segment gives the ICT tools for instructing and erudition in an ODeL environment. These include Mesh 2.0 machineries, Wikis, Blogs, Podcast, Communicating Voice Rejoinder Scheme.

2.3.2.1. Mesh 2.0

The introduction of Mesh 2.0 appliances, especially, wikis, blogs and podcast, have been progressively embraced by numerous online educational institutions (Boulos, Maramba, & Wheeler 2006:2). The reasons are that Mesh 2.0 machineries are laid-back to utilize and rapidly deployed; they foster powerful knowledge or information delivery and ease of collaboration (Boulos et al 2006:1).

2.3.2.2. Wikis

Boulos et al (2006:1) define Wikis as websites whose contents can be altered by any individual who approaches them. The best case of wikis around today are 'Wikipedia' the free encyclopaedia which have recently grown in popularity. Wikipedia speak to a promising rule that can fundamentally change the web data age (Connor 2005:1).

2.3.2.3. Blogs

The word 'blog' is a withdrawal of 'Mesh Log', an online web dairy that can offer an asset rich interactive media condition (Boulos et al 2006:1). A blog functions as an online dairy and it tends to be composed by an individual or a gathering of people. It is a related web data sharing technology where entries on the blog include links to other websites, images and commentary; it may also contain search facility (Boulos et al 2006:1). Given that blogs engross people in sharing of knowledge, it can likewise cause the drawing together of small virtual gathering of individuals intrigued by co-developing information around a typical theme within a network of practice' (Boulos et al 2006:2). In this regards the features of a blog include easy posting of educative charts and pictures, archives of previous posts.

Research by Stiler and Philleo (2003:1) reported that blogs were popular simply because they were new. This does not explain the swiftness at which blogging has been embraced by clients for 'genuine utilizations in various field like news-casting (Perrone 2002:2), occupational (Kharif 2004:1), drug (Herper 2003:1) and schooling (Smith 2007:2). According to Hall and Davison (2007:2) the advancement in the pervasiveness of blogs as informative tools might be epitomized by a swaying preparation of debates offered to convince educationalists of the gains that could be skilled by student bloggers. Given that educational use of blog provides common access to students work, it was anticipated that classroom blogging speeds the provision of online self-support to student communities (Walker 2005:1).

2.3.2.4. Podcasts

A digital broadcast is a media record dispersed online by membership that clients can play on a workstation or convenient media player, including a BlackBerry, PDA, or any MP3 player (Gronstedt 2007:1). The strength of podcasting is in its portability. Students can likewise turn in to digital broadcast on their computers or smart phones anywhere and anytime. Gronstedt (2007:1) unveiled that the spur in the use of podcast as instruction and learning implement includes: (1) the prevalence of new e-learning that is increasingly intelligent and client-driven, and (2) progressively circulated and mobile workforces.

More so, the benefits of podcast are that they are low cost, available at learners' convenience, moves at learners pace, and suits auditory-style learning (Ibid).

2.3.2.5. Communicating Voice Rejoinder Scheme

A *Communicating Voice Rejoinder Scheme* gives voice prompts that supply data to a client, demands information from the client, and presents the clients with a majority information from alternatives (Porter & Weiss 2000:1).

2.3.2.6. Social Media

Social media, sample, Facebook, Twitter and YouTube comprise an undeniably significant settings wherein people live their regular daily lives. According to Friesen and Lowe (2011:2), social media, for sample, Facebook, twitter and YouTube have been greeted as conveying the guarantee of novel, socially drew in instructive encounters for students in undergraduate, self-coordinated, and other educational sectors. According to Wikipedia, Facebook is eminent unrestricted lasting informal communiqué site that enable conscripted patrons to brand silhouettes transference snapshots and audiovisual, and deliver memos and collaborate with chums, kinfolk and partners. Twitter on the other side is a spontaneous informal communication site where patrons post and cooperates with messages called 'tweets', whereas YouTube is a spontaneous informal communication site that facilitates patrons to send, observe, grade, part and add to top pick, description, remarks on videos, and buy in to diverse clienteles.

Social media enable clients to banter and connect with one another, make, alter and part novel type of printed, audiovisual gratified, and sorts, name and prescribed present forms of gratified (Selwyn 2012:1). To Selwyn (2012:2) the quickest centrality of social media for advance schooling is the evidently altering sort of the students who are incoming academy. Social media are hence connected with an expanded propensity of young people to perform various task, (Davis, Desforges, Jessel, Somekh, Taylor, & Vaughan 1997:25).

More importantly, these technologies are likewise connected with an improved social autonomy, where youngsters presently have more authority over what they do, where they do it, when they do it and how they do it (Selwyn 2012:2).

According to Tapscott and Williams (2007:52) learners are not satisfied to be inert shoppers, and increasingly satisfy their craving for choice, accommodation, customization, and rheostat by scheduling, crafting, and dispersing items themselves. Given that 21st century students know nothing other than an existence with the web, (Bauman 2010:7), the expanded nearness of online networking in higher education settings is fundamental if academies are to hook up with these students. The idea is that these students have been ‘innately hosted to a planet knitted from cabled, linked or isolated handiness’ (Selwyn 2012:2).

2.3.2.7. Online discussion

According to Schrage (1990:1) there has been broad confab on the fundamentals of utilizing technology to make a common interplanetary amid students. Therefore, online discussion is an environment on the World Wide Web (www) for holding discussions. Over the years, computer-mediated communication (CMC) such as online discussion has been a revolutionary tool to support teaching and learning (Kang 1998:316). Barnes and Greller (1994:38) explained that the importance of CMC is the evacuation of reality hindrance.

2.3.2.8. Internet

Internet is an electronic communication grid that interface computer grids and organizational computers services around the globe. Chute (2003:309) further echoed that the Internet is now the ideal way for gratified browsing and correspondence communiqué among students and tutors.

2.3.2.9. E-mail

E-mail is a norms or scheme for transferring memos by electronic means. According to Hewson, Yule, Laurent, and Vogel (2003:60) e-mail is the most straightforward and easy Internet technology to use, requiring little specialist or programming knowledge once it has been configured.

2.3.2.10. Whatsapp

Mcloughlin and Lee (2007:665) described WhatsApp as discussion facilitation systems with the intrinsic general affordances of connectivity and social relationship that create spaces of bureaucrat and casual learning. WhatsApp's permission-ability (Bower 2008:5) allows the creation of closed WhatsApp groups, providing safe environments, where academic discussions as well as social dialogue can take place with the lecturer as participant and facilitator/moderator of safety. The share-ability, read-ability, view-ability, listen-ability, write-ability and watch-ability of WhatsApp (Bower 2008:5) allow the lecturer and students to share course information and classroom feedback, but also to communicate peer-to-peer about fears and triumphs.

Given the definition of the Mesh 2.0 technologies, all are essential to the present study as the study focuses on the role of ICT in ODeL environment.

2.4. THE ROLE OF TECHNOLOGY IN BRIDGING THE LEARNING DISTANCE

ICT have momentously transformed the ODeL education process worldwide. This has caused technology to turn into the primary foundation whereupon the general public is constructed today (Olulube, Ubigu & Egbezor 2007:182) and has in turn redesigned instruction and learning forms in higher schooling (Libbrecht & Goosen, 2020:2; Pulkkinen 2007). These technologies have hugely affected on the global frugality, commercial administration and globalisation patterns, and they tolerate a huge prospective to redesign the idea of schooling conditions far and wide, of both conformist and ODeL institutions (Guri-Rosenblit 2005:467). In this regard, ICT conveys a colossal ration of information in a fleeting timeframe, regardless of whether totally online or blended, and can by and large yield more beached erudition upshots than learning head-on unaccompanied (Underwood 2009:11). There are specific roles ICT play in distance learning. To be specific, Crook (1994:3) identified types of ICT usage which are the computer as tutor, the computer as pupil, the computer as a learning tool, the computer as a research tool, the computer as a collaboration tool, as described in the next segment.

2.4.1. Computer as tutor

ICT in ODeL could be utilized as a teaching contrivance where teachers should be engaged in corporative projects and advancement of mediation strategies (Noor-ul-Amin 2013:3). This refers specifically to a form of software which speaks to some degree conventional exemplary of instruction and erudition (Barton 2005:21).

Such programmes were fashioned as a method for conveying deliberately custom-made unforeseen instruction, whereby every student can be trained at their personal level and stride (Light & Littleton 1999:i). In this case, the computer is going about as a ‘instruction contraption’ (Underwood & Underwood 1999:20) to give ‘organized rehearsal’ (Crook 1994:3). In this function it has been recommended that the computer can ‘elevate the intrigue of what may somehow be a fewer remunerating action’ (Crook 1994:5).

2.4.2. The computer as pupil

Crook (1994:6) recommended that as opposed to the pupils' erudition being restrained by the computer, they ought to be offered chances to utilize ethical information to innovative movement, in a milieu of revelation- founded erudition (Crook 1994:7). In any case, reenactment of certifiable frameworks likewise give situations which empower students to practice their insight within rich and significant locales of credible run-through (Crook 1994:9).

2.4.3. The computer as a learning tool

The integration of ICT in ODeL can help rejuvenate both teachers and students (Noor-ul-Amin 2013:3), heighten and improve the nature of schooling by bequeathing curricula supports in challenging topics (Noor-ul-Amin 2013:3; Angadi 2014:518). Angadi (2014:519) explained the role of ICT as to enhance the suppleness of educational delivery so that students can get to information anytime, anywhere. It also sways the demeanor in which the educator teaches and how the student learns because the process is student-directed not teacher-directed (Noor-Ul-Amin 2013:4). Furthermore, ICT will outfit students with lifetime experience and enhance the nature of teaching and learning.

Other authors (Valdez, McNabb, Foertsch, Anderson et al 2000:10) indicated that most students consider computer-aided instructions more highly motivating and interesting, eliciting wonder, fervor, and an uncommon sentiment of strengthening.

Similarly, Polly (2011:40) posits that ICT has been publicized to decidedly impact student erudition when learners probe technology-opulent activities that at the same time await them to utilize higher-order thinking aptitudes, for sample, analyzing or gauging data or crafting fresh portrayal of information. One of the potent of most ICT-based learning is in this revere that students are not under 'strain to get things right the first run through' (Barton 2005:27). In this case the computer enables students to attempt the two undertaking they would have initially finished with a coop and pencil, for example using word processing package (Barton 2005:22), and those that are just

sensibly conceivable utilizing a computer, for instance, conversing by e-mail with peers in another nation (Ager 2002:9).

In Barton's (2005:22) ideas, one generally recognized outcome of admittance to computer tools is the opening of interplanetary for analogous reasoning bustle. As per Noor-Ul-Amin (2013:4), ICT improves the recognition and comprehension of the universe of the student. For instance, students may utilize information taking care of projects to make diagrams and charts, enabling them to focus on translating and investigating the information (Barton 2005:22).

2.4.4. The computer as a research tool

The utilization of ICT in schooling provides exclusive opportunities for learning via exploration, project-based assignments, creative problem-solving, and authentic, self-guided instruction (Ololube 2006b:2). Accordingly, ICT can revolutionize instructing and erudition by being a wellspring of information, agent for transferring gratified, and a communicating asset assisting discourse and innovative investigation, and must be an accomplice in instruction and erudition (Levin & Wadmany 2008:251). The authors further justified that the contact between lecturers, students, and technology should be implicit for ICT to have significant impact (Levin & Wadmany 2008:237). Research as per Hadad (2003:6) found that ICT can transform how tutors teach and this is important in providing effective learning approach, improving the higher order skills, as well as fostering collaborative activities.

Using ICT in ODeL permits new data search strategies, fresh instruction alignments, and in the nick of time scholarly swap (Guttormsen, Zuberbühler, & Krueger 2000:11). ICT remove time hindrances in learning just as inflates the adaptableness of transference of education with the aspiration that students can access information whenever and from anyplace (Noor-Ul-Amin 2013:4-5). In the same tone it is Young (2002:33) who argued that the flexibility has fostered accessibility of just-in-time learning and as well created access to learning for a lot of students that were formerly restrained with other obligations. Furthermore, Akir (2006:22) study uncovered that ICT has the potential to increase educational flexibility, which gives the students opportunity to learn

at any time and from anywhere. It also enables the provision of online materials such as e-libraries which give the students, the teachers and professionals the opportunity to surf the internet for research articles, journals, publications, course materials and the like, at any time and from anywhere (Bhattacharya & Sharma 2007:10). This development made it possible to connect both the academics and researchers, thereby enabling the distribution of scholarly resources (Noor-Ul-Amin 2013:5), to prevent duplication of work (Cholin 2005:189).

One of the key influences of ICT in schooling is Undemanding Admittance to Erudition. According to Noor-Ul-Amin (2013:4) using ICT, students can browse through digital documents, past years question papers, articles, journals as well as having undemanding admittance to study groups, resource personnel, tutors, specialist, pollsters, pros, and mates the world over. These confirm Plomp, Pelgrum, and Law's (2007:84) ideas that folks must get to knowledge via ICT mandate relevant with the new growth. Hence, a broader access to superlative practices and choice of course materials in education, distributed via ICT, can convalesce the excellence of learning, and consequently get the students ready for lifelong learning (Angadi 2014:519).

With regards to environmental flexibility, information and communication technology supports ODeL educational programmes, and as well 'eliminates most limitations faced by students with special needs' (Oyeleye & Uche 2015:12). Students are now commencing to value the privilege to access schooling at anytime and anywhere.

Mooij (2007:1499) stated that ICT removes time barriers in education for both students and teachers. According to Lim and Chai (2004:220) ICT can also help in removing communication problems in terms of time and space.

2.4.5. The computer as a collaboration tool

With ICT, students and their educators can work collaboratively anytime and almost anywhere (Akir 2006:22). These kinds of potentials proposed transformation in

instruction mockups and the instruction and erudition approaches employed by lecturers, creating contemporary situations that support personal and cooperative learning (Valdez at el 2000:9). Additionally, Yeboah-Fofie (2015:189) said that the flexible time-space observed in ODeL utilizing ICT in instruction and erudition procedures greatly improve collaboration and acceptance of information.

To dovetail literature on the roles of ICT in ODeL, one could summarise that teaching, and learning is never again constrained to a corporal cosmos. It would now be to reach out via simulated secluded grids to incorporate online schoolrooms described by an ODeL milieu. In this era, ICT make it possible for many students (both in conventional and ODeL) to have convenient access to rich content, major works and information that have not been conveniently available before (Pineda 2013:1). Also, Cormier (2008:3) said that more than the formal settings of the classroom or the university alone, there are limitless ways of generating knowledge because of emerging technologies.

In past years, Conventional teaching paradigm has laid emphasis on content for decades, courses have been written around textbooks (Angadi 2014:518). Teaching is currently done mainly by using lecturing method and demonstration inter-twined with lectures and erudition undertakings planned to establish and run through the gratified (Noor-ul-Amin 2013:3). In light of the above, the present practices are in support of curricula that foster proficiency and achievement.

Curricula are now placing much attention to competency and apprehensive about the use of the information rather than what is the information itself (Angadi 2014:518). In support of this notion is Oliver (2000:62) who argued that, ICT have the potential to meet all these requisites, and many excellent locales for proficiency and outcome-founded syllabus that cautiously adopt the capacity of these technologies are out there.

However, Zhao and Cziko (2001:1) specified that, for educators to adopt ICT in classrooms, they must satisfy three criteria: Firstly, they must have confidence in the

technology efficiency. A study by Harris (2002:450) on creative didactic run-throughs comprising ICT reported that, the pluses of ICT will be voted for when assured educationalists are happy to research novel breaks for varying their classroom run-throughs. Subsequently, the use of ICT won't just reconstruct learning settings yet additionally blueprint acerbic brink for upcoming live and careers (Wheeler 2001:10). Besides, they must accept that using the technology won't cause any ruckus, and thirdly, they must understand that they have control over technology.

2.5. THEORETICAL PERSPECTIVE

Learning is profoundly mind blogging and subsequently there are numerous elective theories which try to depict the learning procedures (Barton 2005:23). Undoubtedly nobody hypothesis gives all the appropriate response, and after some time contrasting presumptions have impacted classroom run-through to a more prominent or smaller magnitude (Child 1993:91). However, the use of ICT in ODeL relied greatly on an assortment of instruction and erudition theories. This segment presents the basics of these teaching and learning theories underpinning this study and unveils how they identify with technology-based teaching and learning in an ODeL context. The theories behind this inquiry are transactional distance and rhizomatic learning theory

2.5.1. Transactional Distance Theory

According to Moore (1993:22) transactional distance is not described in terms of geographical distance but more specifically as an academic phenomenon encircling the parting of teachers and students by space and time.

Transactional distance theory is the 'mental and communication cosmos' (Ibid), that exists between educators and students as suggested by the context and nature of roles played by individuals within the context. The theory is said to be operational in all didactic styles contemporarily used in higher education, such as head-on learning, melded learning or online learning (Larking & Jamieson-Proctor 2013:437). According to Moore (1993:23), the transactional distance stands on three intertwined variables: the

programmes structure, the teacher and student dialogue, and the degree of student autonomy. Deliberative teaching tactics are sited between the programmes structure and dialogue, while student autonomy is an independent variable.

Structure is how much an educational programmes or courses are tailored to suit individual student's educational needs (Moore 1993:26). The author further accentuated that, structure communicates the inflexibility or adaptability of the programmes scholastic objectives, instruction tactics, and assessment strategies. Moore (1993:21) defined structure to be the degree to which the targets, usage techniques, and assessment strategies of instruction programmes are arranged, or can be adjusted, to intersect explicit goals, execution plans, and assessment strategies of distinctive students. The excellences of the structure rely greatly on how cautiously these variables are coordinated.

Dialogue is the contact among educationalist and the learner, the teacher gives instruction and the learner replies the student asks question and the teacher replies (Moore 1993:23). In the same breath, Moore (1993:21) describes dialogue as a two-route correspondence among teacher and student. Even though interplay of words and actions are vital to initiate a dialogue, there is a difference between interaction and dialogue which is described as positive communication 'which is deliberate, productive and esteemed by each party' (Moore 1993:24). Following this, Larking and Jamieson-Proctor (2013:437) said that the mechanism of correspondence is a major part in deciding the kinds of discussion that can happen and, by controlling the correspondence media; it is conceivable to build conversation among teachers and their student consequently plummeting transactional distance.

Moreover, a study conducted by Jung (2001:1), there are three aspects of dialogue:

(1) Academic connection among learners and instructors, including outer experts;

(2) Collaborative corporation among students; and

(3) Interpersonal connection among students and educators, or among students.

Furthermore, how well the structure and dialogue are constructed, are crucial factors in reducing transactional distance; nevertheless, we must exercise great care in order not to overemphasize these variables at the ‘expense of the agency’ of the students (Larking & Jamieson-Proctor 2013:437). This bureau is defined by the third elements of transactional distance theory: student independence.

Student independence acknowledges that in at last ‘the students as opposed to the instructor decide the aspirations, the learning encounters and the assessment choices of the erudition program (Moore 1993:31), as a guide to autonomous learning, help of students all things considered, a lot of tools for proficiency improvement and creative component for appraisal and checking (Rudd 2001:10). Moore (1993:27) further unveiled that there exists a connection between discourse, make up and learner’s independence, for the prominent the makeup and the lower the discourse in a program, the more independence the students need to work out. On the other hand, Gokool-Ramoo (2008:7) said that there exists an inverse rapport between the program structure and discourse, that is, the higher the program structure the smaller the room for discourse, communication and the arrangement of significance in the instruction and erudition process.

In sum, how well these variables are manipulated, decrease or increase transactional distance, and consequently require less or more autonomy from learners in directing their own learning (Gokool-Ramoo 2008:8). Transactional Distance is a distance education theory that has its application to the field in its entire sphere; thus far its supporting research evidence is sparse. Today, ODeL has become more complicated than the time when the theory was initially pioneered.

Various information and communication technologies that were not in vogue at that time are now readily available in use. These technologies affect transactional dialogue, course structure and the level of student autonomy. Thus, the need for empirical

evidence to investigate the role of ICT in ODeL on the theory base context is on the high side.

2.5.2. Rhizomatic Learning

Rhizomatic learning is a learning mode which creates a web of multiplicity about how learning is acquired, pulled or absorbed (Pineda 2013:1). There is no beginning or end for the rhizome learning, it is processed as cultural code, multiple and fractal in nature (Bussey, Bjurström & Sannum 2010:1). Cormier (2008:3) further maintain that in the rhizomatic vista, information must be arranged, and the logical, community-oriented erudition knowhow pooled by connectivist instructional method is societal just as an individual information-creation process with impermanent objectives and constantly arranged premises.

A rhizome can be thought of as comprising of a lot of conditions which consider numerous, non-progressive section and exit points in information portrayal and elucidation (Deleuze & Guattari 1987:5). Furthermore, a rhizomatic structure can be thought of as a structure which contains parts where every single segment is associated with every single other segment of the living, i.e. natural and possibly boundless, structure. inside a learning structure, this implies students can interface from any action or information point to any other activity or data point to some other movement or data guide concurring toward apparent need.

In addition, a rhizomatic perspective is one such alternative that embraces the multiplicity of learners and learning (Dillon 2016:90). Consequently, due to the utilization ICT in ODeL, the students themselves become producers of knowledge as technologies become ambient (Attwell 2007:7). To this end, learning becomes multi-episodic, taking place in concurrence, in multiplicities, different facets, transforming and expanding (Pineda 2013:1).

The two theories are relevant to the current study due to the fact that students have to socially interact with one another (instructor-student, student-student, and student-content). Furthermore, it has been noted that for students to interact with others, there should be some nodes formed, and these nodes are enhanced by rhizomatic learning. With this in mind, it can be summarised that that learning in open distance learning context is that of a rhizome.

2.6. CONCLUSION

This section portray writing related to the roles of ICT in ODeL. Researchers in this field attest that effective utilization of ICT in schools, have the potency of enhancing instruction and erudition, fostering far-reaching educational reforms, as well as enriching school and community collaborations. The chapter further discussed literature regarding ODeL with special reference to how learning take place in ODeL as well as the ICT tools for instructing and learning in ODeL. The role of ICT in ODeL was also described. The last part of the chapter presented the theories underpinning the study. These include the transactional distance theory as well as the rhizomatic learning theory. The chapter that follows presents the study procedure and plan.

CHAPTER THREE

RESEARCH METHODOLOGY AND DESIGN

3.1. INTRODUCTION

This segment embodies the inquiry technique and plan that were used for the efficacious culmination of the inquiry. The segment also provides in-depth clarification of the data assemblage techniques and the strategies utilized for the analysis of the collected data. In conclusion the segment depicts the pollster's role in the inquiry.

3.2. RESEARCH METHODOLOGY

Research methodology is the overall procedures utilized by the pollster in order to fulfil the inquiry aims, which could possibly influence the selection of research instruments utilized by the researcher for data collection, manipulation, interpretation and presentation (Leedy & Ormrod 2005:12). There are mainly three inquiry (Creswell 2003:18) strategies that someone can pick from when leading a research, these are quantitative, qualitative and mixed techniques. The author, described quantitative inquiry method as such that the pollster fundamentally utilizes post positivist cases for creating expertise, utilizes procedures of inquest such as researches and inquiries, and gathers information on foreordained applications that crop factual information. According to the qualitative literature (Patton 2002:39; Strauss & Corbin 1990:17), qualitative inquiry is viewed as inquiry that crops discoveries not achieved by arithmetical measures or different method of quantification where the phenomenon of intrigue unfurls normally. On the other hand, mixed method is a research approach, in which researchers gather, analyse, and incorporate both deductive and inductive data in a sole inquiry or in a continued long-term program of inquest to address their research questions (Creswell 2003:6).

So as to achieve the objectives of this inquiry, the pollster adopted a mixed technique research approach to congregate and analyse data. A mixed technique inquiry was selected as it provides several approaches to research dependent on the succession of the strategy of data compendium and the level of significance given to every strategy (Creswell 2003:241). Furthermore, the method according to Creswell (2003:22) is helpful to capture the best of both quantitative and qualitative methodologies. Considering the above, a concurrent nested mixed technique approach was utilized for this inquiry (Cresswell 2003:22). This implies that both quantitative and qualitative data collection was done concurrently. This implies that no specific succession was tailed (e.g. quantitative data compendium tailed by qualitative data collection or the other way around). It also implies that; the quantitative approach is predominant in connection to the qualitative approach (which is installed) since the two speak to the investigation questions differently.

3.3. RESEARCH DESIGN

Bhattacherjee (2012:35) defined research strategy as a 'inclusive strategy for data gathering in an experiential study.' With this in mind, the plan for this study involved the research setting, the research participants, data compendium procedure and analysis of the upshots. This plan is further discussed in the following sections.

3.3.1. Research setting

The study was restricted to University of South Africa (UNISA) in South Africa. UNISA is the only provider of ODeL institution of higher learning in the country. Given this attribute, data was collected among postgraduate students and lecturers from one of the colleges at UNISA, the college of Education (CEDU).

3.3.2. Populace and sampling

3.3.2.1. Populace

As per, Polit and Hungler (1999:37) a research populace is the summation of everything items, subjects, or peoples that sensibly speaking expectedly meet a lot of conditions

and necesities. A research populace is a huge collection of peoples or items that become or are focused as the focal point of an experiential research (Castillo 2009:1).

Furthermore, Castillo (2009) described research populace as a well-characterized assortment of peoples or items considered to have similar attribute. In light of the above, the study targeted lecturers and postgraduate students in the masters programme (M.Ed) within the CEDU who registered for 2017 academic year at UNISA. The number of participants depends on the existing registered students and academic staff record for the academic year (2017). There were approximately 654 registered postgraduate students in the M.Ed programme and 194 lecturers within the CEDU during the commencement of this study.

3.3.2.2. Sampling size and procedures

MacDonald and Headlam (2009:69) described sampling as the way towards lessening whole populace of the investigation to a size that is academically satisfactory and pragmatically viable. Additionally, Leedy and Ormrod (2005:144) defined sampling as the systematic ways of choosing participants like people, objects, and other non-human resources such as printed resources, electronic records and/or broad media resources from which information will be collected for the study.

In quantitative research, probability sampling is used, while non-likelihood sampling is utilized in inductive inquiry (Leedy & Ormrod 2005:145). Since the study used online data collection method to amass both quantitative and qualitative data concurrently, the researcher aligned the data collection procedures with those by Couper (2000). Couper (2000:477) identified two types of online sampling techniques which include: non-likelihood and probability sampling techniques. Likelihood-based sampling techniques require strong knowledge of a sampling frame and recruitment process that allows dimension of basis of non-rejoinder that can in turn notify strategy-based fine-tuning tactics (Couper 2000:484). These approaches limit the subjects to those with internet access, thus using a well define populace or utilize a blended method to arrive at a more extensive specimen of the populace (Couper 2000:465).

Examples of probability-based sampling methods include intercept (pop-up), list-based sampling frame, assorted-mode plan with decision of consummation techniques, pre-enlisted board of Internet clients, and non-list based random sampling. In contrast non-probability sampling methods are used ‘either when the likelihood that each unit or respondent comprised in the sample cannot be resolved or it is surrendered over to every person to decide to take part in the study’ (Fricker 2008:198). Examples of this method include entertainment polls, unhindered self-chose studies, and volunteer boards of Internet clients.

Given these descriptions, this study employed a probability-based sampling method, with reference to list-based sampling frame. List-based sampling frame according to Couper (2000:485) can be directed similarly as one would for a customary survey using a sampling frame. It generally begins with a casing or rundown of those with Web ingress. One of the advantages of list-based sampling frame is provision for online data collection. Online data collection using list-based sampling casing can be led either by means of the mesh or by correspondence (Couper 2000:485). E-mail invitations to take the study are sent either to everyone or to a group on the list. According to Fricker (2008:2002), this methodology is generally material to huge homogeneous groups for which a sampling frame with email addresses can be collected (e.g. colleges, government organisations, huge enterprise, and so forth.).

It was anticipated to include approximately 654 registered postgraduate students (in the M.Ed programme) and 194 lecturers within the CEDU. As participation in this study was voluntary, only 52 students in the masters’ programme and seven lecturers from the UNISA CEDU completed the online survey. Therefore, these numbers make up the study sample size. Practically these are immediate recipients of the investigation and were the subjects of the investigation as they were the ones using information and correspondence technology for either teaching or learning.

3.3.3. Data collection

The impetus behind the inquiry as explained in Chapter 1, segment 1.8.3.2 was to explore the role of ICT in ODeL environment. Since the investigation utilized a mixed method research plan, a questionnaire was utilized as primary data compendium instrument. The inquiry utilized a multiple-case study research plan and having explained that this research took place in an open distance and e-learning environment, it was difficult or even impossible for the pollster to collect data using a head-on interview. As such, the researcher settled for online data compendium approach via the mesh (Ahern 2005:5). Cantrell (2007:544) accentuated that online data assortment strategies make chances to direct research universally, particularly among hard to ingress populaces. Also, online data assortment employs a wide range of contemporary technology, demographic and response rate features that influence design, when it may be used and how it should be used (Hewson et al 2003:57).

Considering the abovementioned and with the end goal of this inquiry, the researcher designed the closed ended and open-ended questionnaire using a SurveyMonkey computer software. Waclawski (2012:477) defined Survey Monkey as an ‘web program and facilitating webpage that empowers an individual to build up a questionnaire for use over the web. To administer the questions online, the researcher processed two bulk e-mails (one for the students and the other for lecturers) which comprised a nexus to the questionnaire through the institution ICT’s department. The e-mail contained a request to partake (see Appendix C) in the study and the nexus to access the questionnaire online (see Appendix A for students, and B for lecturers). Directions on the best way to complete the questionnaire were given and each respondent was requested to use the link in the e-mail to get to the questionnaire and finish it. The completion of the questionnaire also implied consent of participation. The finishing of the questionnaire was roughly 15-20 minutes, and the respondents were likewise guaranteed that the outcomes would be utilized for bunch examination. This means that no individual would be known from the responses. The next section describes the design of data collection instrument for this study.

3.3.3.1. Questionnaire

It has been stated in section 3.3 that this inquiry followed a multiple contextual investigation structure. In this inquiry, a self-designed questionnaire was utilized as a tool for gathering information from the respondents. The researcher did cautious review of literature to design the questions so that the questionnaire remains an expedient instrument for the proposed develops of the investigation. Hence, the transactional distance theory and the rhizomatic learning constructs were used as the key concepts to the developed questions. With the end goal of this study two questionnaires were designed: The first questionnaire (see Appendix A) was designed for the students as explained in section 3.5.2, and the second one for lecturers (see Appendix B).

To obtain analogous responses the researcher became certain that the participants had the option to interpret each question similarly. Since the investigator has no overall control on how each participant construe questions (Bernard 2000:233), efforts to remove vagueness, eliminate leading questions and ensuring participants are not force into making unsuitable selections were done through the revision of questions and following feedback from supervisor. Hence, the designed questions were not vague. The researcher has already mentioned that the study was a mixed method, thus the questionnaire was encompassed of two data sets: close-ended and open-ended questions which are discussed in the next section.

- Close-ended questions

The close-ended questions which illustrated the numeric aspect of the study used a five-point Likert-scale format with a rating scale 1 to 5, which was an indication of ‘strength of feeling or attitude’ (Bell 1999:85). According to Bernard (2000:294) the rating scale is often referred to as Likert-type scale. The Likert-type scale allowed the researcher in this study to use a more suitable questioning style rather than dichotomous (yes or no) style questions (Punch 1998:95). Furthermore, as Miles and Huberman (1994:253) attest, the Likert type scale enabled the researcher to include in a ‘level of affectability and separation of rejoinder’ into the study.

Given this, a questionnaire contained questions addressing different areas: (1) Demographic information (2) Effectiveness of ICT tools used for instruction and erudition in ODeL context; and (3) the utilization of ICT to advance transactional distance and rhizomatic learning.

It has been said that a well-structured close-ended question can produce incidences of responses suitable to statistical analysis (Miles & Huberman 1994:247). Following the guidance by Robson (1993:256), respondents frequently found it appealing finishing questions of this sort, as they are bound to provide a meticulous instead of spur of the moment rejoinder (Robson 1993:260). In line with Brown and Dowling's (1998:70) ideas, the designed questionnaire was beneficial in the study in the sense that it allowed the researcher to link each response to a numerical value. Thus, producing numerical data (Miles & Huberman 1994:253), aided the quantitative examination, of 'people' standing remaining on the traits being referred to (Robson 1993:255).

The researcher has already alluded in the sections above that there were two questionnaires designed for two groups of respondents (students and lecturers). The questionnaire for students (See Appendix A) contained 53 question items (QI). Question items 1-41 contained five-point Likert-type scale indicating: 1= Strongly Agree (SA); 2= Agree (A); 3= Neutral (N); 4= Disagree (D); and 5= Strongly Disagree (SD). An option for neutral was made available should in case some of the participants are new to some of the practices. Question item 1, sought the demographic information about the participants; QI 2, basically sought information on ICT tools used for learning in ODeL. Also, QIs 3 – 7 seek answers to sub-question one. Question items 8 – 21 attend to sub-question two, whereas, QIs 22-29 seek answer to sub-question three, and QIs 30 – 37 seek answers to sub-question four. Lastly, QIs 38 – 41 seek answers to sub-question five.

In contrast, the questionnaire for the lecturers (See Appendix B) consists of 48 QIs. Question items 1-37 contained five-point Likert-type scale indicating: 1= SA; 2= A; 3= N;

4= D; and 5= SD. Similar to the students' questionnaire, an option for neutral was made available should in case some of the participants are new to some of the practices. Question items 1-4 sought to provide the demographic information about the participants. Question items 5 basically sought information on ICT tools used for teaching in ODeL. Also, QIs 6 – 9 seek answers to sub-question one, while QIs 10 – 20 attend to sub-question two, and QIs 21-29 seek answers to sub-question three. Question items 30 – 34 seek answers to sub-question four. And lastly, QIs 35 – 37 seek answers to sub-question five.

- Open-ended questions

A progression of open-ended questions was encompassed in the questionnaire to guarantee that certain items of data were collected. The intention was to gather exhaustive information (qualitative information) from both the learners and dons on role of ICT in ODeL. The utilization of open-ended questions also helped in collecting possibly profuse information comparatively unique to that expected by the pollster (Tashakkori & Teddlie 1998, p.l02). It has been alluded to that two questionnaires were developed for two groups of participants. In this regard, a questionnaire for student (See Appendix A), contained eleven questions (question item 42-53) that requested a brief description of how the students used ICT to promotes traditional distance and rhizomatic learning at UNISA. Furthermore, a questionnaire designed for lectures had seven questions (question item 38-44) that requested a brief description of how the lecturers used ICT to promote traditional distance and rhizomatic learning at the institution.

3.3.4. Data analysis

Levine (1997:1) indicates information analysis is a wide range of techniques that aid explain realities, discover designs, create clarifications, and test speculations. This allude to the procedures that the pollster undertook subsequent to gathering data, which regularly prompted the findings or results of the investigation. The questionnaire was sent to 654 M.Ed. students and 194 lecturers in the College of Education. The

respondents were given six months to finish and restore the questionnaire back to the pollster.

Only 52 (7.95%) responses from students and 7(3.60%) from lecturers were returned. Cautiously designed questionnaires provided data in similar format from all respondents (Babbie 1998:256). The responses from the participants were kept for analysis as there were no more responses coming back. It has been clarified in the above segment that this study employed a mixed method approach. This would mean that two sets of data (quantitative and qualitative) were collected and analyzed statistically (quantitatively) and thematically (qualitatively).

3.3.4.1. Statistical Analysis

The quantitative responses from the closed-ended questions were inputted on Microsoft Excel and analyzed utilizing Statistical Package for Social Sciences (SPSS) software (See Appendix F) and the frequency distribution and percentages analysis, as well as the t-test analysis were run through the software. Data entry followed the procedures recommended by Bhattacherjee (2012:119), as it enabled the pollster to quantify and analyze the collected data statistically. The analysis process involved data coding where data was converted into numeric format. In this respect, the data were analyzed using illustrative and inferential statistical strategies (Bhattacherjee 2012:119), to response to the exploration questions. Illustrative analyses comprising incidences, and percentages were utilized to outline the conveyance of the information (Bhattacherjee 2012:122). Inferential insights, comprising means, standard deviations and independent sample t-test were performed for data analysis. In this inquiry the t-test analysis was used to determine whether there is significance different between mean values of the data set. In this case, the .05 level of significance was utilized for inferential statistics (Bhattacherjee 2012:130).

3.3.4.2. Qualitative Analysis

The rejoinders from the open-ended questions were analyzed close by the discoveries of the statistical analysis to expound the significant discoveries. In doing this, the pollster recognized, named and categorized leitmotifs and developing paradigms from

the data by perusing and re-perusing the data a few times. As guided by Bhattacherjee (2012:114), the researcher spotted certain words and expressions that over and again showed up and those outstanding and therefore, looked for symmetries, patterns and leitmotifs that rose up out of the data.

3.4. RELIABILITY AND VALIDITY

According to Bhattacherjee (2012:55) unwavering quality and legitimacy, together called the ‘psychometric properties of estimation scales’, are the measuring sticks against which the sufficiency and exactness of our estimation techniques are assessed in logical research. soundness and legality are further examined in the succeeding segment.

3.4.1. Reliability

Bhattacherjee (2012:56) explained that unwavering quality is how much the measure of a construct is steady or reliable. To test that the exploration instruments in this examination were reliable, the researcher asked similar questions in every part of the questionnaire, to monitor the level at which participants are consistent in their responses (Navarro Sada & Maldonado 2007:147). The reliability was further improved by the study supervisor who moderated the questionnaire.

However, based on the reliability theory, true reliability cannot be calculated. It can only be an estimate (Pabayo 2006:76). A variety of reliability estimates are likely to give different values. For example, the Cronbach’s alpha has the tendency to give a high estimate of reliability. On the other hand, the test-retest reliability has the tendency to give a lower-bound estimate of reliability. In this inquiry, the Cronbach’s alpha reliability was utilized.

3.4.2. Validity

Bhattacherjee (2012:58) characterized legitimacy as the degree to which a measure sufficiently speaks the hidden construct that it should gauge. There are different sorts of legitimacy as clarified by Bhattacherjee (2012). With the end goal of this study, content validity was utilized. The reasons are that in content legitimacy, the mechanism must unveil that it decently and completely caps the area or things that it indicated to lids (Navarro Sada & Maldonado 2007:135).

To guarantee the legitimacy of the study mechanism in this study, the pollster firstly create the mechanism based on consulted literatures (see Angadi 2014; Pineda 2013; Rusten 2010; Cormier 2008; Levin & Wadmany 2008; Fozdar & Kumar 2007; Florian & Hegarty 2004; Jones & Knezek 1993; Kerka 1992). Secondly, the developed instrument was sent to the study supervisor as well as one expert from the Institute of Science and Technology Education (ISTE) unit at UNISA, to ensure readability and comprehension.

To determine whether the questionnaire represents the precise content identified with the study, both the supervisor and the connoisseur's opinions and suggestions were considered for the amendments made. Lastly, all the mistakes were corrected before the instrument could be given to participants.

3.5. TRUSTWORTHINESS AND CREDIBILITY

In a qualitative inquiry trustworthiness is described as the expression that the established substantiation for the reported discovery is inclusive and the line of reasoning emanating from the upshot is considerable (Frank, 2010:1). This supposition of trustworthiness is further echoed by Patton and Cochran (2002:11) who coherent that both the pollster and readers of the research upshot must have guarantee that the discoveries of the inquiry was truly a reflection of the outlined rationale of the inquiry and sustain the same rather than portraying partiality of any sort. This implies that the inquiry and its discoveries must be reproducible, in a way that, any pollster can discover the same thing when using the same topic outlines (ibid).

In a qualitative inquiry credibility sometimes is used interchangeably with trustworthiness, and also described as the satisfactoriness and genuineness of the discoveries of the inquiry, which is constantly improved by the proof such as endorsement of the evaluation of conclusions by the study participants, amalgamation of manifold source of evidence, control of inapt partiality, and relation to theories sustaining the inquiry (Suter, 2012:363). Here, the supreme confidence in the trustworthiness or credibility of the inquiry conclusions was renowned from the accord and support of the participants, the methodical analysis of multiple data sources, interpretation and understanding of readers, and extrapolations stemmed on the aptly resolute theoretical model (Suter, 2012:363). The analysis of data in this inquiry was supported by the employment of diverse data collection tools in lecturers and students open-ended and close-ended questions. These data sources were used to ensure trustworthiness and credibility in the discoveries of the inquiry

3.6. CONCLUSION

This part clarified the research procedure and configuration utilized for conducting this research. It gave a definite narrative of partakers, look into settings, and instruments utilized for this investigation. This section also described information compendium and analysis techniques top to bottom. The legitimacy and dependability of mechanisms; trustworthiness and credibility of the inquiry were explained. The next part, Chapter 4 provides the study results.

CHAPTER FOUR

ANALYSIS AND RESULTS

4.1. INTRODUCTION

This section focuses on analyses and results dependent on both the quantitative and subjective information collected. In presenting the results, quantitative analysis is presented first and thereafter qualitative findings.

4.2. QUANTITATIVE RESULTS

The analysis process involved data coding where data was converted into numeric format. In this respect, the data were analyzed using illustrative and inferential statistical strategies (Bhattacherjee 2012:119), to response to the exploration questions. Illustrative analyses comprising incidences, and percentages were utilized to outline the conveyance of the information (Bhattacherjee 2012:122). Inferential insights, comprising means, standard deviations and independent sample t-test were performed for data analysis. In this inquiry the t-test analysis was performed to determine whether there is significance different between mean values of the data set. In this case, the .05 level of significance was utilized for inferential statistics (Bhattacherjee 2012:130).

This segment shows the outcome from the quantitative information, tables portraying the demographical data of participants, reliability score, frequency distributions and percentages and T-test results were presented. The student results are presented first, then followed by the lecturer's results. The students had to respond to 39 question items scale identified with the role of ICT in ODeL setting. The lecturers on the other hand, had to respond to 32 items scale identified with the role of ICT in ODeL environment.

4.2.1. Demographical data of participants

In this research, data were collected from two groups of participants the M.Ed students and the lecturers. E-mails which contains a link to the questionnaire and Directions on

the most proficient method to finish the questionnaire was mailed to the partakers. During the data compendium everything worked out well, except that the response rate was low, and in some instance, participants did not disclose certain information about themselves which may seem as if reported numbers are not consistent.

Table 4.1: The demographical data of the participants

		Students (N=52)		Lecturers (N=7)	
		N	%	N	%
Gender	Female	31	59.6	5	71.4
	Male	21	40.4	1	14.3
	Not disclosed	0	0	1	14.3
Years at the University	1-5 years	40	76.9	2	28.6
	6-10 years	8	15.4	2	28.6
	11-15 years	2	3.8	2	28.6
	Not disclosed	2	3.8	1	14.3
Number of modules	1-3 modules	47	90.4	4	57.1
	4-6 modules	1	1.9	1	14.3
	7-10 modules	1	1.9	0	0
	Not disclosed	3	5.8	2	28.6
ICT resources used	Video conferencing	10	19.2	2	28.6
	Web 2.0	34	65.4	3	42.9
	Social media	36	69.2	0	0
	Microsoft office	52	100	0	0
	Others	3	5.8	5	71.4
	Not disclosed	0	0	0	0
Experience of using ICT	None	3	5.76	1	14.3
	Little	36	69.2	3	42.9
	More	10	19.2	1	14.3

	Not disclosed	3	5.76	2	28.6

As shown in Table 4.1 above, in terms of gender, there were 21 (40.0%) male and 31 (59.6%) female students who participated in the study. In addition, 1 (14.3%) male and 5 (71.4%) female lecturers took part.

This implies that there were more female participants (both students and lecturers) than the males. Of the participating students, the majority 40 (76.9%) have been in the university for about 1-5 years. The data further revealed that 47 (90.4) of the participating students have registered for one module only during the study.

On the other hand, the data as provided on the table indicate that at least 2 (28.6%) lecturers have been in the university for a period of 1-5, 6-10 and 11-15 years respectively. Additionally, 4 (57.1%) lecturers responded that they teach one module only.

It is evident from the table that the topmost used ICT tools by students is Microsoft Office (100%), followed by the Social Media (69.2%) and the Web 2.0 (65.4%). Similarly, 5 (71.4%) of the participating lecturers responded that they used other ICT tools, whereas 9 (42.9%) used the Web 2.0 and 2 (28.6%) used the video conferencing. However, there is an indication of little experience of using ICT before joining the university by the majority (69.2%) of students and lecturers (42.9%) respectively.

4.2.2. Student quantitative data results

In this section a 39 - item scale was used. The 39 items covered five aspects. These five were, ICT for teaching and learning (5 items); ICT promote interaction (14 items); ICT fosters flexibility (8 items); ICT supports decision making (8 items); and ICT enhances rhizomatic learning (4 items). In each aspect, students rated their reactions on a 5-point Likert-type scale: Strongly Agree (SA); Agree (A); Neutral (N), Disagree (D); and Strongly Disagree (SD).

Table 4.2: Student Quantitative Reliability score

Items	Number of Item	rα (Cronbach's alpha)
ICT for Learning	5	0.575
ICT for learning interaction	14	0.978
ICT for flexible learning	8	0.989
ICT for decision making	8	0.899
ICT for Connective learning	4	0.916
Overall	39	0.871

Considered 'acceptable' (Taber, 2017)

Table 4.2 above show the student quantitative data reliability score. Cronbach's alpha value for all items was .871. According to Taber (2017), Cronbach's alpha values between .45-.98 are considered 'acceptable' and values between .45-.96 are considered 'sufficient'.

Table 4.3: Frequency distribution and percentages as per the five question items on ICT for learning for students (N=52)

Question Item (QI)	SA	A	N	D	SD
QI3: ICT motivates and engages the students to learn.	41(78.8)	5(9.6)	5(9.6)	0	1(1.9)
QI4: ICT makes learning possible anywhere, anytime.	45(86.5)	3(5.8)	4(7.7)	0	0
QI5: ICT provides students with access to learning materials/information.	44(84.6)	7(13.5)	1(1.9)	0	0
QI6: ICT enables students to learn in manners not once in the past conceivable.	43(82.7)	5(9.6)	3(5.8)	1(1.9)	0
QI7: ICT permits students to surf through digital books, digital archives, erstwhile question papers, artefacts and dairies.	46(88.5)	5(9.6)	1(1.9)	0	0

Table 4.3 displays the outcome in revere to five question items for students in relation to ICT for instructing and learning, it is evidence from the table that:

a) For the first question – QI 3: students had to indicate whether the utilization of ICT for learning spurs and connects them to learn. The table shows that about 88.4% demonstrated that they emphatically concurred or concurred with this statement. This discovering recommends that most students felt that the utilization of ICT for erudition spurs and draws in the students to learn.

b) For the second question – QI 4: students were asked whether the use of ICT for learning makes erudition conceivable anyplace, whenever. The table reveals that about 92.3% demonstrated that they firmly concurred or concurred with this statement. This discovering recommends that most students felt that the utilization of ICT for learning makes learning conceivable anywhere, anytime.

c) For the third question – QI 5: students needed to show whether the utilization of ICT for erudition gives the students access to learning materials/data. The table likewise shows that about 98.1% demonstrated that they firmly concurred or concurred with the avowal. This discovering recommends that most students fondled that the utilization of ICT for erudition furnishes students with right to use learning materials/data.

d) For the fourth question – QI 6: students were asked whether the utilization of ICT for erudition enables students to learn in manners not once in the past conceivable. The table reveals that about 92.3% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students fondled that the utilization of ICT for erudition enables students to learn in manners not once in the past conceivable.

e) The fifth question – QI 7: students had to indicate whether the utilization of ICT for learning permits the students to surf through digital books, digital archives, erstwhile question papers, artefacts and journals.

The table shows that about 98.1% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT for erudition grants the students to surf through digital books, digital archives, erstwhile question papers, artefacts and dairies.

Table 4.4: T-Test as per the Five QI identifying with ICT for learning

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
52	1.37	.817	.113	12.049	.000
52	1.21	.572	.079	15.28	.000
52	1.17	.430	.060	19.66	.000
52	1.27	.660	.092	13.863	.000
52	1.13	.397	.055	20.584	.000

Notes: T=t-test value, p<.05 (2-tailed test)
Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.4 shows the T-test as per the five question items identifying with ICT for learning. The table reveals that at confidence level of 95% students felt that ICT used for learning in ODeL are highly effective. This is evident in the mean score of all the items (1.13-1.37) which indicates that most of the students strongly agreed with the items. However, the most important effectiveness of ICT for erudition is that it allows the students to surf through digital books, digital archives, erstwhile question papers, artefacts and dairies- the item had the highest T score with 20.6.

Table 4.5: Frequency distribution and percentages in respect of 14 question items on ICT for learning interaction (N=52)

Question Item (QI)	SA	A	N	D	SD
QI8: ICT bridges the learning gap between the student, content, and lecturer.	41(78.8)	5(9.6)	4(7.7)	2(3.8)	0
QI9: ICT allows students-content interactions anytime and anywhere.	41(78.8)	11(21.1)	0	0	0
QI10: ICT enhances students' ability to relate content to practice.	35(67.3)	13(25.0)	1(1.9)	2(3.8)	1(1.9)
QI11: ICT fosters students' ability to discover and explore new knowledge.	41(78.8)	11(21.1)	0	0	0
QI12: ICT engages the student's knowledge/meaning construction rather than facts memorization.	37(71.2)	8(15.4)	5(9.6)	1(1.9)	1(1.9)
QI13: ICT enhances students' skills in information gathering and analysis.	39(75.0)	11(21.1)	2(3.8)	0	0
QI 14: ICT-aided student-lecturer interaction enables the students to receive prompt and precise feedback from the lecturers.	38(73.1)	8(15.4)	5(9.6)	1(1.9)	0
QI 15: ICT in ODL permits student-lecturer interaction	37(71.2)	10(19.2)	4(7.7)	1(1.9)	0

opportunities similar to those in conventional classroom.					
QI 16: ICT engages students in synchronous and asynchronous discussion with both lecturers and peers.	37(71.2)	11(21.1.)	4(7.7)	0	0
QI 17: ICT-based student-lecturer interaction deepens student critical thinking and problem solving skills.	37(71.2)	10(19.2)	4(7.7)	1(1.9)	0
QI 18: ICT-aided student-lecturer interaction allows student to ask questions and seek clarification from lecturers anytime	38(73.1)	9(17.3)	4(7.7)	1(1.9)	0
QI 19: ICT-enhanced student-lecturer interaction allows the students to receive online/web-based instruction from the lecturer.	40(76.9)	11(21.1)	1(1.9)	0	0
QI 20: ICT-aided student-student interaction permits the students to learn new thought-provoking ideas.	38(73.1)	11(21.1)	3(5.8)	0	0
QI 21: ICT-based student-student interaction supports community learning/teamwork.	38(73.1)	10(19.2)	2(3.8)	2(3.8)	0

Table 4.5 displays the outcomes in reverence to 14 items for students in relation to ICT for erudition interaction, it is perceived from this table that:

a) For the first question – QI 8: students needed to indicate whether the utilization of ICT bridges the learning gap between the student, content, and lecturer. The table shows that about 93.8% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT for erudition bridges the learning breach between the student, gratified, and teacher in ODeL.

b) For the second question – QI 9: students needed to show whether the use of ICT permits students-content interactions anytime and anywhere. The table shows that about 99.9% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that students felt that the utilization of ICT in ODeL permits students-content interactions anytime and anywhere.

c) For the third question – QI 10: students needed to show whether the utilization of ICT enhance students' ability to relate content to practice. The table shows that about 92.3% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT enhances students' ability to relate content to practice in ODeL.

d) For the fourth question QI 11: students had to indicate whether the utilization of ICT for learning fosters students' ability to discover and explore new knowledge. The table reveals that about 93.8% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT for erudition fosters students' ability to discover and explore new knowledge.

e) For the fifth question QI 12: students were asked whether the use of ICT engages the students' knowledge/meaning construction rather than facts memorization. The table shows that about 86.6% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that the use of ICT engages the student's knowledge/meaning construction rather than facts memorization.

f) For the sixth question QI13: students needed to show whether the utilization of ICT enhances students' skills in information gathering and analysis. The table reveals that about 96.1% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT in ODeL boosts students' skills in information gathering and analysis.

g) For the seventh question QI 14: students were asked whether ICT-aided student-lecturer interaction enables the students to receive prompt and precise feedback from the lecturers. The table shows that about 88.5% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that ICT-aided student-lecturer interaction enables the students to receive prompt and precise feedback from the lecturers.

h) For the eighth question QI 15: students had to indicate whether ICT in ODeL permits student-lecturer interaction opportunities like those in conventional classroom. The table reveals that about 90.4% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that ICT in ODeL permits student-lecturer interaction opportunities like those in conventional classroom.

i) For the ninth question QI 16: students were asked whether ICT engages students in synchronous and asynchronous discussion with both lecturers and peers. The table shows that about 92.3% demonstrated that they emphatically concurred or concurred with this statement.

This discovering suggests that most students felt that ICT engages students in synchronous and asynchronous discussion with both lecturers and peers in ODeL.

j) For the tenth question QI 17: students had to indicate whether ICT-based student-lecturer interaction deepens student basic reasoning and critical thinking abilities. The table reveals that about 90.4% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that ICT-based student-lecturer interaction deepens student basic reasoning and critical thinking aptitude in ODeL.

k) For the eleventh question QI 18: students were asked whether ICT-aided student-lecturer interaction allows student to ask questions and seek clarification from lecturers anytime. The table shows that about 95.6% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that ICT-aided student-lecturer interaction allows student to ask questions and seek clarification from lecturers anytime in ODeL.

l) For the twelfth question QI 19: students had to indicate whether ICT-enhanced student-lecturer interaction allows the students to receive online/web-based instruction from the lecturer. The table reveals that about 98% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that ICT-enhanced student-lecturer interaction allows the students to receive online/web-based instruction from the lecturer.

m) For the thirteenth question QI 20: students were asked whether ICT-aided student-student interaction permits the students to learn new thought-provoking ideas.

The table shows that about 94.2% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that ICT-aided student-student interaction permits the students to learn new thought-provoking ideas.

n) For the fourteenth question QI 21: students had to indicate whether ICT-based student-student interaction supports community learning/teamwork. The table reveals that about 92.3% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that ICT-based student-student interaction supports community learning/teamwork in ODeL.

Table 4.6 provides T-Test as far as the 14 items identifying with ICT for learning interaction. The table shows that at confidence level of 95% students felt that ICT promotes learning interaction in ODeL. This is evident in the mean score of 1.63 or below which indicates that most of the students unequivocally concurred or concurred with the items. The responses reveal that at worst ICT promotes cordial interaction among students, lecturers and content as all the p-values are less than 0.05. The most momentous item is the statement that the utilization of ICT in ODeL allows students-content interactions anytime and anywhere which has a T-score of 21.2. Thus, the use of ICT promotes transactional dialogue.

Table 4.6: T-Test in terms of the 14 (QI) relating to ICT for learning interaction

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
52	1.37	.793	.110	12.419	.000
52	1.21	.412	.057	21.185	.000
52	1.50	.960	.133	11.268	.000
52	1.23	.757	.105	11.723	.000
52	1.58	1.091	.151	10.424	.000
52	1.37	.841	.117	11.710	.000
52	1.52	1.038	.144	10.551	.000
52	1.63	1.121	.155	10.518	.000
52	1.46	.896	.124	11.766	.000
52	1.52	1.019	.141	10.749	.000
52	1.56	1.145	.159	9.813	.000
52	1.52	1.213	.168	9.035	.000
52	1.58	1.242	.172	9.154	.000
52	1.56	1.162	.161	9.669	.000

Notes: T=t-test value, p<.05 (2-tailed test)Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.7: Frequency distribution and percentages in respect of eight question items on ICT for flexible learning (N=52)

Question Item (QI)	SA	A	N	D	SD
QI22: ICT supports the institution to design programs that are responsive to students' needs.	35(67.3)	10(19.2)	3(5.8)	3(5.8)	1(1.9)
QI23: ICT supports the institution to employ teaching strategies suitable to students' needs.	32(61.5)	12(23.1)	5(9.6)	2(3.8)	1(1.9)
QI24: ICT supports the institution to use evaluation strategies that meet students' needs.	35(67.3)	12(23.1)	2(3.8)	1(1.9)	2(3.8)
QI25: ICT supports the institutions to select teaching objectives responsive to students' needs.	32(61.5)	10(19.2)	7(13.5)	2(5.8)	1(1.9)
QI26: ICT allows the students to use different technology for learning.	42(80.8)	9(17.3)	1(1.9)	0	0
QI27: ICT allows the institution to provide adequate instructions to the student on the use of learning materials, study techniques, and some form of reference for study problems.	37(71.2)	9(17.3)	4(7.7)	2(5.8)	0
QI28: ICT fosters effective presentation of information, demonstration of skills and values.	38(73.1)	10(19.2)	3(5.8)	1(1.9)	0

QI29: ICT gives the student the opportunity to apply what has been learnt.	36(69.2)	12(23.1)	4(7.7)	0	0

Table 4.7 shows the results in regard to eight items for students in relation to ICT for flexible learning, it might be seen from this table:

a) For the first question – QI 22: students were asked whether the use of ICT supports the institution to design programmes that are responsive to students' needs. The table shows that about 86.5% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students fondled that the utilization of ICT in ODeL supports the institution to design programmes that are responsive to their students' needs.

b) For the second question – QI 23: students needed to indicate whether the utilization of ICT supports the institution to appoint teaching strategies suitable to student needs. The table reveals that about 84.6% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that the deployment of ICT in ODeL supports the institution to employ instructing strategies that are suitable to student needs.

c) For the third question – QI 24: students were asked whether the use of ICT supports the institution to use evaluation strategies that meet student needs. The table shows that about 90.4% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students fondled that the utilization of ICT in ODeL supports the institution to use evaluation strategies that meet student needs.

d) For the fourth question – QI 25: students needed to indicate whether the use of ICT supports the institutions to select teaching objectives that are responsive to student needs. The table reveals that about 80.70% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that the deployment of ICT in ODeL supports the institutions to select educating objectives that are responsive to student needs.

e) For the fifth question – QI 26: students were asked whether the use of ICT allows the students to use different technology for learning. The table shows that about 98.1%

demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students fondled that the utilization of ICT in ODeL allows the students to use different technology for learning.

f) For the sixth question – QI 27: students needed to indicate whether the use of ICT allows the institution to provide adequate instructions to the student on the use of learning materials, study techniques, and some form of reference for study problems. The table reveals that about 88.5% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students fondled that the deployment of ICT in ODeL allows the institution to give adequate instructions to the students on the use of learning materials, study techniques, and some form of reference for study problems.

g) For the seventh question – QI 28: students were asked whether ICT fosters effective presentation of information, demonstration of skills and values. The table shows that about 92.3% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that the integration of ICT in ODeL fosters effective presentation of information, demonstration of skills and values.

h) For the eighth question – QI 29: students needed to indicate whether the use of ICT gives the student the opportunity to apply what has been learnt. The table reveals that about 92.3% demonstrated that they firmly concurred or concurred with this avowal. This discovering proposes that most students fondled that the use of ICT in ODeL gives the students the opportunity to apply what has been learnt.

Table 4.8: T-Test in terms of the 8 (QI) relating to ICT for flexible learning

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
52	1.75	1.297	.180	9.732	.000
52	1.81	1.269	.176	10.275	.000
52	1.712	1.2885	.1787	9.579	.000
52	1.90	1.418	.197	9.683	.000
52	1.40	1.071	.149	9.451	.000
52	1.62	1.191	.165	9.783	.000
52	1.54	1.128	.156	9.833	.000
52	1.56	1.092	.151	10.285	.000

Notes: T=t-test value, p<.05 (2-tailed test)

Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Tables 4.8 shows the T-Test as per the eight question items identifying with ICT for flexible learning. The table shows that for students, ways by which ICT fosters the flexibility of education programmes includes: supporting the institution towards designing responsive programmes (T=9.732; p=0.000); supporting the institution towards employing suitable teaching strategies (T=10.28; p=0.000); supporting the institution towards using useful evaluation strategies (T=9.6; p=0.000); supporting the institution towards selecting responsive teaching objectives (T=9.7; p=0.000); allowing the students to use different technology for learning (T=9.5; p=0.000); allowing the institution to provide adequate instructions to the student on the use of learning materials, study techniques, and some form of reference for student who needs help in dealing with the study problem (T=9.8; p=0.000); fostering effective presentation of information (T=9.8; p=0.000); giving student the opportunity to apply what has been learnt, whether through electronically submitted assignments and/or portfolios (T=10.3; p=0.000). Thus, the deployment of ICT fosters the adaptability of the schooling programs intentions, instruction strategies, and assessments techniques to suite student individual needs (transactional course structure) in ODeL.

Table 4.9: Frequency distribution and percentages as per the eight question items on ICT for decision making (N=52)

Question Item (QI)	SA	A	N	D	SD
QI30: ICT allows students to be dynamic role in their own learning process.	42(80.8)	7(13.5)	1(1.9)	1(1.9)	1(1.9)
QI31: ICT allows the student to determine what to comprehend, when to comprehend, where to comprehend and how to comprehend.	38(73.1)	10(19.2)	3(5.8)	1(1.9)	0
QI32: ICT supports the student to use teaching materials to achieve their own goals, in their own ways, under their own control.	40(76.9)	6(11.5)	3(5.8)	3(5.8)	0
QI33: ICT supports students to become independent lifelong learners.	39(75.0)	11(21.1)	2(3.8)	0	0
QI34: ICT fosters students' ability to independently discover and explore new knowledge.	41(78.8)	9(17.3)	2(3.8)	0	0
QI35: ICT-enhanced independent learning fosters memory retention.	21(40.3)	21(40.3)	7(13.5)	1(1.9)	2(3.8)
QI36: The use of ICT for independent learning fosters intense learning.	32(61.5)	12(23.1)	6(11.5)	2(3.8)	0
QI37: The use of ICT for independent learning	38	11	2 (3.8)	1(1.9)	0

transforms learning from lecturers-driven to student-driven.	(73.1)	(21.1)			

Table 4.9 shows the results as per the eight items for students in relation to ICT for decision making, it may be observed from this table that:

a) For the first question -QI 30: students were asked whether the use of ICT allows students to assume dynamic roles in their own learning procedures. The table shows that about 94.3% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students fondled that the deployment of ICT in ODeL allows student to play active roles in their own learning process.

b) For the second question -QI 31: students needed to indicate whether the use of ICT allows the student to determine what to comprehend, when to comprehend, where to comprehend and how to comprehend. The table reveals that about 92.3% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT in ODeL allows the student to determine what to comprehend, when to comprehend, where to comprehend and how to comprehend.

c) For the third question -QI 32: students were solicited whether the utilization of ICT bolsters the student to use teaching materials to achieve their own goals, in their own ways, under their own control. The table shows that about 88.4% demonstrated that unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that the deployment of ICT in ODeL supports the student to use instructing materials to accomplish objectives of their own, in their own ways, under their own control.

d) For the fourth question -QI 33: students needed to demonstrate whether the utilization of ICT supports students to become nonaligned lifetime students. The table reveals that about 96.1% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT in ODeL supports students to become independent lifelong learners.

e) For the fifth question -QI 34: students were asked whether the use of ICT fosters students' ability to independently discover and explore new knowledge. The table shows that about 96.1% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT in ODeL fosters students' ability to independently discover and explore new knowledge.

f) For the sixth question -QI 35: students had to indicate whether ICT-enhanced independent learning fosters memory retention. The table reveals that about 80.6% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that ICT-enhanced independent learning fosters memory retention for students in ODeL.

g) For the seventh question -QI 36: students were asked whether the utilization of ICT for independent learning fosters intense learning. The table shows that about 84.6% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT for independent learning fosters intense learning for students in ODeL.

h) For the eighth question -QI 37: students needed to demonstrate whether effective utilization of ICT for independent learning transforms learning from lecturers-driven to student-driven. The table reveals that about 94.2% demonstrated that they emphatically concurred or concurred with this statement. This discovering proposes that most students felt that successful utilization of ICT for independent learning transforms learning from lecturers-driven to student-driven in ODeL.

Table 4.10: T-Test as per the eight items identifying with ICT for decision making

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed
52	1.50	1.196	.166	9.041	.000
52	1.56	1.178	.163	9.532	.000
52	1.58	1.226	.170	9.273	.000
52	1.46	1.056	.147	9.976	.000
52	1.42	1.054	.146	9.733	.000
52	2.06	1.259	.175	11.787	.000
52	1.75	1.203	.167	10.494	.000
52	1.52	1.111	.154	9.858	.000

Notes: T=t-test value, p<.05 (2-tailed test)

Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.10 shows the T-Test as per the eight items identifying with ICT for decision-making. The table shows that ICT supports students to make decisions about learning objectives and goals. This is evident in the mean scores of (1.4-2.1) and p-value of 0.000. Thus, the utilization of ICT for instruction and erudition in ODeL promotes transactional autonomy. These findings suggest that most students felt that the utilization of ICT for erudition provides students limitless ways of generating knowledge.

Table 4.11: Frequency distribution and percentages as per the four question items on ICT for connective learning (N=52)

Question Item (QI)	**SA**	**A**	**N**	**D**	**SD**
QI38: ICT allows the student to connect one learning task/activity to another.	37(71.2)	10(19.2)	4(7.7)	1(1.9)	0
QI39: ICT fosters multiple facets of learning process.	35(67.3)	12(23.1)	4(7.7)	1(1.9)	0
QI40: ICT permits the student multiple entry and exit points into learning.	34(65.4)	10(19.2)	5(9.6)	0	0
QI41: ICT provides students limitless ways of generating knowledge.	35(67.3)	12(23.1)	3(5.8)	1(1.9)	0

Table 4.11 shows the outcome in revere to four items for students in relation to ICT for rhizomatic and connective learning, it is evidence from this table that:

a) For the first question -QI 38: students were asked whether the utilization of ICT allows the student to connect one learning task/activity to another. The table reveals that about 90.4% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students fondled that the deployment of ICT in ODeL allows the student to connect one learning task/activity to another according to their needs.

b) For the second question -QI 39: students needed to demonstrate whether the use of ICT fosters multiple or different facets of learning process. The table reveals that about 90.4% demonstrated that they firmly concurred or concurred with this statement. This discovering proposes that most students fondled that the utilization of ICT in ODeL fosters multiple or different facets of learning process.

c) For the third question -QI 40: students were asked whether the use of ICT permits the student multiple entries and exits point in learning. The table shows that

about 84.6% demonstrated that they emphatically concurred or concurred with this statement. This finding proposes that most students fondled that the deployment of ICT permits ODeL students' multiple entries and exit points into learning.

d) For the fourth question -QI 41: students needed to demonstrate whether the use of ICT provides students limitless ways of generating knowledge. The table reveals that about 90.4% demonstrated that they unequivocally concurred or concurred with this statement. This discovering proposes that most students felt that the utilization of ICT for erudition gives ODeL students limitless ways of generating knowledge

Table 4.12 shows the T-Test as per the four question items identifying with ICT for rhizomatic and connective learning. The table shows that at confidence level of 95%, the use of ICT supports students to connect learning nodes in ODeL. This is evident in the mean scores of 1.6 and p-value of 0.000. Thus, the use of ICT allows students in ODeL to connect one learning node, activity or information to another as per their apparent need (rhizomatic).

Table 4.12: T-Test as per the four items identifying with ICT connective learning

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
52	1.60	1.192	.165	9.652	.000
52	1.62	1.140	.158	10.216	.000
52	1.67	1.264	.175	9.547	.000
52	1.60	1.125	.156	10.233	.000

4.2.3. Lecturer's quantitative data results

In this section a 32 - item scale was used. The 32 items covered five aspects. These five were, ICT for teaching and learning (4 items); ICT promote interaction (11 items);

ICT fosters flexibility (9 items); ICT supports decision making (5 items); and ICT enhances rhizomatic learning (3 items). In each aspect, lecturers rated their rejoinders on a 5-point Likert-type scale: Strongly Agree (SA); Agree (A); Neutral (N), Disagree (D); and Strongly Disagree (SD).

Table 4. 13: Lecturer Quantitative Data Reliability Score

Items	Number of item	rα (Cronbach's alpha)
ICT for teaching	4	0.756
ICT for teaching interaction	11	0.899
ICT for student support	9	0.878
ICT for flexible teaching	5	0.870
ICT for Connective learning	3	0.859
Overall	32	0.852

Considered 'acceptable' (Taber, 2017)

Table 4.13 above show the lecturer quantitative data reliability score. Cronbach's alpha value for all items was .852 According to Taber (2017), Cronbach's alpha values between .45-.98 are considered 'acceptable' and values between .45-.96 are considered 'sufficient'.

Table 4.14: Frequency distribution and percentages as per the four question items on ICT for teaching (N=7)

Question Item (QI)	SA	A	N	D	SD
QI6: ICT fosters instructing anywhere, anytime.	4(57.1)	1(14.3)	0	1(14.3)	0
QI7: ICT provides lecturers with access to teaching materials/resources anytime, anywhere.	4(57.1)	1(14.3)	0	1(14.3)	0
QI8: ICT allows lecturers to teach in ways not formerly possible.	5(71.4)	1(14.3)	0	0	0
QI9: ICT enables the lecturers to surf through digital books, digital libraries, and journals.	6(85.7)	0	0	0	0

Table 4.14 displays the outcome in respect to four items for lecturers in relation to ICT for teaching, it is apparent from this table that:

a) For the first question -QI 6: lecturers had to demonstrate whether the utilization of ICT fosters teaching anywhere, anytime. The table shows that about 71.4% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the use of ICT in ODeL fosters teaching anywhere, anytime.

b) For the second question -QI 7: lecturers had to indicate whether the utilization of ICT for teaching provides lecturers with access to teaching materials/tools anytime, anywhere. The table reveals that about 71.4% demonstrated that they unequivocally concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT for teaching in ODeL provides lecturers with access to instruction materials/tools anytime, anywhere.

c) For the third question -QI 8: lecturers were asked whether the utilization of ICT for teaching enables lecturers to teach in manners not earlier conceivable. The table shows that about 85.7% demonstrated that they emphatically concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT for teaching in ODeL enables lecturers to teach in manners not once in the past conceivable.

d) For the fourth question -QI 9: lecturers had to indicate whether the utilization of ICT enables the lecturers to surf through digital books, digital libraries, and journals. The table reveals that about 85.7% demonstrated that they strongly agreed with this statement. This finding proposes that most lecturers felt that the use of ICT in ODeL permits them to surf through e-books, e-libraries, and journals.

Table 4.15: T-test regarding the 4 (QI) identifying with ICT for instructing

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
7	2.29	1.976	.747	3.060	.022
7	2.29	1.976	.747	3.060	.022
7	1.86	1.864	.705	2.635	.039
7	1.71	1.890	.714	2.400	.053

Notes: T=t-test value, p<.05 (2-tailed test)
Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.15 shows the T-test regarding the four question items identifying with ICT for teaching. The table shows that at confidence level of 95% lecturers felt that ICT tools used for teaching in ODL are highly effective. This is evident in the mean score of all the items (1.71-2.29) which indicates that most of the lecturers firmly concurred and concurred with the items. The relatively higher p-value for lecturers may be due to trifling number of respondents -7. Thus, the utilization of ICT for instruction and erudition in ODeL are effective.

Table 4.16 displays the outcomes in revere to 11 items for lecturers identifying with ICT to promote instruction and erudition interaction, it might be seen from this table:

a) For the first question -QI 10: lecturers were asked whether the integration of ICT fosters lecturer-student interaction in ODeL. The table shows that about 85.7% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the integration of ICT fosters lecturer-student interaction in ODeL.

b) For the second question -QI 11: lecturers had to indicate whether ICT-enhanced lecturer-student interaction in ODeL enables lecturers to provide prompt and precise feedback to the students. The table reveals that about 85.7% demonstrated that they unequivocally concurred and concurred with this statement. This discovering proposes

that most lecturers felt that ICT-enhanced lecturer-student interaction in ODeL enables lecturer to provide prompt and precise feedback to the student.

c) For the third question -QI 12: lecturers were asked whether ICT-aided lecturer-student interaction in ODeL give lecturers opportunities to riposte student queries and clarify issue whenever. The table shows that about 57.2% demonstrated that they emphatically concurred and concurred with this statement. This discovering proposes that most lecturers felt that ICT-aided lecturer-student interaction in ODeL gives lecturers opportunities to reply student questions and clarify issues whenever.

d) For the fourth question -QI 13: lecturers had to indicate whether lecturer-student interactions interceded by the ICT permits lecturer to provide curricular support to the student on challenging topics. The table reveals that about 57.2% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that lecturer-student interactions interceded by the ICT permits lecturers to provide curricular support to the students on challenging topics in ODeL.

e) For the fifth question -QI 14: lecturers were asked whether effective lecturer-student interactions through ICT enable lecturers to teach basic skills to the students. The table shows that about 42.9% demonstrated that they emphatically concurred and concurred with this statement. While 42.9% skipped the statement.

f) For the sixth question – QI 15: lecturers had to indicate whether lecturer-student interaction mediated by ICT in ODeL permits lecturers to put accentuation on the use of information than the information itself. The table reveals that about 57.2% demonstrated that they firmly concurred and concurred with this statement. This discovering porposes that most lecturers felt that lecturer-student interaction mediated by ICT in ODeL permits lecturers to put accentuation on the use of information than the information itself.

g) For the seventh question -QI 16: lecturers were asked whether lecturer-student interaction via ICT supports lecturers to meet specific teaching objectives in ODeL. The table shows that about 57.2% demonstrated that they unequivocally concurred and concurred with this statement. This discovering proposes that most lecturers felt that

lecturer-student interaction via ICT supports lecturers to meet specific teaching objectives in ODeL.

h) For the eighth question -QI 17: lecturers had to indicate whether lecturer-content interaction mediated by ICT fosters lecturers' competency in ODeL. The table reveals that about 57.2% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that lecturer-content interaction mediated by ICT fosters lecturers' competency in ODeL.

i) For the ninth question -QI 18: lecturers were asked whether the use of ICT in ODeL allows a lecturer to have an asynchronous discussion with peers. The table shows that about 57.2% demonstrated that they emphatically concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT in ODeL concedes a lecturer to have an asynchronous discussion with peers.

j) For the 10th question -QI 19: lecturers had to indicate whether ICT-supported lecturer-lecturer interaction allows lecturers to compare and exchange information/data on related concepts in ODeL. The table reveals that about 57.2% demonstrated that they unequivocally concurred and concurred with this statement. This discovering proposes that most lecturers felt that ICT-supported lecturer-lecturer interaction allows lecturers to compare and exchange information/data on related concepts in ODeL.

k) For the 11th question -QI 20: lecturers were asked whether the use of ICT for lecturer-lecturer interaction supports collaborative teaching. The table shows that about 57.2% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the use of ICT for lecturer-lecturer interaction supports collaborative teaching.

Table 4.16: Frequency distribution and percentages as per the 11 question items on ICT for teaching and learning interaction (N=7)

Question Item (QI)	SA	A	N	D	SD
QI 10: ICT fosters lecturer-student interaction in ODL	5(71.4)	1(14.3)	0	0	0
QI 11: ICT-enhanced lecturer-student interaction in ODeL enables lecturer to provide prompt and precise feedback to the student.	5(71.4)	1(14.3)	0	0	0
QI12: ICT-aided lecturer-student interaction in ODeL gives lecturers opportunities to answer student questions and clarify issue at any time.	3(42.9)	1(14.3)	0	0	0
QI 13: Lecturer-student interactions interceded by the ICT permits lecturer to provide curricular support to the student on challenging topics.	2(28.6)	2(28.6)	0	0	0
QI 14: Effective lecturer-student interaction through ICT enables lecturers to teach basic skills to the students.	2(28.6)	1(14/3)	1(14.3)	0	0
QI 15: Lecturer-student interaction mediated by ICT in ODeL permits lecturer to put accentuation on the utilization of information than the information itself.	2(28.6)	2(28.6)	0	0	0
QI 16: Lecturer-student interaction via ICT supports	2(28.6)	2(28.6)	0	0	0

lecturers to meet specific teaching objectives in ODeL.					
QI 17: Lecturer-content interaction mediated by ICT fosters lecturers' competency in ODeL.	2(28.6)	2(28.6)	0	0	0
QI 18: ICT allows lecturers to have asynchronous discussion with students in ODeL.	2(28.6)	2(28.6)	0	0	0
QI 19: ICT-supported lecturer-lecturer interaction allows lecturers to compare and exchange information/data on related concepts in ODeL.	3(42.9)	1(14.3)	0	0	0
QI 20: ICT for lecturer-lecturer interaction supports collaborative teaching.	3(42.9)	1(14.3)	0	0	0

Table 4.17 bares the T-test regarding the 11 question items (QI) identifying with ICT to promote instruction and erudition interaction. The table shows that at confidence level of 95%, lecturers felt that the utilization of ICT for instruction and erudition in ODeL promotes effective student-content, instructor-content, instructor-student, student-student and instructor-instructor interactions. This is evident in the mean score of 3.57 or below which indicates that most of the lecturers strongly agreed and agreed with the items. The relatively higher p-value for lecturers may be due to small number of respondents is seven.

Table 4.17: T-Test in terms of the 11 (QI) relating to ICT to promote teaching and learning interaction

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
7	1.86	1.864	.705	2.635	.039
7	1.86	1.864	.705	2.635	.039
7	3.57	2.507	.948	3.769	.009
7	3.43	2.440	.922	3.718	.010
7	3.57	2.370	.896	3.986	.007
7	3.43	2.440	.922	3.718	.010
7	3.43	2.440	.922	3.718	.010
7	3.43	2.440	.922	3.718	.010
7	3.43	2.440	.922	3.718	.010
7	3.29	2.563	.969	3.391	.015
7	3.57	2.507	.948	3.769	.009

Notes: T=t-test value, p<.05 (2-tailed test)
Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.18: Frequency distribution and percentages in respect of nine question items on ICT for student support (N=7)

Question Item (QI)	SA	A	N	D	SD
QI21: ICT in ODeL supports the lecturer to design programmes that are responsive to their students' needs.	1(14.3)	3(42.9)	0	0	0
QI22: ICT in ODeL supports the lecturer to employ teaching strategies that are suitable for students' need.	2(28.6)	1(14.3)	1(14.3)	0	0
QI23: ICT in ODeL supports the lecturer to use evaluation strategies that suit student needs.	1(14.3)	2(28.6)	1(14.3)	0	0
QI24: The use of ICT in ODeL supports lecturer to formulate teaching objectives that are responsive to students' needs.	2(28.6)	2(28.6)	0	0	0
QI25: The utilization of ICT in ODeL enhances the delivery of education programmes.	2(28.6)	2(28.6)	0	0	0
QI26: ICT in ODeL supports the institution to structure educational programmes that could be delivered through various technologies.	1(14.3)	2(28.6)	1(14.3)	0	0

QI27: ICT in ODeL allows the lecturers to provide adequate instructions to the students on the use of the learning materials, study techniques, and some form of reference for a student who needs help dealing with the study problems.	3(42.9)	1(14.3)	0	0	0
QI28: ICT in ODeL gives the lecturer the opportunity to evaluate students' learning.	2(28.6)	2(28.6)	0	0	0
QI29: ICT in ODeL enables the institution to plan educational programmes that will help develop students' higher-order cognitive skills.	2(28.6)	1(14.3)	1(14.3)	0	0

Table 4.18 shows the results in regards to nine items for lecturers in relation to ICT for student support, it might be seen from this table:

a) For the first question -QI 21: lecturers had to indicate whether the use of ICT ODeL supports the lecturer to design programmes that are responsive to their students' needs. The table reveals that about 57.2% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers fondled that the deployment of ICT in ODeL supports the lecturer to design programmes that are responsive to their students' needs.

b) For the second question -QI 22: lecturers were asked whether the use of ICT in ODeL supports the lecturer to employ instruction strategies that are suitable for students' needs. The table shows that about 42.9% demonstrated that they emphatically concurred and concurred with this statement. While 42.9% skipped the statement.

c) For the third question -QI 23: lecturers needed to show whether the utilization of ICT in ODeL supports the lecturer to use evaluation strategies that suit students' needs. The table reveals that about 42.9% demonstrated that they firmly concurred and concurred with this statement. While 42.9% skipped the statement.

d) For the fourth question -QI 24: lecturers were asked whether the use of ICT in ODeL supports lecturer to formulate teaching objectives that are responsive to students' needs. The table shows that about 57.2% demonstrated that they emphatically concurred or concurred with this avowal. This finding proposes that most lecturers felt that the utilization of ICT in ODeL supports lecturer to formulate instructing objectives that are responsive to students' needs.

e) For the fifth question -QI 25: lecturers had to indicate whether the use of ICT in ODeL enhances the delivery of education programmes. The table reveals that about 57.2% demonstrated that they unequivocally concurred and concurred with this statement. This discovering proposes that most lecturers felt that the deployment of ICT in ODeL enhances the delivery of schooling programmes.

f) For the sixth question -QI 26: lecturers were asked whether the integration of ICT in ODeL supports the institution to structure educational programmes that could be delivered through various technologies. The table shows that about 42.9% demonstrated that they firmly concurred and concurred with this statement. While 42.9% skipped the statement.

g) For the seventh question -QI 27: lecturers had to indicate whether the utilization of ICT in ODeL allows the lecturers to give adequate instructions to the student on the use of the educating materials, study techniques, and some form of reference for a student who needs help dealing with the study problems. The table reveals that about 57.2% demonstrated that they emphatically concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT in ODeL allows the lecturers to give adequate instructions to the student on the use of the educating materials, study techniques, and some form of reference for a student who needs help dealing with the study problems.

h) For the eighth question -QI 28: lecturers were asked whether the use of ICT in ODeL gives the lecturer the opportunity to evaluate what is learnt by the student, whether through electronically submitted assignments and/or portfolios. The table shows that about 57.2% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT in ODeL offers the lecturer the chance to evaluate what is learnt by the student, whether through electronically submitted assignments and/or portfolios.

i) For the ninth question -QI 29: lecturers had to indicate whether the utilization of ICT in ODeL enables the institution to plan educational programmes that will help create higher-order cognitive abilities in the students. The table reveals that about 42.9% demonstrated that they unequivocally concurred and concurred with this statement. While 42.9% skipped the statement.

Table 4.19: T-Test in terms of the nine (QI) relating to ICT for student support

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
7	3.57	2.299	.869	4.110	.006
7	3.57	2.370	.896	3.986	.007
7	3.86	2.193	.829	4.653	.003
7	3.43	2.440	.922	3.718	.010
7	3.43	2.440	.922	3.718	.010
7	3.71	2.215	.837	4.437	.004
7	3.29	2.563	.969	3.391	.015
7	3.43	2.440	.922	3.718	.010
7	3.71	2.360	.892	4.163	.006

Notes: T=t-test value, p<.05 (2-tailed test)
Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.19 shows the T-Test as far as the nine question items (QI) identifying with ICT fosters the flexible teaching. The table reveals that at confidence level of 95%, lecturers felt that ICT fosters the flexibility of educational programmes. This is evident in the mean score of 3.86 or below which indicates that most of the lecturers emphatically concurred and concurred with the items. The relatively higher p-value for lecturers may be due to small number of respondents is seven.

Table 4.20: Frequency distribution and percentages regarding the five question items on ICT for flexible teaching (N=7)

Question Item (QI)	SA	A	N	D	SD
QI30: ICT changes the lecturer's roles from being the focal point in students learning process to a facilitator, scaffolding or mentor.	2(28.6)	1(14.3)	1(14.3)	0	0
QI31: ICT fosters the lecturers' ability to increase students' active participation in their learning process.	2(28.6)	1(14.3)	1(14.3)	0	0
QI32: ICT fosters lectures' ability to teach the students requisite skills to become lifelong learners.	3(42.9)	2(28.6)	0	0	0
QI33: ICT enables the lecturers to teach students the requisite skills to discover and explore new knowledge on their own.	3(42.9)	1(14.3)	1(14.3)	0	0
QI34: ICT permits lecturers to provide the students with necessary supports to connect/link one learning task/activity to another according to their own needs.	2(28.6)	2(28.6)	1(14.3)	0	0

Table 4.20 displays the outcomes regarding the 5 items for lecturers in relation to ICT for flexible teaching, it may be observed from this table that:

a) For the first question -QI 30: lecturers were asked whether the use of ICT changes the lecturer's role from being the focal point in students' learning process to a facilitator, scaffolding or mentor. The table shows that about 42.9% demonstrated that they firmly concurred and concurred with this statement. While 42.9% skipped the statement.

b) For the second question -QI 31: lecturers had to indicate whether the utilization of ICT in ODeL fosters the lecturers' ability to build students' active participation in their learning process (e.g. through problem-based teaching, individual or group presentation). The table reveals that about 42.9% demonstrated that they emphatically concurred and concurred with this statement. While 42.9% skipped the statement.

c) For the third question -QI 32: lecturers were asked whether the use of ICT in ODeL fosters lectures' ability to teach the students requisite skills to become lifelong learners. The table shows that about 71.5% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT in ODeL fosters lectures' capacity to teach the students requisite skills to become lifelong learners.

d) For the fourth question -QI 33: lecturers had to indicate whether the utilization of ICT in ODeL enables the lecturer to teach students the requisite abilities to discover and explore new knowledge on their own. The table reveals that about 57.2% demonstrated that they unequivocally concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT in ODeL empowers the lecturer to teach students the requisite skills to discover and explore new knowledge on their own.

e) For the fifth question -QI 34: lecturers were asked whether the utilization of ICT for teaching permits lecturers to provide the students with necessary support to connect/link one learning task/activity to another according to their own needs in ODeL.

The table shows that about 57.2% demonstrated that they firmly concurred and concurred with this statement.

This discovering proposes that most lecturers felt that the utilization of ICT for teaching permits lecturers to provide the students with necessary supports to connect/link one learning task/activity to another according to their own needs in ODeL.

Table 4.21 shows the T-Test regarding the five question items (QI) identifying with ICT for flexible teaching. The table shows that to a large extent, ICT supports students to make decisions about learning objectives and goals. This is evident in the mean scores of 3.71 or below. Thus, the utilization of ICT for instruction and erudition in ODeL promote transactional autonomy.

Table 4.21: T-Test in terms of the five (QI) relating to ICT for flexible teaching

N	**Mean**	**Std. Deviation**	**Std. Error Mean**	**T**	**Sig. (2-tailed**
7	3.71	2.360	.892	4.163	.006
7	3.71	2.360	.892	4.163	.006
7	2.71	2.289	.865	3.138	.020
7	3.00	2.309	.873	3.437	.014
7	3.14	2.193	.829	3.792	.009

Notes: T=t-test value, p<.05 (2-tailed test)
Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.22: Frequency distribution and percentages as per the three question items on ICT for connective learning [N=7]

Question Item (QI)	SA	A	N	D	SD
QI35: ICT for teaching fosters the lecturers' ability to expose the students to multiple or different facets of learning processes.	4(57.1)	1(14.3)	0	0	0
QI36: ICT for teaching allows lecturers to presents the students with multiple entries and exits points to learning.	2(28.6)	2(28.6)	1(14.3)	0	0
QI37: ICT for teaching allows lecturers to provide students limitless ways of creating their own knowledge.	3(42.9)	2(28.6)	0	0	0

Table 4.22 displays the outcomes regarding the three items for lecturers in relation to ICT for connect learning, it might be seen from this table:

a) For the first question -QI 35: lecturers had to indicate whether the utilization of ICT for teaching in ODeL fosters the lecturers' aptitude to expose the students to multiple or different facets of learning processes. The table reveals that about 71.5% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT for teaching in ODeL fosters the lecturers' aptitude to expose the students to multiple or different facets of learning processes.

b) For the second question -QI 36: lecturers were asked whether the utilization of ICT for teaching allows lecturers to present the students with multiple entries and exit points to learning in ODeL. The table shows that about 57.2% demonstrated that they emphatically concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT for teaching allows lecturers to present the students with multiple entries and exit points to learning in ODeL.

c) For the third question -QI 37: lecturers had to indicate whether the utilization of ICT for teaching in ODeL allows lecturers to provide students limitless ways of creating their own knowledge.

The table reveals that about 71.5% demonstrated that they firmly concurred and concurred with this statement. This discovering proposes that most lecturers felt that the utilization of ICT for teaching in ODeL allows lecturers to provide students limitless ways of creating their own knowledge.

Table 4.23: T-Test in terms of the three (QI) relating to ICT for connective learning.

N	Mean	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed
7	2.57	2.370	.896	2.870	.028
7	3.00	2.160	.816	3.674	.010
7	2.71	2.289	.865	3.138	.020

Notes: T=t-test value, p<.05 (2-tailed test)
Scale for items: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 4.23 shows the T-Test regarding the three question items (QI) identifying with ICT for connected learning. The table shows the use of ICT supports rhizomatic learning in ODeL. This is evident in the mean scores of (2.6-3.0). Thus, the deployment of ICT for instruction and erudition in ODeL promote rhizomatic learning.

4.3. QUALITATIVE FINDINGS

This segment reports the findings from the data gathered through the open-ended questions from the questionnaire. It is worth noting that no participants' name appeared in any document used during the discussion sessions for anonymity and confidentiality reasons. The qualitative data from the open-ended questions were analysed thematically following the procedures as recommended by Bhattacherjee (2012). Guided by Bhattacherjee (2012) the researcher identified, named and ordered rising exemplars from the data by perusing and re-perusing the data a few times. In doing this, the pollster spotted certain words and expressions that over and over showed up and those outstanding and therefore, searched for symmetries, patterns and points that rose up out of the data. There were nine open-ended questions for students and seven for lecturers. The results are presented by each question as well as in terms of each group.

4.3.1. Student Qualitative Findings

In Question one, students were required to provide information about how ICT overcomes time and distance barriers to their learning. In response to the above-mentioned question, the majority of students (38 out of 52) mentioned that the utilization of ICT allows them to learn anywhere and anytime without barriers. This implies that, the utilization of ICT in ODeL aids student to overcome the learning barriers they might experience. These are the views typically expressed by students, who indicated:

'I can access learning anytime and anywhere as long as I have the computer or phone with internet connectivity'
'It makes things easier, instead of travelling am connected anytime wherever I am'

In Question two, students were requested to report about their instruction and erudition interaction. The discoveries in this regard revealed that the majority (48 out of 52) of students explained that they use ICT tools such as e-mail, phone call and chat forums to communicate with lecturers. This implies that, the utilization of ICT permits the students to effectively engage with their lecturers in the university. *These are the views typically expressed by students, who indicated:*

'Through email, discussion forums and phone calls'
'Via MYUNISA, discussion forums and phone calls'

In Question three, students were asked to explain whether ICT fosters flexibility. The majority of students (29 out of 52) confessed that the institution has various academic programmes students can choose from based on individual needs. This suggests that, the utilization of ICT permits the university to plan and bid various programmes that are responsive to the students' wants. These are the views typically expressed by students, who indicated:

'UNISA gives various choices and the students choose the one best suited to them'
'There are different route to master program. You choose the route that best suits your needs'

In Question four, the students were asked to explain whether ICT supports them in decision making. The majority of students (46 out of 52) indicated that they find ICT to be simple to support their decision making. These are the views typically expressed by students, who indicated:

"Find it simple. The more I use ICT the more I find it simple".
"It's simple to use with consistency"

In Question five, the students were requested to explain how they use technology for own learning. Forty-six students explained that they use technology to surf the internet and for communicating with lecturers and peers during learning. It is apparent from the data that student do use ICT for different purposes in their learning. This is a view expressed by students when they pointed out that:
'I use ICT to surf the internet, complete task and communicate with lecturers and peers during learning'.
"I use ICT to collect information online, complete and submit and interact with lecturers and peers"

In Question six, the students were requested to report about their roles and responsibilities of using ICT for learning. From the data it was clear that the most of students (33 out of 52) play a role in using ICT for learning and are responsible self-directed learners. This is the view supported by students who said:

'It allows me to direct my own learning, I decided what to learn, when to learn, where to learn and how to learn'.
"ICT permits me to take control of my learning"

In Question seven, the students were requested to explain how ICT help them to learn from different learning nodes or tasks. The data revealed 30 out of 52 participating students have explained that ICT enables them to connect with different information and generate new ideas which broaden their knowledge. In this case students mentioned that:

'It provides access to information from different sources, broaden understanding and help to construct own knowledge'.
'ICT provides me access to myriad of data, help my learning and increase my understanding'

Other students supported the idea and mentioned that:

'Used what I have learnt in one task to solve another task'.
'ICT allows me to apply my knowledge in one assignment to complete another'

In Question eight, the students were requested to explain whether they get help in terms of the challenges with ICT. From the information it was flawless that most of the students (29 out of 52) get help during challenges. In this case students mentioned that:

'Yes within 24 hours'
'In 24 hours'
'Under 24 hours'

Other students supported the idea and mentioned that:

'Yes with 48 hours'
'In 48 hours'

In Question nine, the students were requested to propose the strategies for the upturn of ICT facilities in the University. The data uncovered 27 of 52 participating students having suggested that the university should improve on her ICT facility, capacity and training of students. Students mentioned that:

'Provide more students friendly ICT facility; improve on student training, internet speed and number of ICT personnel'.
'Put in place easy to use ICT gadgets, do more users training, upgrade internet speed and ICT Staff'

4.3.2. Lecturers Qualitative Findings

In Question one, the lecturers were requested to explain how ICT overcomes time and distance barrier to their teaching. The data revealed that the majority (4 out of 5) participants reported that the deployment of ICT in instruction supports them anywhere, any time. This view is typified by participants' statements that:

'Teach fully online anytime, anywhere'.
'Online teaching only'
'Email'
'Whatsapp'
'It increase work load'

In Question two, the lecturers were requested to describe how ICT supports the university to offer flexible educational programmes that suit students' individual needs. At least, the data revealed two participants out of five to have described ICT as a support to e-tutoring programme to provide students individual needs. In this case, the participants indicated:

'E-tutoring'.
'ICT options are limitless. From the VLE to free technologies, programmes can be tailor-made to suit various learning preferences'
'Haphazardly. Most students use the ICT for administrative enquiries and complaints only. Little benefit to teaching and learning'
'I have never experienced that form of support from ICT for my students'
'Own time ODeL education'

In Question three, the lecturers were requested to explain how they use ICT to support the students that learn on their own. The data in this regard revealed that two out of five participants use ICT to support students by answering their queries. Other participants explained that they use ICT to help students learning through alternative assessment as well as using e-tutors. In this case typical arguments were provided by participants who said:

‘Alternative assessment’
‘I always attend to their individual queries’
‘Supporting e tutors to post case studies
‘Haphazardly. Most students use the ICT for administrative enquiries and complaints only. Little benefit to teaching and learning’
‘Not at all based on the lack of use’

In Question four the lecturers were requested to describe how they use technology to provide curriculum support to students on challenging topics.

The data reported that the majority (3 out of 5) of participants use a variety of online tools to provide curriculum support to students on challenging topics. In this instance the participants wrote:

‘Discussion forums, emails and telephonic discussions’
‘Supported in online discussions, blogs, through videos, podcasts’
‘Through discussion forums or video conferencing to explain the challenging section’
‘Need to do this more’
‘Haphazardly. Most students use the ICT for administrative enquiries and complaints only. Little benefit to teaching and learning’

In Question five the lecturers were requested to explain how ICT allows them to support students to connect or link one learning task or activity to another. The data revealed that the majority (3 out of 5) participating lecturers use ICT to support students to link one learning task to another. One more participant explained that students can follow clear instructions.

'Discussion forums'
'I always help them every time they call me regarding that and advice them to go to telecentres for help at their nearby places'
'Clear instructions and e-Portfolios assessment'
'Students can use platforms like a VLE where everything is linked'

'Haphazardly. Most students use the ICT for administrative enquiries and complaints only. Little benefit to teaching and learning'

In Question 6 the lecturers were requested to describe the challenges they experience regarding teaching with ICT in ODeL. The data demonstrated that most (4 out of the 5) participating lecturers experience lack of ICT facilities and support. About this issue, the participants said:

'Internet access'
'Students who cannot access the ICT myunisa programmes'.
'Lack of dependable ICT facilities'
'Infrastructure. Capacity and support of the various functions.'
'Need support in video conferencing, podcasts, blogs'

In Question seven the lecturers were requested to give their opinions regarding chances for improving teaching and learning with ICT. In this regard most participating lecturers (4 of 5) suggested that the institution can improve on her use of ICT for teaching through student support, continuous development and keep systems in good standing. Regarding this matter, the participants argued that:

'Students also require support in use of technology'
'Definitely! There is simply not an option to leave ICT out these days'.
'Yes we can improve the if we support our students , get continuous development and have our systems in good standing'
'Yes, this is the future by continuous improvement in ICT facilities'
'Retiring soon. No chance for improvement.'

4.4 CONCLUSION

Taken everything into account, this part offered the analysis and results of both quantitative and qualitative data. These results were displayed according to the groups of participants (students and lecturers). Quantitative results were presented first and thereafter qualitative findings. The quantitative results were presented in the following manner: Firstly, the demographic data of the participants in all the two participating groups was provided. This was followed by the explanation of results on the quantitative instrument used for each of the participating groups. Lastly, the findings of a qualitative data from the two participating groups are displayed. In Chapter 5 the findings, trailed by the conclusions and suggestions will be talked about.

CHAPTER 5

DISCUSSIONS, RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The reason as expressed in Chapter 1 of this examination was to research the role of ICT in ODeL environment. Given that, the discussion of the findings is presented based on the five sub-queries (see section 1.5.2).

This part is sorted out into three segments. Firstly, the researcher abridges the significant discoveries of the investigation as per the role of ICT in ODeL environment. Secondly, are the recommendations offered for the role of ICT in ODeL for advanced schooling institutions, and for further research in this field. Lastly, the part finishes with an end to the inquiry.

5.2 DISCUSSION TO SUMMARY OF FINDINGS

In this study, closed ended and open-ended questions were utilized to gather quantitative and qualitative data. This inquiry tried to respond to the accompanying exploration questions: What is the role of ICT in ODeL environment? To answer this question, a questionnaire containing both closed-ended and open-ended questions covering a number of aspects were administered to the participants (see Appendix A and B). In the accompanying areas, the swift of discoveries in connection to the investigation questions is condensed.

5.2.1 How effective are the ICT tools for instructing and learning in ODeL context?

In this study, the most important viability of ICT for instructing and learning is that it allows the learners to surf through digital books, digital archives, erstwhile question papers, artifacts and dairies. Bhattacharya and Sharma (2007) posit that ICTs enable the provision of online materials such as e-libraries which gave the students, teachers

and professionals the opportunity to surf the internet for research articles, journals, publications, course materials and the like, at any time and from anywhere. In this study, the most important viability of ICT for instructing and learning is that it allows the learners to surf through digital books, digital archives, erstwhile question papers, artefacts and dairies. In this regard, ICT has been publicized to decidedly impact student erudition, foster learning and make teaching and learning effective (Chudgar 2013; Polly 2011; Bar-Yossef et al 2009) and enhance educational quality (Angadi 2014; Tino 2003).

5.2.2 To what extent have ICT promote student-content, lecturer-student and student-student interaction?

In this study, it was found that the utilization of ICT in ODeL permits lecturers-students and students-content interactions anytime and anywhere. The study confirmed that ICT allow both lecturers and students to interact anywhere and anytime without learning barriers. This implies that, the utilization of ICT in ODeL help student to overcome the learning barriers they might experience. This is in line with Angadi's (2014) notion of ICT as an enabler to the suppleness of educational conveyance that students access knowledge anytime, anywhere. Furthermore, students use ICT tools, for example, email, phone call and discussion forum to connect with lecturers. To this, the students can connect sucessfully with their lecturers through the use of ICT in the university. This confirms literature (Barrus 2010; Levin & Wadmany 2008; Rifkin 2000) on ICT as enabler to the development of affluent systems of communication and interactions between individuals. ICT foster interaction between lecturers and students (Barrus 2010; Levin & Wadmany 2008). In many instances, students use information and communication technologies to interact with peers, whereas teachers on the other hand use the technologies for collaborating and interacting with one another, as well as sharing information with their students (Barrus 2010).

In a nutshell, the inquiry established that the utilization of ICT promotes interaction and increment discourse among students and their educators. In this manner, ICT lessen the learning gap between students and lecturers in ODeL. This is in accords with

transactional distance learning viewpoint as explained by Moore (1993), as well as Larking and Jamieson-Proctor (2013).

5.2.3 How do ICT foster the flexibility of the education programs in open distance and e-Learning?

To address this question, students had to demonstrate how the deployment of ICT foster the flexibility of schooling programmes objectives, instructing strategies, and assessment strategies to suite student individual needs. In this study, it was discovered that, the utilization of ICT fosters the adaptability of the education programme's objectives, instructing strategies, and assessment strategies to suite student individual needs in ODeL. Looking closely at the findings, ICT fosters the adaptability of conveyance of training in ODeL environment, with the goal that students can access information whenever and from anyplace (Noor-Ul-Amin 2014). In this study it was discovered that, the utilization of ICT fosters the adaptability of the education programme's objectives, instructing strategies, and assessment strategies to suite student individual needs in ODeL. The finding confirms literature (Noor-Ul-Amin 2014; Akir 2006; Young 2002) that ICT increases the adaptability of education conveyance and fosters accessibility to just-in-time learning. This suggests, the utilization of ICT permits the university to plan and bid various programmes that are responsive to the student needs thus reducing transactional distance. This agreed well with transactional distance learning theory as posited by Moore (1993).

The study also affirmed the utilization of ICT allows the lecturers to employ teaching strategies that are suitable to student needs. The finding in this regard concurs with literature (Underwood & Underwood 1999) that ICT supports a variety of learning panache, by making learning progressively available and improving the probability of building a bona fide comprehension.

5.2.4 To what extent have ICT support the students to make decisions about learning activities, goals, and evaluation methods in ODeL environment?

This study found that the utilization of ICT in ODeL allows the student to decide the objectives, the learning capabilities and the assessment of the learning rather than the lecturer. The finding confirmed literature (Simataa 2015; Noor-Ul-Amin 2013; Tatkovic et al 2006) that ICT equips and allows students to accept dynamic role in their own learning procedures. Furthermore, the utilization of ICT for instructing and learning provides students limitless ways of generating knowledge (Cormier 2008). This implies that ICT allows the students to decide what to comprehend, when to comprehend, where to comprehend and how to comprehend. This confirms literature (Noor-Ul-Amin 2013; Tatkovic et al 2006) that learning is more student-directed rather than teacher-directed. In this regard, the use of ICT promotes student autonomy, thus allowing them to assume liability for their own learning. This also agrees with the transactional distance learning viewpoint as explained by (Moore 1993) and (Rudd 2001).

Furthermore, it was found that utilization of ICT permits lecturers use of a variety of online tools to provide curriculum support to students on challenging topics. In this view, the lecturers used ICT instrument such as the online talks, blogs, videos, and podcast. The outcome is confirmed by Noor-Ul-Amin's (2013) view that utilization of ICT in instructing, generates meaningful and engaging erudition experiences for students, just as the provision of appropriate learning skills to construct individual knowledge.

5.2.5 How do ICT allow students to connect from one learning node, activity or information to another?

The finding in this regard established that utilization of ICT in ODeL enables students to connect with different information and generate new ideas which broaden their knowledge. This aligns with literature (Dillon 2016; Pineda 2013; Bussey et al 2010; Cormier 2008) that ICT makes it possible for many students both in conventional and ODeL to have convenient access to rich content, major works and information. Moreover, there is no beginning or ending of learning as the rhizome learning theory posits (Dillon 2016; Bussey et al 2010).

The study further established that lecturer's utilization ICT to support student to link one learning task to another. In this manner, the utilization of ICT permits students to utilize what they have learnt in one task to solve another task. This is confirmed by Yeboah-Fofie (2015) and Valdez at el (2000) that teaching, and learning can be stretched out through virtual private systems to incorporates online classrooms.

5.3. RECOMMENDATIONS

In this study, closed ended and open-ended questions were utilized to gather quantitative and qualitative data. basically, issues of reliability and validity were reported. In view of the of the discoveries revealed in this investigation, it is prescribed that:

The utilization of ICT in ODeL environment is indispensable and it is important that the institution makes ICT facilities and the Internet with high speed accessible to both students and lecturers.

There should be provision of technical support to users. Students and lectures ought to be furnished with relevant technological information and skills.

Such skills should include time-to-time preparation on the utilization of contemporary ICT tools, students support services and continuous development that will keep systems in good standing.

The study further suggests follow up studies that will extend to compare instructors and students in the CEDU to instructors and students in non-education program in a larger population sample and with wider objectives to enhance generalisation of the findings within the ODeL. Also, analysis of course materials and interview should be incorporated as a feature of data collection strategies.

5.4. STUDY LIMITATIONS

The present study is not without limitations. Any research dealing with humans is difficult to interpret and the researcher cannot be absolutely sure that everything provided is genuine. It could be possible that participants in this study provided positive and negative responses based on what they thought the researcher was looking for rather than what they genuinely felt. The researcher had no control over these study limitations. In the first place, the closed ended questions were estimated utilizing a Likert-scale design. Participants may decipher the scale uniquely in contrast to each other, for instance, one person's 1 may be equal to another's 3 and still someone else's 2. This could also affect the participants' response.

It is noticeable that the participants in this study were not interviewed per se yet needed to react to open-ended questions in the questionnaire at their convenient time and from different locations. In retrospect, and in order to address the issue raised previously, it would have been wise to lead vis-a-vis interviews with selected students and instructors. Furthermore, a sample size of 52 students and seven lecturers was too small for this study. This sample size cannot be used to oversimplify the study discoveries to a bigger populace of the entire institution. This should be increased to a larger size. Future studies should consider these issues.

5.5. STUDY SUMMARY

In this section the synopsis of the sections is exhibited. Chapter One commenced with the introduction, background and the context of the study. Matters relating to ODeL were briefly discussed under this section. It was mentioned that the study was conducted in a university that offers ODeL education in South Africa, the University of South Africa (UNISA). Furthermore, issues relating to context of the study such as literature review, theory underpinning the study were described. Also, here the synopsis of the inquiry question, purpose of the inquiry, aims and objective of the inquiry, research design and methods were presented. This was trailed by the significance of the study just as the ethical issues. Finally, issues identifying with elucidation of lexes and exposition of the dissertation were addressed.

Chapter Two provided a review of literatures and a theoretical perspective that for the basis of the study. On the primary, the emphasis was on published literature relating to ICT in ODeL. This was achieved by discussing the information that grounded the study. In this regard, the chapter began by identifying and discussing issues relating to role of ICT in ODeL. Literature focusing on ICTs and ICT tools in ODeL was also presented. The chapter concluded with a theoretical perspective that grounded the study.

Chapter three started with the description of this study's philosophy. It was emphatically stated here that the study's philosophy was pragmatism in nature. It was pragmatism in the sense that the research approach followed was a mixed method. So, issues relating to research design were discussed. For instance, the discussion includes explanations of data methods using different instruments. Following the process of data collection, data analysis was explained. Furthermore, measures to guarantee unwavering quality and legitimacy relating to the collected data were addressed. The chapter concluded by discussing the ethical issues.

Chapter four detailed the findings dependent on the analyses of the deductive and inductive data. The findings were discussed in terms of each data collection instrument and research question. First was the presentation of the participants' demographic data, followed by the quantitative data results. The chapter concluded with the presentation of the qualitative discoveries.

In **Chapter five**, the dialogue on summary of discoveries, followed by the recommendations and conclusions was provided.

5.6. Conclusion

The aim of this examination was to research the role of ICT in ODeL environment. Given that, it was established in this study that the most important viability of ICT for instructing and learning is that it allows the learners to surf through digital books, digital archives, erstwhile question papers, artifacts and dairies. The study confirmed that ICT allow both lecturers and students to interact anywhere and anytime without learning barriers. In this study, it was discovered that, the utilization of ICT fosters the adaptability of the education programme's objectives, instructing strategies, and assessment strategies to suite student individual needs in ODeL. The study also affirmed the utilization of ICT allows the lecturers to employ teaching strategies that are suitable to student needs.

Furthermore, the study also found that the utilization of ICT in ODeL allows the student to decide the objectives, the learning capabilities and the assessment of the learning rather than the lecturer. It also was found that utilization of ICT permits lecturers use of a variety of online tools to provide curriculum support to students on challenging topics. In this view, the lecturers used ICT instrument such as the online talks, blogs, videos, and podcast. The finding in this regard established that utilization of ICT in ODeL enables students to connect with different information and generate new ideas which broaden their knowledge. The study further established that lecturer's utilization ICT to support student to link one learning task to another. In this manner, the utilization of ICT permits students to utilize what they have learnt in one task to solve another task.

REFERENCES

Adesote, A.V. and Omojeje, S.A., 2011, African Journal of social Research and Developmet, 2011.

Adams, D., Samat, S.N.A. and Samah, H.A., 2018. Teacher leadership: Going beyond classroom. International Online Journal of Educational Leadership, 2(1), pp.1-3.

Ager, R., 1998. Information and communications technology in primary schools. Children or computers in control. London. David Fulton Publishers.

Ahern, N.R., 2005. Using the Internet to conduct research. Nurse researcher, 13(2).

Akir, Z.I., 2006. Impact of information and communication technology on teaching and training: a qualitative systematic review (Doctoral dissertation, Ohio University).

Al-Ansari, H., 2006. Internet use by the faculty members of Kuwait University. The

Electronic Library Vol.24, No. 6, P: 791-803.

Angadi, G.R., 2014. An Effective Use of ICT Is a Change Agent for Education. Online International Interdisciplinary Research Journal, {Bi-Monthly}, ISSN2249-9598, Volume-IV, March 2014 Special Issue.

Antifaiff, G., 2000. Integrating Technology into the Curriculum. [Online]. Available at <http://www.usask.ca/education/coursework/802papers/antifaiff/antifaiff>.pdf retrieved on September 11, 2011.

Attwell, G., 2007. Personal Learning Environments: The future of e-Learning. eLearning Papers, 1-8.

Baharuldin, Z., Jamaluddin, S. and Shaharom, M.S.N., 2020. The Role of School Administrative Support and Primary School Teachers' ICT Literacy to Integrate ICT into the Classrooms in Pahang, Malaysia. International Online Journal of Educational Leadership, 3(1), pp.26-42.

Bakari, J., Mbwette, T.S., & Salaam, D.E., 2010. Implementing eLearning in higher open and distance learning institutions in developing countries: the experience of the Open University of Tanzania. In Fifth International Conference of Learning International Networks Consortium (LINC), Massachusetts Institute of Technology.

Barnes, S., & Greller, L.M., 1994. Computer-mediated communication in the organization. Communication Education, 43(2), 129-142.

Barak, M., 2013. Closing the gap between attitudes and perceptions about ICT-enhanced learning among pre-service STEM teachers. Journal of Science education Technology.

Barrus, J., 2010. Educational Benefits of a Computer. EHow Contributor. [Online]. <Available at http://www.ehow.com/...l-benefits-computer.html> retrieved on April 1, 2011.

Barton, H., 2005. The impact of the new opportunities fund (NOF) ICT in subject in subject teaching training programme (Doctoral dissertation, Education).

Bar-Yossef, N., Ben-Hur, Y., & Klieger, A. 2009. 'Integrating Laptop Computers into Classroom', Attitudes, Needs, and professional development of Science Teachers - A Case Study. Journal of Science Education Technology, 187-198.

Bauman, Z., 2010. Forty-four letters from the liquid modern world. Cambridge, Polity.

Bell, J., 1999. Doing your research project. A guide for first-time researchers in education and social science. Buckingham. Open University Press.

Bernard, H.R., 2000. Social research methods. Qualitative and quantitative approaches. London. Sage Publications.

Bhattacharya, I. & Sharma, K., 2007. India in the knowledge economy – an electronic paradigm', International Journal of Educational Management Vol. 21 No. 6, Pp: 543-568.

Bhattacherjee, A., 2012. Social science research: Principles, methods, and practices.

Bogdan, R.C. & Biklen, S.K., 2003. Qualitative research for education: An introduction to theories and methods. (4th Ed.). Boston: Pearson Education, Inc.

Boulos, M.N.K., Maramba, I. and Wheeler, S., 2006. Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC medical education*, *6*(1), p.41.

Bower, M. 2008. Affordance analysis − Matching learning tasks with learning technologies. Educational Media International 45(1): 3−15. Available at

doi:10.1080/09523980701847115.http://www.tandfonline.com/doi/abs/10.1080/09523980701847115.

Brosnan, M., 1997. The fourth 'R': are teachers hindering computer literacy in school children? Education section Review. 21,1,29-37.

Brown, R., 2003. The potential of ICT, in Becta Leading the way in ICT. Report on a one-day seminar for Chief Education Officers. Coventry. Becta.

Brown, A. and Dowling, P., 1998. Doing research / reading research. A mode of interrogation for education. London. Falmer Press.

Bransford, J., Brown, A.L. & Cocking, R.R., (Eds) 2000. How people learn: Brain, Mind, experience and school (2nd Ed.). Washington D.C.: National Academiy Press.

Breuleux, A., Laferriere, T. & Bracewell, R., 1998. Networked learning communities in teacher education.

Bussey, M., Bjurström, E. & Sannum, M., 2010. Rhizomatiska lekplatser.

Cantrell, M.A. 2007. Methodological issues in online data collection. Journal of advanced nursing, 60(5), pp.544-549.

Carneiro, R., 2007. The big picture: understanding learning and meta-learning challenges. *European Journal of Education*, *42*(2), pp.151-172.

Carrasco, M.R. & Torrecilla, F.M., 2012. Learning environments with technological resources: a look at their contribution to student performance in Latin American elementary schools. Education Technology Research Development, 1107-1128.

Castillo, J.J., 2009. Research Population [Online]. Available at <http://explorable.com/researchpopulation> retrieved on Mar 04, 2013.

Chetty, D., 2012. Challenges and prospects: ICT enhanced teaching and learning in the College of Human Sciences (Unisa).

Chickering, A.W. & Ehrmann, S.C. 1996. Implementing the seven principles: Technology as lever. AAHE bulletin, 49, 3-6.

Child, D., 1993. Psychology and the teacher. London. Cassell Education.

Cholin, V.S., 2005. Study of the application of information technology for effective access to resources in Indian university libraries', The International Information & Library Review Vol.37,No.(3), Pp:189-197.

Chudgar, A., 2013. The provision and challenges of using mobile phones for adult literacy training: Data from one Indian state. International Journal of Educational Development.

Chute, A.G., 2003. From teletraining to e-learning and knowledge management. Handbook of distance education, 297-313.

Connor, A., 2005. Rewriting the rule books (BBC News WEBLOG WATCH–The Magazine's review of weblogs–15 Aug 2005).

Couper, P., 2000. Web surveys: a review of issues and approaches. Public Opinion Quarterly, 64(4), 464–94. Tallahasee, FL. Retrieved March 12th, 2003, from <http://www.emoderators.com/moderators/flcc.html>

Cormier, D., 2008. Rhizomatic education: Community as curriculum. Innovate: Journal of online education, 4(5), 2.

Creswell, J.W., 2003. Research Design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage.

Crook, C., 1994. Computers and the collaborative experience of learning. London. Routledge.

Davis, N., Desforges, C., Jessel, J., Somekh, B., Taylor, C. and Vaughan, G., 1997. Can quality in learning be enhanced through the use of IT?, in Somekh, B. and Davis, N. (eds) Using information technology effectively in teaching and learning. Studies in pre-service and in-service teacher education. London. Routledge.

Dela Pena-Bandalaria, M., 2007. Impact of ICTs on open and distance learning in a developing country setting: the Philippine experience. International Review of Research in Open and Distance Learning, 8(1), 1-15.

Department of Education (DOE) 2004. Draft white paper on e-Education. Transforming learning and teaching through Information and Communication Technologies (ICTs) Government Gazette. No. 26734.

Deleuze, G. & Guattari, F., 1987. Introduction: rhizome. A thousand plateaus: Capitalism and schizophrenia, 3-25.

Dighe, A., 2006. Use of ICTs in literacy and lifelong learning.

Dijkstra, S., 1991. Instructional design models and the representation of knowledge and skills. Educational Technology, 31(6), 19-26.

Dillon, M., 2016. Learning Happens: Incorporating a Rhizomatic Perspective into Teaching and Learning.

Duffy, T. & Cunningham, D., 1996. Constructivism: Implications for the design and delivery of instruction, Handbook of research for educational telecommunications and technology (Pp: 170-198). New York: MacMillan.

Dyer, C., 1995. Beginning Research in Psychology. Oxford: Blackwell.

Ferreira, J.G & Venter, E., 2011. Barriers to learning at an ODL institution. Progressio, 33(1), 80-93.

Flecknoe, M., 2002. How can ICT help us to improve education"? Innovations in Education & Teaching International, Vol. 39, No. 4, Pp: 271-280.

Florian, L. & Hegarty, J., (Eds.) 2004. ICT and Special Educational Needs: A tool for inclusion. Berkshire: Open University Press.

Forcheri, P., Molfino, M.T., 2000. ICT driven individual learning: New opportunities and perspectives. Educational Technology & Society, 3(1), 51-61.

Fozdar, B.I. & Kumar, L.S., 2007. Mobile Learning and Student Retention. International Review of Research in Open and Distance Learning, 8(2), 1-18.

Frank, L. (2010). Trustworthiness in Qualitative Research. [Online]. Available at http://problemfinding.labanca.net/2010/05/24/trustworthiness-in-qualitative-research/ retrieved on May 5, 2014.

Fricker, R.D., 2008. Sampling methods for web and e-mail surveys. The SAGE handbook of online research methods, 195-216.

Friesen, N. & Lowe S., 2011. The questionable promise of social media for education: connective learning and the commercial imperative. Journal of Computer Assisted Learning. 426 1.12.

Garrison, D.R., Anderson, T. & Archer, W., 2003. A theory of critical inquiry in online distance education. Handbook of distance education, 1, 113-127.

Gioko, A., 2012. Creating an effective professional learning sessions model on technology integration for a Kenyan school district. Education Information Technology, 151-164.

Gronstedt, A., 2007. Basics of Podcasting. Info online Pp:1-15

Guri-Rosenblit, S., 2005. 'Distance education' and e-learning': Not the same thing. Higher education 49(4), 467-493.

Guttormsen Schär, S., Zuberbühler, H.J. and Krueger, H., 2000. A comparison of static and dynamic media types for process oriented learning tasks. In -MEDIA 2000, World Conference on Educational Multimedia, Hypermedia & Telecommunications, Montreal Canada, June.

Hall, H. and Davison, B., 2007. Social software as support in hybrid learning environments: The value of the blog as a tool for reflective learning and peer support. *Library & information science research*, *29*(2), pp.163-187.

Harris, S., 2002. Innovative pedagogical practices using ICT in schools in England. Journal of Computer Assisted Learning, No. 18, Pp: 449-458.

Hennessy, S. Harrison, D. & Wamakote, L., 2010. Teacher Factors influencing Classroom use of ICT in Sub-Saharan Africa. Itupale Online Journal of African Studies, 39-54

Herper, M 2003. Best medical blogs. Retrieved March 28, 2007 from <http://www.forbes.com/2003/10/03/cx_mh_1003medblogs.html>

Hewson, C., Yule, P., Laurent, D. and Vogel, C., 2003. INTERNET RESEARCH METHODS: A Practical Guide for the Social and Behavioural Sciences. Sage.

Hsu, S. & Kuan, P., 2013. The impact of multilevel factors on technology integration: the case of Taiwanese grade 1-9 teachers and schools. Education Technology Research Development, 25-50.

Jones, G. and Knezek, G., 1993. Non-commercial radio-satellite telecommunications: affordable options for technology educators. In *Proceedings of the tenth international conference on technology and education* (Vol. 2, pp. 701-703).

Jordan, K., 2011. 'Framing ICT', teachers and learners in Australian school education policy. Australian Education Resources, 417-431.

Jung, I., 2001. Issues and challenges of providing online inservice teacher training: Korea's experience. The International Review of Research in Open and Distributed Learning, 2(1).

Kang, I., 1998. 'The use of computer-mediated communication: Electronic collaboration and interactivity'. Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse, 315-337.

Kennewell, S., Parkinson, J. & Tanner, H., 2000. "Developing the ICT capable school". London: Routledge Falmer.

Kerka, S., 1992. 'Higher order thinking skills in vocational education'. In ERIC Clearinghouse on adult career and vocational education Columbus OH, ERIC Digest No. 127. Retrieved from http://www.eric.ed.gov/PDFS/ED350487.pdf

Kahl Jr, D.H. and Venette, S., 2010. To lecture or let go: A comparative analysis of student speech outlines from teacher-centered and learner-centered classrooms. Communication Teacher, 24(3), pp.178-186.

Kharif, O., 2004. "Blogging for business". Retrieved March 28, 2007 from

<http://www.businessweek.com/technology/content/aug2004/tc2004089_3601_tc024.htm>

Kolikant, Y.B., 2010. 'Digital natives', better learners? Students' beliefs about how the Internet influenced their ability to learn. Computers in Human Behaviour, 1384-1391.

Kudinov, I.V., Kudinova, G.F., Aitov, V.F., Kadi, S.V., Bannikova, L.V. and Voronkova, O.Y., 2018. Information technologies in professional pedagogical

education. International Journal of Mechanical Engineering and Technology, 9(9), pp.1284-1292.

Larkin, K. & Jamieson-Proctor, R., 2013. 'Transactional distance theory (TDT)', An approach to enhancing knowledge and reducing anxiety of pr-service teachers studying a mathematics education course online. In proceedings of the Mathematics Education Research Group Australasia (MERGA36) (pp. 434-441).

Lau, B.T. and Sim, C.H., 2008. Exploring the extent of ICT adoption among secondary school teachers in Malaysia. *International Journal of Computing and ICT research*, *2*(2), pp.19-36.

Lebow, D., 1993. 'Constructivist values for instructional systems design', Five principles toward a new mindset. Educational Technology, Research and Development, Vol.41, No. (3), Pp: 4-16.

Leedy, D. & Ormrod, E., 2005. "Practical Research", Planning and Design (8th Ed.). Pearson Education: Upper Saddle River, NJ, US.

Levine, R.S., 1997. Martin Delany, Frederick Douglass, and the politics of representative identity. Univ of North Carolina Press.

Levin, T. & Wadmany, R., 2008. "Teachers' views on factors affecting effective integration of information technology in the classroom" Developmental scenery. Journal of Technology & Teacher Education, 16(2), 233-263. Retrieved from <http://vnweb.hwwilsonweb.com.proxy.lib.iastate.edu:2048/hww/results/external_link _maincontentframe.jhtml> DARGS=/hww/results/results_common.jhtml.44

Libbrecht, P. and Goosen, L., 2016. Using ICTs to facilitate multilingual mathematics teaching and learning. In Mathematics Education and Language Diversity (pp. 217-235). Springer, Cham.

Light, P. and Littleton, K., 1999. Getting IT together, in Littleton, K. and Light, P. (eds) Learning with computers. Analysing productive interaction. London. Routledge.

Lim, C.P. & Chai, C.S., 2004. 'An activity-theoretical approach to research of ICT

integration in Singapore schools: Orienting activities and learner autonomy',

Computers & Education Vol. 43, No. (3), Pp: 215--236.

Loveless, A. and Ellis, V., 2001. ICT, Pedagogy and the Curriculum: Subject to Change. London: Routledge/Falmer.

Lowther, D.L., Inan, F.A., Strahl, J.D. & Ross, S.M., 2008. Does technology integration workwhen key barriers are removed? Educational Media International, vol. 45, pp.195-213.

Louw, J., Muller, J. & Tredoux, C., 2008. Time-on-task, technology and mathematics achievement. Evaluation and Program Planning, 31(1), 41-50.

MacDonald, S. and Headlam, N., 2009. 'Research Methods Handbook', Introductory guide to research methods for social research. CLES, pp. 1-37.

Manali, O., 2008. Research on Computers and Education: Past, Present and Future. Prepared for the Bill and Melinda Gates Foundation&Role of Computers in Education. [Online]. Available at <http://www.buzzle.com/articles/role-of-computers-in-education.html> retrieved on September 10, 2010.

McAndrew, P., Taylor, J. & Clow, D., 2010. "Facing the challenge in evaluating technology use in mobile environments", Open Learning, 25(3), 233-249.

Mcloughlin, C. and M. J. W. Lee. 2007. Social software and participatory learning : Pedagogical choices with technology affordances in the Web 2.0 Era. Ascilite Singapore: 664−675.

Miles, M.A. and Huberman, A.M., 1994. Qualitative data analysis. An expanded sourcebook. London. Sage Publications.

Miller, J.W., Martineau, L.P. & Clark, R.C., 2000. "Technology infusion and higher education: Changing teaching and learning". Innovative Higher Education, 24(3), 227-241.

Adams, D., Samat, S.N.A. and Samah, H.A., 2018. Teacher leadership: Going beyond classroom. International Online Journal of Educational Leadership, 2(1), pp.1-3.

Mooij, T., 2007. Design of educational and ICT conditions to integrate differences in learning: Contextual learning theory and a first transformation step in early education', Computers in Human Behaviour Vol. 23, No. (3), Pp:1499-1530.

Moore, M., 1993. “Theory of transactional distance”. In D. Keegan (Ed), theoretical principles of distance education (pp. 22-38). London: Routledge.

Navarro Sada, A. & Maldonado, A., 2007. Research Methods in Education. -by Louis Cohen, Lawrence Manion and Keith Morrison.

Nelson, J., Christopher, A. & Mims, C., 2009. TPACK and Web 2.0: Transfromation of Teaching and Learning. TechTrends, 80-87.

Niess, M. L., 2012. Teacher knowledge for teaching with technology: A TPACK lens. In Educational technology, teacher knowledge, and classroom impact: A research handbook on frameworks and approaches (pp. 1-15). IGI Global.

Noor-Ul-Amin, S., 2013. An effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience: ICT as a change agent for education. Scholarly Journal of Education, 2(4), 38-45.

Olusola, J.A. & Alaba, O.S., 2011. Globalisation, Information and Communication Technologies (ICTs) and Open/Distance Learning in Nigeria: Trends, Issues and Solution. Turkish Online Journal of Distance Education,12 (3), 66-77.

Olulube, N. P.; Ubogu, A.E. and Egbezor, D.E., 2007. ICT and Distance Education Programs in a Sub-Saharan African Country: A Theoretical Perspective. Journal of Information Technology Impact. Vol. 7, No. 3, pp. 181-194.

Ololube N. P., 2006. Appraising the Relationship between ICT Usage and Integration and the Standard of Teacher Education Programs in a Developing Economy. International Journal of Education and Development using Information and Communication Technology, 2(3), 70-85

Panagiotakopoulos, C., Lionarakis, A. and Xenos, M., 2003. Open and Distance Learning: Tools of Information and Communication Technologies for Effective Learning. In *Proceedings of the Sixth Hellenic-European Conference on Computer Mathematics and its Applications, HERCMA 2003* (Vol. 1, pp. 361-367).

Patton, M.Q., 2002. Qualitative evaluation on research methods (3rd ed.). Thousand Oaks: Sage Publications, Inc.

Patton, M.Q. and Cochran, M. (2002). A Guide to Using Qualitative Research Methodology. Medecins Sans Frontieres. [Online]. Available at

http://evaluation.msf.at/fileadmin/evaluation/files/documents/resources_MSF/MSF_Qualitative_Methods.pdf retrieved on March 14, 2014.

Perrone, J., 2002. April 12. About Newsblog. Retrieved March 28, 2007 from

http://blogs.guardian.co.uk/news/archives/about_newsblog/index.html

Pityana, N.B., 2009. Open distance learning in the developing world: Trends, progress and challenges.

Plomp, T.; Pelgrum, W. J. & Law, N., 2007. SITES2006—International comparative survey of pedagogical practices and ICT in education', Education and Information Technologies Vol.12, No. (2), Pp: 83-92.

Polit, D.F. & Hungler, B.P., 1999. Nursing Research. Principles and Methods (6th Ed.). Philadelphia: J.B. Lippincott Company.

Polly, D., 2011. Examining teachers' enactment of technological pedagogical and content knowledge (TPACK) in their mathematics teaching after technology integration professional development. Journal of Computers in Mathematics and Science Teaching, 30(1), 37-59.

Porter, D. & Weiss, D., 2000. Interactive voice response system. Us patent 6,4111, pp.686.

Pulkkinen, J., 2007. Cultural globalization and integration of ICT in education. *Educational technology: Opportunities and challenges*, pp.13-23.

Punch, K., 1998. Introduction to social research: quantitative and qualitative aproaches.

Ramorola, M.Z., 2018. The roles and responsibilities of e-tutors in Open Distance and eLearning environment. *Beyond Familiar Territories*.

Robson, C., 2002. Real World Research (second edition). Oxford: Blackwell.

Rifkin, J., 2000. The age of access: The new culture of hypercapitalism. Where All of Life is a Paid-For Experience, Tarcher, New York, 33, 40-51.

Robson C., 1993. Real world research: A resource for social scientists and practitioner - researchers. Oxford. Backwell. Ross, J. and Schulz, R. (1999) Can computer-aided instruction accommodate all learners equally? British Journal of Educational Technology. 30,1, 5-24.

Rusten, E., 2010. 'Using Computers in Schools' p. 208 & 209. [Online]. Available at <http://www.learlink.aed.org/.../computers_in_schools_modelofuse.pdf> retrieved on August 10, 2010.

Schank, R., 2005. Lessons in learning, e-learning, and training. San Francisco: Pfeiffer.

Schrage, M., 1990. Shared minds: The new technologies of collaboration**.**

Selwyn, N., 2012. Social media in higher education. The Europa world of learning, 1, pp.1-10.

Simataa, G.M., 2015. The integration of computer technology in the Namibian education system (Doctoral dissertation).

Sethy, S.S., 2008. Distance education in the age of globalization: An overwhelming desire towards blended learning. *Turkish Online Journal of Distance Education*, *9*(3), pp.29-44.

Smith, A.G., 2007. Issues in" blogmetrics"-case studies using BlogPulse to observe trends in weblogs.

Stiler, G. and Philleo, T., 2003. Blogging and blogspots: an alternative format for

encouraging reflective practice among preservice teachers. Education, 123(4), 789.

Strauss, A. and Corbin, J., 1990. Basics of qualitative research: Grounded theory procedures and techniques. Newbury Park, CA: Sage Publications, Inc.

Suter, W.N. (2012). Introduction to Educational Research: A Critical Thinking Approach (2nd Ed.). Arkansas: Sage.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. Research in Science Education, 48(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

Tapscott, D. and Williams, A.D., 2007. Innovation in the age of mass collaboration. *Business Week*, *1*, p.2007.

Tashakkori, A. and Teddlie, C., 1998. Mixed methodology. Combining qualitative and quantitative approaches. London. Sage Publications.

Tatkovic, N., Ruzic, M. & Tatkovic, S., 2006. Open Distant Learning: Pedagogical Terms of Reference and Dilemmas. Online Submission.

Tinio, V.L., 2003. ICT in education. E-ASEAN task force. Manila, Philippines: UNDP-APDIP.

Treadwell, J., 2015. Coping with complexity: working beyond the guidelines for patients with multimorbidities.

Underwood, J.D., 2009. The impact of digital technology: a review of the evidence of the impact of digital technologies on formal education.

Underwood, J. and Underwood, G., 1999. Task effects on co-operative and collaborative learning with computers, in Littleton, K. and Light, P. (eds) Learning with computers. Analysing productive interaction. London. Routledge.

Unisa, 2008. Open Distance Learning policy. Retrieved from <http://www.unisa.ac.za/cmsys/staff/contents/departments/tuition_policies/docs/OpenDistance Learning_Council3Oct08.pdf>

Valdez, G., McNabb, M., Foertsch, M., Anderson, M., Hawkes, M. & Raack, L., 2000. Computer-based technology and learning: Evolving uses and expectations (Rev. ed.). Oak Brook, IL: North Central Regional Educational Laboratory.

Van Heerden, D. and Goosen, L., 2020. Promoting the Growth of Fourth Industrial Revolution Information Communication Technology Students: The Implications for Open and Distance E-Learning. In Promoting Inclusive Growth in the Fourth Industrial Revolution (pp. 118-147). IGI Global.

Waclawski, E., 2012. How I use it: Survey monkey. Occupational Medicine, 62(6), 477-477.

Wagner, A.D., 2001. IT and Education for the Poorest of the Poor: Constraints, Possibilities, and Principles". TechKnowLogia, July/August, P: 48-50.

Walker, J., 2005. Weblogs: learning in public. On the horizon, 13(2), 112-118.

Wheeler, S., 2001. Information and Communication Technologies and the changing role of the teacher. Journal of Educational Media, Vol.26, No.(1), Pp:7-17.

Wikipedia [http://Wikipedia.org/]

Yeboah-Fofie, M., 2015. ICT as a Facilitator of a New Breed of Educa-tional Modalities: A Review of Curricula Re-forms, Improving In-Service Teacher Training, and Reinforcing Non-Formal and Distance Education Approaches in Ghana. Information Communication Technology (ICT) Integration to Educational Curricula: A New Direction for Africa, 189.

Young, J., 2002. The 24-hour professor. The Chronicle of Higher Education, Vol.48, No. (38), Pp:31-33.

Yusuf, M.O., 2005. Information and Communication Education: Analyzing the Nigerian national policy for information technology. International Education Journal. Vol.6 No.(3), Pp:316-321.

Zhao, Y. & Cziko, G.A., 2001. Teacher adoption of technology: a perceptual control

theory perspective. Journal of Technology and Teacher Education, Vol. 9, No. (1), Pp: 5-30.

LIST OF APPENDICES

Appendix A

Students survey link: https://www.surveymonkey.com/r/ZCKSQ8X

Appendix B

Lecturers survey link: https://www.surveymonkey.com/r/SBHWNPV

Appendix C

Letter of invitation

Ethical Clearance Ref#: 2017_CGS/ISTE+007

RPSC Ref #: 2017_RPSC_049

DEAR PARTICIPANTS

My name is Ogunsina Simonpeter Oluniyi, a masters' student at the University Of South Africa (UNISA). I would like to ask you to participate in a study on "The Role of Information and Communication Technology as a Teaching and Learning tool to promote Transactional Distance and Rhizomatic learning in Open Distance Learning Environment".

The aim of this study is to determine, to what extent does the use of information and communication technology (ICT) as a teaching and learning tool shows the traces of transactional distance theory and rhizomatic learning in Open Distance Learning environment.

The data collected through this closed and open-ended online survey will be used to answer the research questions quantitatively and qualitatively.

If you give your consent to participate in this research, you will join a group of fellow participants who will also be taking part in the investigation. This group of participants will be send an online survey to complete. It will take only 15 -20 minutes to complete the online survey.

I also would like to make it clear that your participation in this study is strictly voluntary and you may quit at any time by indicating so prior or during the investigation. The investigation does not involve any practical risks, and therefore there is no provision for compensation of any kind for your participation in it. Your name will also not appear on any documents used during the discussion sessions for confidentiality and any information collected from you will not be shared with any person unless required by law. All collected information from you and from other participants, will be maintained and managed by my course supervisor, Prof. MZ Ramorola at UNISA and myself.

If you need clarity on any aspect of the investigation or have any questions with regards to the investigation and your participation, or if you would like to have a copy of the final report of this investigation please contact me at 0739543229. You can also contact my supervisor at UNISA, Prof. MZ Ramorola on +27 (0)12 429 6965. If you agree to participate in this investigation and give consent for your answers to be used in the research, please access the survey on the link attached to the e-mail.

Certification Statement:

I, Ogunsina Simonpeter Oluniyi (Researcher), hereby confirm that I have explained to the above named participant the purpose and nature of this research project. I have also mentioned to the participant that he or she is free to ask any possible questions that he or she may have in regard to the project and his/her participation I also certify to have provided the participant's a copy of this signed consent form.

12-07-2017

Researcher Signature Date

Appendix D

RPSC approval letter

UNISA university of south africa

RESEARCH PERMISSION SUB-COMMITTEE (RPSC) OF THE SENATE RESEARCH, INNOVATION, POSTGRADUATE DEGREES AND COMMERCIALISATION COMMITTEE (SRIPCC)

25 August 2017

Decision: Research Permission Approval from 25 August 2017 until 31 December 2017.

Ref #: 2017_RPSC_049
Mr. Simonpeter Ogunsina
Student #: 58047948
Staff #: N/A

Principal Investigator:
Mr. Simonpeter Ogunsina
Institute for Science and Technology Education
College of Graduate Studies
ogunsinasimonpeter@yahoo.com, 0739543229

Supervisor: Prof Ziphorah Ramorola
ramormz@unisa.ac.za, 012 429-6965/ 0716407432

A study titled: "The role of Information and Communication Technology as a teaching and learning tool in Open Distance Learning environment."

Your application regarding permission to conduct research involving UNISA employees, students and data in respect of the above study has been received and was considered by the Research Permission Subcommittee (RPSC) of the UNISA Senate, Research, Innovation, Postgraduate Degrees and Commercialisation Committee (SRIPCC) on 24 August 2017.

It is my pleasure to inform you that permission has been granted for the study. You may:

1. Gain access to a list of academics from the College of Education according to their levels (lecturer, professor) through the gatekeeping assistance of the supervisor, in order to invite ten of them and send them an online survey.
2. Gain access to the MyLife email addresses of M.Ed. students through the gatekeeping assistance of the supervisor and send them an online survey.

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

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

You are requested to submit a report of the study to the Research Permission Subcommittee (RPSC@unisa.ac.za) within 3 months of completion of the study.

The personal information made available to the researcher(s)/gatekeeper(s) will only be used for the advancement of this research project as indicated and for the purpose as described in this permission letter. The researcher(s)/gatekeeper(s) must take all appropriate precautionary measures to protect the personal information given to him/her/them in good faith and it must not be passed on to third parties. The dissemination of research instruments through the use of electronic mail should strictly be through blind copying, so as to protect the participants' right of privacy. The researcher hereby indemnifies UNISA from any claim or action arising from or due to the researcher's breach of his/her information protection obligations.

Note:
*The reference number **2017_RPSC_049** should be clearly indicated on all forms of communication with the intended research participants and the Research Permission Subcommittee.*

We would like to wish you well in your research undertaking.

Kind regards,

Dr Retha Visagie – Acting Chairperson
Email: visagrg@unisa.ac.za, Tel: (012) 429-2478

Prof A Davis – Acting Executive Director: Research
Email: davisa@unisa.ac.za, Tel: (012) 429-8357

Appendix E

Ethical clearance

UNISA | college of science, engineering and technology

Dear Mr Simonpeter Oluniyi Ogunsina (58047948)

Date: 2017-06-14

Application number:
2017_CGS/ISTE+007

REQUEST FOR ETHICAL CLEARANCE: (The Role of Information and Communication Technology as a Teaching and Learning Tool in an Open Distance Learning Environment)

The College of Science, Engineering and Technology's (CSET) Research and Ethics Committee has considered the relevant parts of the studies relating to the abovementioned research project and research methodology and is pleased to inform you that ethical clearance is granted for your research study as set out in your proposal and application for ethical clearance. However, as your study involves UNISA staff and students your clearance is **provisional**, on the condition you will apply at the Unisa Research Permission Subcommittee of the Senate Research and Innovation and Higher Degrees Committee (RPCS) committee for approval. You also need to complete the RPSC application forms and follow an additional approval process.

Therefore, involved parties may consider ethics approval as granted ***provisionally***. Therefore, permission to proceed must be fully authorised by RPCS before any research is conducted. However, the permission granted must not be misconstrued as constituting an instruction from the CSET Executive, the CSET CRIC or RPCS that sampled interviewees (if applicable) are compelled to take part in the research project. All interviewees retain their individual right to decide whether to participate or not.

We trust that the research will be undertaken in a manner that is respectful of the rights and integrity of those who volunteer to participate, as stipulated in the UNISA Research Ethics policy. The policy can be found at the following URL:
http://www.unisa.ac.za/static/corporate_web/Content/Colleges/CGS/documents/Policy-on-Research-Ethics-rev-appr-Council-20.09.2013.pdf

Please note that the ethical clearance is granted for the duration of this project and if you subsequently do a follow-up study that requires the use of a different research instrument, you will have to submit an addendum to this application, explaining the purpose of the follow-up study and attach the new instrument along with a comprehensive information document and consent form.

Yours sincerely

Prof K Padayachee
Chair: Ethics Sub-Committee (Institute for Science and Technology Education) CSET

Prof MN Feza
HOD: Institute for Science and Technology Education

Prof B Mamba
Executive Dean: College of Science, Engineering and Technology

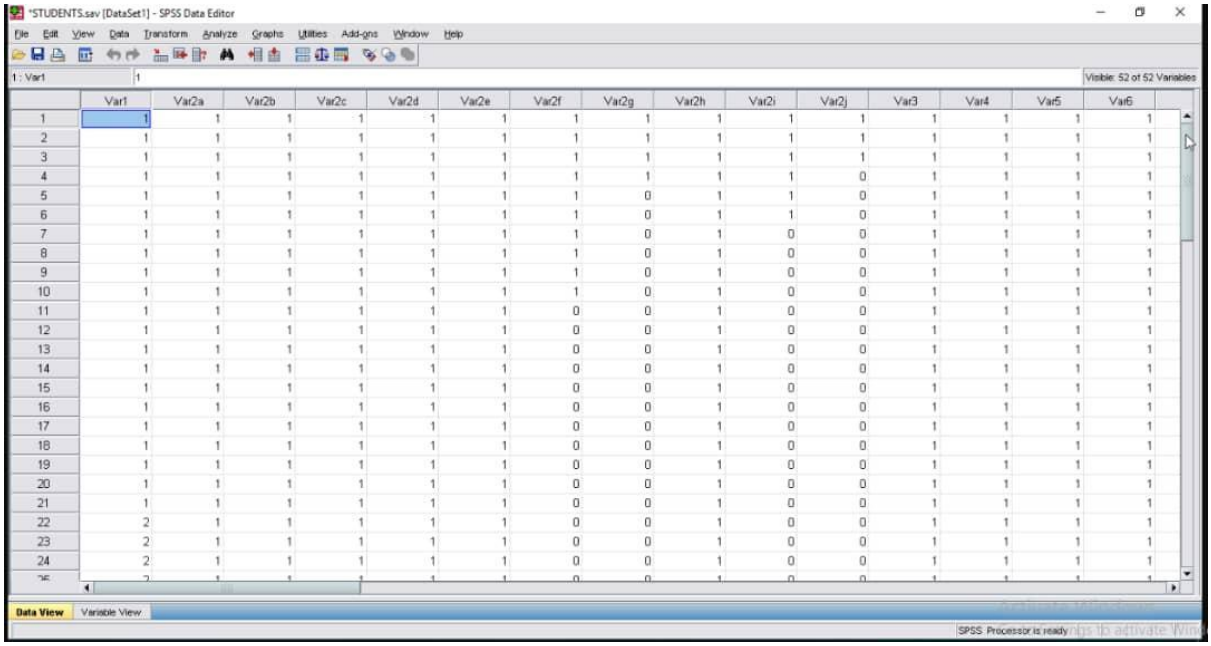
RECEIVED
2017 -06- 21
OFFICE OF THE EXECUTIVE DEAN
College of Science, Engineering and Technology

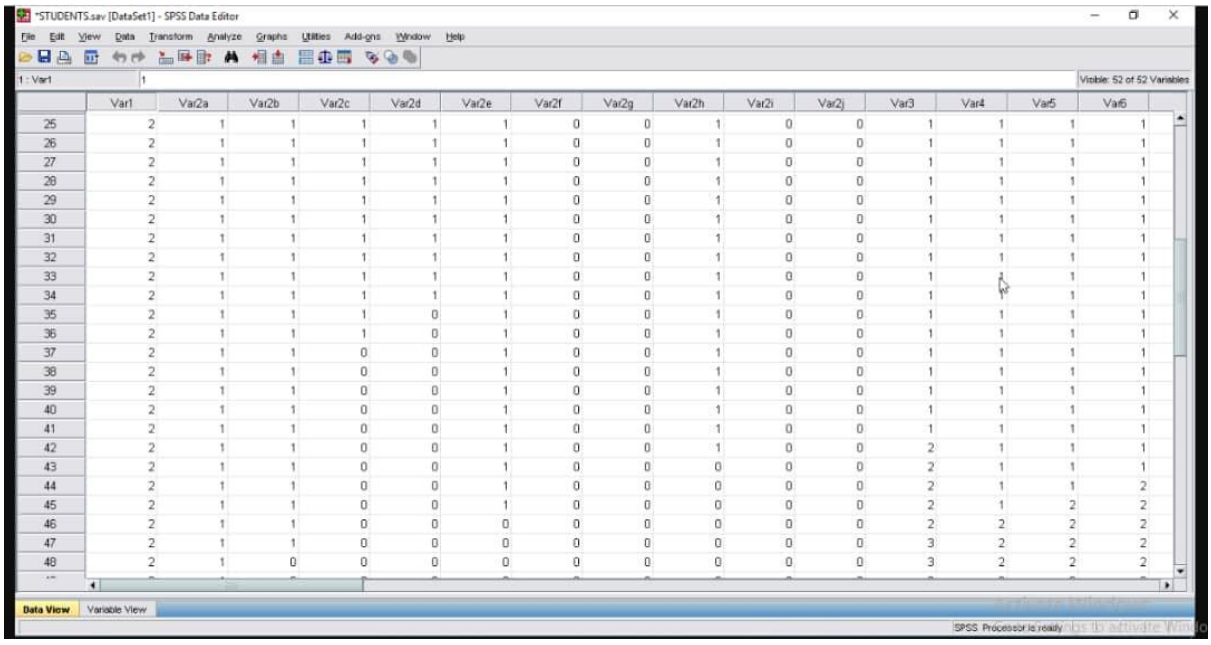
University of South Africa
College of Science, Engineering and Technology
The Science Campus
C/o Christiaan de Wet Road and Pioneer Avenue,
Florida Park, Roodepoort
Private Bag X6, Florida, 1710

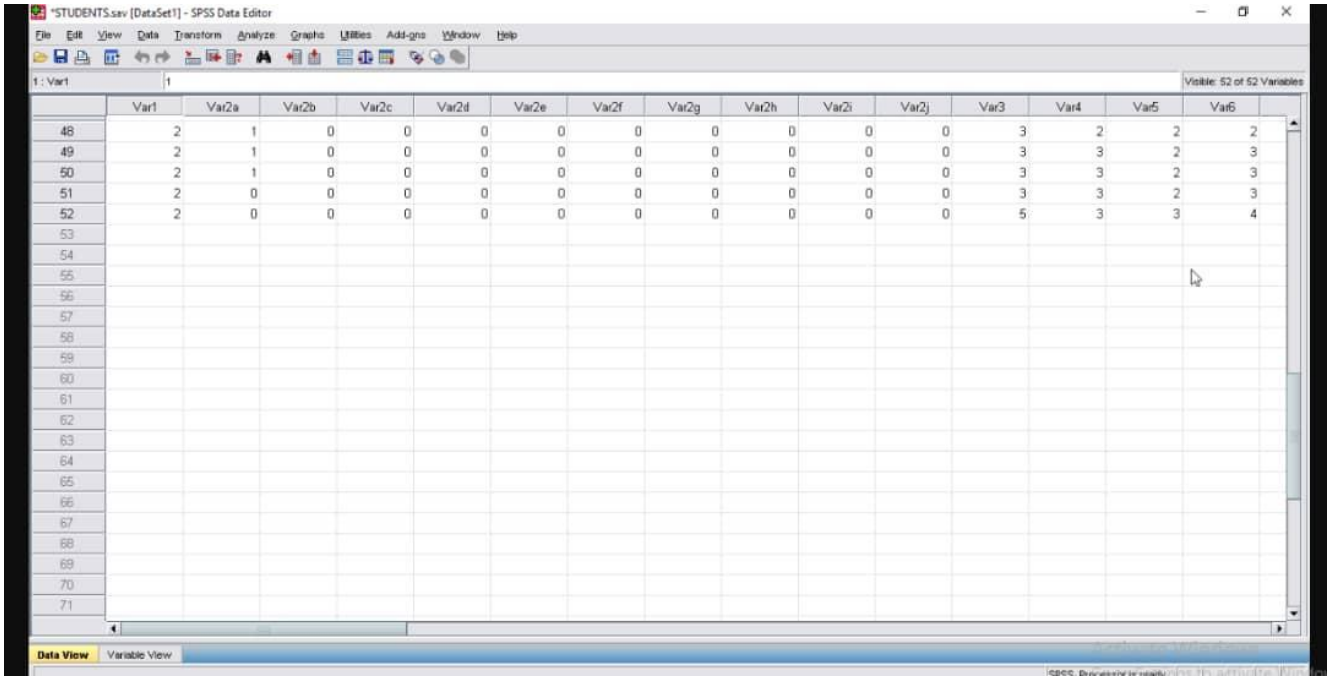
UNISA | college of science, engineering and technology

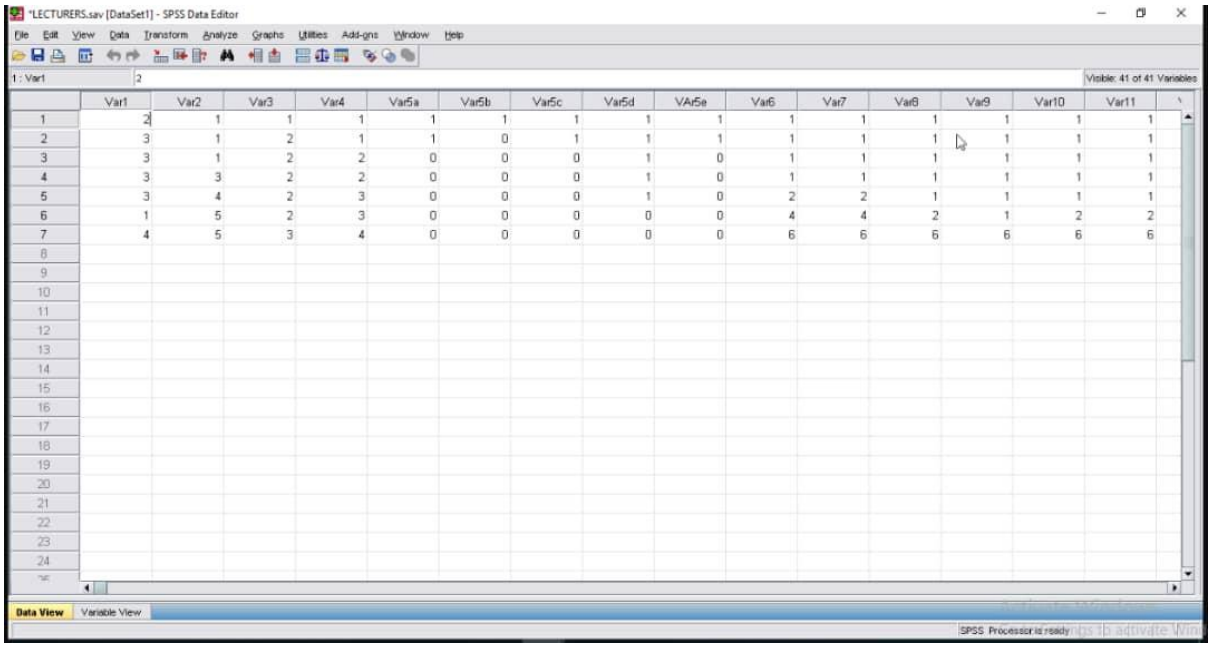
Appendix F

SPSS files






*STUDENTS.sav [DataSet1] - SPSS Data Editor
File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help
1 : Var1
Visible: 52 of 52 Variables
Var1 Var2a Var2b Var2c Var2d Var2e Var2f Var2g Var2h Var2i Var2j Var3 Var4 Var5 Var6
48 2 1 0 0 0 0 0 0 0 0 0 3 2 2 2
49 2 1 0 0 0 0 0 0 0 0 0 3 3 2 3
50 2 1 0 0 0 0 0 0 0 0 0 3 3 2 3
51 2 0 0 0 0 0 0 0 0 0 0 3 3 2 3
52 2 0 0 0 0 0 0 0 0 0 0 5 3 3 4
Data View
Variable View


*LECTURERS.sav [DataSet1] - SPSS Data Editor
File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help
1 : Var1
Visible: 41 of 41 Variables
Var1 Var2 Var3 Var4 Var5a Var5b Var5c Var5d VAr5e Var6 Var7 Var8 Var9 Var10 Var11
1 2 1 1 1 1 1 1 1 1 1 1 1 1 1
2 3 1 2 1 1 0 1 1 1 1 1 1 1 1 1
3 3 1 2 2 0 0 0 1 0 1 1 1 1 1 1
4 3 3 2 2 0 0 0 1 0 1 1 1 1 1 1
5 3 4 2 3 0 0 0 1 0 2 2 1 1 1 1
6 1 5 2 3 0 0 0 0 0 4 4 2 1 2 2
7 4 5 3 4 0 0 0 0 0 6 6 6 6 6 6
Data View
Variable View
SPSS Processor is ready

Appendix G

Turnitin original report

Turnitin_Originality_Report_1240630580.html