THE EFFECTIVENESS OF MOODLE IN PROMOTING ONLINE LEARNING IN TERTIARY PUBLIC INSTITUTIONS: THE CASE OF THE UNIVERSITY OF ZAMBIA

By

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DECLARATION

I, Nancy Kambolokoni, hereby declare that this dissertation represents my own work and that it has not previously been submitted for a degree, diploma or any other qualification at this University or any other similar institution and that all the sources of information used have been acknowledged by complete reference.

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APPROVAL

This dissertation of Nancy Kambolokoni has been approved as fulfilling the partial requirements for the award of the Master of Public Administration Degree by the University of Zambia.

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Supervisor……Signature…… Date……

ABSTRACT

Electronic learning has over the years transitioned from targeting only the working class and secondary school leavers who could not go to the university because of the distance and lack of places. The introduction of e-learning platforms is bridging the gap in the provision of education. The background of the research shows that e-learning was introduced to promote distance education through online learning. In addition, e-learning has the ability to reduce the cost of education. The general objective of this research is to examine the effectiveness of Modular Object-Oriented Dynamic Learning Environment in promoting online learning at the University of Zambia. Specifically, the research aims at examining the extent to which MOODLE has promoted education at the University of Zambia and to examine the extent to which MOODLE has reduced the cost of accessing education compared to the traditional method at the University of Zambia.

This was an explanatory research and was a one-time case study. It made use of questionnaires and semi-structured interviews to collect quantitative and qualitative data, which were analysed using Statistical Package for Social Sciences and content analysis, respectively. The sample size was 104 comprising 60 students, 40 lecturers and four key informant, one from each of the four schools namely; school of Mines, school of Engineering, school of Veterinary Medicine and school of Agricultural Sciences. The four key informants were purposively selected while simple random sampling which combined lottery method and systematic sampling was used to select the lecturers and students. The findings shows that MOODLE is very effective in enhancing distance education in public universities such as UNZA. This is because most of the lecturers and students are able to use it. This is achieved through measurers put in place by the university management such as the creation of an online platform which allows lecturers to perform their work and training of lecturers on the use of MOODLE.

Although management created online courses to enhance distance education, not all lecturers are able to deliver all courses online and not all students' accesses lectures on the online platform due to various challenges. Furthermore, MOODLE is not very effective in reducing in cost of accessing university education in public universities such as UNZA. This is because there are some areas where students still incur costs to access education despite using MOODLE. These areas are accommodation, where 26.7% of the students experienced a reduction in the cost of accommodation when using MOODLE while 73.3% of the students did not. Transportation, where 46.7% of the students experienced a reduction in the cost of transportation when using MOODLE while the majority being 53.3% did not. Accessing lectures, where 26.7% of the students experienced a reduction in the cost of accessing lectures after the introduction of MOODLE while 73.3% did not.

DEDICATION

I fondly dedicate this dissertation to my family, my father, Ignatius Kambolokoni and my mother Ireen Yengayenga Kambolokoni for their selfless sacrifices. The very embodiment of support and encouragement. They are the reason I have been able to work hard and constantly unleash my potential.

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ABBREVIATIONS

ASU	Assosa University
CD	Compact Disc
CMU	Carnegie Mellon University
DVD	Digital Video Disc
E-book	Electronic Book
ECZ	Examination Council of Zambia
E-learning	Electronic Learning
GIS	Geographic Information System
ICT	Information Communication Technology
IDE	Institute for Distance Education
LMS	Learning Management Systems
MERLOT	Multimedia Educational Resource for Learning and Online Teaching
M-learning	Mobile Learning
MOODLE	Modular Object Oriented Dynamic Learning Environment
ODL	Online Distance Learning
PHD	Doctor of Philosophy
SPSS	Statistical Package for Social Sciences
UNZA	University of Zambia
USA	United States of America
WCET	Western Cooperative for Educational Telecommunications
WIFI	Wireless Fidelity
VLE	Virtual Learning Environment
Zamtel	Zambia Telecommunication Company

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

The purpose of this chapter is to introduce the dissertation and the background of the research. To achieve its purpose, the chapter presents the background of the research, statement of the problem, research objectives, rationale of the research, conceptual framework, structure of the dissertation and conclusion.

1.2 Background

Traditional ways of delivering tertiary education in Africa involved students being in one class room with their lecturer or teachers. Traditional teaching approaches are generally teacher-directed where students are taught in a manner conducive to sitting and listening (Grudeo, 2016). Traditional learning was seen to be a major goal that can be a time consuming process if taken literally for each student because teachers are interacting in a direct face-to-face situation with students. Alternately, there was also social and physical interaction among students called group work. This was done by students through using a specialist language of a particular field and discourse learning its cultural framework, social intercourse and problem solving being the most important part of the learning process (Bernard et al, 2004). Students on distance learning travelled from various locations to meet in one environment conducive with their lecturers and classmates to get their work done.

Although traditional methods of learning seemed plausible because of the face-to-face interaction between students and lecturers, it did have its various shortcomings. Traditional learning was challenging for students on the aspect of costs. Some students attending class have to travel from distant locations to their institutions and this attract costs. Students that drive to their place of lectures spent money on fuel cost only for them to be delayed in traffic before arriving at the place of lectures causing them to miss out on the beginning of the lecture and others simply do not make it for lectures on time. Some students are unable to make it to physical classes because of various reasons pertaining to vehicle breakdowns. In addition, traditional method of learning is affected by the fact that

lectures are based on a certain amount of time and this can affect the concentration of students especially if the lecture goes on for long hours. (Grudeo, 2016). Parking spaces is another challenge faced by students in the traditional learning system. Some institutions may not have enough parking space for their students to park their vehicles when they arrive at the location of the face-to-face lectures. Students that drove from far places would have problems with where to park their vehicles. Some tertiary institutions experienced overcrowding challenges during traditional methods of learning. Some courses may have too many students to an extent where the classroom fails to accommodate them all. Since the traditional learning system emphasises on physical interactions of lecturers and students, students were required to physically be in the classroom hence the issue of space was one of the major challenges in the case of courses having a large number of students (Grudeo, 2016). The challenges of traditional learning method worsened after the emergence of Corona Virus Diseases of 2019 (COVID-19) which affected the whole globe. According to the Ministry of Health of the Republic of Zambia (2019), COVID-19 is a respiratory disease caused by a new coronavirus which emerged in 2019. The virus causes respiratory illness similar to a common cold and in severe cases leads to pneumonia, kidney failure and can result in death. The virus was first identified in China in 2019 and has since spread to other countries across the globe. COVID-19 spreads from person to person through close communities. When people with COVID-19 breathe out or cough, they expel tiny droplets that contain the virus, these droplets can enter the mouth or nose of someone without the virus, causing an infection to occur (Kandola, 2020). Furthermore, the most common way that this illness spreads is through close contact with someone who has the infection. Close contact is within around six feet. The disease is most contagious when a person's symptoms are at their peak. However, it is possible for someone without symptoms to spread the virus. This caused health practitioners to introduce the five golden rules to be observed globally which that are: people must practice social distancing of approximately 1 meter apart. This made traditional learning method even more challenging because it requires too much space for people to fit in a classroom while observing the rule. People are required to constantly wash their hands with soap, always wear face masks provided they are in public places and must constantly use disinfectants such as hand sanitizer. These

challenges cause traditional learning method to be more expensive because people are required to buy face masks, soaps and hand sanitizers. The last rule is that people that exhibited signs and symptoms of the virus where isolated. This tragedy has shaken up the education sector and this fear has resonated across the education sector globally. The COVID-19 pandemic outbreak forced many schools and colleges to remain closed this lead to discontinued face-to-face teaching (Dhawan, 2020).

In an attempt to deal with issues petuning to traditional learning method, electronic learning was introduced. The term electronic learning, also referred to as e-learning or online learning was coined to evoke how people use computers to learn, enrol in online degrees and improve their education (Xenos, 2018). E-learning is the delivery of a learning, training or education program by electronic means, it is the acquisition of knowledge which takes place through electronic technologies and media (Tamm 2020). E-learning involves the use of electronic device such as mobile phones, laptops, tablets and computers to provide training, educational or learning material. Typically, e-learning is conducted on the Internet, where students can access their learning materials online at any place and time. E-learning most often takes place in the form of online courses, online degrees or online programs and actual procedures used in e-learning environments can be varied such as online training or education, Internet or an Intranet, CD's and DVD's (Tamm, 2020).

E-learning in Africa was introduced in 1996 in Ethiopia by the World Bank in the attempt to improve cyber education in Africa. It then spread too many other African countries including Zambia. E-learning was meant to target the working class and secondary school leavers who could not go to the University because of the distance and lack of places. It mainly targeted the working class because online education had a big advantage that the students did not need to resign from their jobs to take courses in the online university and those students with younger children did not need to spend extra cost on babysitters to take care of their children so that they could go for classes (Kotoua et al, 2014). The modes of teaching were the use of satellite broadcast in the form of videos and e-mail interaction between teachers and students.

E-learning in Zambia has widely spread across the country because of negative effects brought by COVID-19 in the disruption of the education system. Zambia had to shut schools as one of the measures to contain the pandemic, a move that saw hundreds of students staying at home. However, the introduction of e-learning platforms is bridging the gap in the provision of education. E-learning spread to almost all parts of the country because the Zambian government was not left out in ensuring education continues during the pandemic in all parts of the country. In April 2020, the government of Zambia, in collaboration with the state-run telecommunication firm Zambia Telecommunication Company (Zamtel) and the Examination Council of Zambia (ECZ), launched a national e-learning portal and smart revision platform aimed at allowing learners to continue with their learning country wide (Xhinhua, 2020).

The University of Zambia (UNZA) is one of the tertiary institutions that adopted e-learning around 2015. Although e-learning in its early stages at the University was confined to distance students only, it was later extended to the other modes of study such as regular and parallel modes in the year 2020 when UNZA management officially informed all staff and students that e-learning platforms were ready for access. This was largely inspired by the COVID-19 pandemic (UNZA, 2020). That traditional methods of learning at UNZA have been affected by the COVID-19 pandemic largely. Students are unable to meet in classrooms with their lecturers because of the fact that the virus can be easily transmitted through physical contact hence the government has taken preventive measures to fight the pandemic such as maintenance of physical distancing, a 1 metre apart rule must be observed at all times to ensure safety. Due to the large numbers of students at the university, it is impossible to have all students fit in the lecture rooms while observing such measures. The institution would have to provide hand sanitizer for students to use while they access classes which is logically impossible and would be very costly to manage due to the large number of students and other faculty. Furthermore, students are unable to be accommodated within the institution as a result of the pandemic. This makes it harder for all students at UNZA to be in one location collectively hence physical academic group discussions are not easy to conduct and accessing the library is impossible (Chewe, 2018).

UNZA has employed strategies to implement e-learning through the introduction of Virtual Learning Environments (VLEs). These are technology spaces created for the purpose of students and lectures to learn and deliver academic contents. VLEs are online spaces that are used to support learning and related administrative processes (Chewe, 2018). VLEs were first implemented to carter for distance learning students under the Institute for Distance Education (IDE) but because of the emphasis on social and physical distancing to prevent COVID-19, UNZA management introduced VLEs across all the modes of study. The VLE platforms introduced at UNZA include Modular Object-Oriented Dynamic Learning Environment (MOODLE) and Astria e-learning platform. The introduction of MOODLE and Astria were also in line with UNZA's 2018-2022 strategic direction which posted that by 30th June 2020, the University would have implemented a fully-fledged e-learning platform for all University programmes (UNZA, 2018).

MOODLE was originally developed by Martin Dougiamas in around August 2002 in Australia with the goal of helping educators create online courses and focus on interaction and collaborative construction of content. MOODLE is an open source application that can be downloaded from the Moodle official website. In order to access this application online, MOODLE needs to be installed into a web hosting. Users are able to set an automatic learning schedule, thus the material provided by the teacher will be easily obtained and learned. MOODLE has a variety of features such as availability of reading resources, worksheets, online exercise facility and discussion forum facility as means for lecture and students online interaction are necessary (Yusuf et al, 2019).

1.3 Statement of the problem

From the background, we note that e-learning was introduced to promote online education through online learning (Grudeo, 2016). In addition, the background shows that e-learning has the ability to reduce the cost of education (Kotoua et al., 2014). However, it is not clear if e-learning platforms such as MOODLE and Astria are effective in delivering tertiary education in public institutions such as UNZA which has scientific courses that require laboratories and Mathematical experiments to be conducted and is characterised by bureaucratic inertia and lack of innovation. In this research, effectiveness of e-learning

is taken to mean the ability to teach and learn through electronic means without being confined to one specific location.

1.4 Research Objectives

1.4.1 General Objective

The general objective of this research is to examine the effectiveness of MOODLE in promoting online learning at the University of Zambia

1.4.2 Specific Objectives

The specific objectives of this research are as follows:

i. To examine the extent to which MOODLE has promoted education at the University of Zambia.
ii. To examine the extent to which MOODLE has reduced the cost of accessing education compared to the traditional method at the University of Zambia.

1.5 Rationale of the Research

The rationale of the research is that it has provided information on the effectiveness of e-learning in the delivery of tertiary education by public universities. E-learning has been chosen because since people started finding ways in which to address online learning challenges, e-learning seemed to be the only solution. Further, since the emergence of COVID-19, e-learning has been the only way through which education has continued in most parts of the globe. Public universities have been chosen because they are aimed at giving every student that wishes to pursue university education rather than a select few.

The information that the research has provided will be helpful to stakeholders which are the students that are using e-learning to accesses tertiary education, the lecturers who are using e-learning platforms to deliver education to the students, to management as they are the body overseeing e-learning in the University and lastly the government which makes policies on how e-learning should be carried out in tertiary institutions. The stakeholders will be able to devise mechanisms that can eliminate the constraints presented on e-

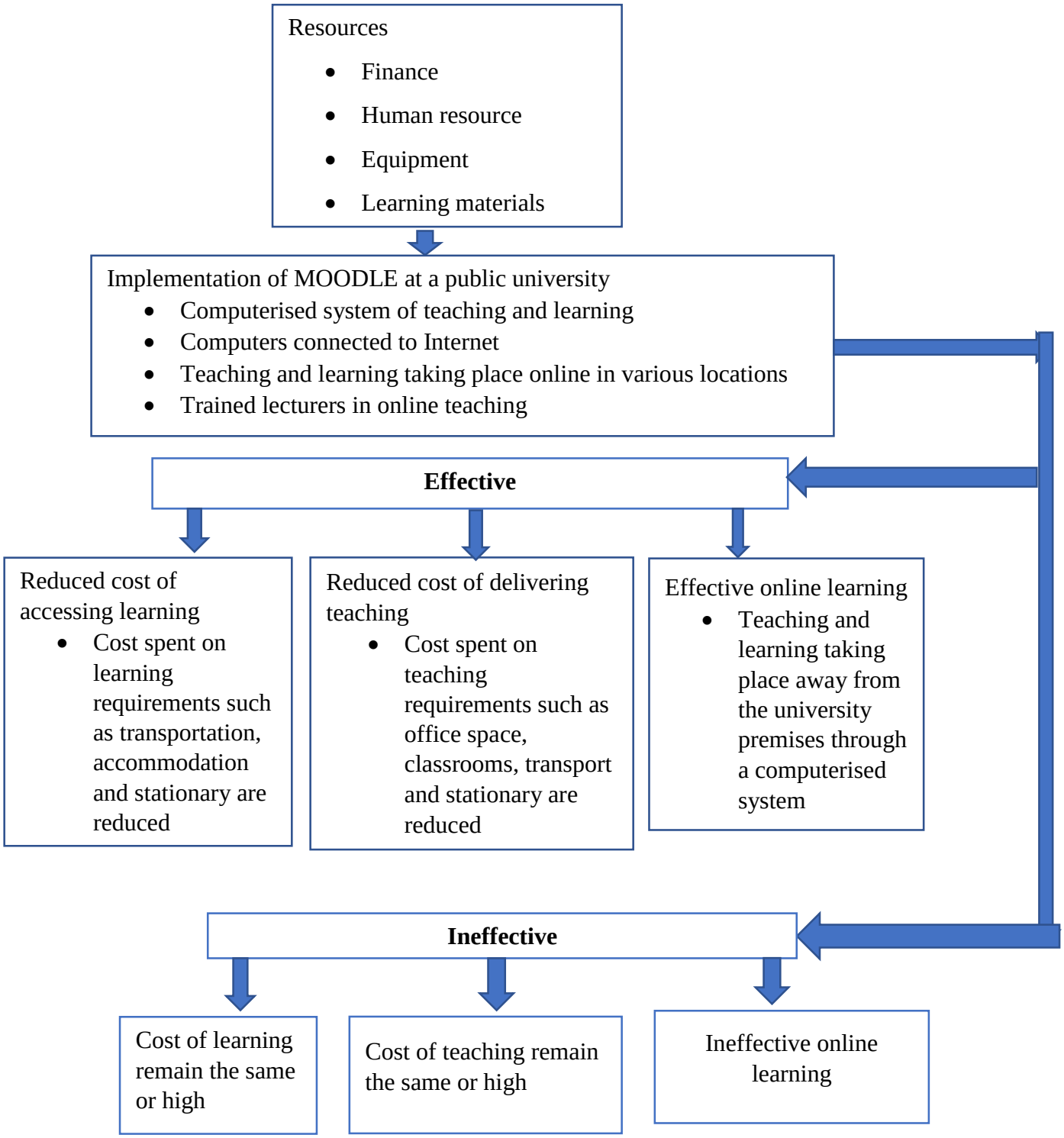
learning in the delivery of tertiary education and utilise the opportunities available to ensure effective use of e-learning platforms.

Furthermore, the information that has been provided by this research will help avail different ways to improve e-learning and highlight various weaknesses and strengths being faced by all the stakeholders. It will give an overview on what should be done to improve the challenges that will be mentioned through e-learning.

1.6 Conceptual Framework

The conceptual framework of this research is presented in Figure 1.1. Figure 1.1 shows the relationship among the key concepts in the research. The first relationship is between inputs (resources) and processes (implementation of e-learning). Resources refer to the means that are necessary to implement e-learning. These include finance, human resource, equipment and raw materials are needed to aid online learning. Implementation of e-learning is taken to mean a platform of teaching and learning which uses computers that are connected to the internet, lecturers who are able to teach online and students being able to learn in various places away from the university premises. Once this process is effective, positive outputs are expected such as: reduction in the cost of accessing learning, where students do not have to pay for transportation, accommodation or stationary cost. Furthermore, reduced cost of delivering education is expected. Cost spent on office space, stationary, lecturer's transportation and classroom space are eradicated. Lastly, effective learning is attained where teaching and learning take place away from the university premises through a computerised system.

Figure 1.1.1: A model of the Conceptual Framework of the Effectiveness of E-learning in Deliver Tertiary Education



Source: Author's own illustration

In an event where the implementation is ineffective, negative outputs are expected such as: The cost of learning either remains the same or it becomes higher. Furthermore, the cost of teaching remains the same or it increases. And lastly, online learning all together is ineffective. Where students and lecturers require to physically meet in a physical environment such as a classroom in order to access and deliver learning.

1.7 Structure of the Dissertation

This dissertation is divided into six chapters. Chapter 1 introduced the dissertation and presented the context of the research. It also presented the structure of the dissertation.

Chapter 2 is a review of literature relevant to this research. The review starts with literature on traditional methods of delivering tertiary education and literature on delivering tertiary education through e-learning.

Chapter 3 presents the methodology used to conduct the research. Specifically, the chapter presents the type of research, the location of the research, the research approach, research design, sources of data, sample size, sampling methods, data collection methods, reliability of data, validity of data, data analysis techniques, ethics applied when conducting the research and the limitations of the research.

Chapter 4 examines the effectiveness of MOODLE in enhancing distance education in public universities. This chapter looks at the ability of lecturers to use MOODLE for teaching purposes. It also looks at the ability of students to use MOODLE to access education.

Chapter 5 analyses the effectiveness of MOODLE in reducing the cost of accessing education at the University of Zambia. The chapter focuses on the effectiveness of MOODLE in reducing the cost of accessing lectures, the effectiveness of MOODLE in reducing the cost of accommodation, the effectiveness of MOODLE in reducing the cost of transportation and the effectiveness of MOODLE in reducing the cost of stationary. Chapter 6 presents a summary of the conclusions and recommendations of the dissertation.

1.8 Conclusion

The chapter has presented a background which shows that e-learning was introduced to deal with the shortcomings of traditional learning methods. The chapter has also stated the research problem which indicates that it is not clear whether e-learning is effective in delivering tertiary education in public universities. The chapter has also presented the general objective which is to examine the effectiveness of e-learning in the delivery of tertiary education in public universities. The chapter has also provided the rationale of the research which is that the research provides information on the effectiveness of e-learning in the delivery of tertiary education by public universities. The chapter has also provided a conceptual framework of the research which shows the relationship among the key concepts in the research. Lastly the chapter has presented the structure of the dissertation which contains six chapters.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature relevant to this research. To achieve this, the chapter is divided into four sections. The first section is an introduction of the chapter. The second section is a review of literature on the effectiveness of e-learning in enhancing distance education. The third section is a review of literature on the effectiveness of e-learning in reducing the cost of accessing education. The fourth section is on the lessons drawn from the literature. The fifth section is on the gaps in the literature and the last section is a conclusion of the chapter.

2.2 Literature on the effectiveness of e-learning in enhancing distance education

Himoonga and Phiri (2020) present a journal article titled *increasing the use of e-learning in tertiary learning institutions for blended programmes in Zambia*. The methodology that was used to conduct the research for this journal article involved a mixed methods paradigm and the sampling frame was composed of populations of lecturers and students from public colleges. The findings by Himoonga and Phiri (2020) are that the development of the mobile technology brings a new era in e-learning known as mobile-learning. M-learning can be defined as the portable and lightweight platform where the learner can engage in learning activity without having any geographical constraint. They state that e-learning can either be classified as Asynchronous e-learning or Synchronous e-learning. Asynchronous e-learning is a form of self-study that is commonly facilitated by media such as email and discussion groups and supports work relationships among learners with teachers, even when participants cannot be online at the same time. On the contrary, synchronous e-learning allows for real-time interaction and just in-time responses between instructors and learners commonly supported by media such as video conferencing and chats. Students who are mainly distance learners do have some personal contact with their instructor, but not all contacts happen within the classroom. Himoonga and Phiri (2020) further state that the most common e-learning platforms are Astria and MOODLE. Astria was designed in a way that systems work seamlessly together to deliver an effective distance learning experience for students. Astria Learning's vibrant and

expansive Astria Digital Library makes available over 172,000 e-books as well as millions of articles and journals. All of these robust and timely educational resources can easily be accessed at any time for learning purposes. This Learning Management System facilitates online distance learning (ODL) and engages students in new and exciting ways to set them up for success in the ever-changing global business and educational environments. Himoonga and Phiri (2020) further state that MOODLE is one of the widely used, free of charge and open-source learning platforms. It was originally made for education, training and development environments to help educators create online courses with a focus on interaction and collaboration. The platform is used in many countries around the world as it is available in various languages. Himoonga and Phiri (2020) note that Astria and MOODLE are the e-learning platforms being used by other colleges such as Evelyn Hone College and Lusaka Business and Technical College. The National Institute of Public Administration College on the other hand is using MOODLE.

While the literature sheds light on e-learning and enhancement of distance education in tertiary institutions of learning in Zambia, it focuses on the experiences in colleges. There is no literature on the experiences in universities. Nevertheless, lessons can be drawn from experiences in other African countries. Belayneh (2017) presents a thesis titled *Assessment of E-learning readiness of Assosa University* in Ethiopia. The methodology that was used to conduct the research involved a descriptive survey design to establish and determine the level of readiness to implement e-learning in ASU. The sampling frame consisted of teachers, administrative officers, students, library director and ICT experts. The findings are that e-learning encompasses a lot more than online learning, virtual learning distributed learning, networked or web-based learning. E-learning would incorporate all educational activities that are carried out by individuals or groups working online or offline and synchronously or asynchronously via networked or stand-alone computers and other electronic devices. Belayneh (2017) further states that there are different types of e-learning modalities and are presented as follows: Firstly, individualised self-paced e-learning online refers to situations where an individual learner is accessing learning resources such as a database or course content online via an Intranet or Internet. A typical example of this is a learner studying alone or conducting some research on the Internet or a local network in a location of their choice. Secondly,

individualized self- paced e-learning offline refers to situations where an individual learner is using learning resources such as a database or a computer-assisted learning package offline (i.e. while not connected to an Intranet or the Internet). An example of this is a learner working alone off a hard drive, a CD or DVD. Thirdly, group-based e-learning synchronously refers to situations where groups of learners are working together in real time via an Intranet or the Internet. It may include text-based conferencing and one or two-way audio and videoconferencing. Examples of this include learners engaged in a real-time chat or an audio-videoconference. The fourth is the group based e-learning asynchronously which refers to situations where groups of learners are working over an Intranet or the Internet where exchanges among participants occur with a time delay. Typical examples of this kind of activity include online discussions via electronic mailing lists and text-based conferencing within learning management systems (LMS). The modalities mentioned are confined to regular day time activities and can take place in a variety of locations including homes, schools, libraries, Internet cafes and open fields. Thus, integration of modern technology signifies a paradigm shift in teaching and it is true that a modern day classroom is now seen as a virtual learning environment in which learning is no longer bounded by space time and geographical location.

Other lessons can be drawn from experiences in countries outside Africa. Singh et al, (2005) present a journal article titled *A Study into the Effectiveness of E-learning of Higher Education* in Asia and USA. The methodology used in this research is that the research relied on secondary data focusing on higher education in several countries across the world such as those in USA and Asia, among others. The findings are that universities should consider that e-learning initiatives will not only give them a new channel of educational deployment but they will also support strategic objectives by assisting asynchronous discussion consortiums and networked communities. They further noted that e-learning can promote higher education. Singh et al, (2005) note that the e-learning methods facilitate more effective education and offer significant advantages over traditional teaching methods because e-learning environments allow lecturers to offer constant educational support as students are able to communicate with classmates and lecturers and visit websites and view course material regardless of their time and location. They also state that although recent studies indicate that the success of e-learning methods

in higher education can only be measured according to the effectiveness of delivery, training staff may be regarded as a major challenge in the adoption of e-learning initiatives. It is acknowledged that some academicians working in higher education are reluctant in accepting aspects of technology in their teaching and learning. They further add that contemporary lecturers are not resistant to training in the use of technological applications, they are simply confused as to how to implement such into lectures or more formal teaching methods. Lecturers that enter the profession in today's information age are much more likely to have used computers and have significant access to the internet than those in previous years and are more likely to accept technological advances in teaching methods. They discovered that in higher education, student participation is a primary feature of enhanced performance and in distance learning courses, students are more likely to participate in class discussions and group work than in traditional lectures. This is because they are given more time to prepare questions and responses. Some studies suggest that e-learning university students outperform those on traditional courses. They also note that Carnegie Mellon University (CMU) in America for example, where e-learning techniques have not only improved student exam results but have acted as educational bridges between subjects and reaching the ancient boundaries between disciplines. Lastly, they state that the inference is that higher education institutions which utilise effective e-learning methods not only enhance the performance of students in assessments but also produce graduates who are theoretically and practically prepared for working in an information age.

Tularam and Machisella (2018) present a journal article titled *Traditional vs Non-traditional Teaching and Learning Strategies: The case of E-learning* at Griffith University in Australia. The methodology used in this research is that the research relied on secondary data focusing on teaching of students in high school and tertiary levels across several countries such as New Zealand and Australia. Their findings are that it is true that the internet provides some opportunities for discussion and collaboration but the internet limits opportunities for young students to develop social interaction skills that are critical to their overall emotional and social development. They note that students tend to be more attentive in e-learning environments however, this does not directly imply that learning is taking place even when some amount of gains are noted in academic testing

results. Students need to learn to be analytical, metacognitive reflective and evaluative of their efforts as well as of others. These sorts of actions include identification of faults in arguments or finding errors in solutions presented in class or in texts. Such processes and teaching actions are more easily and perhaps more effectively done in traditional learning contexts of lectures. They also noted that the concept of social engagement with peers help in the longer run to develop students' abilities to cope with the pressures of real work environments, where support and collaboration is important and required. E-learning method although enhances distance learning, it is unable to causes learners to understand that some criticism of their work may be forthcoming in real work places and as such must experience the same in learning environments. Placing appropriate levels of work pressure such as attending on time to workshops, lectures, tutorials, and other class engagements are all important real life experiences that must be taught in learning environments. In this manner, being subjected to some criticism either by the lecturer or other students etc may be helpful for learners in the longer run in any case. E-learning takes out real life interactions or face to face interactions that students (humans) are often looking for where real feelings and emotions also play a part in learning and problem solving contexts. In recorded media, teachers are more cautious in their approach to solving problems in any case for the fear of what may be on record. In mathematics for example, emails do not provide an appropriate communication platform where typing of symbolic material often requires a lot of time on computer. A direct video link helps but once again a recording normally places undue pressure on the teacher to always be correct so real problem solving of blind alleys or incorrect approaches may not be shown to the learner for fear of recordings where the teacher is not able to solve the problem directly at hand when in fact this is the real approach to problem solving and one that is particularly useful for students to experience in real life problem solving especially when there are no existing solutions.

Bencheva (2010) in the journal article titled *Learning Styles and E-Learning: Face-to-Face to the Traditional Learning*, looks at the experiences in Bulgaria. The methodology used in this research is that the research relied on secondary data focusing on traditional learning, blended learning and e-Learning. The main findings are that there is an argument that traditional learning is the best way of maintaining a learning process. Other models

are always considered to be inferior or less efficient although research shows that technology-supported models are at least as good as traditional learning. Bencheva (2010) indicates that in e-learning setup, the learning takes place in any location at any time and not only within the classroom at a school. E-learning enables students to learn the how and not the what. In this learning set up, students and the teachers are not focused only on completing the required subject matter of the quota but self-learning is taking place. The teacher is seen as a person to direct the students to the right information rather than the authority, therefore extensive research is done by the students using online platforms away from the classroom. This causes students to be involved in inquiry based education and solving problems rather than focusing only on tasks set by the teacher. Furthermore, in e-learning method, the students' motivation is high and the subject matter is not distant from them because they are involved in matters that are close to them or the ability to participate in the discussion of the matter rather than them listening to what the teacher has to say. The teacher dictates the structure of the lesson and the division of time.

Kim and Bonk (2004) present a journal article titled *the future of online teaching and learning in higher education* in the United States of America. The methodology used in this research relied on secondary data focusing on individuals believed to have relevant experience with and insights into the factors affecting the present and future state of online education who are college instructors and administrators who were members of either the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) or the Western Cooperative for EducationalTelecommunications (WCET), both premier associations for online education. The findings of the survey are that institutions of higher education have increasingly embraced online education and the number of students enrolled in distance programs in colleges and universities increased in the United States. Although institutions have been working on strategic plans to implement e-learning, misconceptions and myths related to the difficulties of online learning such as technologies available to support online instructions creates challenges for such vision statements and planning documents. They further argue that higher education explores dozens of e-learning technologies such as e-books, podcasting, text messaging and blogs seem to emerge each week and these technologies require instructors and administrators to continuously budget retrenchment and rethinking. Kim and Bonk (2004) stated that

students were dropping out of online classes while pleading for richer and more engaging online learning experiences. They believe that given the demand for online learning, the plethora of online technologies to incorporate into teaching, the budgetary problems and the opportunities for innovation, online learning environments are facing a perfect e-storm linking pedagogy, technology and learner needs. Kim and Bonk (2004) noted that although a recent survey of higher education in the United States reported that more than 2.35 million students enrolled in online courses in 2004. This report also noted that online education is becoming an important long-term strategy for many postsecondary institutions. They further state that given the rapid growth of online education and its importance for postsecondary institutions, it is imperative that institutions of higher education provide quality online programs. The literature addresses student achievement and satisfaction as two means to assess the quality of online education. Kim and Bonk (2004) further note that studies focused on academic achievement have shown mixed reviews. Some researchers point out that online education can be at least as effective as traditional classroom instructions. They also found that several research studies on student satisfaction in online courses or programs reported both satisfied and dissatisfied students. Faculty training and support is another critical component of quality online education. Many researchers posit that instructors play a different role from that of traditional classroom instructors when they teach online courses, as well as when they teach residential courses with Web enhancements. They stated that such new roles for online instructors require training and support and they indicate that such programs can have positive impacts on instructor transitions from teaching in a face-to-face to an online setting. They also found that online education will improve in the future. The quality of online courses would be identical to traditional instructions by the year 2006. They also found that the quality of online education would be superior or the same as that of traditional learning by 2013. They further state that training students to self-regulate their learning was needed most followed by better evaluation of student achievements.

2.3 Literature on the effectiveness of e-learning in reducing the cost of accessing education

Mudende et al (2021) present a journal article titled *Implementation of Astria E-Learning Solutions in Zambia: A Survey of the University of Zambia Institute of Distance Education.* The methodology that was used to conduct the research involved a qualitative approach to document the benefits and challenges of the introduction and implementation of the online mode of delivery at UNZA-IDE. The finding by Mudende et al (2021) is that majority of the students who interacted with Astria E-learning platform found their academic life cheaper. However, some students experienced challenges with the high cost of buying data bundles. Furthermore, before the introduction of Astria E-Learning platform, students experienced various cost. Students used to apply manually and afterwards, they had to travel from various parts of the country to physically deliver their application forms to the University or have their forms posted. This attracted transportation cost. It was also mandatory that for registration purposes, all students were to travel to Lusaka for verification and guide to avoid selecting wrong courses. During this time, students spent many days on queues to be cleared and that proved costly in terms of money and time. It was further found that the IDE administration did all their work manually and at times, there was communication breakdown and some important information delayed in reaching the intended target. Since this meant providing each candidate with modules, it meant mass production of the study material. This contributed to persistent breakdown on the only industrial machine, thus, becoming very costly to maintain the processes as well as to meet the demands of every student. Some students were unable to receive the study materials and yet they had paid for them.

Wiinga et al (2021) present a journal article titled *Opportunities and Challenges of Exclusive E-Learning during Covid-19: A Case of the Fourth Year Records and Archives Management Students of the University of Zambia*. The methodology that was used to conduct the research involved qualitative data. The findings of this research were that e-learning was cost-effective and allowed the learners to be in control of their learning at their own pace. Another finding of the study was that students considered e-learning to be

cost-beneficial because they did not spend as much money on internet bundles as they do on food, accommodation and groceries when they are learning face to face.

Lessons can also be drawn from experiences in other African countries. Belayneh (2017) presents a PHD thesis titled *Assessment of E-learning readiness of Assosa University* in Ethiopia. The methodology that was used to conduct the research involved a descriptive survey design to establish and determine the level of readiness to implement e-learning in ASU. The finding by Belayneh (2017) is that e-learning is an appropriate tool for just-in-time learning at a lower cost in developing countries. This is because the interaction between the teacher and learner is not confined to regular day time activities and can take place in a variety of locations including homes, schools, libraries, Internet cafes and open fields

Llic and Jovanovic (2012) present a journal article titled *Strategy of reducing expenses by introducing e-learning in university level education institutions* in Serbia. The methodology used in this study relied on secondary data focusing on higher education. The findings are that e-learning contributes to reducing the costs of studying. The platforms which makes possible this kind of studies presupposes that students would not have to come to the classes often, which would reduce transportation costs, which would eventually reduce the total costs of education. E-learning reduces classroom and office expenses. Students and lecturers do not have to meet in a classroom physically to learn. This means that there is no need to pay for classroom space. Office space is not a requirement in online learning, this is another cost that is cut down. E-learning is cheap because most virtual learning environments are open source and are accessed for free. E-learning also reduces the cost of education by the reduced demand for faculty time or substitution of less expensive instructional assistance, such as graduate assistants or peer tutors. E-learning is designed to reduce educational costs by reaching a mass audience at very low cost to the student thereby pointing out possibilities for the improvement of retention, completion, and graduation rates and hence institutional efficiency. Increasing completion, retention and graduation means a potential to lower the institutional cost. E-learning reduces the cost of infrastructure through shared services online. Reducing the duplication of courses and delivery infrastructure on separate campuses can be a key

contributor to cost containment. E-learning reduces costs by ensuring that when academic libraries coordinate specialization, deep collaboration and a small number of collection-of-record libraries combine to ensure continued access to library materials at a vastly reduced cost to participating institutions.

Chakrabarty et al, (2014) present a journal titled *Economics of E-learning: Indicators of comparative cost analysis in Higher Education.* The methodology used in this study is that it relied on secondary data focusing on e-learning and face to face traditional learning in understanding the economics of higher education in Australia. Their findings are that technological development has initiated a new paradigm for e-education in higher academic institutes. As such, the concepts of education and learning have evolved beyond their traditional dimensions into a new system of independent space and time, which has potential to minimize costs of higher education. E-learning eliminates distance and time, thus facilitates fast and flexible learning opportunities in terms of financial wellbeing of all stakeholders. E-learning reduces cost for students such as expenditure on tuition fees, other fees and charges, purchase of books, stationary, hostel accommodation expenses and transport. However, in e-learning method, student incur costs that come with the volume and mode of distribution of reference materials supplied to them by their lecturers. Furthermore, the use of media and managing online students mean that the overhead costs of the institution, the costs of developing a course and the course related costs of presenting courses are in general higher in distance teaching institutions than in traditional institutions for management.

2.4 Lessons drawn from the literature

Six major lessons have been drawn from the literature. The first lesson is that e-learning promotes distance learning. Both lecturers and students are not required to be in the same location at the same time for learning to take place (Himoonga and Phiri, 2020; Belayneh, 2017; Singh et al, 2005; Tularam and Machisella, 2018; Kim and Bonk, 2004 and Bencheva, 2010). The second lesson drawn is that e-learning reduces costs associated with traditional learning methods. It is a cheaper way of delivering and accessing learning (Llic and Jovanovic, 2012) and (Wiinga et al 2021). Furthermore, e-learning reduces cost for students such as expenditure on tuition fees, other fees and charges, purchase of books,

stationary, hostel accommodation expenses and transport (Chakrabarty et al, 2014). The third lesson drawn from the literature is that e-learning limits opportunities for young students to develop social interaction skills that are critical to their overall emotional and social development. E-learning is unable to causes learners to understand that criticism of their work may be forthcoming in real work places and as such must experience the same in learning environments. Thus, placing appropriate levels of work pressure such as attending on time to workshops, lectures, tutorials and other class engagements are all important real life experiences that must be taught in learning environments but e-learning takes out real life interactions or face to face interactions that students (humans) are often looking for where real feelings and emotions play a part in learning and problem solving contexts (Tularam and Machisella, 2018). The fourth lesson drawn from the literature is that students incur costs that come with the volume and mode of distribution of reference materials supplied to them by their lecturers (Chakrabarty et al, 2014).The fifth lesson drawn from the literature is that the overhead costs of an institution, the costs of developing a course and the course related costs of presenting courses are higher in distance teaching institutions than in traditional institutions for management (Chakrabarty et al, 2014). The sixth lesson drawn from the literature is that students recorded some reductions while using E-Learning platforms however majority of the students experienced high costs when travelling from their various locations to the university in order to be attended to and when sending their application forms (Mudende et al 2021).

2.5 Gaps in the literature

The major gap in the literature is that it is based on the experiences before the COVID-19 pandemic. This pandemic made face-to-face learning difficult. As such, many institutions of learning where forced to try different e-learning platforms. However, the literature does not explain how effective the various post-COVID-19 e-learning platforms have been.

2.6 Conclusion

In conclusion, from the literature, it can be learnt that e-learning is designed in a way that enables students and lecturers to have their classes regardless of their location and time through virtual learning environments such as MOODLE and Astria. Networks, computer devices and internet connections are the key materials to aid e-learning and if these things are available, e-learning has the capacity to enhance distance learning. The major gap in the literature is that the literature presents experiences before the COVID-19 era. As such, the literature does not explain the effectiveness of e-learning in the post-COVID-19 era. Furthermore, the literature does not talk about the use of e-learning in universities in Africa.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was adopted for this research. The chapter specifically looks at the type of research, the location of the research, the research approach, the research design, the sources of data, the population and sample size, the sampling methods, the data collection methods, the reliability of data, the validity of data, the data analysis techniques and the ethics that were applied when conducting the research. The chapter then presents the limitations of the research. Finally, a conclusion is given.

3.2 Type of Research

The type of research that was conducted was descriptive research. Manjunatha (2019) defines descriptive research as a research method that describe the characteristics of the population or phenomenon that is being studied. In this research, the variables that have been described in this research are e-learning and distance education in tertiary learning in public institutions. Descriptive research was chosen because it allows for the research to be conducted in the natural environment of the respondent and this insures that high quality and honest data is collected, (Manjunatha 2019). The research was conducted during the period March to July 2022.

3.3 Location of the Research

The research was conducted at the University of Zambia Great East Road Campus in Lusaka. The University of Zambia was chosen for this research because it is the largest public university in Zambia. The University of Zambia has a population of about 30,000 students. According to Lusaka Times (2017), the institution was established in 1966 with a total number of 312 students. UNZA has now a total number of over 30, 000 students that include parallel, regular, block release and distance programmes. It has about 879 academic staff and 1,621 administrative staff. Great East Road campus has nine schools namely; Education, Humanities and Social Sciences, Engineering, Law, Mines,

Veterinary Medicine, Natural Science, Agricultural Science and Graduate School of Business.

Figure 3.1: Map of the University of Zambia

Source: UNZA (2018)

3.4 Research approach

This research used a mixed methods approach. This method focuses on collecting both qualitative and quantitative data. Qualitative approach to research has been defined by McLeod (2019) as the process of collecting, analysing and interpreting non-numerical data. He further states that qualitative research can be used to understand how an individual subjectively perceives and gives meaning to their reality. This approach was chosen because it focuses on collecting in-depth information about the issue under investigation and because the results of the qualitative research approach provide deep understanding of how people perceive their social realities and in consequence, how they act within the social world. Quantitative data on the other hand has been defined by

Creswell (2003) as data that involves expressing data statistically or numerically. This approach has been chosen because it focuses on collecting in-depth information about the issue under investigation and because the results of the qualitative research approach provide deep understanding of how people perceive their social realities and in consequence, how they act within the social world. The mixed method approach was chosen because the weaknesses of one approach can be resolved by the strengths of the other approach and vice versa McLeod (2019).

3.5 Research Design

The type of research that was conducted was a non-experimental design. Swart et al (2019) defines non-experimental design as research that lacks the manipulation of an independent variable. Non-experimental design was chosen because it measures variables as they naturally occur rather than manipulating an independent variable. The specific type of non-experimental design that was used in this research is the case study. Stake (1995) defines a case study as a research approach where multiple methods of data collection are used for a detailed examination of a single case. In this research, the case being studied is the use of MOODLE at UNZA. MOODLE was chosen because it was the first e-learning platform adopted by UNZA to teach undergraduate programs. Thus, there are more lessons to be drawn from MOODLE because it exposed users to e-learning. There is more to tell from a platform that been used for a longer period than the newest forms. The case study method was chosen based on four major reasons illustrated by Madimutsa (2019) which are, first, it allows the researcher to collect detailed information on the behaviour of the social unit under investigation. In this case, detailed information was collected from management, lecturers and students on how MOODLE is used at UNZA. Second, the case study method helps the researcher to understand the history of the social unit and its interaction with the environment. In this case, the research sought to understand the history of management, lecturers and students on how they interact with MOODLE. Third, the case study method enables the researcher to identify challenges faced by the social unit as it interacts with the environment. In this case, the research tried to identify challenges faced by management, lecturers and student. Fourth, the case study

method enables the researcher to make recommendations on how to deal with the challenges faced by the social unit. In this research, recommendations have been made.

3.6 Sources of Data

The research made use of primary data. Primary data is data that is collected afresh for the first time and it happens to be original in character. Primary data gives a better understanding of the research problem as it comes from the concerned and reliable respondents and as such, is considered to be original (Kothari, 2004). The source of this type of data in this study was collected from students, lecturers and management. Primary sources of data were chosen because the collection of original and independent data increases its authenticity and enhances the reliability of data, Kothari (2004).

3.7 Population and Sample Size

The total population from which the sample was selected was 554, comprising 43 management officials, 207 lecturers and 304 students. These participants were drawn from the Schools of Engineering, Veterinary Medicine, Agricultural Sciences and Mines. From this population a total sample 104 was drawn. This sample comprised of four management officials where one official was drawn from each of the four schools mentioned above. The guiding criteria for this sample size was illustrated by Creswell (2014), where he states that he found narrative research to include one or two individuals, phenomenology to range from three to ten and grounded theory from 20 to 30. Therefore, a sample of four management officials was large enough in this research to deduce how MOODLE is being implemented in the four school. The sample also had 40 lecturers. Four lecturers where from the School of Mines, 15 from the School of Engineering, eight from the School of Veterinary medicine and 13 from the School of Agricultural Sciences. The sample also had 60 students. From the 60 students, six were from the School of Mines, 24 were from the School of Engineering, 13 from the School of Veterinary Medicine and 17 from the School of Agricultural Sciences. The central limit theorem was taken into consideration when picking the samples for quantitative data which included lecturers and students. Gray (2014) states that the central limit theorem establishes that when independent random variables are summed up, their properly normalised sum tends

towards a normal distribution. Therefore, in this research, a sample of 60 students and 40 lecturers represent characteristics similar to those of the population from which the samples were drawn.

3.8 Sampling Methods

The key informants who included management officials were purposively selected. Creswell and Plano (2011) state that purposive sampling involves the identification and selection of individuals or groups of individuals that are proficient and well informed with the phenomenon of interest. Purposive sampling was chosen because it allows the researcher to make a judgment as to which participant is more knowledgeable about the subject under investigation (Creswell and Plano, 2011). In this regard, the management officials are more knowledgeable about how MOODLE is being implemented at UNZA.

Lecturers were selected using simple random sampling. O'Sullivan et al (2003) defines simple random sampling as a method where each unit of the population has a known, equal, nonzero probability of being included in the sample. In this research, the selection of one lecturer from the population did not increase or decrease the probability that any other lecturer of the same population will also be chosen for the sample. The specific method of simple random sampling method that was applied in this research is lottery method. A lottery method was chosen in this research because it ensures against the unintentional introduction of a pattern of systematic bias in the sampling procedure. The application of this method in this research involved numbers that were written on pieces of paper and folded in order to pick which lecturers where to participate in the research. The number that corresponded with the name on the list of lecturers in the school was chosen. With regards to the students, systematic sampling was used to select the participants. O'Sullivan et al (2003) defines systematic sampling as a method of sampling where the investigator establishes the skipped interval and uses that random number to select the case. In this research, a skipped interval of two was established. One student was skipped from each class and the next was chosen in every row. Simple random sampling was chosen because it gives participants an equal chance of being part of the research by ensuring the selection of each unit is independent of the selection of any other unit (O'Sullivan et al 2003).

3.9 Methods of Data Collection

Semi-structured interviews were used to collect qualitative data. A semi-structured interview is a meeting in which the interviewer does not strictly follow a formalised list of questions. Instead, they ask more open-ended questions, allowing for a discussion with the interviewee rather than a straightforward question and answer format (Doyle, 2020). This method was chosen because it consists of a number of predetermined questions but allows for the interviewer to ask additional questions to get clarification or more details about the issue under discussion (Abawi, 2014).

A questionnaire was used to collect quantitative data. A questionnaire is a data collection instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents (Abawi, 2014). This method was chosen because it gives respondents the choice of choosing from a list of pre-set responses or to create their own responses.

3.9.1 Reliability of Data

This research used data triangulation method to assess reliability of qualitative data. Yeasmin and Rohman (2012) defines data triangulation as a process of data verification that increases validity by incorporating several viewpoints and methods. In this research, qualitative data was collected from different deans from the four schools to increase confidence in the findings through the confirmation of proposition. This method was chosen because the combination of findings from two or more sources provides a more comprehensive picture of the results. Internal consistency on the other hand was the method used to assess reliability of quantitative data. Internal consistency involves the use of questions in a research instrument that are logically related to their responses (Mwanje, 2001). To achieve this, the research instruments were designed in such a way that the questions were logically related. After data collection, the responses from each informant were checked for their logical relationship. In cases where the informant was found to be contradictory, the data was rejected. Only responses that were not contradictory to the corresponding questions were taken to be reliable. These are the data that have been presented and analysed in this research.

3.9.2 Validity of Data

The validity of both qualitative and quantitative data was accessed using content validity. Content validity refers to the extent to which the items on a test are fairly representative of the entire phenomenon the test seeks to measure (Taherdoost, 2016). Content validity has been chosen because in this research, the research instruments were the full contents of the phenomenon. In the case of e-learning, the contents that were covered include management members. As for delivery of tertiary education, its content included lecturers and students.

3.9.3 Methods of Data Analysis

Qualitative data was analysed using thematic analysis. Thematic analysis involves soughing data into themes. Thematic analysis is a method of analysing qualitative data which is usually applied to a set of texts such as interviews or transcripts (Caulfield, 2019). Thematic analysis helped in this research by allowing flexibility in the interpretation of large qualitative data by sorting it into themes. This method was chosen because it analyses data collected from interview guides. Quantitative data on the other hand was analysed using statistical analysis programs. O'Sullivan et al, (2003) defines statistical analysis programs as computer software programs used for managing numerous and analysing large data. These programs include spreadsheets, database managers, statistical analysisis programs and geographic information systems (GIS). In this research, statistical analysis programs where chosen because the research collected a large dataset and many types of analysis were done. The specific statistical analysis program that was used in this research was Statistical Package for Social Sciences (SPSS). SPSS was chosen because it calculates numerous statistics and allows datasets to be subdivided, combines values of different variables, creates new variables from earlier calculations and changes the values of variables (O'Sullivan et al 2003). Thus, SPSS helped to analyse scientific data related to the effectiveness of e-learning in the delivery of tertiary education in public universities and in the generation of descriptive statistics and cross tabulations.

3.9.4 Research Ethics

Ethical issues were considered when carrying out this research. Firstly, permission to collect data was sought from the Directorate of Research and Graduate Studies at the University of Zambia. All potential research subjects were spoken to about the objectives of the research, sampling methods and data collection methods. Research subjects were allowed to ask any questions about the research and their consent was requested for.

Also, the research subjects were informed of their right to withdraw their consent whenever they felt like doing so. Furthermore, participants were assured of their rights to decline to answer questions which they felt uncomfortable with in the process of data collection. Confidentiality was also employed and participant's identities were kept anonymous.

3.9.5 Limitations of the Research

The following were the limitations of the research:

1. At the time of data collection, the University had opened fully and the COVID-19 pandemic was coming to an end thus most students were physically in school. This meant that some lecturers would conduct physical classes always although the University was to conform to blended learning. Nonetheless, the researcher attempted to deal with this limitation by ensuring that the responses that all research participants gave were in line with the time that e-learning was at its pick and was being used for both delivering and accessing learning in the University.

2. The use of e-learning in delivering tertiary education in public institutions is new in Zambia. Considering that it gained momentum during the COVID-19 pandemic. The findings may differ if a similar research is done later on. For example, after five years. Although variations might occur with the findings of subsequent studies, these findings are still reliable because they provide information on experiences in the early stages of implementing e-learning in public institutions. These findings can also act as baseline information upon which

future findings can be compared to see whether experiences with e-learning change at different points in time.

3.10 Conclusion

In conclusion, this research took the form of a case study. By focusing on small numbers, greater depth and more details were obtained. The research was conducted at the University of Zambia Great East Road Campus in Lusaka. This research used a mixed methods approach. The research took the form of a non-experimental design and the specific type of non-experimental design that was used is the case study. The research further made use of primary data. The total population from which the sample was selected was 554 and from this population a total sample 104 was drawn. The key informants who included management officials were purposively selected while lecturers were selected using simple random sampling and students were selected using systematic sampling. Semi-structured interviews were used to collect qualitative data and questionnaires were used to collect quantitative data. This research used data triangulation method to assess reliability of qualitative data. Internal consistency on the other hand was the method used to assess reliability of quantitative data. The validity of both qualitative and quantitative data was accessed using content validity. Qualitative data was analysed using thematic analysis while quantitative data on the other hand was analysed using statistical analysis programs. Ethical issues were considered when carrying out this research. The research had two limitations and these are that, firstly, at the time of data collection, the University had opened fully and the COVID-19 pandemic was coming to an end thus most students were physically in school and secondly, the use of e-learning in delivering tertiary education in public institutions is new in Zambia, considering that it gained momentum during the COVID-19 pandemic.

CHAPTER 4: EXTENT TO WHICH MOODLE HAS PROMOTED EDUCATION AT THE UNIVERSITY OF ZAMBIA

4.1 Introduction

The purpose of this chapter is to present and discuss the findings relating to the first specific objective which reads: To examine the extent to which MOODLE has promoted education at the University of Zambia. In order to achieve its purpose, the chapter begins with an introduction. The chapter then examines the ability of lecturers to use MOODLE for teaching purposes. Thereafter, the chapter examines the ability of students to use MOODLE to access university education. Finally, a conclusion will be drawn.

4.2 Use of MOODLE by lecturers for teaching purposes

This section looks at the use of MOODLE by lecturers for teaching purposes, benefits they get by using MOODLE and the challenges they face. The details of these issues are presented below.

4.2.1 Ability of lecturers to use MOODLE for teaching purposes

Ability in this research is taken to mean the extent to which lectures are able to deliver lectures on MOODLE. Out of 40 lecturers, 39 lecturers (representing 97.5%) are able to use MOODLE and only 1 lecturer (representing 2.5%) is unable to use the software. Based on this finding, it can be noted that majority of the lecturers are able to use MOODLE for teaching purposes. From this finding, it can be argued that from the lecturer's perspective, MOODLE has the ability to enhance distance education in public universities. This finding is similar to what was discovered by Himoonga and Phiri (2020) regarding the use of e-learning in collages by lecturers in Zambia. This finding agrees with The Dean of the School of Engineering who stated that "lecturers post notes for students to study at a time convenient for them and lecturers give assessments on the MOODLE platform which add to each student's continuous assessment". Apart from posting lecture notes online, lecturers are also able to assess student performance in the course online. The Assistant Dean of the School of Veterinary Medicine indicated that "management has ensured that online courses have been created in order for students to learn from their various locations.

Lecturers add assessments to the platform such as assignments and quizzes which students can access on the platform. Of course, under restrictions such as time [duration of the assessment]." Furthermore, the online platform allows lecturers to conduct virtual classes. According to the Dean of the School of Engineering, "lecturers also have virtual classes on the platform where students are able to directly speak with their lecturers and get clarity on notes that could have been unclear after self-study and the lecturers are there to attend to such issues during the hour of the virtual class". The issue of virtual classes was also mentioned by the Dean of the School of Agricultural Sciences who indicated that "lecturers spend time explaining concepts through virtual classes that students don't understand fully during self-study". Not only does this finding agree with management members on the issues of lecturers being able to deliver classes on MOODLE but it also agrees with management in that lectures are able to use MOODLE because management provides training for them. The Dean of the School of Mines indicated that:

> Management has ensured that lecturers in the school of Mines undergo continuous training on the use of MOODLE in order for them to keep up with the new features being introduced on the platform. Following the introduction of the Big Blue Button which enables lectures to have live virtual classes, management held a training for lectures where they were taught on how it works and how they are to use it in delivering distance education.

This finding above agrees with the findings by Kim and Bonk (2004) who did a study focusing on online teaching and learning in higher education in USA and argue that faculty training and support are critical components of quality online education. Despite majority of the lecturers being able to use MOODLE for teaching purposes, the experiences between male and female lecturers are different. Sex was used to see if it had an influence on the ability of male and female lecturers to deliver courses on the platform. Table 4.1 shows that in the case of males, all of them, 29 lecturers (representing 100%) use MOODLE for teaching purposes. Female lecturers on the other hand,10 lecturers (representing 90.9%) use MOODLE for teaching purposes while 1 lecturer (representing

9.1%) does not use MOODLE. This means that the rate of using MOODLE is higher among male lecturers (100%) than females (90.9%). This finding means that male lecturers have a higher chance of using MOODLE to enhance distance education than their female counterparts. Therefore, sex is acting as an intervening variable. The type of person using MOODLE determines the effectiveness of the platform. Thus, MOODLE as a tool is very effective however, when female lectures use it, it becomes less effective. The female lecturer failed to use MOODLE because of challenges such as failure to access students on the platform, poor internet connectivity and the system altogether is unstable. This is because the system is unable to accommodate over 100 students to one class. If the number of students exceeds 100, the system simply shuts down.

Table 4. 1: Sex of lecturers using MOODLE

Sex of lecturers	Use of MOODLE		Total
	Yes	No	
Male	29	0	29
Female	10	1	11
Total	39	1	40

Source: Field data

Table 4. 2: Percentage of courses delivered by lecturers on MOODLE

Percentage of courses	Frequency	Percent	Valid Percent
Less than 10	1	2.6	2.6
10-19	4	10.3	10.3
20-29	5	12.8	12.8
30-39	6	15.4	15.4
40-49	5	12.8	12.8
50-59	10	25.6	25.6
60-69	2	5.1	5.1
70-79	1	2.6	2.6
80-89	2	5.1	5.1
90-100	3	7.7	7.7
Total	39	100	100

Source: Field data

Table 4.2 shows that only 3 out of 39 lecturers (representing 7.7%) were able to deliver 90-100% of their courses on MOODLE while 36 lecturers (representing 92.3%) were only able to deliver less than 90-100% of courses on MOODLE while the rest, 36 lecturers

(representing 92.3%) were unable to teach up to 90% of their courses using MOODLE. In fact, most of the lecturers (21 out of 39 lecturers representing 53.8%) were unable to deliver up to 50% of their courses on MOODLE. This finding show that majority of the lecturers are unable to deliver above 50% courses on MOODLE platform. This finding agrees with the Dean of the School of Engineering who indicated that "the school faces challenges using the MOODLE platform to enhance distance education because the school lacks devices such as computers to properly facilitate online education." Similarly, the Dean of the School of Mines stated that "the school lacks modern computer devices that lecturers can use to aid deliver classes." The Dean of the School of Agricultural Sciences further stated that:

> The school faces challenges using the MOODLE platform to enhance distance education because the school has no ICTs [Information and Communication Technologies] such as computer devices to aid the education process. The computers that are available are either destroyed or are old model and do not have memory that can allow for a software like MOODLE to be installed on them.

The Dean of the School of Engineering further stated that "access to the network is very poor and slows down the learning process." This finding is not just unique at the School of Engineering but also the Dean of the School of Mines indicated that "the school faces internet challenges that cause lecturers to fail to deliver virtual classes."

The finding further agrees with the Dean of the School of Mines who indicated that "the platform has no provision for practical lab work and has no provision for final examinations to be conducted." This shows why lecturers are unable to deliver above 50% of their courses on MOODLE. Lastly, the Dean of the School of Engineering stated that "the school lacks adequate funding to keep up with purchasing of electronic devices [such as modern computers] that are essential to the use of MOODLE."

Although majority of the lecturers were unable to teach up to 50% courses on MOODLE, the experiences were different between male and female lecturers. Table 4.3 shows that

15 out of 29 male lecturers (representing 51.7%) were unable to deliver up to 50% of their courses on MOODLE while 13 out of 29 male lecturers (representing 44.8%) delivered above 50% courses on MOODLE. This was quite not the case with female lecturers were 8 out of 11 (representing 72.7%) failed to deliver up to 50% of their courses on MOODLE while only 3 out of 11 female lecturers (representing 27.3%) delivered above 50% of their courses on MOODLE. This finding shows that despite both sexes failing to teach all their courses on the online platform, the situation is worse for female lecturers (72.7%) than male lecturers (51.7). This was so because most of the lecturers that found it hard to access students on the online platform where female.

Table 4. 3: Sex vs course delivered on MOODLE

Sex of lecturer	Course percentage on MOODLE										Total
	Less than 10	11-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Male	1	4	4	3	4	7	1	0	2	3	29
Female	0	1	3	1	3	1	1	0	0	1	11
Total	1	4	5	6	5	10	2	1	2	3	39

Source: Field data

Table 4. 4: Schools vs course delivered on MOODLE

School of lectures	course percentage delivered on MOODLE										Total
	Less than 10	11-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Engineering	0	2	1	2	1	5	1	0	1	2	15
Veterinary Medicine	0	2	0	1	0	2	1	1	1	0	8
Mines	0	0	0	1	1	2	0	0	0	0	4
Agricultural Sciences	1	0	4	2	3	1	0	0	0	1	12
Total	1	4	5	6	5	10	2	1	2	3	39

Source: Field data

Although both male and female lecturers failed to deliver up to 50% of their courses on MOODLE, Table 4.4 shows the different experiences among the schools. 2 out of 4

lecturers (representing 50%) from the School of Mines were unable to deliver up to 50% courses on MOODLE while the other 2 out of 4 lecturers (representing 50%) delivered above 50% of their courses on the platform. 3 out of 8 lecturers (representing 37.5%) from the School of Veterinary Medicine were unable to deliver up to 50% courses on the online platform while 5 out of 8 lecturers (representing 62.5%) delivered above 50% of their courses on MOODLE. 6 out of 15 lecturers (representing 40%) from the School of Engineering failed to deliver up to 50% courses on MOODLE while 9 out of 15 lecturers (representing 60%) were able to deliver above 50% of their courses. 10 out of 12 lecturers (representing 83.3%) from the School of Agricultural Sciences were unable to deliver above 50% courses on MOODLE while 2 out of 12 lecturers (representing 16.7%) delivered above 50% of their courses on MOODLE. This finding simply shows that majority of the lecturers that failed to deliver their courses on MOODLE were from the School of Agricultural Sciences with up to 83.3% of lecturers failing to deliver their courses on MOODLE platform. Lecturers from the School of Agricultural Sciences failed to deliver majority of their courses on MOODLE because they faced challenges such as poor internet connectivity, they found it difficult to access their students online because the platform can only accommodate 100 students at a time. This caused lecturers from the school to fail to access and deliver lectures to all the students easily. Furthermore, the lecturers failed to deliver their courses on MOODLE because the school does not provide ICTs to aid their teaching. This finding in fact agrees with the earlier finding where the Dean of the School of Agricultural Sciences indicated that the school faces challenges using the MOODLE platform to enhance distance education because the school has no ICTs.

Table 4.5 show that 15 out of 31 lecturers (representing 48.4%) on permanent and pensionable employment type failed to deliver up to 50% of their courses on MOODLE while 16 out of 31 lecturers (representing 51.6%) on the same employment type delivered above 50% of their courses on MOODLE.

6 out of 8 lecturers (representing 75%) on fixed-term contract employment failed to deliver up to 50% of their courses on MOODLE while 2 out of 8 lecturers (representing 25%) delivered above 50% of their courses on MOODLE. This finding means that most of the lecturers failing to deliver their courses on MOODLE are on fixed-term contract

type of employment with up to 75% of lecturers failing to deliver their courses on MOODLE compared to 48.4% of lecturers on permanent and pensionable employment type.

Table 4. 5: Employment type vs courses delivered on MOODLE

Employment type of lecturer	Lecturers delivering courses on MOODLE										Total
	Less than 10	11-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Permanent and pensionable	0	3	4	5	3	10	1	1	2	2	31
Fixed-term contract	1	1	1	1	2	0	1	0	0	1	8
Total	1	4	5	6	5	10	2	1	2	3	39

Source: Field data

Table 4. 6: Age vs courses delivered on MOODLE

Age of lecturer	Lecturers delivering courses on MOODLE										Total
	Less than 10	11-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
30-39	0	0	1	0	1	2	0	1	0	1	6
40-49	1	2	1	5	1	5	1	0	1	1	18
50 and above	0	2	3	1	3	3	1	0	1	1	15
Total	1	4	5	6	5	10	2	1	2	3	39

Source: Field data

While most lecturers failing to deliver their courses on MOODLE are on permanent and pensionable type of employment, Table 4.6 shows the age of the lecturers that failed to deliver their courses on MOODLE platform. 2 out of 6 lecturers (representing 33.3%) aged between 30-39 failed to deliver up to 50% of their courses on MOODLE while 4 out of 6 lecturers (representing 66.7%) delivered above 50% of their courses on MOODLE. 10 out of 18 lecturers (representing 55.6%) aged between 40-49 failed to deliver up to 50% of their courses on MOODLE while 8 out of 18 lecturers (representing 44.4%)

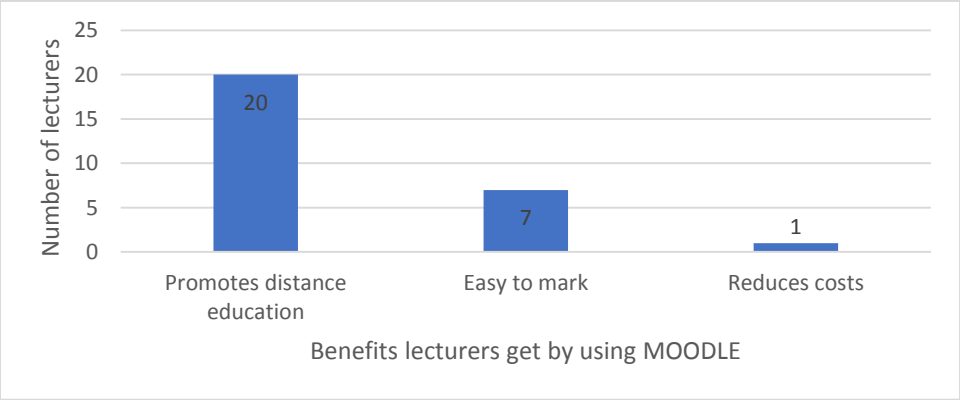
delivered above 50% of their courses on the online platform. 9 out of 15 lecturers (representing 60%) that were 50 years and above failed to deliver up to 50% of their courses on MOODLE while 6 out of 15 lecturers (representing 40%) delivered up to 50% of their courses on MOODLE. This entails that although some lecturers from all age groups failed to deliver their courses on MOODLE, the situation was getting worse among older lecturers (aged 50 years and above) were majority (60%) failed to deliver their courses on MOODLE. This finding is similar to the experiences in other countries outside Africa such as Asia and the USA where Singh et al, (2005) did a study focusing on the effectiveness of e-learning in tertiary education and discovered that (younger) lecturers that enter the profession in today's information age are much more likely to have used computers and have significant access to the internet than those in previous years and are more likely to accept technological advances in teaching methods.

4.2.2 Benefits lecturers get by using MOODLE

It is important to note that MOODLE is beneficial to most schools including those that faced challenges however, the schools are underequipped. It was observed that out of 40 lecturers, 28 found the platform beneficial and the benefits they get are shown in Figure 4.1. The major benefit that lecturers get from MOODLE is that it promotes distance education. This implies that lecturers are able to teach students without having to meet them physically. This benefit was given by 20 out of 28 lecturers (representing 71.4%). This finding agrees with the Dean of the School of Engineering who stated that "the use of MOODLE software . . . has caused the school to capture more students because they are able to learn from their various locations at their own time. Students that have to do both work and school have been captured too." The second benefit is that it makes marking of students work easy. This benefit was given by 7 out of 28 lecturers (representing 25%). This finding agrees with the Dean of the School of Agricultural Sciences who stated that "MOODLE has benefited the school by providing flexible teaching opportunities for lecturers. Through online interactions, lecturers are able to access students from all parts of the country and lessons are carried out very easily without physical interactions." The Assistant Dean of the School of Veterinary Medicine also stated that "MOODLE platform is highly customised. It enables lecturers to conduct

virtual classes, upload quizzes, tests and lecture notes for the students easily". The third benefit is that costs associated with teaching are reduced. This benefit was given by 1 out of 28 lecturers (representing 3.6%). This finding agrees with Belayneh (2017) who argues that E-learning is considered as the appropriate tool for just-in-time accessible and universal approaches to providing learning at a lower cost. The finding is similar to the findings by Llic and Jovanovic (2012) who did a study focusing on strategy of reducing expenses by introducing e-learning in university level education institutions in Serbia and discovered that e-learning contributes to reducing the costs of studying.

Figure 4.1: Type of benefits lecturers get by using MOODLE



Source: Field data

With regards to age, Table 4.7 shows that lectures that get the most benefits from MOODLE were aged between 30-39. Lecturers in this age group got 100% (6) benefits using MOODLE. The second age group that got benefits using the platform were lecturers between the ages of 40-49. This group recorded 14 out of 19 lecturers (representing 73.7%) that got benefits using MOODLE while 5 out of 19 lecturers representing 26.3%) did not. The third group of lecturers that got benefits using MOODLE were aged 50 years and above. This category recoded 8 out of 15 lecturers (representing 53.3%) that found the platform beneficial while 7 out of 15 lecturers (representing 46.7%) did not. This implies that as far as age is concerned, younger lecturers find MOODLE more beneficial than older lecturers for teaching purposes. This finding further agrees with Sign et 'al (2005) who state that lecturers that enter the profession in today's information age are

much more likely to have used computers and have significant access to the internet than those in previous years and are more likely to accept technological advances in teaching methods.

Table 4. 7: Age vs benefits using MOODLE

Age of lecturers	Benefits using MOODLE		Total
	Yes	No	
30-39	6	0	6
40-49	14	5	19
50 and above	8	7	15
Total	28	12	40

Source: Field data

In terms of sex, Table 4.8 shows that 18 out of 29 male lecturers (representing 62.1%) get benefits using MOODLE while 11 out of 29 male lecturers (representing 37.9%) do not. 10 out of 11 female lecturers (representing 90.9%) get benefits using MOODLE while 1 out of 11 female lectures (representing 9.1%) does not. This means that female lectures (90.9%) find MOODLE software more beneficial than male lecturers (62.1%).

Table 4. 8: Sex vs benefits using MOODLE

Sex of lecturers	Benefits brought by MOODLE		Total
	Yes	No	
Male	18	11	29
Female	10	1	11
Total	20	12	40

Source: Field data

Table 4.9 shows that the School of Mines recoded the highest number of lecturers that found MOODLE beneficial. All 4 lecturers in the School of Mines (representing 100%) get benefits using the online platform. The School of Agricultural Sciences was second

and recoded 10 out of 13 lecturers (representing 76.9%) that get benefits using the platform while 3 out of 13 lecturers (representing 23.1%) did not. The School of Engineering recoded the third highest with 10 out of 15 lecturers (representing 66.7%) that get benefits using MOODLE while 5 out of 15 lecturers (representing 33.3%) did not. The School of Veterinary Medicine was the fourth. The school recorded 4 out of 8 lecturers (representing 50%) that found MOODLE beneficial while 4 out of 8 lecturers (representing 50%) did not. From this finding, it is established that lecturers from the School of Mines recoded the most benefits using MOODLE platform with 100% of the lecturers getting benefits from the online platform. This finding in fact agrees with the Dean of the School of Mines who noted that management has ensured that lecturers in the school of Mines undergo continuous training on the use of MOODLE. The finding also agrees with Kim and Bonk (2004) who argue that faculty training and support are critical components of quality online education.

Table 4. 9: Schools vs benefits using MOODLE

Name of schools	Benefits using MOODLE		Total
	Yes	No	
Engineering	10	5	15
Veterinary Medicine	4	4	8
Mines	4	0	4
Agricultural Sciences	10	3	13
Total	28	12	40

Source: Field data

Table 4.10 shows that lecturers who were on permanent and pensionable employment type recorded 21 out of 32 (representing 65.6%) getting benefits using MOODLE while 11 out of 32 lecturers (representing 34.4%) did not. Lecturers on fixed-term contract recorded 7 out of 8 (representing 87.5%) getting benefits using MOODLE while 1 out of 8 lecturers (representing 12.5%) on the same employment type did not get benefits using

MOODLE. This implies that majority of the lecturers that got benefits using MOODLE were on fixed-term contract (87.5%) compared to lecturers on permanent and pensionable type of employment (65.6%). The reason why lecturers on fixed-term contract got benefits using MOODLE are because they found it easy to mark students using MOODLE, they found the use of the platform to have reduced cost and that the platform promotes distance education.

Table 4. 10: Type of employment of lecturers that get benefits using MOODLE

Type of employment	Benefits using MOODLE		Total
	Yes	No	
Permanent and pensionable	21	11	32
Fixed-term contract	7	1	8
Total	28	12	40

Source: Field data

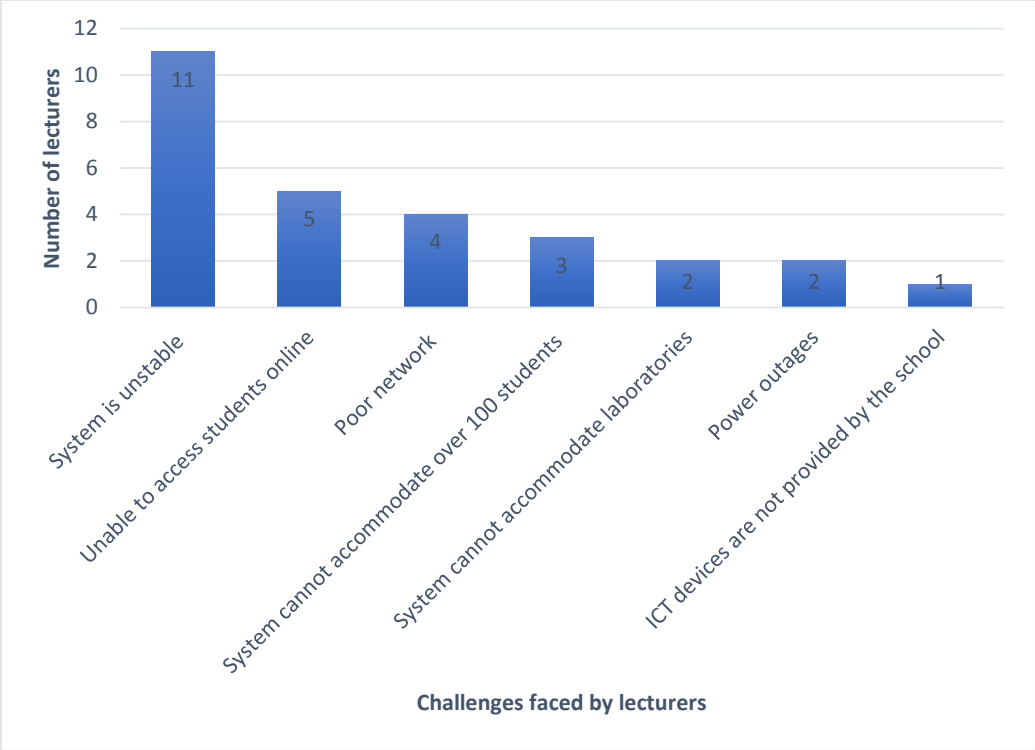
4.2.3 Challenges faced by lecturers using MOODLE

It was discovered that 28 out of 40 lecturers (representing 70%) had challenges using MOODLE software while 12 out of 40 lecturers (representing 30%) did not. The findings show that majority of the lecturers face challenges using MOODLE. The challenges the 28 lecturers face using MOODLE are shown in Figure 4.2. These lecturers face 7 major challenges in the process of using MOODLE. The first challenge is that the system is unstable. This challenge was given by 11 out of 28 lecturers (representing 39.3). The second challenge is that lecturers are unable to access students online. This challenge was given by 5 out of 28 (representing 17.9%). The third challenge is that the network is poor. This finding agrees with the Dean of the School of Mines who indicated that "the school faces internet challenges that cause lecturers to fail to deliver virtual classes." This challenge was given by 4 out of 28 lecturers (representing 14.3%). The fourth challenge lecturer's face is that the system is unable to accommodate over 100 students. This challenge was given by 3 out of 28 lecturers (representing 10.7%). The fifth challenge lecturers gave is that the system is unable to accommodate laboratories. This finding

agrees with the Dean of the School of Mines who indicated that "the platform has no provision for practical lab work and has no provision for final examinations to be conducted." This challenge was given by 2 out of 28 lecturers (representing 7.1%). This finding is similar to the finding by Tularam and Machisella (2018) who did a study focusing on traditional vs non-traditional teaching and learning strategies in Australia and noted that in mathematics for example, emails do not provide an appropriate communication platform where typing of symbolic material often requires a lot of time on the computer. The sixth challenge is that lecturers experience power outages. This reason was given by 2 out of 28 lecturers (representing 7.1%). The seventh challenge is that Information and Communication Technology (ICT) devices such as computers are not provided by the school. This challenge was given by 1 out of 28 lecturers (representing 3.6%). This finding agrees with the Dean of the School of Engineering who indicated that "the school faces challenges using the MOODLE platform to enhance distance education because the school lacks devices such as computers to properly facilitate online education." Similarly, the Dean of the School of Mines stated that "the school lacks modern computer devices that lecturers can use to aid deliver classes." The Dean of the School of Agricultural Sciences further stated that:

> The school faces challenges using the MOODLE platform to enhance distance education because the school has no ICTs [Information and Communication Technologies] such as computer devices to aid the education process. The computers that are available are either destroyed or are old model and do not have memory that can allow for a software like MOODLE to be installed on them.

Figure 4.2: Challenges faced by lecturers using MOODLE



Source: Field data

Table 4.11: Age vs challenges using MOODLE

Age of lecturers	Challenges using MOODLE		Total
	Yes	No	
30-39	3	3	6
40-49	12	7	19
50 and above	13	2	15
Total	28	12	40

Source: Field data

Table 4.11 shows that lecturers aged 50 and above faced the most challenges using MOODLE. Lecturers in this age group were 13 out of 15 (representing 86.7%) facing challenges using MOODLE while only 2 out of 15 lectures (representing 13.3%) did not. This was followed by lecturers aged between 40-49 with 12 out of 19 lecturers (representing 63.2%) experiencing challenges using the platform while 7 out of 19

lecturers (representing 36.8%) did not. Lastly, lecturers aged between 30-39 followed with 3 out of 6 lecturers (representing 50%) facing challenges using the platform while 3 out of 6 lecturers (representing 50%) did not. This finding shows that despite lecturers from all age groups facing challenges using MOODLE, the situation was worse with lecturers that were older. This finding further agrees with Sign et al, (2005) who state that lecturers that enter the profession in today's information age are much more likely to have used computers and have significant access to the internet than those in previous years and are more likely to accept technological advances in teaching methods.

Table 4.12: Sex vs challenges using MOODLE

Sex of lecture	Challenges using MOODLE		Total
	Yes	No	
Male	20	9	29
Female	8	3	11
Total	28	12	40

Source: Field data

Although older lecturers found challenges using MOODLE, Table 4.12 shows that 20 out of 29 male lecturers (representing 69%) faced challenges using MOODLE while 9 out of 29 male lecturers (representing 31%) did not. 8 out of 11 female lecturers (representing 72.7%) faced challenges using the online platform while 3 out of 11 lecturers (representing 27.3%) did not. This finding shows that female lecturers faced more challenges using MOODLE software with up to 72.7% compared to male lecturers who faced 69% challenges using MOODLE. This finding was so because most female lecturers indicated that they faced challenges such as power outages, some found the system to be unstable and others indicated that they experienced poor network.

Table 4.13 shows that the School of Engineering recoded the most challenges with 12 out of 15 lecturers (representing 80%) facing challenges using MOODLE software while 3 out of 15 lecturers (representing 20%) did not. This was followed by the School of Agricultural Sciences were 10 out of 13 lecturers (representing 76.9%) were facing challenges using MOODLE while 3 out of 13 lecturers (representing 23.1%) did not. The School of Mines recoded 2 out of 4 lecturers (representing 50%) facing challenges using

MOODLE while the other 2 out of 4 lecturers (representing 50%) did not. Lastly the School of Veterinary Medicine recoded 4 out of 8 lecturers (representing 50%) that faced challenges using MOODLE software while 4 out of 8 lecturers (representing 50%) did not. This finding means that despite all schools facing challenges using MOODLE software, the situation was worse at the School of Engineering where 80% lecturers faced challenges using MOODLE. This finding agrees with the Dean of the School of Engineering who indicated that the school faces challenges using the MOODLE platform to enhance distance education because the school lacks devices such as computers to properly facilitate online education.

Table 4. 13: School vs challenges using MOODLE

Name of Schools	Challenges Using MOODLE		Total
	Yes	No	
Engineering	12	3	15
Veterinary Medicine	4	4	8
Mines	2	2	4
Agricultural Sciences	10	3	13
Total	28	12	40

Source: Field data

Table 4. 14: Employment type vs challenges using MOODLE

Type of employment	Challenges using MOODLE		Total
	Yes	No	
Permanent and pensionable	23	9	32
Fixed-term contract	5	3	8
Total	28	12	40

Source: Field data

Table 4.14 shows that lecturers on permanent and pensionable employment type recorded 23 out of 32 lecturers (representing 71.9%) facing challenges using MOODLE platform while 9 out of 32 lecturers (representing 28.1%) did not. Lecturers on fixed-term contract

recorded 5 out of 8 lecturers (representing 62.5%) facing challenges using the online platform while 3 out of 8 lecturers (representing 37.5%) did not. This finding shows that majority of lecturers on all employment types faced challenges using MOODLE however the situation was worse with lecturers on permanent and pensionable employment type were lecturers faced up to 71.9% challenges using MOODLE compared to lecturers on fixed-term employment who faced 62.5% challenges using MOODLE. The reason for this finding is because most lecturers on permanent and pensionable employment type faced issues such as failure to access students on the MOOSLE platform because the system could not accommodate more than 100 students otherwise it would crush. Some lecturers on the same employment type noted that they do not have ICT devices to aid learning on MOODLE because the various schools did not provide the necessary electronic devices such as computers or even WIFI. Other lecturers indicated that the system cannot accommodate laboratories hence making it hard for them to use MOODLE. Lastly, some lecturers on this type of employment indicated that power outages and poor internet contributed to the challenges they faced in using MOODLE for teaching purposes.

4.3 Use of MOODLE by students

Three aspects on the use of MOODLE by students to access education are covered in this section. These are the ability of students to use MOODLE to access education, the benefits they get by using MOODLE and the challenges faced. The details of these aspects are presented below.

4.3.1 Ability of students to use MOODLE to access education

The data collected from the filed indicates that all the 60 students (100%) are able to use MOODLE to access education. This finding is similar to findings by Himoonga and Phiri (2020) who studied the experiences in collages in Zambia and stated that MOODLE is widely used by students. The finding is also similar even in developed countries such as the United States where higher learning institutions have increasingly embraced e-learning (Kim and Bonk, 2004). Table 4.16 shows the courses that students accessed on MOODLE.

Table 4.15 shows that students that accessed 1-4 courses on MOODLE were 28 out of 60 (representing 46.7%) and students that accessed 5-8 courses on the same online platform were 31 out of 60 (representing 51.7%). There was only 1 out of 60 students (representing 1.7%) who accessed more than 8 courses on the platform. This means that majority of the students are able to access courses on the platform. The finding confirms the earlier finding in this research were lecturers where found to have been delivering courses on MOODLE platform. This is why students are in fact able to access the courses on MOODLE.

Table 4. 15: Courses accessed by student on MOODLE

Number of courses	Number of students	Percentage	Valid Percent
1-4	28	46.7	46.7
5-8	31	51.7	51.7
More than 8	1	1.7	1.7
Total	60	100.0	100.0

Source: Field data

Table 4. 16: Sex vs courses accessed on MOODLE

Sex of students	Courses accessed on MOODLE			Total
	1-4 courses	5-8 courses	More than 8 courses	
Male	14	22	0	36
Female	14	9	1	24
Total	28	31	1	60

Source: Field data

Table 4.16 shows that male students that accessed 1-4 courses on MOODLE were 14 out of 36 (representing 38.9%) while male students that accessed 5-8 courses on MOODLE were 22 out of 36 (representing 61.1%). Female students on the other hand that accessed 1-4 courses on MOODLE were 14 out of 24 (representing 58.3%) while those that accessed 5-8 courses were 9 out of 24 (representing 37.5%). Lastly, only 1 female student out of 24 (representing 4.2%) accessed more than 8 courses on the online platform. This means that majority of male students accessed 5-8 course on MOODLE

with up to 61.1% while majority of the female students accessed 1-4 courses on MOODLE with up to 58.3%. The finding shows that male students are able to access courses on MOODLE more than female students. The female students indicated that they experienced internet challenges and this caused them not to access courses on MOODLE like most male students did.

Table 4. 17: School vs courses accessed on MOODLE

School of students	Courses accessed on MOODLE			Total
	1-4 course	5-8 courses	More than 8 courses	
Mines	1	5	0	6
Engineering	10	13	1	24
Veterinary Medicine	9	4	0	13
Agricultural Sciences	8	9	0	17
Total	28	31	1	60

Source: Field data

Table 4.17 shows that the School of Mines recorded 1 out of 6 students (representing 16.7%) accessing 1-4 courses and 5 out of 6 students (representing 83.3%) accessing 5-8 courses on MOODLE. This finding disagrees. This was followed by the School of Agricultural Sciences which recorded 8 out of 17 students (representing 47.1%) accessing 1-4 courses on MOODLE while 9 out of 17 students (representing 52.9%) accessing 5-8 courses. This finding agrees with the Dean of the School of Agricultural Sciences who stated that "MOODLE has benefited the school by providing flexible teaching and learning opportunities for both lecturers and students. The School of Veterinary Medicine followed and recorded 9 out of 13 students (representing 69.2%) accessing 1-4 courses while 4 out of 13 students (representing 30.8%) accessing 5-8 courses on MOODLE. Lastly, the School of Engineering recorded 10 out of 24 students (representing 41.7%) accessing 1-4 courses on the online platform while 13 out of 24 students (representing 54.2%) accessing 5-8 courses and 1out of 24 students (representing 4.2%) accessing more than 8 courses on MOODLE. This finding means that majority of the students accessing 1-4 courses are from the School of Veterinary Medicine while majority of the students accessing 5-8 courses on MOODLE are from the School of Mines. However, the students

from the School of Mines accessed more courses on MOODLE with up to 83.3% as compared to students from the rest of the schools. Some students from the school of Mines indicated that MOODLE is a good system unlike students from other schools who noted that they found it expensive to buy data bundles to access MOODLE and that they were unable to login to the platform due to overloading of the system.

Table 4. 18: Year of study vs courses accessed on MOODLE

Year of study	Courses accessed on MOODLE			Total
	1-4 courses	5-8courses	More than 8 courses	
5th year	23	29	1	53
6th year	5	2	0	7
Total	28	31	1	60

Source: Field data

Table 4.18 shows that fifth year students who accessed 1-4 courses were 23 out of 53 (representing 43.4%) while fifth year students who accessed 5-8 courses were 29 out of 53 (representing 54.7%) and 1 out of 53 fifth year students (representing 1.9%) accessed more than 8 courses on MOODLE. Sixth year students that accessed 1-4 courses on the platform were 5 out of 7 (representing 71.4%) while sixth year students who accessed 5-8 courses were 2 out of 7 (representing 28.6%). This finding shows that majority of the fifth year students accessed 5-8 courses on MOODLE while majority of the sixth year students accessed 1-4 courses on MOODLE. However, despite both fifth and sixth year students accessing courses on MOODLE, the data shows that fifth year students accessed more courses on the platform than sixth year students. This was because fifth year students found the platform to be user friendly and that the system was generally a good online learning system. This was obviously not the case with sixth year students who noted that buying electronic devices to access the platform such as smart phones and laptops are expensive.

Table 4.19 shows that full-time (regular) students were 25 out of 55 (representing 45.5%) that accessed 1-4 courses while 29 out of 55 (representing 52.7%) accessed 5-8 courses on MOODLE. Only 1 out of 55 students (representing 1.8%) on full-time (regular) accessed more than 8 courses on MOODLE. 2 out of 3 students (representing 66.7%) on full-time (parallel) accessed 1-4 courses on MOODLE while 1 out of 3 students

(representing 33.3%) accessed 5-8 courses on the online platform. 1 out of 2 students (representing 50%) on part-time study mode accessed 1-4 courses on the online platform while the other 1 out of 2 students (representing 50%) accessed 5-8 courses. The majority of students that accessed 1-4 courses are on full-time (parallel) study mode with up to 66.7% while majority of students that accessed 5-8 courses on MOODLE are on full-time (regular) mode of study with up to 52.7%. This finding however indicates that students on full-time (parallel) mode of study accessed more courses on MOODLE compared to students on other modes of study. The students on full-time (parallel) noted that they found the platform to be user friendly. This explains why they accessed more courses on MOODLE compared to other.

Table 4. 19: Study mode vs courses accessed on MOODLE

Study mode	Courses accessed on MOODLE			Total
	1-4 courses	5-8 courses	More than 8 courses	
Full-Time (regular)	25	29	1	55
Full-Time (parallel)	2	1	0	3
Part-Time	1	1	0	2
Total	28	31	1	60

Source: Field data

Table 4. 20: Courses accessed by students on face-to-face learning

Percentage of Courses	Frequency	Percent	Valid Percent
1-25%	4	6.7	6.7
26-50%	34	56.7	56.7
51-75%	6	10	10
76-100%	16	26.7	26.7
Total	60	100.o	100.0

Source: Field data

In terms of courses accessed by students on face-to-face learning, Table 4.20 shows that 38 out of 60 students (representing 63.4%) were unable to access more than 50% courses on face-to-face learning while 22 out of 60 students (representing 36.7) were able to

access above 50%. This finding means that majority of the students are unable to learn on face-to-face basis. The finding confirms the earlier finding in this research were lecturers where found to have been delivering courses on MOODLE platform. This is in fact why students are unable to access courses on face-to-face basis because lectures do not deliver courses on face-to-face methods.

Table 4.21 shows that 23 out of 36 male students (representing 63.9%) were unable to accesses above 50% courses on face-to-face learning methods while 13 out of 36 male students (representing 36.1%) were able to access above 50% courses on face-to-face learning method. 15 out of 24 female students (representing 62.5%) were unable to access above 50% courses on face-to-face learning while 9 out of 24 female students (representing 37.5%) were able to access above 50% courses on face-to-face learning. This finding means that majority of the students are unable to access above 50% courses on face-to-face learning however, the situation was worse among male students (63.9%) than females (62.5%).

Table 4. 21: Sex vs courses accessed on face-to-face learning

Sex of students	Courses accessed on face-to-face				Total
	1-25%	26-50%	51-75%	76-100	
Male	1	22	4	9	36
Female	3	12	2	7	24
Total	4	34	6	16	60

Source: Field data

In terms of schools, Table 4.22 shows that the School of Agricultural Sciences recorded the highest number of students that failed to access above 50% courses on face-to-face learning with up to 14 out of 17 students (representing 82.4%) failing to access 50% courses on face-to-face while 3 out of 17 students (representing 17.6%) access above 50% courses on face-to-face learning. This finding confirms the earlier statement by the Dean of the School of Agricultural Sciences who stated that "MOODLE has benefited the school by providing flexible teaching and learning opportunities for students. This shows why majority of the students in the School of Agriculture Sciences are unable to access

face-to-face learning. This was followed by the School of Mines which recorded 4 out of 6 students (representing 66.7%) failing to access 50% courses on face-to-face learning while 2 out of 6 students (representing 33.3%) accessed above 50% courses on face-to-face learning. The School of Engineering followed with 14 out of 24 students (representing 58.3%) failing to access above 50% of courses on face-to-face learning while 10 out of 24 students (representing 41.7%) accessed above 50% courses on face-to-face learning. Lastly, the School of Veterinary Medicine recorded 6 out of 13 students (representing 46.2%) failing to access above 50% courses on face-to-face learning while 7 out of 13 students (representing 53.8%) accessed above 50% courses on face-to-face learning. This finding implies that although majority of the students from all the schools are unable to access courses on face-to-face learning, the situation in worse with students from the School of Agricultural Sciences where 82.4% students were failing to access above 50% courses on face-to-face learning.

Table 4. 22: School vs courses accessed on face-to-face learning

School of students	Courses accessed on face-to-face				Total
	1-25%	26-50%	51-75%	76-100	
Mines	0	4	1	1	6
Engineering	1	13	4	6	24
Veterinary Medicine	2	4	0	7	13
Agricultural Sciences	1	13	1	2	17
Total	4	34	6	16	60

Source: Field data

Table 4.23 shows that 33 out of 53 fifth year students (representing 62.3%) are unable to access above 50% courses on MOODLE while 20 out of 53 fifth year students (representing 37.7%) were able to access above 50% courses on face-to-face learning. 5 out of 7 sixth year students (representing 71.4%) were unable to access above 50% courses on MOODLE while 2 out of 7 students (representing 28.6%) were able to access above 50% courses on face-to-face learning. This finding means that majority of both fifth and

sixth year students are unable to access above 50% courses on face-to-face learning, however, the situation is worse among sixth year students as compared to fifth year students.

Table 4.23: Year of study vs courses accessed on face-to-face learning

Year of study	Courses accessed on face-to-face				Total
	1-25%	26-50%	51-75%	76-100	
5th	2	31	6	14	53
6th	2	3	0	2	7
Total	4	34	6	16	60

Source: Field data

Table 4. 24: Mode of study vs courses accessed on face-to-face learning

Mode of study	Courses accessed on face-to-face				Total
	1-25%	26-50%	51-75%	76-100	
Full-Time (regular)	4	31	6	14	55
Full-Time (parallel)	0	2	0	1	3
Part-Time	0	1	0	1	2
Total	43	34	6	16	60

Source: Field data

Table 4.24 shows that full-time (parallel) students recorded 2 out of 3 (representing 66.7%) failing to access above 50% courses on face-to-face learning while 1 out of 3 students (representing 33.3) accessed above 50% courses on face-to-face learning. This was followed by students on full-time (regular) mode of study who recorded 35 out of 55 students (representing 63.6%) failing to access above 50% courses on face-to-face learning while 20 out of 55 students (representing 36.4%) accessed above 50% courses on face-to-face learning. Lastly, part-time students who recorded 1 out of 2 students (representing 50%) failing to access above 50% courses on face-to-face learning while 1 out of 2 students (representing 50%) accessed above 50% courses on face-to-face learning. This finding means that although majority of the students failed to access above

50% courses on face-to-face learning, the situation was worse among students on full-time (parallel) mode of study.

4.3.2: Benefits students get when using MOODLE

The benefits that students get when using MOODLE which are covered in this research are two. These are ability to improve their academic performance and ability to improve their interaction with lecturers. In the case of improvement in academic performance, 20 out of 60 students (representing 33.3%) found the online platform beneficial in improving academic performance while 40 students (representing 66.7%) did not. This finding means that majority of the students did not find MOODLE beneficial in improving their academic performance. It can therefore be argued that the ability of MOODLE to improve the academic performance of students is less. Despite the fact that the use of MOODLE relatively improves the students' academic performance, there are some variations in terms of experiences between sexes. Table 4.25 shows that 8 out of 36 male students (representing 22.2%) found MOODLE beneficial in their academic performance while 28 students (representing 77.8%) did not. In the case of female students, 12 out of 24 students (representing 50%) found the online platform to have been beneficial in their academic performance while 12 students (representing 50%) did not. This means that there is an equal number among female students who view MOODLE as being beneficial in improving their academic performance and those who do not. From this finding, we can see that more female students (50%) have had their academic performance improved due to the use of MOODLE than their male counterparts (22.2%).

In terms of schools, table 4.26 shows that students from the School of Veterinary Medicine recorded the most benefits using MOODLE in academic performance with 6 out of 13 students (representing 46.2%) having improved in their academic performance while 7 out of 13 students (representing 53.8%) did not. This was followed by the School of Engineering. The School of Engineering recorded 9 out of 24 students (representing 37.5%) that found benefits using MOODLE in academic performance while 15 out of 24 students (representing 62.5%) did not. The School of Mines was next and recorded 2 out of 6 students (representing 33.3) that found benefits using the online platform while 4 out

of 6 students (representing 66.7%) did not. The least school experiencing benefits in academic performance due to the use of MOODLE is the School of Agricultural Sciences where 3 out of 17 students (representing 17.6%) had their performance improved by using MOODLE while 14 out of 17 students (representing 82.4%) did not. This finding reflects the statement given by the Dean of the School of Agricultural Sciences who stated that:

> The school faces challenges using the MOODLE platform to enhance distance education because the school has no ICTs [Information and Communication Technologies] such as computer devices to aid the education process. The computers that are available are either destroyed or are old model and do not have memory that can allow for a software like MOODLE to be installed on them.

Table 4. 25: Sex vs students that found MOODLE beneficial in academic performance

Sex of students	MOODLE and academic performance		Total
	Yes	No	
Male	8	28	36
Female	12	12	24
Total	20	40	6 0

Source: Field data

Table 4.27 shows that 17 out of 55 students (representing 30.9%) on full-time (regular) mode of study found MOODLE beneficial in academic performance while 38 out of 55 students (representing 69.1%) did not. 2 out of 3 students (representing 66.7%) on full-time (parallel) found the online platform beneficial in academic improvement while 1 out of 3 students (representing 33.3%) did not. Lastly 1 out of 2 students (representing 50%) on part-time mode of study found MOODLE beneficial while 1 out of 2 students (representing 50%) did not. This finding means that majority of the students on full-time

(parallel) mode of study found MOODLE more beneficial in academic performance as compared to other study modes.

Table 4. 26: School vs students that found MOODLE beneficial in academic performance.

Name of schools	MOODLE and academic performance		Total
	Yes	No	
Mines	2	4	6
Engineering	9	15	24
Veterinary Medicine	6	7	13
Agricultural Sciences	3	14	17
Total	20	40	60

Source: Field data

Table 4. 27: Mode of study vs students that found MOODLE beneficial in academic performance

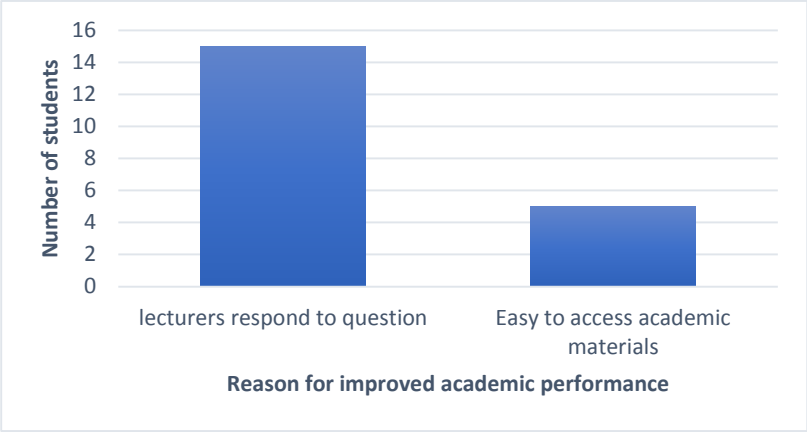
Mode of study	MOODLE and academic performance		Total
	Yes	No	
Full-Time (Regular)	17	38	55
Full-Time (Parallel)	2	1	3
Part-Time	1	1	2
Total	20	40	60

Source: Field data

The reasons given by the 20 students whose academic performance improved due to the use of MOOODLE are presented in Figure 4.3. The major reason given by these students is that lecturers respond to questions on the MOODLE platform. This reason was given by 15 out of the 20 students (representing 75%). The second reason is that students are able to access academic materials easily on the MOODLE platform. This reason was given by 5 out of the 20 students (representing 25%).

As for improvement in interaction with lecturers, 5 out of 60 students (representing 8.3%) indicated that MOODLE software had improved their interaction with lecturers while 55 out of 60 students (representing 91.7%) did not. This finding shows that majority of the students did not find MOODLE beneficial in improving their interaction with lecturers. This finding disagrees with Belayneh (2017) who states that e-learning is an appropriate tool for just-in-time learning because the interaction between the teacher and learner is not confined to regular day time activities and can take place in a variety of locations including homes, schools, libraries, Internet cafes and open fields.

Figure 4.3: Reasons for improved academic performance



Source: Field data

Table 4. 28: Sex vs improved interaction with lecturers

Sex of students	Improved interaction with lecturers		Total
	Yes	No	
Male	4	32	36
Female	1	23	24
Total	5	55	60

Source: Field data

In terms of experiences between sexes, Table 4.28 shows that 4 out of 36 male students (representing 11.1%) found MOODLE to have improved their interaction with lecturers while 32 out of 36 male students (representing 88.9%) did not. As for female students, 1 out of 24 students (representing 4.2%) found MOODLE to have improved their interaction

with lecturers while 23 out of 24 female students (representing 95.8%) did not. This means that majority of the female students did not experience improved interaction with their lecturers. Despite MOODLE not having improved interaction between most of the students with their lecturers, there was a higher percentage of male students (11.1%) who found their interaction with lecturers to have improved due to the use of MOODLE compared to their female counterparts (4.2%). Female students indicated that it was hard to access lecturers on MOODLE and that lecturers do not respond to questions.

Table 4. 29: School vs improved interaction with lecturers

School of students	Improved interaction with lecturers		Total
	Yes	No	
Mines	2	4	6
Engineering	2	22	24
Veterinary Medicine	0	13	13
Agricultural Sciences	1	16	17
Total	5	55	60

Source: Field data

Although few students had improved interaction with their lecturers by using MOODLE, there are some variations among the schools. Table 4.29 shows that the school with the highest level of improved students-lecturer interaction due to the use of MOODLE is the School of Mines which recoded 2 out of 6 students (representing 33.3%) whose interaction with lecturers improved while 4 out of 6 students (representing 66.7%) did not. The School of Engineering followed with 2 out of 24 students (representing 8.3%) that experienced improved interaction with lectures using MOODLE while 22 out of 24 students (representing 91.7%) from the school did not. The School of Agricultural Sciences was the third on the list which recorded 1 out of 17 students (representing 5.9%) whose interaction improved with their lecturers while 16 out of 17 students (representing 94.1%) did not. Lastly was the School of Veterinary Medicine where all the 13 students (representing 100%) did not experience improved interaction with their lecturers. Students from the School of Veterinary Medicine

indicated that it was hard to access lecturers on MOODLE. They further noted that it was hard for them to actively participate during classes due to network issues.

Table 4. 30: Year of study vs improved interaction with lecturers

Year of study	Improved interaction with lecturers		Total
	Yes	No	
5th	4	49	53
6th	1	6	7
Total	5	55	60

Source: Field data

Table 4.30 shows that 5 out of 53 fifth year students (representing 7.5) experienced improved interaction with their lecturers on MOODLE while 49 out of 53 fifth year students (representing 92.5%) did not. 1 out of 7 sixth year students (representing 14.3%) experienced improved interaction with lecturers while 6 out of 7 sixth year students (representing 85.7%) did not. This finding simply means that majority of the students from both years of study did not experience improved interaction with their lecturer on MOODLE, however most sixth year students experienced more improved interaction with their lecturers using MOODLE with 14.3% as compared to fifth year students who recoded 7.5% improved interaction with their lecturers on MOODLE. Sixth year students experienced more improved interaction with their lecturers because they found it easier to communicate with lecturers on MOODLE, they stated that lecturers answer questions on the platform.

Table 4.31 shows that students on full-time regular recorded 3 out of 55 students (representing 5.5%) experienced improved interaction with their lectures using MOODLE while 52 out of 55 students (representing 94.5%) did not. This was followed by students on full-time (parallel) who recorded 1 out of 3 students (representing 33.3%) that experienced improved interactions with their lecturers while 2 out of 3 students (representing 66.7%) did not. Lastly, students on part-time followed with 1 out of 2 students (representing 50%) that experienced improved interactions with their lecturers while the other 1 out of 2 students (representing 50%) did not. This implies that although

majority of the students on all modes of study did not experience improved interactions with their lecturers on MOODLE, students on part-time mode of study experienced more improved interactions with lecturers with up to 50% as compared to students on the other modes of study. The findings above disagree with the findings of Singh et al (2005) who noted that e-learning environments allow lecturers to offer constant educational support, as students are able to communicate with lecturers.

Table 4. 31: Mode of study vs interactions with lecturers

Mode of study	Improved interaction with lecturers		Total
	Yes	No	
Full-time (regular)	3	52	55
Full-time (parallel)	1	2	3
Part-time	1	1	2
Total	5	55	60

Source: Field data

For students who reported MOODLE having improved their interaction with lecturers, they gave one reason for their positive response. This reason is that lecturers are able to respond to their questions.

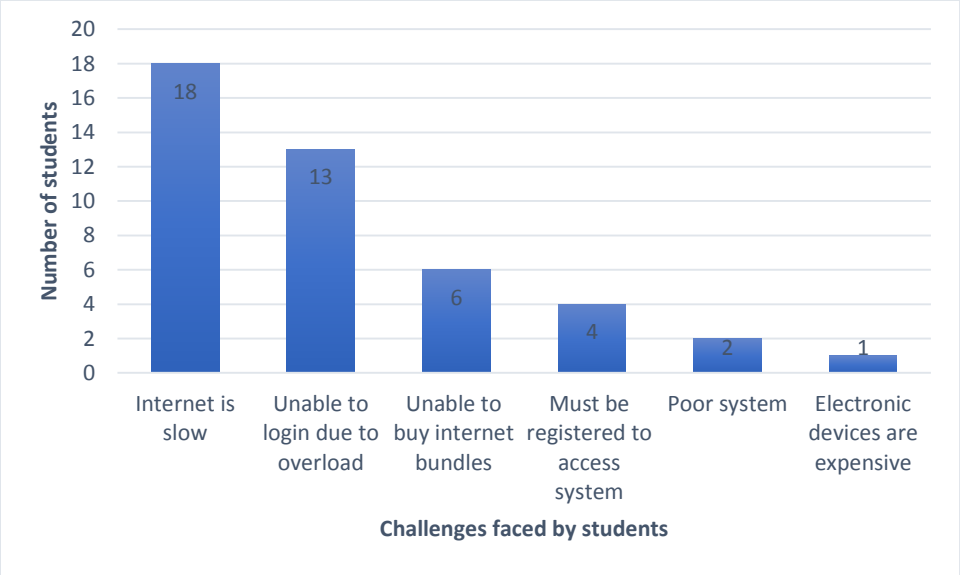
4.3.3 Challenges faced by students when using MOODLE

It was observed that 44 out of 60 students (representing 73.3%) faced six challenges when using MOODLE software and only 16 out of 60 students (representing 26.7%) did not. The challenges faced by the 44 students are presented in Figure 4.4.

The major challenge that students faced using MOODLE software was that the internet was slow. This challenge was given by 18 out of 44 students (representing 40.9%). These students faced internet challenges and this hindered them from using the platform. This finding agrees with the Dean of the School of Engineering who stated that "access to the network is very poor and slows down the learning process." The finding is also similar with Tularam and Machisella (2018) who stated that it is true that the internet provides some opportunities for discussion and collaboration but the internet limits opportunities

for young students to develop social interaction skills that are critical to their overall emotional and social development. The second challenge was that students were unable to login to the system due to overloading. This challenge was given by 13 out of 44 students (representing 29.5%). These students were unable to login to the system because the system stops admitting students once it is full. The third challenge is that students were unable to buy internet bundles. This challenge was given by 6 out of 44 students (representing 13.6%). The fourth challenge students faced using MOODLE is that to access the platform, they had to be registered. This challenge was given by 4 out of 44 students (representing 9.1%). This meant that all students that did not pay the minimum registration fee set by the university could not access the platform. The fifth challenge is that the system all together is poor. This challenge was given by 2 out of 44 students (representing 4.5%). The sixth challenge is that students were unable to buy electronic devices such as smart phones and laptops that could help them access the platform due to the high purchase price of the devices. This challenge was given by 1 out of 44 students (representing 2.3%). This finding shows that most of the students faced internet challenges while using MOODLE.

Figure 4.4: Challenges faced by students when using MOODLE



Source: Filed data

With relation to age, Table 4.32 shows that students aged between 20-29 were 43 out of 59 students (representing 72.9%) that faced challenges using MOODLE while 16 out of 59 students (representing 27.1%) in the same age group did not. Furthermore, all students aged between 30-40 (representing 100%) faced challenges using the online platform. This finding means that although students from both age groups faced challenges using MOODLE, the situation is worse among older students.

Table 4. 32: Age vs students that faced challenges using MOODLE

Age of students	Challenges using MOODLE		Total
	Yes	No	
20-29	43	16	59
30-40	1	0	1
Total	44	16	60

Source: Field data

In terms of sex, Table 4.33 shows that 26 out of 36 male students (representing 72.2%) faced challenges using MOODLE while 10 out of 36 male students (representing 27.8%) did not. 18 out of 24 female students (representing 75%) faced challenges using MOODLE while 6 out of 24 female students (representing 25%) did not. This finding shows that the majority of male and female students faced challenges using MOODLE but the situation is worse among female students (75%) than male students (72.2%).

Table 4. 33: Sex vs students that faced challenges using MOODLE

Sex of students	Challenges using MOODLE		Total
	Yes	No	
Male	26	10	36
Female	18	6	24
Total	44	16	60

Source: Field data

Table 4.34 shows that the School of Mines recorded 4 out of 6 students (representing 66.7%) that faced challenges using MOODLE while 2 out of 6 students (representing 33.3%) from the school did not. This was followed by the School of Veterinary Medicine where 10 out of 13 students (representing 76.9%) faced challenges using MOODLE while 3 out of 13 students (representing 23.1%) did not. This was followed by the School of Engineering were 15 out of 24 students (representing 62.5%) faced challenges while 9 out of 24 students (representing 37.5%) did not. Lastly, the School of Agricultural Sciences recorded 15 out of 17 students (representing 88.2%) that faced challenges using MOODLE while 2 out of 17 students (representing 11.8) did not. This finding means that despite the majority of students from all schools facing challenges using MOODLE, the situation was worse at the School of Agricultural Sciences where students faced up to 88.2% challenges using the platform.

Table 4. 34: School vs students that faced challenges using MOODLE

Name of Schools	Use of MOODLE		Total
	Yes	No	
Mines	4	2	6
Engineering	15	9	24
Veterinary Medicine	10	3	13
Agricultural Sciences	15	2	17
Total	44	16	60

Source: Field data

Table 4. 35: Year of study vs students that faced challenges using MOODLE

Year of study	Challenges using MOODLE		Total
	Yes	No	
5^{th}	39	14	53
6^{th}	5	2	7
Total	44	16	60

Source: Field data

With regard to year of study, Table 4.35 shows that fifth year students were 39 out of 53 students (representing 73.6%) that faced challenges using MOODLE platform while 14 out of 53 fifth year students (representing 26.4%) did not face challenges using MOODLE. Sixth year students were 5 out of 7 (representing 71.4%) facing challenges using MOODLE platform while 2 out of 7 sixth year students (representing 28.6%) did not. The findings show that majority of both fifth and sixth year students faced challenges using MOODLE but the situation was worse among fifth year students who recorded up to 73.6% challenges as compared to sixth year students who recorded 71.4% challenges.

Table 4.36 shows that students on full-time (regular) mode of study recoded the most challenges using MOODLE with 43 out of 55 students (representing 78.2%) facing challenges using the online platform while 13 out of 55 students (representing 23.6%) did not. This was followed by students on part-time study mode who recorded 1 out of 2 students (representing 50%) facing challenges using MOODLE while 1 out of 2 students (representing 50%) did not. Lastly students on full-time (parallel) mode of study recorded 1 out of 3 students (representing 33.3%) facing challenges using MOODLE while 2 out of 3 students (representing 66.7%) did not face challenges. This finding entails that majority of students on full-time (parallel) mode of study did not face challenges using MOODLE. However, this was not the case with students on full time (regular) and students on part-time mode of study were majority of the students faced challenges using MOODLE. The finding shows that the situation was in fact worse with students on full-time (regular) mode of study where students faced up to 76.4% challenges using MOODLE.

Table 4. 36: Mode of study vs students that faced challenges using MOOD

Mode of study	Challenges using MOODLE		Total
	Yes	No	
Full-Time (Regular)	42	13	55
Full-Time (Parallel)	1	2	3
Part-Time	1	1	2
Total	44	16	60

Source: Field data

4.4 Conclusion

In conclusion, it can be noted that MOODLE is very effective in enhancing distance education in public universities such as UNZA. This is because 97.5% lecturers are able to use MOODLE and only 2.5% lecturers are unable to use the software. In the case of students, there is a 100% usage of the MOODLE platform to access education. This is achieved through measurers put in place by the university management such as the creation of an online platform which allows lecturers to perform their work and training of lecturers on the use of MOODLE. Through these measures, management has ensured that lecturers are able to access students away from campus through creating online courses and students are able to have classes online without physically being on campus.

Although management created online courses to enhance distance education, not all lecturers are able to deliver all courses online and not all students accesses lectures on the online platform. This is because of a number of challenges faced by lecturers such as; the system is unstable. They also noted that it is hard to access students online. The other challenge is that the internet network is poor. The system cannot accommodate over 100 students without crushing and the system is unable to hold laboratories. ICTs such as computer devices and smart phones are not provided by the school and lastly, power outages. Students on the other hand that were unable to access all courses online stated that it was because of challenges such as the internet being slow. Other students were unable to login to the platform due to system overload. Some students are unable to buy internet bundles and others stated that only registered students could access the system while unregistered students could not access education. Some students noted that the system all together is poor and lastly, electronic devices such as smart phones and computers are expensive for student to purchase in order for them to access education.

CAPTER 5: EXTENT TO WHICH MOODLE HAS REDUCED THE COST OF ACCESSING EDUCATION COMPAIRED TO TRADITIONAL METHOD AT THE UNIVERSITY OF ZAMBIA

5.1 Introduction

The purpose of this chapter is to present and discuss the findings relating to the second specific objective which reads: To examine the extent to which MOODLE has reduced the cost of accessing education compared to the traditional method at the University of Zambia. In order to achieve its purpose, the chapter has been divided into six sections. The first section is the introduction. The second section establishes whether MOODLE is able to reduce the cost of accessing lectures. The third section looks at MOODLE's ability to reduce the cost of accommodation. The fourth section looks at whether MOODLE is able to reduce the cost of transportation. The fifth section looks at MOODLE's ability to reduce the cost of stationary. The sixth and final section is a conclusion of the chapter.

5.2 MOODLE and reduction in the cost of accessing lectures

In this research, cost is being examined using the perception of the users of MOODLE both students and lecturers rather than the actual amounts of money spent. It was discovered that 16 out of 60 students (representing 26.7%) experienced a reduction in the cost of accessing lectures after the introduction of MOODLE while 44 out of 60 students (representing 73.3%) did not. This finding entails that majority of the students do not experience a reduction in the cost of accessing lectures while using MOODLE. This is because the students found data bundles to join online classes to be very expensive and that all fees are paid the same as physical learning. It can therefore be argued that MOODLE is not effective in reducing the cost of accessing lectures. This finding disagrees with Llic and Jovanovic (2012) who state that e-learning is designed to reduce educational costs by reaching a mass audience at very low cost to the student.

In terms of the experiences between sexes, Table 5.1 shows that 11 out of 36 male students (representing 30.6%) experienced a reduction in the cost of accessing lectures while 25 out of 36 male students (representing 69.4%) did not. This means that the

majority of male students did not experience a reduction in the cost of accessing lectures. In the case of female students, 5 out of 24 students (representing 20.8%) experienced a reduction in the cost of accessing lectures on MOODLE while 19 out of 24 students (representing 79.2%) did not. This means that like their male counterparts, majority of female students did not experience a reduction in the cost of accessing lectures on MOODLE. However, more male students experienced a reduction in the cost of accessing lectures on MOODLE (30.6%) than female students (20.8%). The reason female students did not experience a reduction in the cost of accessing lectures on MOODLE are that data bundles to join classes are expensive, the internet network is poor and that one has to be registered by paying the stated minimum fee set by the university to accesses the classes on the online platform which was not the case in a face to face setup where students could access classes without payment of the minimum registration fee. Male students on the other hand found the platform to have reduced their cost of accessing education because they found submitting of soft copy assignments online cheaper rather than printing them out. Some male students indicated that MOODLE is a good platform altogether and that buying of data bundles is cheap.

Table 5.1: Sex vs reduction in the cost of accessing lectures on MOODLE

Sex of students	Reduction in cost of accessing lectures on MOODLE		Total
	Yes	No	
Male	11	25	36
Female	5	19	24
Total	16	44	60

Source: Field data

Table 5.2 shows that students from the School of Mines recorded the highest cost reduction in accessing lectures on MOODLE with 3 out of 6 students (representing 50%) experiencing a reduction while the other 3 out of 6 students (representing 50%) did not experience a reduction. This was followed by the School of Engineering where 8 out of 24 students (representing 33.3%) experienced a reduction in the cost of accessing lectures on MOODLE while 16 out of 24 students (representing 66.7%) did not. The School of Veterinary Medicine followed with 3 out of 13 students (representing 23.1%) experienced

a reduction in the cost of accessing lectures while 10 out of 13 students (representing 76.9%) did not. Lastly, the School of Agricultural Sciences recorded 2 out of 17 students (representing 11.8%) that experienced a reduction in the cost of accessing lectures on MOODLE while 15 out of 17 students (representing 88.2%) did not. It can therefore be noted that although a good number of students from the School of Mines experienced a reduction in the cost of accessing lectures while using MOODLE, a large number of students from the three schools did not experience a reduction in the cost of accessing lectures while using MOODLE. In fact, the situation is worse at the School of Agricultural Sciences where 88.2% students did not experience a reduction in the cost of accessing lectures while using MOODLE. The reason students from the School of Agricultural Sciences did not experience a reduction in the cost of accessing lectures is that data bundles to join the online classes are very expensive for them to purchase and majority of the students from this school did not pay the minimum registration fee required to access the online platform.

Table 5.2: School vs reduction in the cost of accessing lectures on MOODLE

Schools	Reduction in cost of accessing lectures on MOODLE		Total
	Yes	No	
Mines	3	3	6
Engineering	8	16	24
Veterinary Medicine	3	10	13
Agricultural Sciences	2	15	17
Total	16	44	60

Source: Field data

Table 5.3 shows that students on part-time recorded the highest experience in reduced cost of accessing lectures on MOODLE. All students on this mode of study (2) (representing 100%) experienced a reduction in cost of accessing lectures. This was followed by students on full-time (regular) were 14 out of 55 students (representing 25.5%) experienced a reduction in the cost of accessing lectures while 41 out of 55 students (representing 74.5%) on the same mode of study did not. Lastly, all the students (3) (representing 100%) on full-time (parallel) did not experience a reduction in the cost

of accessing lectures on MOODLE. This finding entails that students on part-time experienced a reduction in the cost of accessing lectures while using MOODLE as compared to students on the other modes of study. The reason students on part-time experienced a reduction in the cost of accessing lectures on MOODLE is because they found submitting softcopy documents online much cheaper than submitting physical printed documents. However, majority of the students did not experience a reduction in the cost of accessing lectures while using MOODLE. This was due to the challenges the majority of the students faced with the high price of data bundles and the poor network which affected their access to lectures even after buying the expensive bundle.

Table 5.3: Mode of study vs reduction in the cost of accessing lectures on MOODLE

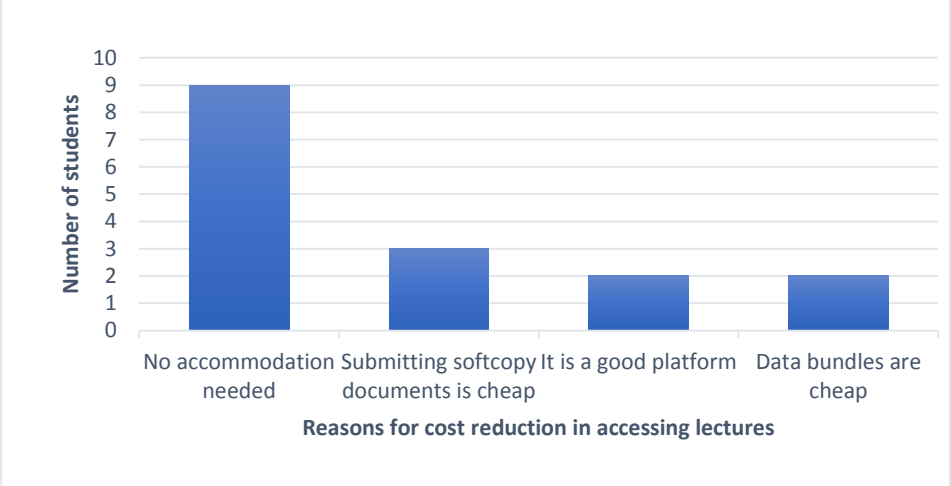
Mode of study	Reduction in cost of accessing lectures on MOODLE		Total
	Yes	No	
Full-Time(regular)	14	41	55
Full-Time(parallel)	0	3	3
Part-Time	2	0	2
Total	16	44	60

Source: Field data

The reasons given by students who experienced reductions in the cost of accessing lectures on MOODLE are presented in Figure 5.1. The major reason given is that students did not have to pay accommodation fees. This is because students were able to access lectures on the MOODLE platform from their various locations. This reason was given by 9 out of 16 students (representing 56.3%). This finding agrees with the Dean of the School of Engineering who stated that "the use of MOODLE software. …captures more students because they are able to learn from their various locations". The second reason was given by 3 out of 16 students (representing 18.8%) and it is that submitting of soft copy documents online is cheap. This means that students did not have to print out hard copy documents when submitting to their lecturers instead, they submitted their documents online in the form of soft copy. The third reason was given by 2 out of 16 students (representing 12.5%). These students experienced a reduction in the cost of

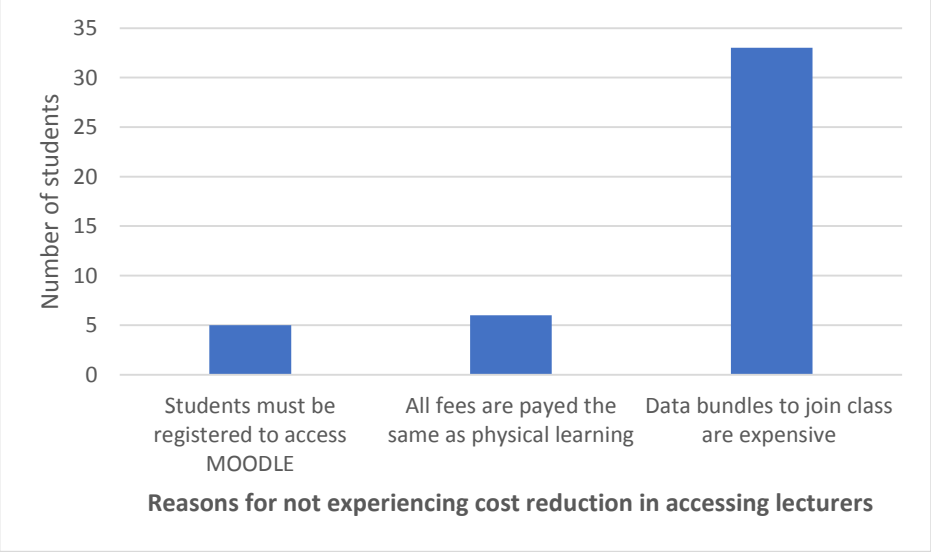
accessing lectures because they found MOODLE to be a good platform. The fourth reason students experienced a reduction in the cost of accessing lectures on MOODLE was given by 2 out of 16 students (representing 12.5%) which is that buying data bundles to access learning on MOODLE is cheap.

Figure 5.1: Reasons for reductions in the cost of accessing lectures on MOODLE



Source: Field data

Figure 5.2: Reasons for not experiencing reductions in the cost of accessing lectures on MOODLE



Source: Field data

For students who did not experience reductions in the cost of accessing lectures on MOODLE, the reasons they gave are shown in Figure 5.2. The major reason given by

these students is that data bundles to join online classes are very expensive. This reason was given by 33 out of 44 students (representing 75%). The second reason was given by 6 out of 44 students (representing 13.6%) and is that all fees are paid the same as physical learning. The third reason is that students must be registered to access learning on MOODLE platform. This reason was given by 5 out of 44 students (representing 11.4%).

5.3 MOODLE and reduction in the cost of accommodation

The findings indicate that 16 out of 60 students (representing 26.7%) experienced a reduction in the cost of accommodation when using MOODLE while 44 out of 60 students (representing 73.3%) did not. From this finding, it can be noted that majority of the students did not experience a reduction in the cost of accommodation while using MOODLE. This was because the students were still required to pay all the fees including accommodation fees just like before the introduction on MOODLE and this was much worse for students who were in private arrangements such as boarding houses. This finding disagrees with Chakrabarty et al, (2014) who note that e-learning reduces cost such as hostel accommodation expenses for students.

Table 5.4: Sex vs reduction in the cost of accommodation

Sex	Reduction in cost of accommodation		Total
	Yes	No	
Male	10	26	36
Female	6	18	24
Total	16	44	60

Source: Field data

Table 5.4 shows that 10 out of 36 male students (representing 27.8) experienced a reduction in the cost of accommodation using MOODLE while 26 out of 36 male students (representing 72.2%) did not. 6 out of 24 female students (representing 25%) experienced a reduction in the cost of accommodation while 18 out of 24 female students (representing 75%) did not. This shows that majority of both male and female students did not experience a reduction in the cost of accommodation while using MOODLE. However, a larger percentage of male students experienced a reduction in the cost of accommodation

(27.8%) than female students (25%). This is because it was discovered that female accommodation fees in private boarding houses are much more expensive than that of male students. This is influenced by the extra expense that comes with running a female boarding house such as the provision of sanitary hygiene (pad bins) that the landlords have to provide for female students to ensure menstrual cleanness.

Table 5.5: School vs reduction in cost of accommodation

School	Reduction in cost of accommodation		Total
	Yes	No	
Mines	3	3	6
Engineering	6	18	24
Veterinary Medicine	2	11	13
Agricultural Sciences	5	12	17
Total	16	44	60

Source: Field data

Although, generally, the reduction in the cost of accommodation when using MOODLE is very small, there is a large variation in the experiences among the schools. Table 5.5 shows that students in the School of Mines had the highest rate of reduction in the cost of accommodation when using MOODLE to pursue their studies. This school recorded 3 out of 6 students (representing 50%) that experienced a reduction in the cost of accommodation while 3 out of 6 students (representing 50%) did not. This was followed by the School of Agricultural Sciences which recorded 5 out of 17 students (representing 29.4%) that experienced a reduction in the cost of accommodation while 12 out of 17 students (representing 70.6%) did not. The next was the School of Engineering which had 6 out of 24 students (representing 25%) experiencing a reduction in the cost of accommodation while 18 out of 24 students (representing 75%) did not. The last was the School of Veterinary Medicine which recorded 2 out of 13 students (representing 15.4%) that experienced a reduction in the cost of accommodation while 11 out of 13 students (representing 84.6%) did not. This finding entails that although most of the students from all the schools did not experience a reduction in the cost of accommodation while using MOODLE, the situation was worse among students from the School of Veterinary

Medicine where 84.6% of the students did not experience a reduction. This was because most of the students from the School of Veterinary Medicine are female students who have accommodation in private boarding houses and as established earlier, female students face more accommodation expenses as compared to male students in private boarding arrangements.

Table 5.6: Year of study vs reduction in cost of accommodation

Year of study	Reduction in cost of accommodation		Total
	Yes	No	
5th	14	39	53
6th	2	5	7
Total	16	44	60

Source: Field data

Table 5.6 shows that 14 out of 53 fifth year students (representing 26.4%) experienced a reduction in the cost of accommodation while 39 out of 53 (representing 73.6%) did not. On the other hand, 2 out of 7 sixth year students (representing 28.6%) experienced a reduction in the cost of accommodation while 5 out of 7 sixth year students (representing 71.4%) did not. This means that although a number of students reported reductions in the cost of accommodation, sixth year students had a larger portion experiencing a reduction in the cost of accommodation (28.6%) than fifth year students (26.4%). This was because most 5th year students were accommodated in private boarding houses and still had to pay for accommodation fee while learning online.

Table 5.7: Mode of study vs reduction in cost of accommodation

Mode of study	Reduction in cost of accommodation		Total
	Yes	No	
Full-time (regular)	14	41	55
Full-time (parallel)	1	2	3
Part-time	1	1	2
Total	16	44	60

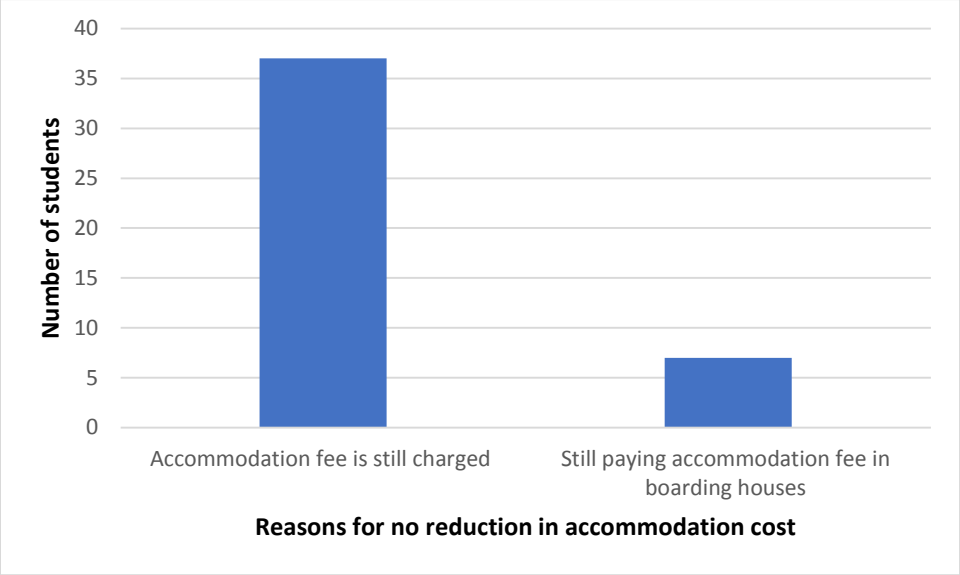
Source: Field data

Table 5.7 shows that part-time students recoded the highest reduction in accommodation cost with up to 1 out of 2 students (representing 50%) while 1 out of 2 students (representing 50%) did not. This was followed by full-time (parallel) students who recorded 1 out of 3 students (representing 33.3%) that experienced a reduction in the cost of accommodation while 2 out of 3 students (representing 66.7%) did not. Lastly, full-time (regular) students recorded 14 out of 55 students (representing 25.5%) that experienced a reduction in the cost of accommodation while 41 out of 55 (representing 74.5%) did not. Majority of the students on full-time (regular) mode of study did not experience a reduction in the cost of accommodation because they still had to pay accommodation fees in their private boarding houses and others stated that they were still paying the exact school fees as before the introduction of MOODLE which means that accommodation fees were still being charged by the university even when they were learning from home.

The reason given by all the 16 students who experienced a reduction in the cost of accommodation while using MOODL is that there is no need to pay for accommodation because learning is done from home. This finding agrees with the Dean of the School of Veterinary Medicine who indicated that "management has ensured that online courses have been created in order for students to learn from their various locations. The finding further agrees with the Dean of the School of Agricultural Sciences who stated that lecturers are able to access students without physical interactions.

The reasons given by students who did not experience a reduction in the cost of accommodation are shown in Figure 5. 3. The first reason given by these students is that despite learning online, the university is still charging accommodation fees. This reason was given by 37 out of 44 students (representing 84.1%). The second reason is that students are still required to pay accommodation fees in private boarding houses. This reason was given by 7 out of 44 students (representing 15.9%).

Figure 5.3: Reasons students did not experience a reduction in the cost of accommodation



Source: Field data

5.4 MOODLE and reduction in the cost of transportation

The findings indicate that 28 out of 60 students (representing 46.7%) experienced a reduction in the cost of transportation when using MOODLE while 32 out of 60 students (representing 53.3%) did not. It can be noted that majority of the students did not experience a reduction in the cost of transportation while using MOODLE. This finding disagrees with Llic and Jovanovic (2012) who states that e-learning reduces transportation costs, which would eventually reduce the total costs of education for students. The finding further disagrees with Chakrabarty et al, (2014) who note that e-learning reduces cost for students such as expenditure on transport.

In terms of sexes, Table 5.8 shows that 18 out of 36 male students (representing 50%) experienced a reduction in the cost of transportation while 18 out of 36 male students (representing 50%) did not. 10 out of 24 female students (representing 41.7%) experienced a reduction in the cost of transportation while 14 out of 24 female students (representing 58.3%) did not. This finding implies that although majority of the students did not experience a reduction in the cost of transportation, a larger segment of male students experienced a reduction in transportation costs (50%) than female students

(41.7%). The reason majority of female students had to travel to school to access the internet and to write examinations unlike the male students who seemed to have experienced a reduction in transportation because their boarding houses are within a walkable distance to the university hence transportation costs were eradicated.

Table 5.8: Sex vs reduction in cost of transportation

Sex	Reduction in cost of transportation		Total
	Yes	No	
Male	18	18	36
Female	10	14	24
Total	28	32	60

Source: Field data

Table 5.9: School vs reduction in cost of transportation

School	Reduction in cost of transportation		Total
	Yes	No	
Mines	6	0	6
Engineering	11	13	24
Veterinary Medicine	5	8	13
Agricultural Sciences	6	11	17
Total	28	32	60

Source: Field data

Table 5.9 shows that students from the School of Mines experienced the most reduction in transportation costs. In this school, all the 6 students (representing 100%) indicated that they had reductions in transport costs while using MOODLE to pursue their studies. This was followed by students from the School of Engineering where 11 out of 24 of them (representing 45.8%) experienced a reduction in the cost of transportation while 13 out of 24 (representing 54.2%) did not. The School of Veterinary Medicine was the next with 5 out of 13 students (representing 38.5%) experiencing a reduction in the cost of transportation while 8 out of 13 students (representing 61.5) did not. The School of Agricultural Sciences was last where 6 out of 17 students (representing 35.3%)

experienced a reduction in the cost of transportation while 11 out of 17 students (representing 64.7%) did not. This was so because most of the students who had to travel to the university to access the internet and write examinations are from the School of Agriculture Science. Students from the School of Mines on the other hand experienced a reduction in transportation cost because they either had campus accommodation or they were in boarding houses that are a walkable distance to the university.

Table 5.10: Year of study vs reduction in cost of transportation

Year of study	Reduction in cost of transportation		Total
	Yes	No	
5th	26	27	53
6th	2	5	7
Total	28	32	60

Source: Field data

In the case of year of study, Table 5.10 shows that 26 out of 53 fifth year students (representing 49.1%) experienced a reduction in the cost of transportation while 27 out of 53 fifth year students (representing 50.9%) did not. On the other hand, 2 out of 7 sixth year students (representing 28.6%) experienced a reduction in the cost of transportation while 5 out of 7 sixth year students (representing 71.4%) did not. This finding means that fifth year students experienced more reduction in cost of transportation (49.1%) compared to sixth year students (28.6%). This is because 5th year students have campus accommodation and their boarding houses are close to the university as compared to 6th year students.

Table 5.11: Mode of study vs reduction in cost of transportation

Mode of study	Reduction in cost of transportation		Total
	Yes	No	
Full-time (regular)	26	29	55
Full-time (parallel)	0	3	3
Part-time	2	0	2
Total	28	32	60

Source: Field data

Table 5.11 shows that students on part-time mode of study experienced the highest reduction in the cost of transportation. This was the case with all the 2 students (representing 100%) under the part-time mode of study who experienced a reduction in the costs of transportation. This was followed by students on full-time (regular) mode of study where 26 out of 55 students (representing 47.3%) experienced a reduction in the cost of transportation while 29 out of 55 students (representing 52.7%) did not. The last category is full-time (parallel) where all the 3 students (representing 100%) did not have reductions in the cost of transportation.

The reason given by all the 28 students who experienced a reduction in the cost of transportation is that transport money is saved because they do not have to travel to the university to learn. Instead, learning takes place while they are at home.

The main reason given by all the 32 students who did not experience reductions in the cost of transportation while using MOODLE is that they were still required to travel to campus to access education. Three reasons for their travel to campus were given. First, students who were accommodated on campus were required to travel from their homes to campus to access their accommodation. This reason was given by 19 out of 32 students (representing 59.4%). The second reason is that some students were required to travel from their homes to private boarding houses near campus. This reason was given by 7 out of 32 students (representing 21.9%). The third reason is that students were required to travel from their residential areas to campus to write examinations. This reason was given by 6 out of 32 students (representing 18.7%).

5.5 MOODLE and reduction in the cost of stationery

The findings indicate that 39 out of 60 students (representing 65%) experienced a reduction in the cost of buying books and printing out assignments while 21 out of 60 students (representing 35%) did not. This finding implies that majority of the students experienced a reduction in the cost of buying books and printing out assignments with up to 65% as compared to 35% students who did not. Based on this finding, it can be noted that majority of the students experienced a reduction in the cost of buying books and printing out assignments. From this finding, it can be argued that from the student's

perspective, MOODLE has the ability to reduce the cost of stationary in public Universities. This finding agrees with Llic and Jovanovic (2012) who state that e-learning contributes to reducing the costs of studying. The finding also agrees with Chakrabarty et al, (2014) who note that e-learning reduces cost for students such as expenditure on purchase of books and stationary.

Table 5.12: Sex vs reduction in the cost of buying books and printing out assignments.

Sex	Reduction in cost of buying books and printing assignments		Total
	Yes	No	
Male	20	16	36
Female	19	5	24
Total	39	21	60

Source: Field data

Table 5.12 shows that 20 out of 36 male students (representing 55.6%) experienced a reduction in the cost of buying books and printing out assignments while 16 out of 36 male students (representing 44.4%) did not. 19 out of 24 female students (representing 79.2%) experienced a reduction in the cost of buying books and printing out assignments while 5 out of 24 female students (representing 20.8%) did not. This finding shows that despite majority of the students experiencing a reduction in the cost of buying books and printing out assignments, female students experienced more reduction in the cost of buying books and printing out assignments (79.2%) as compared to male students (55.6%) because they only needed to buy a few books since learning was done online and they found submitting of soft copy documents in the form of assignments much cheaper than printing out and physically submitting the documents.

Table 5.13 shows that students from the School of Mines experienced the most reduction in the cost of buying books and printing out assignments. In this school, all the 6 students (representing 100%) indicated that they had reductions in the cost of buying books and printing out assignments while using MOODLE to pursue their studies. This was followed by the School of Veterinary Medicine were 9 out of 13 students (representing 69.2%)

experienced a reduction in the cost of buying books and printing out assignments while 4 out of 13 students (representing 30.8%) did not. The School of Engineering was next with 16 out of 24 students (representing 66.7%) experiencing a reduction in the cost of buying books and printing out assignments while 8 out of 24 students (representing 33.3%) did not. The School of Agricultural Sciences recoded 8 out of 17 students (representing 47.1%) who experienced a reduction in the cost of buying books and printing out assignments while 9 out of 17 students (representing 52.9%) did not. This finding entails that as far as schools are concerned, the School of Mines is doing exceptionally well in experiencing a reduction in the cost of buying book and printing out assignments while using MOODLE. The reasons these students are experiencing this reduction is because they are all satisfied with submitting soft copy documents to their lecturers. They seem to find this method cheaper than physical hard copy submission.

Table 5.13: School vs reduction in the cost of buying books and printing out assignments

School	Reduction in cost of buying books and printing assignments		Total
	Yes	No	
Mines	6	0	6
Engineering	16	8	24
Veterinary Medicine	9	4	13
Agricultural Sciences	8	9	17
Total	39	21	60

Source: Field data

Table 5.14 shows that 35 out of 53 fifth year students (representing 66%) experienced a reduction in the cost of buying books and printing out assignments while 18 out of 53 fifth year students (representing 34%) did not. 4 out of 7 sixth year students (representing 57.1%) experienced a reduction in the cost of buying books and printing out assignments while 3 out of 7 sixth year students (representing 42.9%) did not. This finding simply means that fifth year students experienced more reduction in the cost of buying books and printing out assignments (66%) compared to sixth year students (57.1%). Fifth year

students noted that online submission of assignments is cheap and they do not need to buy as many books as they needed during physical learning because the notes are in the form of softcopy and are available online.

Table 5.14: Year of study vs reduction in the cost of buying books and printing out assignments.

Year of study	Reduction in cost of buying books and printing assignments		Total
	Yes	No	
5th	35	18	53
6th	4	3	7
Total	39	21	60

Source: Field data

Table 5.15: Mode of study vs reduction in the cost of buying books and printing out assignments.

Mode of study	Reduction in cost of buying books and printing assignments		Total
	Yes	No	
Full-time (regular)	36	19	55
Full-time (parallel)	1	2	3
Part-time	2	0	2
Total	39	21	60

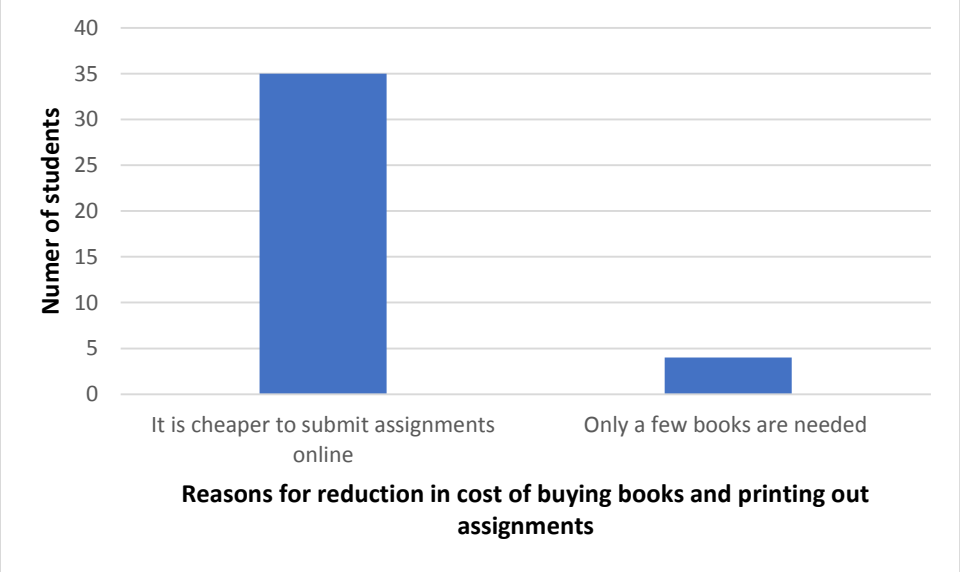
Source: Field data

Table 5.15 shows that all the 2 students (representing 100%) on part-time mode of study experienced the highest reduction in the cost of buying books and printing out assignments. This was followed by students on full-time (regular) mode of study were 36 out of 55 students (representing 65.5%) experienced a reduction in the cost of buying books and printing out assignments while 19 out of 55 students (representing 34.5%) did not. Lastly, full-time (parallel) students were 1 out of 3 (representing 33.3%) that experienced a reduction in the cost of buying books and printing out assignments while 2 out of 3 students (representing 66.7%) did not. This is because students on full-time

(parallel) noted that they did their assignments on paper, scanned them from the internet café at a fee and then submitted them online hence the reduction in the cost of buying books and printing out assignments was not experienced by them.

The 2 reasons given by students who experienced a reduction in the cost of buying books and printing out assignments are shown in Figure 5.4. The first reason given by these students is that it is cheaper for them to submit assignments online rather than physical submission. This reason was given by 35 out of 39 students (representing 89.7%). The second reason is that the students only need few books since the rest of the notes are uploaded online. This reason was given by 4 out of 39 students (representing 10.1).

Figure 5.4: Reasons students experienced a reduction in the cost of buying books and printing out assignments

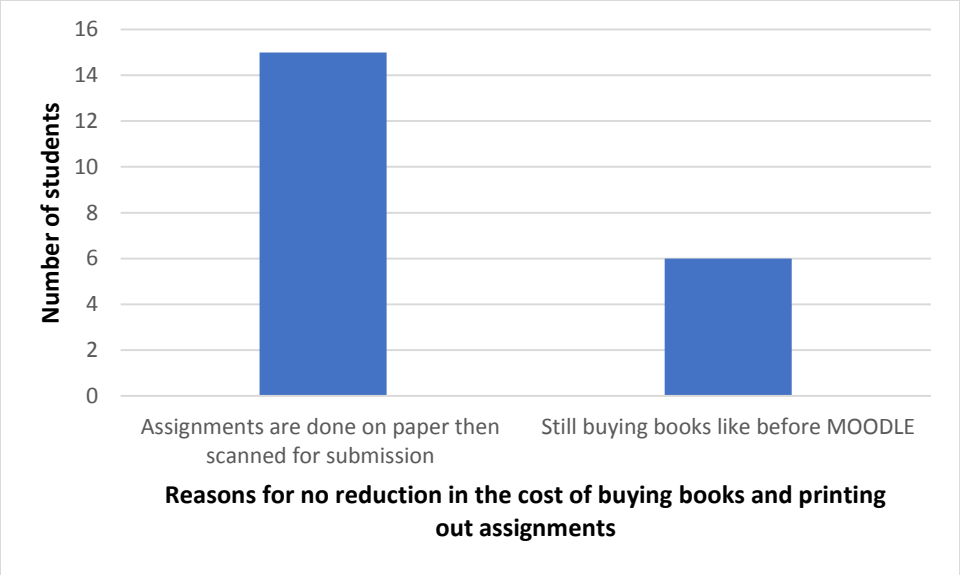


Source: Field data

Students gave two reasons to why they did not experience a reduction in the cost of buying books and printing out assignments. These reasons are shown in Figure 5.5. The first reason given is that students had to do their assignments on paper then scanned them in order for them to submit on the online platform. This reason was given by 15 out of 21 students (representing 71.4%). The second reason is that the students were still buying books just like before the introduction of MOODLE platform. This reason was given by

6 out of 21 students (representing 28.6%). This finding disagrees with Chakrabarty et al, (2014) who note that e-learning reduces cost for students such as expenditure on purchase of books.

Figure 5.5: Reasons students did not experience a reduction in the cost of buying books and printing out assignments



Source: Field data

5.6 Conclusion

In conclusion, it can be noted that MOODLE is not very effective in reducing in cost of accessing university education in public universities such as UNZA. This is because there are some areas where students still incur costs to access education despite using MOODLE. These areas are accommodation, where 26.7% of the students experienced a reduction in the cost of accommodation when using MOODLE while 73.3% of the students did not. Transportation, where 46.7% of the students experienced a reduction in the cost of transportation when using MOODLE while the majority being 53.3% did not. Accessing lectures, where 26.7% of the students experienced a reduction in the cost of accessing lectures after the introduction of MOODLE while 73.3% did not. Costs in these areas are incurred because students are required to pay for internet bundles, university

accommodation, private boarding houses and transport to campus especially when writing examinations. The other costs incurred by students include paying all the fees applicable to physical learning, printing assignments for lecturers who want them to be submitted physically and buying textbooks that are not available online. However, minor reductions are seen in costs such as accommodation and transportation. This is because some students are able to learn while at home without the need to travel or seek accommodation on or near campus. The area where there is substantial reduction in cost is stationary due to online submissions. The findings indicate that 65% of students experienced a reduction in the cost of buying books and printing out assignments while 35% of students did not.

CHAPTER 6: SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The purpose of this chapter is to present a summary of the conclusions and recommendations of the dissertation. In order to achieve its purpose, the chapter will begin by presenting a summary of the conclusions of the dissertation and end with recommendations.

6.2 Summary of Conclusions

The summary of the conclusions of this dissertation are presented in accordance with the objectives of the research. The first specific objective of the research was to examine the extent to which MOODLE has promoted education at the University of Zambia. The findings show that MOODLE has the ability to enhance distance education in public universities because both students and lecturers are able to use it. This is achieved by measurers put in place by management such as; the creation of an online platform which allows lecturers to perform their work and training of lecturers on the use of MOODLE. Management has ensured that lecturers are able to access students away from campus through creating online courses and students are able to have classes online without physically being on campus. Management gets two benefits in the process of enhancing distance education through MOODLE platform. The first benefit is that management is able to capture more students on distance learning and the second benefit is that MOODLE promotes flexible teaching and learning opportunities. However, management faced challenges in the process of enhancing distance education such as lack of electronic devices to aid the use of MOODLE, poor network, the inability to conduct laboratories and examinations on MOODLE and lack of funding.

Although management created online courses to enhance distance education, not all lecturers are able to deliver all courses online and not all students accesses lectures on the online platform. This is because of a number of challenges faced by lecturers such as; the system is unstable. Lecturers also noted that it is hard to access students online. The other challenge is that the internet network is poor. Furthermore, lecturers noted that the system

cannot accommodate over 100 students without crushing and that the system is unable to hold laboratories. Lecturers further stated that ICTs such as computer devices and smart phones are not provided by the school and lastly, lecturers experience power outages. Students on the other hand that were unable to access all courses online stated that it was because of challenges such as; the internet being slow, other students were unable to login to the platform due to system overload, some students are unable to buy internet bundles and others stated that only registered students could access the system while unregistered students could not access education. Some students noted that the system all together is poor and lastly, electronic devices such as smart phones and computers are expensive for student to purchase in order for them to access education.

The second specific objective of the research is to examine the extent to which MOODLE has reduced the cost of accessing education compared to the traditional method at the University of Zambia. The findings revel that MOODLE is not effective in reducing the cost of accessing university education in public institutions. This is because there are some areas where students still incur costs when accessing education despite using MOODLE. These are accommodation, transportation and accessing lectures. Costs in these areas are incurred because students are required to pay for internet bundles, university accommodation, private boarding houses and transportation to campus especially when writing examinations. The other costs incurred by students include paying all the fees applicable to physical learning, printing assignments for lecturers who want them to be submitted physically and buying textbooks that are not available online.

The area where there is substantial reduction in cost is stationary due to online submissions. The other areas where there are minor reductions in cost is accommodation and transportation. This is because some students are able to learn while at home without the need to travel or seek accommodation on or near campus.

The general objective of the research was to examine the effectiveness of e-learning in the delivery of tertiary education in public universities. The general conclusion of this research is that e-learning is not very effective in the delivery of tertiary education. This is because both lecturers and students have challenges using it. Although a significant number of lecturers and students use e-learning, it was observed that it was not effective

in delivering education. Both parties found e-learning to have been expensive because to accesses it, ICT devices are needed. These devices are very expensive. Although e-learning brought some notable cost reduction in some areas, costs remained the same or increased in most areas. Furthermore, e-learning does not cause improved performance in university students.

6.3 Recommendations

The recommendations are in two categories. These are policy recommendations and areas for future research.

6.3.1 Policy Recommendations

To ensure that there is effectiveness in e-learning in the delivery of tertiary education in public universities the following recommendations should be considered by either policy makers at the national level, by public universities and all other parties involved in e-learning.

1. The university should agree with service providers to come up with a subsidized way for students to access the internet. For instance, reducing the price of internet bundles. This may reduce the burden for students in that they will not have to spend too much money on internet bundle.
2. Continuous training for both lecturers and students must be prioritized by the University. A department responsible for training should be established which can attend to lecturers and students at any time throughout the academic year. This may help those that are not familiar with the system learn how to go about it.
3. The university should come up with ways in which MOODLE can facilitate both laboratories and examinations. This may enable students to cut down on costs such as transportation and accommodation.
4. The university should consider buying new model computers. This may enable lecturers to adequately deliver lectures via e-learning.

5. WIFI connection must be provided everywhere around the university and not just in specific areas of the university. This may enable lecturers to properly facilitate classes without using their own resources.
6. The university should ensure that the capacity of MOODLE is increased in terms of the maximum number of students that can attend class from 100 to at least 1000.

6.3.2 Areas for future research

Although this research has provided valuable insights into the effectiveness of e-learning in the delivery of tertiary education in public institutions, it looked at e-learning in public universities in its early stages i.e. during the COVID-19 period. E-learning could still be in the stages of getting established and still facing early stage challenges. A similar study can be conducted for the same after 2 to10 years to investigate if there are any changes in the findings. This study was also confined to e-learning in public universities leaving out the experiences in other sectors. Therefore, other studies can be done to find out how effective e-learning is in other sectors such as primary and secondary schools.

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APPENDICES

Appendix A: Interview guide for school managers

The University of Zambia

School of Humanities and Social Sciences

DEPARTMENT OF GOVERNMENT AND MANAGEMENT STUDIES

INTERVIEW GUIDE FOR SCHOOL MANAGERS

Dear informant,

My name is Nancy Kambolokoni and I am a student at the University of Zambia. I am conducting research on the *Effectiveness of Electronic Learning in the Delivery of Tertiary Education by Public Institutions: The Case of MOODLE at the University of Zambia*. This is to enable me to particularly fulfill the requirements of the degree of Master of Public Administration (MPA).

You have been selected as an informant and I will be very thankful if you can spare a few minutes of your time to answer a few questions. The information you are going to give will be confidential and is entirely for the purpose of my MPA dissertation. Please be as open and honest as possible when answering the questions.

PART 1. BACKGROUND INFORMATION

Date of interviews:

……

Start time of interview:

……

1. Gender:
1. Male ( )
2. Female ( )

2. Name of school:

……

3. Position held in the school:

……

PART 2. ABILITY OF MOODLE SOFTWARE TO ENHENCE DISTANCE EDUCATION

4. How are you implementing MOODLE software so as to enhance distance education?

……

……

5. Why did you as management decide to engage MOODLE software in the delivery of distance education?

……

……

6. What benefits has MOODLE software brought to you as management in enhancing distance education?

……

……

……..

7. Do you face any challenges using MOODLE software to deliver distance education as management?

1. Yes ( )
2. No ( )

8. If the response in question 7 is yes, please specify the challenges.

……

…

PART 3. RECOMMENDATIONS

9. What do you think should be done to increase the effectiveness of MOODLE software?

.....

....

End time of interview:

…….....

Duration of interview:

…….....

END OF INTERVIEW

THANK YOU FOR YOUR TIME.

Appendix B: Questionnaire for lecturers

Dear respondent,

My name is Nancy Kambolokoni and I am a student at the University of Zambia. I am conducting research on the Effectiveness of *Electronic Learning in the Delivery of Tertiary Education by Public Institutions: The Case of MOODLE at the University of Zambia*. This is to enable me to particularly fulfill the requirements of the degree of Master of Public Administration (MPA).

You have been selected as a respondent and I will be very thankful if you can spare a few minutes of your time to answer a few questions. The information you are going to give will be confidential and is entirely for the purpose of my MPA dissertation. Please be as open and honest as possible when answering the questions.

Instructions: Tick in the spaces provided or fill in the blank spaces.

PART 1. BACKGROUND INFORMATION

1. Sex of lecturer.

a) Male [ ]

b) Female [ ]

2. Age of lecturer

a) 20-29 [ ]

b) 30-39 [ ]

c) 40-49 [ ]

d) 50 and above [ ]

3. Marital status

a) Single [ ]

b) Married [ ]

c) Divorced [ ]

d) Widowed [ ]

4. Name of school

a) Engineering [ ]

b) Veterinary Medicine [ ]

c) Mines [ ]

d) Agricultural Sciences [ ]

5. Rank of lecturer

a) Lecturer III [ ]

b) Lecturer II [ ]

c) Lecturer I [ ]

d) Senior Lecturer [ ]

e) Associate Professor [ ]

f) Professor [ ]

g) Part-time lecturer [ ]

6. Length of service as lecture

……

7. Type of employment

a) Permanent and pensionable employment [ ]

b) Fixed-term contract [ ]

c) Part-time employment [ ]

PART 2: ABILITY OF MOODLE SOFTWARE TO ENHENCE DISTANCE EDUCATION

8. Do you use MOODLE software in delivering lectures?

a) Yes [ ]

b) No [ ]

9. If answer in question 8 is yes, to what percentage do you use MOODLE software in delivering lectures?

……

10. If answer in question 8 is no, why so?

……

11. Do you face challenges using MOODLE software?

a) Yes [ ]

b) No [ ]

12. If answer in question 11 is yes, what challenges do you face?

……

13. If answer in question 11 is no, why so?

……

14. Has MOODLE software brought any benefits to you in delivering distance education?

a) Yes [ ]

b) No [ ]

15. If answer in question 14 is yes, what benefits has MOODLE brought?

……

16. If answer in question 14 is no, please give reasons.

……

PART 3. RECOMMENDATIONS

17. What do you think should be done to improve MOODLE software?

……

END OF QUESTIONAIRE

THANK YOU

Appendix C: Questionnaire for students

Dear respondent,

My name is Nancy Kambolokoni and I am a student at the University of Zambia. I am conducting research on the Effectiveness of *Electronic Learning in the Delivery of Tertiary Education by Public Institutions: The Case of MOODLE at the University of Zambia*. This is to enable me to particularly fulfill the requirements of the degree of Master of Public Administration (MPA).

You have been selected as a respondent and I will be very thankful if you can spare a few minutes of your time to answer a few questions. The information you are going to give will be confidential and is entirely for the purpose of my MPA dissertation. Please be as open and honest as possible when answering the questions.

Instructions: Tick in the spaces provided or fill in the blank spaces.

BACKGROUND INFORMATION

1. Sex of students

a. Male [ ]

b. Female [ ]

2. Age of student

……

3. School of student

a. Mines [ ]

b. Engineering [ ]

c. Veterinary Medicine [ ]

d. Agricultural Sciences [ ]

4. Year of study

a. 5^{th} Year [ ]

b. 6^{th} Year [ ]

5. Mode of study

a. Full-time (regular) [ ]

b. Full-time (parallel) [ ]

c. Part tine [ ]

d. Block release [ ]

PART 2: ABILITY OF MOODLE SOFTWARE TO ENHENCE DISTANCE LEARNING

6. Do you use MOODLE software to accesses distance learning?

a. Yes [ ]

b. No [ ]

7. If answer in question 6 is no, give reasons.

……

8. Do you use MOODLE software in learning all your courses including laboratory work?

a. Yes [ ]

b. No [ ]

9. If answer in question 8 is no, how many courses do you learn using face-to-face method?

……

10. How many courses do you learn using MOODLE software?

……

11. Are all your assessments done on MOODLE software including final examinations?

a. Yes [ ]

b. No [ ]

12. If answer in question 11 is no, what percentage of course material is covered on MOODLE software?

……

13. If answer in question 11 is no, what percentage of course material is covered on face-to-face learning?

……

14. Do you have challenges using MOODLE software to access learning?

a. Yes [ ]

b. No [ ]

15. Give reasons for your answer in question 14.

……

16. Has MOODLE software improved your academic performance?

a. Yes [ ]

b. No [ ]

17. Give reasons for your answer in question 16.

……

18. Has MOODLE software improved your interaction with lectures?

a. Yes [ ]

b. No [ ]

19. Give reasons for your answer in question 18.

.....

PART 3: ABILITY OF MOODLE SOFTWARE TO REDUCE COST

20. Has MOODLE software reduced the cost of accessing learning?

a. Yes [ ]

b. No [ ]

21. Give reasons for your answer in question 20.

……

22. Has MOODLE software caused a reduction in the cost of accommodation fees?

a. Yes [ ]

b. No [ ]

23. Give reasons for your answer in question 22.

……

24. Has MOODLE software caused a reduction in the cost of transportation?

a. Yes [ ]

b. No [ ]

25. Give reasons for your answer in question 24.

……

26. Has MOODLE software caused a reduction in the cost of buying books and printing out assignments?

a. Yes [ ]

b. No [ ]

27. Give reasons for your answer in question 26.

……

28. How would you rate the coast of learning on MOODLE software?

a. Cheap [ ]

b. Expensive [ ]

29. Give reasons for your answer in question 28.

……

PART 4: RECOMMENDATIONS

30. Would you recommend the continued use of MOODLE software in accessing learning?

a. Yes [ ]

b. No [ ]

31. Give reasons for your answer in question 30.

……

……

THE END

THANK YOU FOR YOUR TIME