INFLUENCE OF MODULAR OBJECT-ORIENTED DYNAMIC LEARNING ENVIRONMENT FEATURES ON STUDENT'S SATISFACTION IN LEARNING COMMON UNITS IN PUBLIC UNIVERSITIES IN KENYA.

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The Degree of Doctor of Education Degree (Curriculum Studies)

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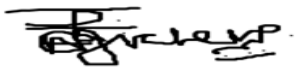
DECLARATION

This thesis is my original work and has not been submitted for award of a degree in any other University.



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DEDICATION

I dedicate this thesis to my dad Joseph Mwangi Gicheru, My mum Margaret Wanjiru Gicheru, my wife Victoria, my children: Melany and Olive, my sister Mary, my brothers: Andrew, Samuel and Peter for their encouragement and support.

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ABBREVIATIONS AND ACRONYMS

DeKUT	Dedan Kimathi University of Science and Technology
EU	Egerton University
ICT	Information Communication Technology
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KIBU	Kibabii University
KNBS	Kenya National Bureau of Statistics
LMS	Learning Management Systems
MOODLE	Modular Object Oriented Dynamic Learning Environment
MU	Maseno University
PDF	Portable Document Format
SPSS	Statistical Package For Social Sciences
UCU	University Common Unit
UoK	University of Kabianga
USA	United States of America
VLE	Virtual Learning Environment

ABSTRACT

This study investigated the influence of modular object-oriented dynamic learning environment (MOODLE) on students' level of satisfaction in learning common units in public universities in Kenya. The following are major variables that formed objectives of the study: ease of access features, feedback features, communication features, interactive features, and evaluation features. The study was guided by constructivism theory and mixed-method research design. The study targeted a population of 216,502 undergraduate students, 17public universities, 236 lecturers teaching common units, 102 eLearning administrators, 34 dean of faculties and seventeen directors of quality assurance. The sample size comprised of 1919 second year students, 84 lectures, 12 deans of faculties,15 elearning administrators ,6 directors of quality assurance. Instruments for data collection included questionnaires, interview guides, and a focus group discussion guide.

The validity of instruments construct was determined by expert's judgement and test-retest method while reliability index was calculated using Cron Batch alpha via SPPS where student's questionnaire r=0.912, lecturer's questionnaire r=0.773, focused group guide r=0.806, elearning administrator guide r=0.719, Director of quality assurance guide r= 0.636 and the deans of faculty guide r=0.876. The data was analyzed via descriptive and inferential statistics using SPSS. Descriptive statistics included: mean, frequencies, deviations presented in table and pie chart. Inferential statistics used was ordinal regression and Wald chi-square. The findings were as follows: All the five hypotheses were tested at alpha value =0.05 using ordinal regression. The first hypothesis found there is no significant relationship between MOODLE ease of access features and student satisfaction. The significant value was 0.515. The second hypothesis found out there is no significant relationship between MOODLE feedback features and students' satisfaction with using MOODLE LMS and the significant value was 0.884. The third hypothesis established that there was no significant relationship between MOODLE communication features and students' satisfaction. The significant value was 0.902. The fourth hypothesis found that there was no significant relationship between MOODLE interactive features and students' satisfaction. The significant values was found to be 0.787. The last hypothesis established there was no significant relationship between MOODLE evaluation features and student satisfaction in learning common units in public universities in Kenya and the significant value was 0.357.

The key findings indicate low to high (23%-75%) students satisfaction level with the ease of access MOODLE LMS features, moderate students satisfaction level with feedback features, Medium students satisfaction level with MOODLE communication features, low students satisfaction with interactive features and finally lower students satisfaction with MOODLE evaluation features The study recommends public universities to partner with international internet service providers with local presence and digital devices companies for affordable eLearning devices . secondly, frequent training on eLearning skills among all users and finally universities need to upgrade their ICT servers and internet infrastructure.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

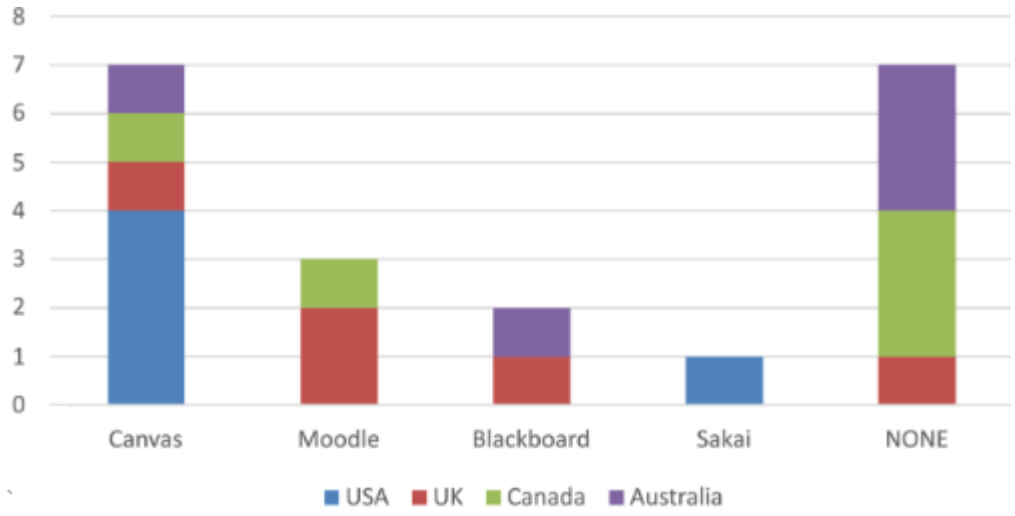
Education researchers and scientists are continuously rediscovering innovative ways to contribute to quality scholarly work, research and teaching in university institutions globally by incorporating new information communication technologies (ICT) in education. (Pikhart and Kozlova, 2021). This is also supported by studies done by Puplampu and Mugo (2020) who pointed out that advanced educational establishments in Africa are undergoing revolutions in order to participate and engage fully in both national and continental agenda. This has necessitated higher institution s in third-world countries to re-invent and adopt affordable and efficient learning management systems (LMS) to run a number of academic programs via online learning, flipped learning, and recently blended learning after the incidence of COVID-19 in march 2020.

An example of learning management system that has been adopted by widely in Kenya is Modular Object-Oriented Dynamic Learning Environment (MOODLE). This system is said to be safe and secure. Young (2018), documented that Modular Object Oriented Dynamic Learning Environment software enable virtual classes to take place was designed by Martin Dougiamas for online learning education. This learning management system powered by internet services and requires elearning devices such as smartphones, assorted e-note books among others. Omar and Mahmud (2015),

points out that learning management provides virtual environment tailored to meets need of individual education organizations to activate elearning.

Studies by Singh (2015), noted that Modular Object Oriented Dynamic Learning Environment has over 80 Million registered users in over 200 countries. Long (2015) also concur MOODLE LMS is widely used in conducting online education globally. However, a recent study Turnbull, Chugh and luck (2022) on the other hand established that this LMS is no longer dominant in elearning circles in united states of America. The statistics below confirms their findings.

Figure 1.1 Popular Learning management systems adopted in USA, UK, Australia and Canada



Source: Turnbull, chugh and luck (2022)

Findings by Long (2015), also confirms that the increased implementation of online education as a result of adoption of MOODLE LMS in universities globally from early 2000 to date due to the innovation in ICT industry. This agrees with Gamage (2022) findings which revealed that MOODLE system is widely used in educational

institutions because of its exclusive features which are compatible with eLearning infrastructure and digital devices such as smartphones. These features enhance seamless interaction among students and also between students and their course tutors. These unique inbuilt MOODLE tools enable all authorised user's in educational institutions to conduct online learning, share and manage information, develop eResources and organize classes. Sarfo and Yidana (2016) also echoed similar findings by noting that these features enable flipped learning and collaborative activities by students.

MOODLE as an open Learning Management Systems is endowed with assorted features used for managing teaching undertakings, learning activities, editing eResources, developing class contents and tracking users for administration purposes.

These MOODLE features can be categorized into: Announcement and broadcast features, teaching and learning tools, authoring and editing tools and finally tracking and administration. The MOODLE teaching and learning features can have separated into: ease of access, feedback tools, communication tools, interactivity tools, and evaluation tools which make learners form opinions, perceptions, and experiences during and after online classes.

Although MOODLE LMS has been in existence and available for teaching and learning activities since 1999, it has attracted attention to researchers in the field of pedagogy and elearning evidenced by plethora of valuable information published in different journals globally. According to Evans (2015) by 31st December 2019, there was a total of 12,700 journal articles in relation to MOODLE LMS. In line with this context, there is mixed reaction in terms of perceptions, acceptance, attitudes,

experiences and challenges in relation to MOODLE features which influences student's satisfaction levels during elearning classes.

Ease of access is among the key MOODLE driver that has been studied by educational researchers in European countries since it elicits reactions from all users such as satisfaction, comfortability, easiness and acceptability. Research findings by Carvalho, Areal, and Silva (2011) revealed that the students experienced difficulties in logging into MOODLE learning management system compared to the Blackboard LMS in Portuguese universities citing the complex design to operate and difficult log in procedures. Numerous studies also established that MOODLE LMS design is confusing, horrible, difficult in navigating, finding specific features, lack of elearning support (Baile, 2017; Keržič, Tomaževič, Aristovnik, and Umek ,2019)

On the other hand, Pektaş and Demirkan (2014), demonstrated that over 80 % of learners were satisfied with accessibility of MOODLE LMS classes with difficulties. Silva, et al. (2017) also found majority of students were contented with MOODLE LMS portal availability and conveniency. Chukwuemeka, Edori, and Bakare (2015) also observed that postgraduate students from Eastern Mediterranean University in Cyprus were also gratified with the learning process through MOODLE system.

Interactivity features associated with MOODLE may also dictate learner's satisfaction levels. Anistyasari, Sarno, and Rochmawati (2018), expound that interactivity is a features that enables users to access information through links created by designers by use of applications within a system. Okenese (2017) observed that MOODLE LMS enable learners to interact in virtual spaces. Koneru (2017) on the other hand listed

types of interactives activities that can be implemented in teaching and learning. Examples are video clips, cartoons, games and surveys. Okenese (2017), also found approximately 80 % of learners in a university in New Zealand observed that MOODLE LMS enhanced accessibility and interaction of teaching learning resources. Marwa (2016), concur that over 70% of learners in East Africa university were satisfied by MOODLE interactive learning activities. Ally (2016), vehemely disagreed on interactivity created by MOODLE virtual spaces in learning discourse citing poor architecture and limited elearning skills.

Mpongose (2020), established that tutors in South Africa resisted implementation of MOODLE classes due to authoritative nature of management. This disrupted online education despite heavy investments of internet infrastructure and elearning devices. This reaction very common especially if a new innovation is not owned by users or lack of involvement at inception due to myriad of issues such as elearning skills, access to elearning devices, threats, too much work, intimidation and fear among other reasons which causes human beings to retaliate naturally. Closely related studies by Mtebe and Kondoro (2016) revealed that education organizations in Africa failed miserably in implementation of online learning due to inferior elearning devices, poor attitude towards technology, technophobia among other factors. These has remained a burning issues up to date in Africa leading to ineffective implementation of online education lowering satification levels among students and tutors.

Feedback from tutors and peer through MOODLE LMS is another characteristic that influences satification level among student. Centre for Innovation in Research and Teaching at Grand Canyon University (2018), observed that comment from instructors

have a bearing to students' academic achievement. Akakandelwa and Mkulama (2017) observed that University leaners grumbled that they actually don't receive feedback from their instructors through MOODLE LMS. Probable explanations for this phenomenon might be limited elearning skills, underutilization of feedback features, lack of time to provide responses to large number of students or poor customization of this LIMS. Suesawaluke and Poonsri (2008), established that majority of university students becomes inspired by actually accessing their grade online thereby improving their academic progress and achievement

MOODLE communication features in the LMS has a bearing to student's level of acceptance and fulfillment in learning activities. The architectures and design of MOODLE learning management system has applications that enable conversing between instructors and students and also amongst students (Lopes, 2017). Pektaş and Demirkan (2014), observed that communication features enable teaching and learning activities to run. Such features include the microphones, the broadcasts desk, raise hand icons, mute icon, unmute icons, discussion platform, chats, among others. (Hölbl and Welzer, 2015; Ally ,2016 & Young, 2018).

Teo, Huang, and Zhou (2019), at Macau University, noted that MOODLE communication features help students discover new information, networking, collaborate and mingle and also for entertainment reasons. Pektaş and Demirkan (2014), found out that majority of learners are able to utilize communication features in MOODLE for gaining new knowledge through enhanced interaction. Hölbl and Welzer (2015) highly refuted this by documenting that majority of MOODLE communication features are underutilized by all users and more so the students. This

is very worrying as communication is the only link between learners and new knowledge.

In Africa, the adoption of eLearning and online-related activities is at the infancy stage and this is confirmed by Asunka (2008), who established that Ghanaian University students professed joint virtual learning ventures within their environment is a more challenging and laborious exercise.

According to trends.builtwith.com,2022 the statistics of learning management systems in Kenya indicate MOODLE LMS, Learning Press and Learn Dash are among the dominating LMS in education sector in Kenya (Refer Figure)

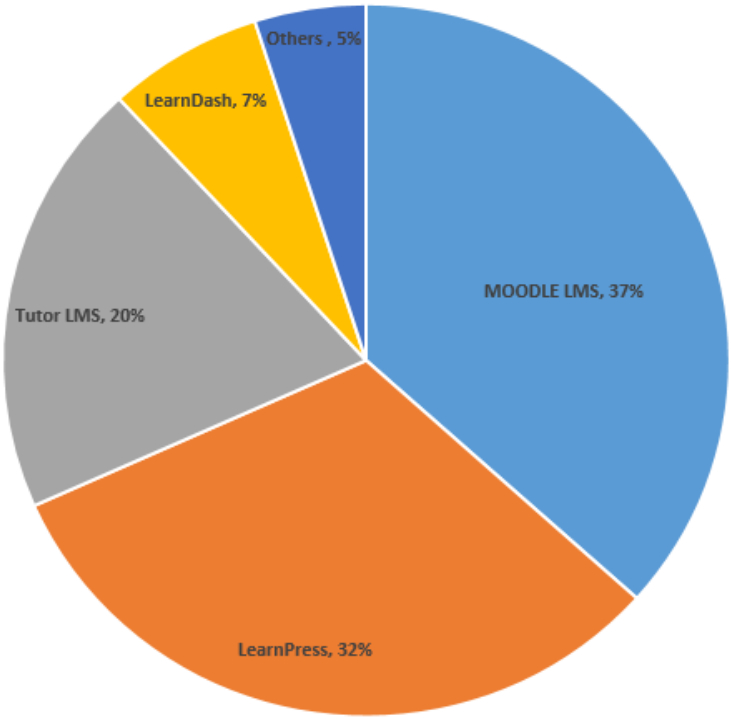


Figure: 1.2 Top eLearning Management System Usage Distribution in Kenya

Although MOODLE is among the widely used educational learning management system across nations for virtual education, Kenyan universities have adopted different elearning management systems. University of Nairobi being the learning higher

institution in Kenya , has adopted Claroline open learning management systems,, JKUAT has adopted MOODLE system, Moi University is currently using MUSOMI customized from MOODLE, Kenyatta University switched from MOODLE LMS to Blackboard Learn Management System to address challenges the institution was experiencing previously with MOODLE. (Kikemboi and Oboko ,2018).

A cross-check of websites and elearning portals of public universities in Kenya indicate 17 out of 41 institutions representing 41.5 % are using MOODLE LMS to conduct eLearning. (refer Appendix XIV). Other institutions like Egerton University, Maseno University, University of Kabianga, Dedan Kimathi of the University of Technology, Embu University, Pwani University Cooperative University, and Kirinyaga University are among the institution that has adopted MOODLE LMS.

Rising cost of managing education in public universities in Kenya coupled with dwindling capitation by government has forced a number university to seek affordable means of delivering quality education. Ndalo (2022) confirmed that public universities in Kenya are swimming in debts. This means capitation released to each institution periodically is not enough for fulfil their core mandate teaching, training and research. With steady increase of enrollment of fresh undergraduate students to universities, thanks to free primary and secondary education, numerous institutions are in the crossroad of either retaining bloated teaching workforce or discontinuing some academic programmes or refurbishing dilapidated teaching facilities and learning resources. University common units such as introduction to computers, creative and critical thinking, communication and library skills, ethics and integrity, among others

are taught to all undergraduate students enrolled in each university as a curriculum requirement. Teaching of these common units has been major headache to majority of institution due to large population of students who cannot fit inside lecture halls. Numerous institutions resolved to teach these units online from 1999 to date while some institutions like University of Nairobi, recently discontinued teaching common units and over 40 academic programmes that are not attractive to students". (Odour, 2019).

Some institution continues to put brave face by hiring part time lecturers who can teach university common units online to large numbers of students as a cost cutting measure instead of hiring pensionable lecturers to teach common units face to face mode. This calls for more efficient and cost-effective learning management system such MOODLE. Commonly used learning management systems for offering university common units through online mode include, MOODLE, Blackboard Learn, Claroline, Musomi, WebCT, SAKAI among others. Makokha and Mutisya (2016) observed that in one pubic university in Kenya using MOODLE LMS, one instructor was allocated an online class with 300 students to teach a common unit. This is weighty matter considering one instructor cannot effectively interact and provide feedback to over 300 students. This go against CUE standard of 2012 where staff to student ratio of 1:50 is advocated to arts-based courses. This implies higher number of student compared to instructor may compromise the quality of learning. Although MOODLE LMS may provide some relief to institution such that they may save on cost of hiring numerous full time lecturers for face to face education, online classes

may not necessarily be smooth ride if all users are not properly acquainted with eLearning skills and LMS features.

Since the implementation of MOODLE learning management system in numerous campuses, countless of challenges have been reported by several studies concerning online education. For example, Odhiambo and Acosta (2009) carried out comparative study on different learning management systems used in Kenya and established that widely used learning management systems and platforms are deficient of interactive and feedback features. This scenario emanates from systems related factors (such as softwares incompatibity and poor configuration), students related factors (such as poor attitude, limited elearning skills, unsuitable elearning devices) instructors related factors (such as limited elearning skills, advanced age, lack of time, poor motivation, poor attitude among others). These factors compromise the level of satisfaction among learners.

Hadullo (2018) evaluated quality of MOODLE LMS at Jomo Kenyatta university of Agriculture Technology and found out that eLearning support, course design, managerial support, students and instructor related characteristics, institutional relate factors and social factors affect the quality of LMS. These aspects are very critical because they influence theory and practice in educational context which has a bearing to satisfaction level of all the users. According to Muuro, Wagacha, Oboko and Kihoro (2014) cooperative learning in universities in that have adopted elearning, a lot of feedback and communication difficulties were experienced by students working in a virtual environment. Studies by Hadullo, Oboko, and Omwenga (2018) demonstrated

that over 40% of postgraduate students at JKUAT developed negative attitude towards assignment feature found in MOODLE LMS. Communication, feedback and assessment are among the ingredients for learning discourse and any aspects that interfere with above the overall objectives and aims of the course unit (s) cannot be achieved. Limited quality interface between instructors and learners and also between students due to underutilization of communication features in MOODLE, promotes and cultivates individualism instead of collaboration. This implies the context of eLearning education in Kenya growing at slower rate which may impede learners to catch up with the 23rd Century's global technological pace so that they can enjoy and experience the benefit of effective MOODLE collaboration.

Findings by Araka, Maina, Oboko and Kihoro (2021) revealed majority of LMS features in Kenya institutions remain underutilized by learners. This was also supported by Hölb and Wezer (2015) who arrived to the same conclusion in relation to MOODLE LMS. Similar finding was also echoed by Omanyo (2018) who established that majority of learning institutions in Kenya have not attained the envisioned benefits of elearning citing low usage, minimal use of LMS features, low attitude in acceptance of LMS students, high dropout rates in elearning mode of study, negative attitude of instructors towards LMS due to technology complexity. Other factors might be due limited elearning skills by users, unaware the existence of such features, complexity in use, systems incompatibility, poor architecture of MOODLE LMS among others. All these issues reported in our public institution affect online education of common units and contributes to low overall student’s satisfaction level in learning through MOODLE LMS.

In Kenya a number of higher institutions of learning and tertiary institutions offering online learning classes are supported by Kenya Education Network (KENET). This organization is a licensed private network operator hosted at University of Nairobi whose goal is to partner with tertiary institution of learning in Kenya to support online learning. KENET as a consortium of Broadview International investment bank and Electra Partners Asset Management Firm has been in operation for a number of years with long term goal of expanding online education, connecting institution for networking, partnering and collaborations. According to deputy CEO, KENET "*we provide affordable and robust dedicated internet network to over 300,000students distributed in 78 institutions over 5000 faculty members in both private and public universities and other government affiliated bodies such as Kenya National Library Services, Kenya Agriculture Livestock Research Institute, Higher Educations, Teachers service commission among others with over 27,000 Mbps" (*Kenya education network,2023)

Mwangi and Pingey (2013) points out that KENET has connected more than 120 campuses within a span of 4 years and they have two data centers in collaboration with other local companies such as Safaricom, Kenya Data Network, Jamii Telecom, Telkom Kenya. Currently KENET is governed by a total of five vice chancellors drawn from public and private universities, permanent secretary ministry of education, CEO of Telkom Kenya & Communication commission of Kenya and a team of secretariat & technical officers. KENET as a service provider offers high speed internet for supporting online education, connectivity, research, enterprise and capacity building.

According to Mzungu and Njue (2021) KENET stepped in to support online learning when education in Kenya was thrown into uncertainty after the outbreak of Covid -19 that brought the country into stand still. During this period learning was disrupted in all educational institutions and KENET partnered with safaricom and Telkom to deliver affordable internet to educational institutions using special 3G and 4G SIM cards by training instructors, students and other users on elearning discourse.

According to Webometrics (2017) and EduRank ,2023), University of Nairobi is the leading among universities in Kenya. It is surprising to know elearning education in this institution is offered via Claroline management system and various platforms. According to Kikemboi and Oboko (2016), UoN was using WEDUsoft platform system for teaching online classes. In 2018 /2019 academic year the then Director of ICT disclosed that the institution was using Claroline to manage its online education classes. A year later after outbreak of Covid-19 Dr Collins Odote, the then Director of Centre for Advanced studies in Environmental Law and Policy (CASELAP) was quoted "*We used Google platforms to administer our exams after intense teaching online using Google Suite, Zoom and WebEx learning platforms. We invited our students to Google Classroom so that we are able to see all of them in a screen and then we used Google Meet to monitor or invigilate the examination process*." (Kamuyu ,2020). This marked a great milestone among other public universities by setting the pace where learners did their examination from the comfort of their homes.

Awang and Darus (2012) point out that Claroline learning management system supports tools such as wiki, forum, scorm, variety of authoring tools, video conferencing, gamification, simulation, interactivity and collaboration spaces. Among other striking features of this system, it allows instructors to generate series of questions and track students' performance. Elearning industry (2020) on the other hand also point out that Claroline LMS has more advance interactive and communication features compared to MOODLE LMS.

Claroline LMS can enroll large number of students and staff. This system softwares is also well-suited to wide range of operating systems. This might be the among reason UoN adopted this LMS given that it has large number of enrolled students. This is contrast with studies by Karolcik and Čipková (2013) where students rated its features from as low as 2% to a maximum of 25 %.

Kenyatta university on the other hand are currently using Blackboard Learn System which has more superior features compared to MOODLE LMS. This eLEARNING management software was created in 1997 and is loaded with state of art and unique features making it among the best and expensive LMS globally. McGravey (2021), confirms to any institution using this LMS usually pay an annual license fee of $160,000. According to Director of Open and distance learning (ODeL) "*previously the institution had implemented Modular Object-Oriented Dynamic Learning Environment system for online education classes, but it was overwhelmed by chain of challenges including large number of student's enrollment and a decision was made by management to procure an efficient and reliable LMS to match their needs*" (Bench marking report, 2016).

Ombati (2019) noted that Blackboard Learn management system used at Kenyatta university is easy to login, very effective, easier to access to course modules, making communication online seamless among users sharing e-resources. According to elearning industry (2022), Claroline LMS scored users satification of 87% compared 78% of MOODLE LMS. This implies Claroline is more superior compared to MOODLE due to its unique features. On the other hand, Blackboard learn synchronize well with Dropbox, Microsoft applications such OneDrive, superior interactive and engagement features, integrated with social media application and robust content control features (Technology evaluation center, 2019). This means both Blackboard and Claroline may exaggerate data for interactive, communication and evaluation features under the current study and therefore University of Nairobi and Kenyatta university was left out from this study.

1.2 Statement of the Problem

Modular Object-Oriented Dynamic Learning Environment (MOODLE) is an online platform that is gaining popularity in public universities in Kenya, especially for teaching university common units to large volume of student's population. Although MOODLE LMS is an economical online learning management system, research studies by Hadullo, Oboko, and Omwenga (2019) identified weaknesses with MOODLE LMS assignment management feature used by postgraduate students in one of the public universities in Kenya. Araka, Maina, Oboko and Kihoro (2021) undertook a study focusing different LMS used in public universities and found majority of LMS features remain underutilized by learners. Although the above

studies reported important findings in the field of elearning, very limited information is available on undergraduate students' satisfaction with MOODLE learning management features in public universities given that approximately 42% of higher institution of learning in Kenya have embraced Modular Object Oriented Dynamic Learning Environment system in teaching university common units to undergraduate students online, therefore , there is a need to investigate students' satisfaction with these features to enhance effective teaching and learning of university common units. Hence, this investigation aims to interrogate the effect of this LMS features on student's satisfaction level in learning common units in Kenya public universities.

1.3 Purpose of the Study

The purpose of this study was to investigate influence of MOODLE features on students satification in learning common university units in public universities in Kenya.

1.4 Objectives of the Study

The following were the specific objectives of the study:

i. To determine the relationship between ease of access of Modular Object-Oriented Dynamic Learning Environment and students' satisfaction in learning University common units.

ii. To establish the relationship between Modular Object-Oriented Dynamic Learning Environment feedback features and students' satisfaction in learning University common units.

iii. To examine the relationship between Modular Object-Oriented Dynamic Learning Environment communication tool features and students' satisfaction in learning University common units.

iv. To evaluate the relationship between Modular Object-Oriented Dynamic Learning Environment interactivity features and students' satisfaction in learning University common units.

v. To determine the relationship between of Modular Object-Oriented Dynamic Learning Environment evaluation tool features and student satisfaction in learning of University common units.

1.5 Research hypothesis

The hypotheses of the study were as follows.

$H0_1$: There is no significant relationship between ease of accessing modular object-oriented dynamic learning environment learning management system and student's satisfaction in learning common University units.

$H0_2$: There is no significant relationship between modular object oriented dynamic learning environment feedback features and students' satisfaction in learning of common university units.

$H0_3$: There is no significant relationship between modular object oriented dynamic learning environment communication features and students' satisfaction in learning of common university units.

$H0_4$: There is no significant relationship between modular object-oriented dynamic learning environment interactive features and students' satisfaction in learning of common university units.

$H0_5$: There is no significant relationship between modular object-oriented dynamic learning environment evaluation tools and students ‘satisfaction in learning of common University units.

1.6 Significance of the study

The outcome of this study is useful to policy planners in the Commission for University Education of Kenya to offer advisory roles to institutions using MOODLE LMS. Public universities may also use findings to improve infrastructures and make LMS responsive to learners' needs and satisfaction. The study provides feedback to deans, directors of quality assurance, and the university board of management on MOODLE LMS students' satisfaction level in teaching university common units and makes adjustment accordingly. The study will lead to creation of knowledge that is likely to be utilized by online course instructors in order to accommodate learners' interests. The study is also an eye-opener for universities intending to use MOODLE LMS for offering online learning. The of the study will help in improving students’ performance in the common units and thus reduce wastage at the university. Finally, the data generated is worthwhile and useful to researchers focusing on the same thematic area.

1.7 Limitations of the Study

The study was limited to mixed method research design on the investigation of student’s satisfaction with MOODLE learning management features in learning common university units at public universities in Kenya. Data collection tools was

limited to questionnaires, interviews guide and focused group discussions guide following steps expounded by Krueger (2002). The study was limited MOODLE features focusing on teaching and learning. Fourthly, there was low rate of filling in the questionnaire because students were busy with either exams or online lectures in order to recover time lost during the COVID-19 outbreak. To counteract this, a reminder was sent to the participants through the announcement tool and also through class representatives to persuade the respondents to fill and hand in the questionnaire on time. Fifthly the researcher encountered difficulty in scheduling interviews with directors of quality assurance and the deans due to their busy nature of work schedules. To mitigate this, the researcher requested for alternative means of gathering data such as phone conversation and google questionnaire. And finally quantifying qualitative data lead to lose of flexibility and depth of the information.

1.8 Delimitation of the Study

The current research targeted approximately 216,502 undergraduate students registered in the 2019/2020 academic year. The study focused on five MOODLE features namely: ease of access, feedback features, communication features, interactivity features, and evaluation features on students' satisfaction with using MOODLE. The findings will only be limited to only seventeen Kenya's public universities which have embraced MOODLE LMS for online education. Participants for the study included the Deans of schools/faculties, directors of quality assurance, lecturers teaching common units, eLearning administrators, and second-year students. The second-year undergraduate cohorts were chosen as respondents since they had

completed at least three university common units taught using MOODLE and more so they were knowledgeable in online learning.

1.9 Assumptions of the Study

The current research assumed participants were aware of Modular Object-Oriented Dynamic Learning Environment features influencing satisfaction on learning common university units and that they provided honest and truthful information required for the study. The study assumed the two main category of universities have equal strength in terms of infrastructural development.

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1.10 Definitions of significant terms

The following were the key terms used in the study:

Common University units: - refers to study subjects such as HIV and Aids, communication skills, creative and critical thinking, ethics and integrity, entrepreneurship, introduction to computers among others that undergraduate students are required to register, study and pass.

Communication tools: -refers to software used for conveying and exchanging information between learners and also between learners and instructors via the internet-enabled MOODLE platform

Ease of access: - refers to time and effort used by eLearner to log in portal, locate and open eResources.

Evaluation tools: refers to resources used by instructors and students to gauge the quality of teaching and eResources.

Feedback tools: -refers to resources used by instructors either to carry out surveys on a topic or course taught.

Interactivity tools: - refers to tools that engage the learners such as H5P, guess the answer game, interactive slides, pop-ups, hot potato, storyboard and learning logs during online classes.

Learning management system: - refers to a virtual learning environment with computer software such as MOODLE, BlackBoard, and WebCT among others used in the delivery of online learning courses.

MOODLE: -refers to Modular Object-Oriented Dynamic Learning Environment. It is a platform that manages learning and delivers eLearning resources to online learners.

Object oriented - refers to computer semantic coding which enables software and systems to communicate with each other.

Platform: - refers to the stage on which computer educational programs utilize to deliver and disseminate data among stakeholders involved in eLearning.

Satisfaction: - refers to learners' perception in terms of contentment while using MOODLE Learning Management System.

1.11 Organization of the Study

This document is organized into five chapters. Chapter one highlights background information, a statement of the problem; purpose, objectives, and research questions, the importance of the study, limitations and delimitation of current research, assumptions, and keywords used in the study. Chapter two addresses the literature review under the following sub-titles: Concept of MOODLE LMS, ease of access of MOODLE LMS feature and students satification, MOODLE LMS feedback features and student's satisfaction, MOODLE communication tools and student's satisfaction, MOODLE LMS interactivity features and student's satisfaction and finally MOODLE LMS evaluation tools and students' satisfaction. The theoretical and conceptual framework is also expounded in this section. Chapter three focuses on research design, the population of the study, expected sample size and sampling technique, research tools to be used, validity and reliability of data collection tools, data gathering steps and finally the data analysis technique intended to be used. Chapter four highlights the data analysis used, presentation and interpretation of results used in the study. Finally, chapter five focuses on findings, conclusions and recommendations of the study

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

Chapter two comprises of following sub-topics; University common units, Concept of MOODLE LMS, MOODLE system and ease of access, MOODLE LMS Feedback features and student's satisfaction, MOODLE LMS communication features and student's satisfaction, MOODLE LMS interactive features and student satisfaction, MOODLE evaluation features and students' satisfaction, conceptual and theoretical framework.

2.2 University Common Units

University common units refers compulsory courses that have been integrated intentionally to students' academic programmes for knowledge and skills acquisition. According Commission of University Education standard, (2014, pg. 106), Information literacy and competency knowledge should be incorporated to all university programs as common units. An example of common units is introduction to computers which equips and prepares the university students to apply information technology in communications and scholarship activities such as searching information, writing an essay, accomplishing assignments, among others. Communication skills is another university common unit, that prepares students for future courses. Haillo.com (2023) observes that communication skills as a course subject help to create harmony among students from various background, create environment for sharing ideas, among other benefits.

Basic common courses in universities include: communication skills, HIV & AIDS, entrepreneurship, critical thinking skills, introduction to computers, creativity and innovation just to mention a few. Majority of this course's units are taught to year one and year two undergraduate students. Due to large number of student's enrollment teaching these common units have become a challenge since they cannot fit in standard lecture halls and therefore majority of public universities have resolved to teach these courses online. It is also important to note, University of Nairobi recently scrapped common units and over programmes which attract lower number of students as a cost cutting strategy. (Oduor ,2019)

2.3 Concept of MOODLE and student's satisfaction with learning.

Modular Object-Oriented Dynamic Learning Environment (MOODLE) is a free computer application platform that requires internet connectivity in order to actualize online learning to college and university students. Long (2017) and Young (2018), refers MOODLE as an open learning management system software, which manages online learning and delivers eLearning resources to the learners. According to Singh (2018), MOODLE LMS has enrolled approximately 80 million users scattered globally over 222 nations. Moodle organization (2023), documents statistics of 358,477,021 users located in 165,428 sites distributed across 240 countries globally.

Lopes (2017), confirms MOODLE LMS is a popular platform embraced by educational institutions to deliver learning electronically and gives teachers upper hand to control and manage large online learning sessions. Since this LMS is

economical and can accommodate large number of users, this might be the motivating reasons why it is popular in educational institutions of higher learning.

MOODLE LMS infiltrated our public institutions from late 90's. This coincided with implementation of common university units' communication skills, HIV and AIDS, critical thinking and recently ethics & integrity, introduction to computers and entrepreneurship in higher institution of learning. Approximately 42% of public Universities in Kenya have adopted online learning using MOODLE LMS to manage teaching common units, especially to a large number of undergraduates who cannot fit into physical lecture halls in one go. Although online learning seems to be the panacea to overcome large numbers of students due to limited lecture halls capacity and lean teaching staff. Each course unit registered by students must be taught and assessed according to criteria outlined in Commission for Higher Education,2008, p. 90). Since over 42% of higher institutions learning are rushing to offer common units online, factual data is needed to confirm the status of student's satisfaction with MOODLE features.

According to MOODLE organization (2018), MOODLE learning management system has several categories of features: Announcement and calendar features, Dashboard highlighting students registered units or instructor's unit load, teaching and learning features, authoring and editing features, tracking and administration features. MOODLE features associated with teaching and learning which influence student's satisfaction include: ease of access features, feedback features, communication features, interactive features and evaluation features.

Chen, Chen, and Lee (2022) carried out a study involving third-year students in learning a medical course and their findings revealed that the group that integrated MOODLE application software in learning had better performance and higher perceived satisfactions with the course unit compared to learners who did not use MOODLE learning management system. This clearly indicates that MOODLE LMS plays a central role in students' academic achievement and satisfaction in learning.

2.4 MOODLE LMS ease of access and students' satisfaction

Accessing online class is a joy of every learner that creates inner satisfaction. Virtual Learning Environment (VLE) creates learning spaces to eLearners. In fact, Keržič et al. (2019) noted that LMS accessibility and system support are imperative for the learners using MOODLE. Its indicators include how fast or slow to log in to the portal, steps and procedures that the user should follow to access eResources among others.

According to Silva et al. (2017), ease of access online class and eResources brought satisfaction to approximate 50% of students from Portuguese university. Studies by Pektaş and Demirkan (2014) revealed that over 88% of students confirmed easiness and utilization of MOODLE LMS in online education. Carvalho et al. (2011) castigated MOODLE LMS due to logging in difficulties into the eLearning portal. Paragină, Jipa, Paragină, Savu, and Dumitrescu (2011) on the other hand decried that weak and unstable internet connectivity limits accessibility to MOODLE learning management system. It is believed that a system that is not responsive to learner's needs, usually leads to low motivation and frustrations especially where online

infrastructure frustrates students to access online sessions and yet they have paid for the service. This indicates students may also abandon programmes offered through MOODLE system given a choice of another LMS.

According to Hongjiang and Mahenthiran (2015), learners' contentment with MOODLE platform depends on course content arrangement, easiness in completing classwork given, and interaction with eResources. Wezer (2010), also found online students accessed eResources regardless of their location globally using MOODLE LMS. However, in Africa, the scenario is bit different as expounded by Ssekakubo et al. (2011) who noted eLearning in Africa is at the infancy stage coupled and faces a myriad of glitches such as weak internet connectivity, poor attitude towards technology, low illiteracy rates, ineffective learners' support services, low comfort level with technology and lack of suitable devices for accessing eResources.

Studies by Mwatilifange and Mufeti (2023) established that over 60% of students from university of Namibia had myriad of difficulties in accessing classes offered virtually via MOODLE LMS. Reasons cited include: lack of quality ICT devices or applications required. Lack of stable internet connectivity remains a challenge to majority of institution in Africa due to limited connectivity and where available it is characterized by prohibitive exorbitant cost. Poor devices with incompatible software's is another uphill task that militate against eLearning practices in Africa. This was confirmed by studies carried out by Mtebe and Kondoro (2016) who decried that mobile phones used for eLearning yielded little success at university of Daren Salam. Mobile smart phone with minute storage space and incompatible application

does not support eLearning activities, therefore efforts must be made to acquire suitable devices to activate online education.

Essel and Osafo (2017) noted that MOODLE LMS permits tutors to regulate access to a variety of eResources such as class notes, course outlines, photos, video clips, etc. to the students. This privilege and control rights given to instructors of not granting learners full access to eResources may have negative impact to their satisfaction level with eLearning activities. This is because majority of learners naturally like to explore all learning objects within their disposal online. Educationist argues that use of ICT in teaching activities makes learning more interesting, captivating, authentic and enjoyable by creating stimulus variation that engage the student throughout the session.

2.5 MOODLE LMS feedback and student's satisfaction

The University of South Carolina defines feedback as any information given by a teacher pertaining student's achievement or performance. Department of Education, Victoria state government emphasize that feedback from instructors is used to gauge students level of academic progress in order to strategize next course of action in line with course goals. Futurelearn.com (2018), stresses that comments provided to learners should be positive, timely and appropriate. Centre for Innovation in Research and Teaching at Grand Canyon University (2018) observed that feedback boost academic achievement and confidence and motivate them to even work harder.

Center for Teaching and Learning at the University of Columbia, highlights types of feedback given to learners encompasses: epistemic, suggestive, corrective and finally

epistemic & suggestive feedback. Epistemic feedback guides the students to reflect deeper on some particular aspect of the content while corrective comments identifies particular part of the assignment where students met the desired expectation and parts which requires improvement while. Suggestive feedback on the other hand gives students some tips or advice on ways to improve their work while epistemic & suggestive feedback requires the students to provide additional clarification and also offer a variety of tips on how to make their work better.

According to Nagi etal. (2008), learners develop interest after seeing their grades which reflects their academic progress and often leads to an increase in satisfaction regardless of the marks or grade awarded. Studies by Teo etal. (2019), also revealed that prompt feedback and responses through MOODLE learning management system is important for young students today. The above findings were however contradicted by Akakandelwa and Mkulama (2017), who observed that instructors using MOODLE LMS rarely provide feedback to their students. This aspect negates the classical behaviorist theory of reinforcement as expounded by BF Skinner where a response influences learning behaviour such that positive response encourages the learner to work harder as reward is forthcoming thereby sustaining positive response. In equal measure negative response discourages the students which may eventually cancel the stimulus that was reinforcing performance.

Feedback provided whether positive or negative will give a chance to the implementers either to amplify positive issues or at the same time improve on elements' that are not working according to initial Plan. Sibgatullina, Ivanova, and Yushchik (2022) observed that constructivists believe that feedback boosts students'

performance. A system that does not provide feedback to learners and other user creates a vacuum or confusion and to some extent frustration. This calls for alternative ways and with time it becomes obsolete and ultimately culminates in the replacement of LMS which is more responsive to student's needs.

Pham, Limbu, Bui, Nguyen, and Huong (2019) emphasis that elearning support plays a critical function in relaying feedback to learners in Vietnam which enhance their satisfaction with elearning education. Ali, Puah, Fatima, Hashmi, and Ashfaq (2022) underscored the role played by elearning support service which greatly impacts student's satisfaction with online learning activities. ICT support plays a crucial role when students seek help in relation to various issues ranging from login, lack of display, unresponsive dashboards, and lack of specific course units in their portal among others. Feedback, therefore, becomes very important which resolves issues related to elearning activities for it run seamless without a hitch thereby increasing students' satisfaction. If students' queries remain unanswered, ignored or delayed, the rate of frustration and dropout increases which also lowers satisfaction with online learning.

In MOODLE LMS, instructors view providing feedback frequently as time-consuming especially if the number of eLearners exceeds the recommended threshold. This was echoed by Makokha and Mutisya (2016) who observed that, in one public university in Kenya, lecturers teaching communication skills handle over 300 undergraduate students per session through online classes. How is possible for the same instructor to provide quality feedback to over 300 students on time? The larger number of students

per lecturer ratio compromises the quality and often triggers feedback dissatisfaction with eLearners since it is almost impossible to provide feedback to all learners on time

2.6 MOODLE LMS communication tools and student's satisfaction

Embedded MOODLE features used for communication encompass: broadcasts block, electronic mail, dialogue spaces, future events space, almanac schedule, mass mute icon, unmute icon, microphone icon, communiqué, and teamwork spaces. This was supported by Lopes (2017), who noted that MOODLE learning management systems has innate features used by instructors and learners to interact and also for enable learners to interact with their peers. Pektaş and Demirkan (2014), asserts that MOODLE communication features enable virtual criticisms, access to teaching and learning resources, preparing concepts, and submitting plans. Without communication among learning stakeholders, no effective learning can take place. Therefore, communication features within MOODLE is very crucial for learning activities to exist.

Studies by Widodo and Slamet (2021), established that 30% of lecturers "strongly agreed" and 70% "agreed" that MOODLE learning management system facilitate flow of information among the target users in the virtual spaces during synchronous and asynchronous class set up. Effective communication among education stakeholders ensures teaching has taken place where learners understand and comprehends the content being taught. A system that does not allow seamless communication among stakeholders often leads to overall poor performance and dissatisfaction among its users.

Studies by Ghoyal and Purohit (2011), noted that MOODLE learning management system enhances student satisfaction and improves communication between the teachers and students. Kotzer and Elran (2012), emphasized that MOODLE LMS interconnects social media applications that are popular with youthful learners and can elearning coaches can take advantage of this option for the purposes of knowledge generation and sharing. Studies by Hölbl and Welzer (2015), revealed glumly picture that over 60% of communication tools are not utilized by MOODLE LMS users. This trend is worrying as it defeats the importance of such features. This might be due to limited skills in utilization of features available, lack of existence of such features, poor architecture of MOODLE LMS or incompatibity of these soft wares with elearning devices.

Akakandelwa & Mkulama (2017), also concurs students had difficulty in using MOODLE as a communication tool in universities in Zambia. This might be due to limited dedicated internet bandwidth, inadequate or lack of drilling in using LMS, or systems assistance online. Since the current learners are more occupied with social media, an online system that does not give them a chance with social web resources usually demotivates them and may lead to low satisfaction with the system.

2.7 MOODLE interactivity features and student's satisfaction

An interactive session encourages students to participate more and more in a learning activity, this implies leaners graduate from being passive participant to an active participant. MOODLE LMS provide such service encoring learners to be engaged throughout the class session as it enhances stimulus variations. Ghoyal and Purohit

(2011), opined that MOODLE has a wide range of interactive applications. Studies by Koneru (2017), highlight simple and complex interactive activities. Simple interactive learning activities include: gamification, drop and grad appropriate answers, ranking items, flash card responses, recreations, puzzles, joining parts among other activities.

Sonia, Bouziane, and Alvarez (2014) assert that MOODLE platform provides interactive teaching and learning sessions at Paris Descartes University. Studies by Okenese (2017), revealed that approximately 80% of students' concurred that MOODLE LMS is enriched with adequate interactive activities. A similar finding was also echoed by Marwa (2016) who established that over 74% of online students under agreed that MOODLE LMS supports interactive learning. Studies by Hajjar (2017), and Barge and Londhe (2014), also revealed MOODLE learning management systems create an interactive environment between lecturers and their respective students. These findings were however controverted by Odhiambo & Acosta (2009) and Ally (2016) opined that online learning management systems used in Kenyan and Tanzanians institutions respectively lacked the critical aspect of interactivity.

Mir *etal* (2022) emphasized that it is possible to activate the Interactive Video Suite (IVS) is an audiovisual software embedded in MOODLE learning management system and permits a deeper understanding of concepts that elicit students' active learning and engagement with video. The benefits that accrue from using this software, enable learners to add comments and respond to questions asked by either the instructor or their peer thereby gauging the depth of the content being taught. The IVS also enables users to change playing speed and zoom in and out for better engagement and understanding. Tutors, on the other hand, can analyze learners' commentaries and

responses to gauge their entry behavior to the course and also provide learner summary reports for evaluation and assessment activities.

Rodrigues, Brandão, and Brandão (2010) summarized MOODLE interactivity into the following steps: (i) The students fill in the forms provided or academic activity given (ii) The filled form is then submitted (iii) the MOODLE database receives the submitted document (iv) The document is processed (v) Finally the responses are sent to the student. These are general steps especially where activities to be done are linked with databases that provide immediate responses to the learners. Another view on interactivity is where content creators and designers provide links in which users click and are then directed to a wide range of eResources.

Marcen, Fošner, and Knežević (2022) carried out a study involving 150 learners in a mathematical course and their analysis revealed that 84.3% of students were able to solve class exercises successfully when the course was taught using interactive activities rather than physical chalk and board. Reason given was motivation created through step by step active engagements. This clearly shows the benefits of interactive activities provided by MOODLE LMS on students' performance simply because interactive session makes students active and alert while following the procedure. This underscores the importance of interactive activity in learning discourse where instructors are obligated to make learning as interactive as possible by engaging them in all the steps.

Yang (2022) on the other hand carried out studies by teaching using two modes: Through conventional and MOODLE LMS concluded that MOODLE learning

management platform provides a highly interactive online environment in Japanese universities. Mir, Zafar, and Shams (2021) on the other hand did a study on incorporating video in MOODLE LMS and concluded students taught with MOODLE interactive video were more satisfied compared to students in class environment.

Interactivity often increases the latitude of learners in accessing a variety of eResources which makes learning interesting and motivating. Odhiambo and Acosta (2009) criticized several eLearning platforms in higher institutions of learning in Kenya citing presence of hardcopies of lecture notes in form of PDF. This means links to eLearning resources are almost impossible creating a boring learning session since operability is not detected. This aspect does not motivate learners or make them yearn for the next learning session. A system with a variety of links to video clips, audio clips, photos, simulations, lecture notes, the latest updates on the topic, and much more which not only engages the learner senses but makes learning interesting and captivating always. The Converse is true and often makes learners to be demotivated and dissatisfied with the LMS in use.

2.8 MOODLE LMS evaluation features and student's satisfaction

There are assorted inbuilt indicators or features in MOODLE LMS used to evaluating learners. Some are subjective while others are very specific. Examples of such indicators include: hits, views, test, assignments, quizzes, workspaces, and questionnaires. Deepak (2017) observed feedback, group fora, tests and assignments, in MOODLE LMS as used to evaluate student's achievement in Finland, Kajaani University of Applied Science in a particular course unit of study. Almost similar

activities are found in physical classes where traditional paper and pen dominate assessment sessions.

Barge and Londhe (2014), found out that approximately 80% of students were happy with MOODLE short tests while 65 percent indicated they enjoyed multiple choice related questions. Jawad (2014), also established both teachers and students were satisfied with MOODLE evaluation tools at Iraq universities. Yassine, Kardy and Sacilia (2016) asserts MOODLE LMS lack of integrated learning assessment tools that can evaluate educational goals and envisage a learner's academic success against a particular goal. This is a challenge inbuilt within the system but using other indicators such as hits, views, quizzes, forums, discussion marks can predict the scores students likely to get in future.

Kaupp, Frank, and Watts (2013), reported that MOODLE has an inbuilt weakness in grading learning outcomes and the process is cumbersome causing delays in releasing grades to learners hence lowering student satisfaction. Evans (2020) established student perception on MOODLE assessment function as simple to use but not flexible. This means that process and procedure is straightforward for example drag and drop activities, clicking the right choices, ranking the alternatives, expounding a concept, discussing an idea among others but sometimes when student has chosen an answer it’s difficult to edit or when a student want extra minutes to finish writing responses the system declines and submits incomplete responses. This may cause frustration as learners feels they could have performed better in overall scores. These can be as a result of poor configuration of MOODLE applications software, inferior learning device or students related challenge factors. The panacea for above challenge is state

of art elearning infrastructure, frequent training of all users on evaluation features and positive attitudes toward elearning education.

Peiping (2016) reiterate that MOODLE interactive evaluation features have the following advantages: provide a variety of assessment strategies, make evaluation more impartial, practical, encourages self and peer evaluation, create interest and passion as they acquire skills of peer coaching and finally enables learners to view their grades and sometimes average scores of the classmates. This aspect is very encouraging because it provides element of students' progress. Peer evaluation on other hand is more beneficial and educative as more information is created because of wider lenses on a particular element by a number of students rather than a single view from the course unit instructor. MOODLE therefore encourages collaborative learning which is an important element in education of 23rd century.

Alvarez and Villamañe (2022) noted there are two types of evaluation customized at final assessment and continuous assessment. Continuous assessment activities encompass theoretical works, assignments reports, laboratory work, and projection work. The study established it was very difficult for tutors to update student's grade as because of long and bewildering procedure. Aged instructors require much support from elearning administrators compared to young and energetic instructors who are versatile with ICT and elearning skills. Therefore, there must be a closer working relationship between instructors and elearning administrators to ensure success in MOODLE assessment activities which improves overall satisfaction with the online learners. This was confirmed by studies by Febliza, Afdal, Copriady, and Futra (2021) which established that MOODLE quiz features in the learning management system

usually produce valid, consistent, and hands-on criteria for evaluating communication skills course units.

Niragudi (2021) studies demonstrated students pursuing a bachelor of arts degree and demonstrated that positive attitude toward MOODLE online examination. The study recorded following factors which enhances success in online assessment activities: being a male student, residency in urban center, higher academic qualification of parents and student enrolled in computer science and related programmes. These key factors revolved around confidence in using and interacting with digital gadgets where males are known to be swift in manipulating digital devices. Secondly in urban areas, ICT infrastructural facilities are common such as internet, competition from different internet service providers and network availability and coverage which is limited in rural areas. Students whose parents have post-graduate degrees and reside in urban areas are likely to buy computers, laptops, smartphones, iPad, and other ICT gadgets for their children making them socialize with ICT early in life hence cultivating a positive attitude towards using ICT in learning compared to illiterate parents living in rural areas where electricity and network coverage is limited. In such areas government should deliberately increase electricity and internet connectivity to minimize eLearning blackout.

Although online assessment testing is more advanced in European countries, Africa is still trailing in assessment-related activities online. This was confirmed by Sodoké, Raîche, Nkambou, and Riopel (2007), who observed that the majority of adopted virtual environment and online examination is almost new phenomena in Africa. Maina Oboko and Waiganjo (2017) on the other hand observed that MOODLE LMS

does not support individual assignments but only collaborative activities in higher institutions in Kenya. Online testing and assessment in Kenya is a new phenomenon that is slowly taking route in almost all the higher institutions after the outbreak of the Coronavirus pandemic in March 2020 where physical learning was suspended. According to Fred (2020), Prof Kiama revealed that the University of Nairobi (UoN) senate approved the procedures and guidelines for online examination on 8th May 2020. Since UoN is the leading university in Kenya (webometric,2020), this indicates the institution has set the pace, and other universities in Kenya should emulate and implement online assessments.

2.9 Summary of literature review

Studies by Lopes (2017), Singh (2015), and Davis, Carman, and Wagner (2009) confirmed that MOODLE LMS is among the popular LMS used in delivering online learning. Baile (2013), on the other hand, learners decried MOODLE LMS is terrible and difficult to operate. This finding clearly gives the learners' perception of using MOODLE LMS.

On the ease of access of MOODLE feature, Keržič et al. (2019), confirmed that learners enjoy to use MOODLE LMS therefore higher satisfaction. Pektaş and Demirkan (2014), established approximately 88% of students concurred MOODLE classes can be accessed without difficulty, however Carvalho et al. (2011) observed that learners experienced log in difficulties. Mkulama and Akakandelwa (2017) observed eLearning in Africa is at the infancy stage. This is true in Kenya's situation since not every part of the country has internet connectivity.

On MOODLE LMS interactivity feature, Anderson (2016), highlights MOODLE tools that enhance interactivity while at the same time making learners to focus and concentrate on the content being taught. Marwa (2016) found about 74% eLearning learners concurred MOODLE LMS encourages interactive online sessions if well customized. This was also supported by Okenese (2017), who noted 78 percent of students felt LMS improved lecturer-student interactions and eResources. Studies by Ally (2016) and Odhiambo and Acosta (2009) found LMS used in Tanzania and Kenya respectively does not support interactivity. This might be due to MOODLE design and architecture.

Ghoyal and Purohit (2011), found that postgraduate students were contented with MOODLE tools used in communication among the targeted users. Hölbl and Welzer (2015), found communication features not fully utilized by MOODLE users.

Raîche, Nkambou, and Riopel (2007), observed that the majority of virtual environments and online examination is a new phenomenon in Africa and therefore adoption and efficiency will be gradual. Maina, Oboko, and Waiganjo (2017) on the other hand observed that MOODLE LMS does not support individual assignments but only collaborative activities in higher institutions in Kenya. Studies by Akakandelwa & Mkulama (2017) acknowledged that MOODLE LMS has its own share of positive and negative issues and students reiterated that the platform is problematic and difficult to use, especially in relaying information to instructors. Poor architecture of communication tools, limited training of users, and also technophobia-related issues curtail smooth flow of information among stakeholders in learning discourse leading to low MOODLE online satisfaction among the students.

The above studies seem not conclusive in focusing on all the MOODLE features and how learners perceive them, especially the undergraduate enrolled for university common units, therefore, the current study wants to interrogate learners satisfaction with MOODLE LMS features used in teaching common units in higher institution of learning in Kenya.

2.10 Theoretical framework

The current study is entrenched in constructivism's philosophy as advanced by Jean Piaget (1960) and Levy Vygotsky (1978). The proponents of constructivism theories, potent that new knowledge is processed and created by individuals as a result of personal experiences. It is through social interaction, negotiation, and sharing information including experiences that creates knowledge among the learners. Burns, Menchaka & Dimock (2002) identify the following principles according to constructivist philosophy:

a) **Learners' knowledge:** Learners bring exclusive previous facts, understanding, and opinions to the education expedition. As learners interact with eResources, among themselves and with their instructors through MOODLE communication and interactive features, they bring to class some experiences on which they build from known to unknown. This means they have some information on how to access online classes offered through MOODLE system.

b) **Knowledge construction:** Information is created exclusively, in numerous ways, and circumstances. Through MOODLE communication features and interactive

applications, students can access a lot of eResources and thereby construct their own knowledge.

c) **Active learning:** Knowledge creation is psychomotor activity and requires thought engagement. Through the MOODLE interactive, feedback, communication, and evaluation features, learners become engaged in various learning activities rather than being passive recipients of knowledge. They can listen, replay a recorded clip, carry out an assignment, quiz, discuss, chatting among other activities that engage them.

d) **Learning process:** learning is a mental and physical process of accepting new ideas or ways of doing things. As learners use different features of MOODLE, they can accommodate new information by constructing new mental pictures and concepts.

e) **Social interaction:** Enables individuals to dissect issues from different points of view and finally create a common meaning or understanding. Learners interact among themselves, interact with instructors and eResources using MOODLE communication features where they discuss new information and ideas and share meaning.

f) **Learners' mind:** Learning is mental activity and is regulated by the learner. As learners interact through MOODLE features, he /she constructs, create meaning, accommodate, and assimilate new information in the mind. Therefore, I can conclude learning is an activity of the mind that requires enablers which are the MOODLE features.

The current dispensation of constructivism advocates' for heutagogy that make learners take control of their learning activity and apply a lot of connectivism in the

course of learning and manipulating objects. Objects in this case is MOODLE LMS features and eResources utilized in learning a course unit such as university common units. Lockey, Conaghan, Bland and Astin (2020), expound that learner led approach encourages self-directed coaching in handling their learning activities. This means that partnership and technology used in learning unpack great potential in learners and inspires them to create and share knowledge.

According to McLeod (2023), Social constructivism philosophy holds that new information is generated via social interface and collaborations among learners while cognitive constructivists posit that that new information is created via mental evolutions. The radical constructivist on the other hand believe knowledge is established via subjective practices and interaction with the world. Miller (2019) also confirms effective instruction encompasses engaging student with hands-on experiences and applications rather than feeding learners with knowledge.

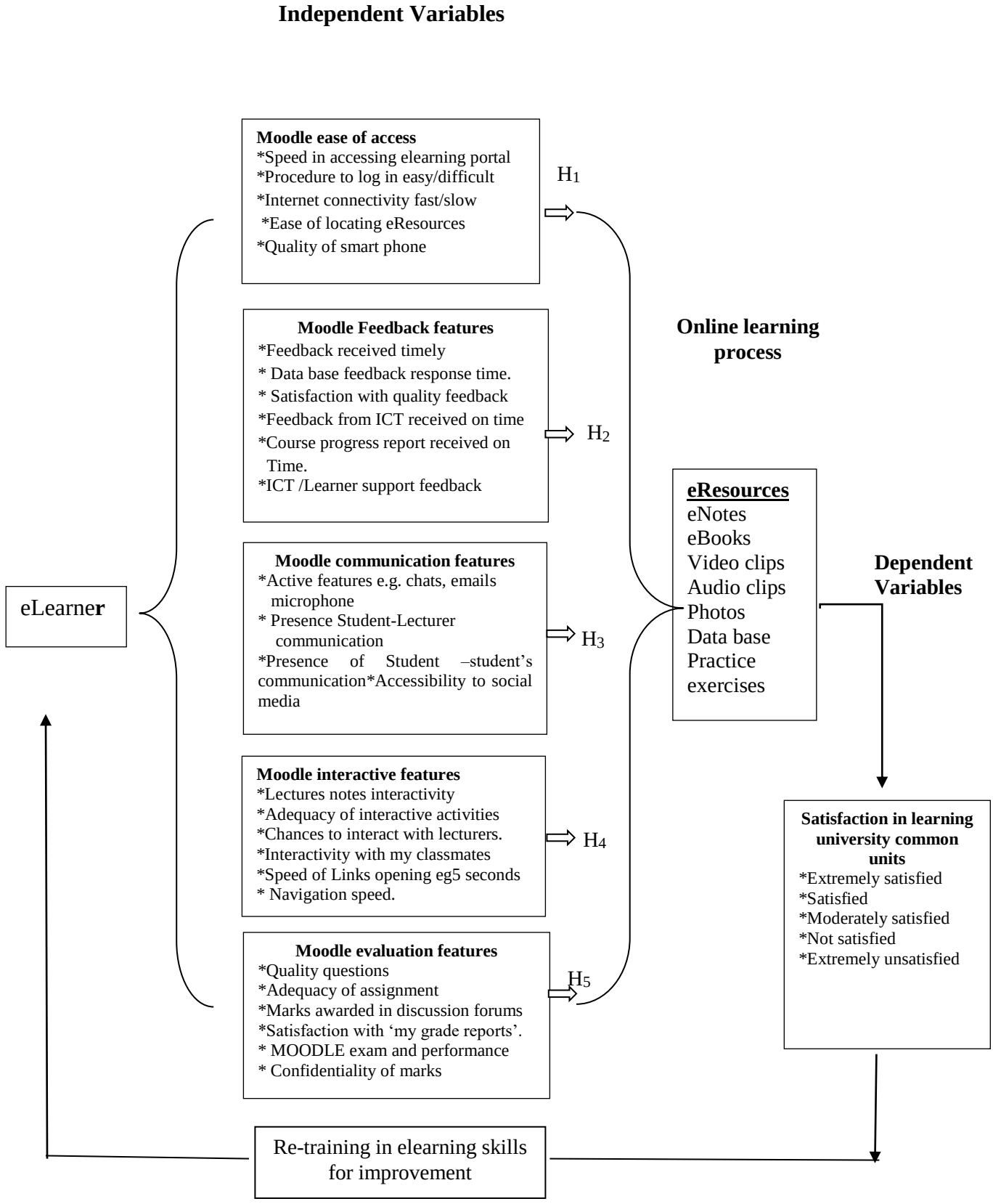
According to McLeod (2019), Vygotsky believed that the environment in which children grew influences their thought processes. Acquiring new information and ideas is a result of give and take which should be in line with community values. This means when learners interact online through MOODLE LMS courtesy of its features, they become socialized, engage in negotiation and create meaning of new knowledge. Although Piaget believed that creating objects manually is an important ingredient for normal mental growth, his critics disagreed and assert that physically challenged persons whose hands and legs are impaired, therefore cannot manipulate objects, have the potential of attaining normal mental growth, therefore there are other factors than mere manipulation of the object that plays a role in cognitive development. McLeod

(2019), on the other hand, argued it is unfair to accept Piaget's theory because he used his own children and therefore biased sample from the higher social economic class, and therefore his cognitive theory can only become applicable to rich children. His theory was also questioned because he did not explain how he selected his sample and therefore biased sample can lead to biased findings. Another school of thought observed, that the cognitive theory developed by Piaget cannot be generalized to include adults since the experiment was carried out in children.

2.11 Conceptual framework

The gaps recognized in the literature is represented inform of conceptual framework. These comprises of MOODLE features variables such as ease of access, feedback, communication, interactive and evaluation features with their indicators. Level of student’s satisfaction with MOODLE features is the dependent variable.

Figure 2:1 Conceptual framework



The conceptual framework highlights MOODLE LMS ease of access as the first independent variable whose indicators include: speed of accessing the elearning MOODLE portal, easiness in identifying features, ease of procedure for login, speed of opening up the learning resources, quality of smartphone and internet availability. These factors may influence students' satisfaction with learning university common units.

MOODLE LMS feedback tools features is also an independent variable whose indicators include: timely responses, database response, performance results, and quality feedback may have an impact on satisfaction level in learning university common units. MOODLE LMS communication tools features is another independent variable whose indicators comprises of email, blogs, chats, and forum discussion. Learners use these tools in the course of instruction and this ultimately determines the level of their satisfaction. MOODLE LMS interactivity features on the other hand whose indicators such as interactive activities, interoperability, and variety of resources and links created to access eResources also influence student's satisfaction levels when using MOODLE platform. Interactivity as one of the principles of teaching makes learning more interesting as it engages the learner throughout the learning session. The lack of interactive activities makes learning boring and the majority of learners may not be enthusiastic about the next learning session hence they become demotivated and dissatisfied if interoperability is limited concerning learning objects. MOODLE LMS evaluation tools features are another independent variable whose indicators encompass quizzes, assignments, hits, views, and my reports among others also has a bearing on students' satisfaction levels with MOODLE LMS.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This Chapter covers target population, sample size and sampling technique, research instruments, validity of research instruments, reliability of research instruments, data collection procedure, data analysis technique and finally ethical considerations.

3.2 Research Design

The current study adopted mixed method research design. Creswell (2012), asserts that this research design comprises of approaches which involves collecting, evaluating and assimilating qualitative and quantitative data in a study to address a research phenomenon.

Justification of mixed method approach

According to George (2021) mixed methods gives a researcher a more comprehensive representation than a single quantitative or qualitative study, as it adapts benefits of both methods. Shorten and Smith (2017) observes that mixed method design integrates different techniques of viewing a phenomenon via assorted research lenses. It takes care of generalizability, contextualization and credibility of results due to triangulation of qualitative and quantitative approaches. Kothari (2004) observes that qualitative approach of data analysis focusses on subjective assessment of sentiments, attitudes, and behaviour. This approach was preferred because researcher anticipated to gather both sets of data from participants in line with the current study.

The student's questionnaire and lecturer's questionnaire were dominated by quantitative data replies from closed ended questions and few open-ended questions for generating qualitative data. Focused group discussions generated qualitative data that was organized into subthemes. Quantitative data was also gotten from focused group discussion via polls and probing questions. Interviews for eLearning administrators, deans of faculties and directors of quality assurance responses contained both qualitative and quantitative data on student's satisfaction.

3.3 Target Population

The current study targeted a population of 216,405 undergraduate students (KNBS,2020 p.262), 236 lecturers teaching common units, one hundred and two (102) eLearning administrators, seventeen (17) directors of quality assurance and thirty-four (34) deans of faculties/or schools.

3.4 Sample size and Sampling Techniques

Degu and Yigzaw (2006), describes a sample is a representative of all items or entities under study. The researcher intends to pick samples from public universities delivering eLearning through MODDLE platform. According to MOODLE.org, Kenya has 533 sites offering eLearning using MOODLE LMS. Commission for University Education (CUE) report for 2017/2018 provides a comprehensive list of both private and public universities. The reports highlight fourty-one (41) public universities in Kenya. Scanning through websites of public universities and published information on journals, the researcher found 17 universities are using MOODLE to conduct online learning of some courses including university common units. This implies 17out of 41

(41.46%) public universities had adopted MOODLE LMS for offering online education.

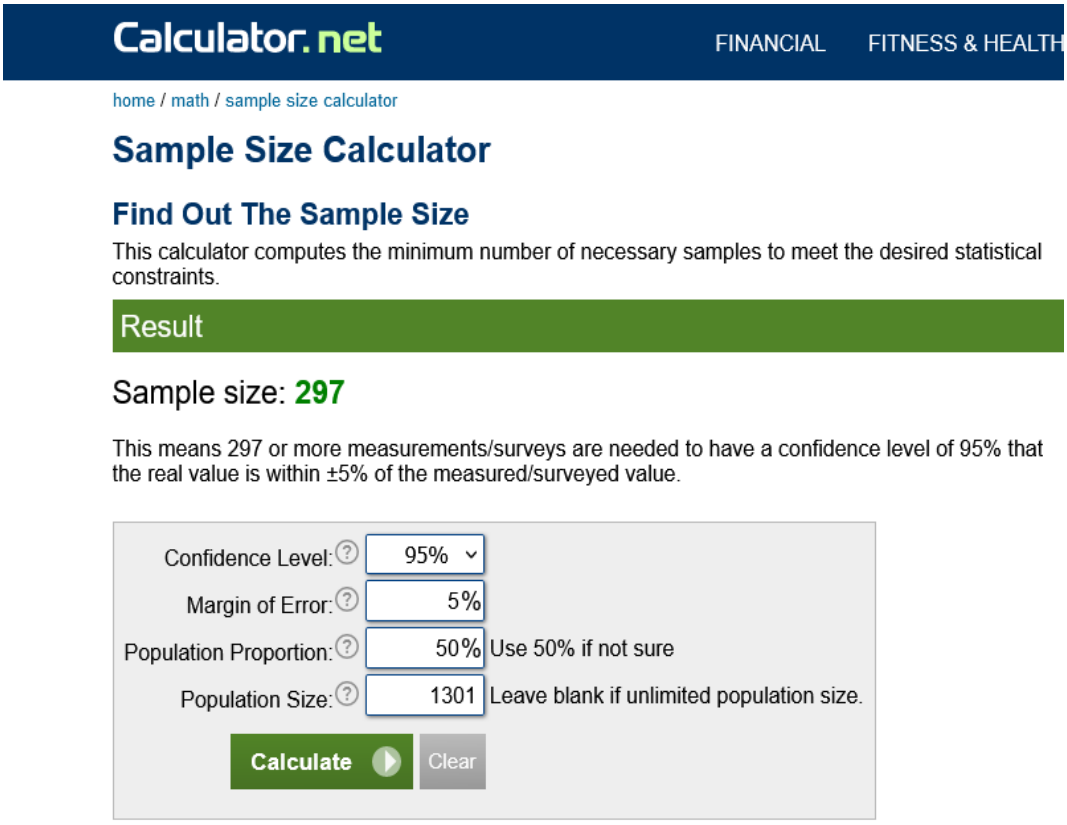
University of Nairobi adopted Claroline LMS which was confirmed by the then Director of ICT. Kenyatta University on the other hand switched from MOODLE LMS to Blackboard LMS in 2012 (Benchmarking report, 2016). Both of these LMS's which are somewhat different from MOODLE learning management system in terms of features and design. This was echoed by Tarus, Gichoya and Muumbo (2015) who noted higher institutions in Kenya such as University of Nairobi is using Claroline LMS while Kenyatta University are offers eLearning programmes through Blackboard LMS. Other public universities offering online learning through MOODLE learning management systems are captured in appendix XIV according to Moodlesites.org (2023).

According to Sharma (2019), Blackboard is more advanced and has a variety of student's assessment, communication and evaluation features for example it supports video conferencing, live chart which is absent in MOODLE. Elearning industry (2020) also confirms that Claroline possess more advance interactive and communication features compared to MOODLE. This means both Blackboard and Claroline may exaggerate data for interactive, communication and evaluation features under the current study and therefore excluded from the study.

Due to similarities among the public universities in Kenya such: years since establishment, students capacity , degree programmes offered and number of university staff , out of seventeen (17) public universities who have adopted MOODLE in teaching and learning university common units, the researcher selected

at random three newly created universities less than twelve years since establishment and three oldest universities more than twenty years since their existence whose respondents sample was selected randomly (CUE Report ,2017/18).The researcher used *https://www.calculator.net/sample-size-calculator* available online to calculate sample size in each subpopulation at 95% confidence level and margin error of 5% among second year students in the six selected universities. For example, at Dedan Kimathi University of Technology (DeKUT), the researcher keyed in a population of 1301 in the online automated calculator below. By clicking "calculate" a sample size of 297 sample size was generated automatically.

Figure 3.1 Screen shot of sample size calculator



www.calcutator.net ,n.d.

Since a population of 1301, yielded a sample of 297 was generated. The same procedure was repeated in other remaining five (5) universities. Lecturers teaching UCU, eLearning administrator, directors of quality assurance and dean of faculties housing UCUs' were involved in data collection activity.

Table 3.1 Sampling Frame

PARTICIPANTS	Newly* established Universities			Old** established universities			Sample
	A	B	C	D	E	F	
SECOND YEAR STUDENTS POPULATION	1301	1062	1450	4729	2630	3140	
Students sample size	297	283	304	356	336	343	**1919**
Focused group discussion	10	10	10	10	10	10	**60**
Undergraduate Common Units Lecturers	10	8	12	16	15	18	**84**
eLearning Administrators	2	2	2	3	3	3	**15**
Deans of Faculty / Schools	2	2	2	2	2	2	**12**
Director Quality Assurance	1	1	1	1	1	1	**6**
	Total number of participants						**2096**

***** Newly established universities (less than 20 years since inception

** Old universities (More than 20 years since inception)

Table above shows distribution of sample size in six public universities (three newly established university and three old university) comprising of students, lecturers teaching common units, elearning administrators, deans of faculties housing the common units and directors of quality assurance. Mugenda and Mugenda (2013) points out that if a population less than ten thousand, a sample between 10 to 30% is adequate for the study. Two deans of faculties were picked in each university because UCU is hosted on average two or three faculties and therefore they were adequate to give information concerning student's satisfaction with MOODLE features. For directors of quality assurance, in almost all institutions there is one established post and therefore all the six were picked purposively. For eLearning administrators each institution had an average of between six to ten ICT officers supporting UCU, therefore 2 or 3 participants met threshold of 30% sample size.

3.5 Research Instruments

The following comprised of data gathering tools: student's questionnaires, focused group discussion, questionnaire for lecturers and interviews for eLearning administrators, the deans and directors of quality assurance.

3.5.1 Questionnaire

According to Kothari (2004), questionnaires are preferred because participant have enough time to provide clear responses in absence of researcher who might amplify biasness. The researcher chose questionnaires to administered to students and lectures who might have ample time to respond to numerous questions as they interact directly with MOODLE LMS as opposed to other users such university administrators whose schedule are tight to read, understand and respond by filling in answers. The study therefore had students and lecturer's questionnaire.

3.5.1.1 Students questionnaire on moodle features

The student's questionnaire was divided in Part I and Part II. Part I focused on bio-data such as gender, age bracket and degree registered by the participant. Part II dealt with MOODLE LMS features divided into 5 sections: Section A -ease of access, Section B-Feedback features, Section C-communication features, Section D-interactives and Section E- Evaluation features. All the section had forty-two (42) items organized into open and closed ended questions. Close ended question had with 5-point Likert scale.

3.5.1.2 Lecturers questionnaire on moodle features.

Was divided in two main parts. **Part I** dealt with bio data: Age bracket and gender while **Part II** focused on five MOODLE LMS Features. The questionnaire was dominated by closed ended questions with 5- point Likert scale for mearing the level of students satification with MOODLE features.

3.5.2 Focused group discussion

Focused group discussion (FGD) is technique used by social scientist researchers to collect qualitative information. This method is convenient, generates more in-depth cogency information (Kothari ,2004; Freitas, Oliveira, Jenkins & Popjoy 1998). McLeod (2014) also observed that this method of data collection allows the group members to respond with detailed information which assists the researcher to capture information required and, in some cases, ask probing questions to get more facts.

Krueger (2002) highlighted that FGD possess the following characteristics: 6-8 partipants, requires conducive sitting environment, requires skillful moderator, the analysis and reporting should be systematic and uses verifiable process. According to him physical FGD requires early preparation, recoding the session, taking notes, smooth and snappy introduction, ability to control participant's reaction and application of the three-step conclusion which involves: summary confirmation, review purpose and ask if anything has been omitted and final remarks and finally thanking the participants.

The researcher organized focused discussion group each comprising of six to ten members so as to capture in-depth information about MOODLE features. According to Nyumba, Wilson, Derrick and Mukherjee (2018), participants can range between three to about twenty-one per group. Krueger (2002) noted number 5 to 10 members can form a group but 6-8 is ideal. Prince and Davies (2001) observed that participants for focused group methodology should comprise 6-12 individuals. The researcher arranged discussion groups comprising of 6 to 10 participants i.e. five (5) male students and five female students in each of the six sites. The (ten)10 students were selected purposively keeping in mind homogeneity of the participant. In cases where of 2 to 4 students fail to turn up, 6 students were adequate for the exercise.

The researcher requested students list from eLearning administrator indicating their gender, school / colleges / faculty they belong. The researcher then selected the partipants randomly. (See appendix VIII –page 63 and 64). For example, at Kibabii university, academic programmes are organized into five schools/faculties, a male and a female student were picked at random in each of the five divisions. For institution with more than five schools/faculties /colleges, a male and a female student were picked from each division at random and finally the researcher then picked five (5) male and five (5) female students from the pool. Once the participants were selected, consent form was given out for them to fill. Research assistant also called them and also sent a short message service (sms) a day before the before the session.

Focused group discussion had five thematic areas with total 18 items as follows:

Subtheme A: Moodle ease of access features

- Collected information related to general experience between online and physical classes of common units, thoughts on MOODLE access, views on satisfaction on accessing online learning.

Subtheme B: Moodle communication features

- Focused on favorite communication feature in MOODLE LMS, satisfaction with communication features and improvement needed.

Subtheme C: MOODLE interactive features

- Focused on thoughts MOODLE interactive activities, adequacy, satification and improvement.

Subtheme D: Moodle evaluation features

- Focused on opinions between physical and online assessment, experiences on online examination, pros and cons of online assessment and satisfaction on online assessment.

Sub Theme E: Gender MOODLE Features Satisfaction

- Collected views of male students on MOODLE features satisfaction, opinion of female students on MOODLE features satisfaction

3.5.3. Interviews

According to Creswell (2014), interviews enables researcher to collect detailed views from participants and has a higher responsive rate compared to other methods. The researcher preferred this method because a lot of information can be captured about the study on short period of time due to busy nature of university administrators such as deans and director of quality assurance who might postpone answering questionnaire that requires, reading, understanding and writing responses. Interviewees

do not need time for writing and filling in answers, they are only required to responds orally.

According to Washington State University (n.d.), oral responses from interviews contains ample information than written answers. Researcher was able to capture facial expression and other nonverbal cues of respondent. The researcher therefore adopted structured interview using a set of predetermined questions (Kothari, 2004, pp.98) for easy data capture and analysis. McLeod (2014) noted that interviews schedules have a uniform format meaning similar questions are asked to each interviewee in the same order. This implies it is easy to quantify and analyse the responses as opposed to unstructured interview.

The study had the following interview guide questions for different participants: The interview guide questions for eLearning administrators, directors of quality assurance and dean of faculty.

3.5.3.1 Interview guide for elearning administrators

Comprised of nine (9) structured questions focusing on variables of MOODLE LMS features on student's satisfaction.

3.5.3.2 Interview guide for directors of quality assurance

The guide had seven (7) structured questions focusing on opinion related to student's complaints between face to face versus eLearning, views on satisfaction between online & physical classes, views on extents of students satification with MOODLE features.

Rating of student's satisfaction with online evaluation, views on how to increase student's satisfaction and finally future recommendation on teaching university common units

3.5.3.3 Interview guide for deans of faculties

The guide had 7 items (structured questions) focusing on learner's preference on learning mode of university common units, student's satisfaction with accessing elearning portal, views on students satification with online communication, evaluation and interactive features. The guide also sought views of gender preference satification and recommendation for teaching common units online in future.

3.6 The validity of research instruments

The validity of the student's questionnaire on MOODLE LMS features influencing learner's satisfaction was based on content validation. According to Clause (2018), this refers to how precisely an instrument captures the intended construct. The researcher determined the validity of the following instruments: student's questionnaire, lecturer questionnaire, focused group discussion guide question, interview guide questions for: elearning administrators, directors of quality assurance and deans of faculty before embarking on data collection activity:

3.6.1: Validity of student's questionnaire on MOODLE LMS satisfaction

For the face validity my supervisors crosschecked if items in questionnaire were able to capture the construct intended. There after the researcher conducted pilot study to 26 questionnaires and did a retest again after two weeks. The Pearson's correlation values of each of the 52 questionnaires was calculated using SPSS. Pearson correlation table at P=0.05 was used to obtain critical value with degree of freedom of (DF-2) 50

which was 0.2732. SPPS generated a table showing obtained Pearson correlation values that were cross checked using the critical value. For example, question one, the obtained correlation value was 0.482 and a critical value of 0.2732. This means it was highly significant implying a valid question. For subsequent questions, the generated Pearson's correlation values were higher compared with critical value confirming they were valid. Only item 27 and 46 were not valid by posting correlation values 0.220 and 0.231 respectively. Slight editing was done to make questions clearer before commencing on data collection exercise.

3.6.2 Validity of lecturer's questionnaire.

The questionnaire was initially subjected to face validity by experts and my supervisors then piloted. A set of five (5) lecturer's questionnaires was piloted in two institutions; University A representing newly established institution and University representing old university. The filled questionnaire was coded then keyed into social research survey tool then uploaded to SPSS to for further analysis. The data was subjected to SPPS Pearson correlation statistics for nine items captured. The values obtained were compared against critical value obtained from Pearson correlation table at P=0.05, DF of 8 which was 0.632. All the generated Pearson's correlation values were higher than the critical value.

3.6.3 Validity of focused group discussion guide questions.

Researcher subjected question guide to content validity index (CVI) to determine the validity. According to Yusoff (2019), the acceptable CVI should be between 0.78 and 0.99. The researcher engaged two experts to counter checks the construct of the questions in reference to the five sub- themes and thereafter content validity index (CVI) was calculated. All the 18 items had validity content index between ranging from 0.62 to 0.99. Thereafter the researcher calculated content validity ratio and obtained a value of 0.81 which was considered to be reasonable high. Slight modification was done on items with low CVI before the tool was administered.

3.6.4 Validity of eLearning administrators interview guide questions.

The eLearning administrators' guide questions was also subjected to content validity index. The average value for index was 0.89 was obtained, indicating high validity. Therefore, the instrument was ready for data collection.

3.6.5 Validity of directors of quality assurance interview guide questions.

The directors of quality assurance interview guide questions were also subjected to content validity index test and content validity ratio was 0.76. Slight modification was done before the tool was used.

3.6.6 Validity of deans of faculty interview guide questions.

Content validation of interview guide question for deans of faculty was done and a higher index of 0.98 was obtained. Therefore, no change was made to items and therefore the instrument was ready to be applied in data collection exercise.

3.7 Reliability of Research Instruments

Price, Rajiv and Chiang (2015) define reliability as the consistency of a measure. The researcher intends to run test-retest on data gathering tools to determine their internal consistency. The internal consistent or reliability was measured by Cronbach alpha. Stephanie (2022), highlights that Cronbach's alpha, was coined in 1951 and it evaluates trustworthiness or internal consistency of a data collection tool.

The Cronbach's alpha reveals how the items are associated a set of test items. According to Perneger, Courvoisier and Hudelson, a sample size of about 20 is adequate to determine its reliability.

3.7.1 Reliability of student's questionnaire

The researcher piloted 26 questionnaires, conduct focused group discussion comprising of five female and five male students in one of the institutions. All the ambiguous and unclear statements were revised and post-test was done after two weeks. The reliability was calculated using cron batch alpha correlation coefficient by via SPSS. The raw data obtained was coded and keyed into excel sheet, coded and exported to SPSS software for analysis. According to SPSS (Feb 2015), 0.9 value indicate higher reliability while values closer to 0.1 indicates the instrument has very low reliability. This is also echoed by Stephanie (2022), acceptable value for alpha α should range between highest values of 0.9 and lower value of 0.5 .

Table 3.2 Students questionnaire reliability test

Reliability Statistics Test

Cronbach's Alpha	Cronbach's Alpha Standardized Items	Number of Items
0.918	0.922	42

Table 3.2 posted a Cronbach alpha of 0.922 which translates to reliability index of 92.2% for the 42 items displayed in questionnaire. This implies internal consistency of the questionnaire was high enough and ready for data collection activity.

3.7.2 Reliability of lecturer's questionnaire

The lecturer's questionnaire with 9 items was subjected Cronbach alpha using SPPS to determine reliability of the instrument. Stephanie (2022), observed that alpha value of 0.9 is excellent while lower than $0.5 > \alpha$ unacceptable.

The results is as follows.

Table 3.3 Lecturer's questionnaire reliability test

Reliability Statistics test

Cronbach's α	Cronbach's α Based on Standardized Items	Number of Items
0.732	0.774	9

Table 3.3 posted a Cronbach alpha of 0.774 which translates to reliability index of 77.4% for the lecturer's questionnaire implying that internal consistency of 9 items was high and ready for data collection activity.

3.7. 3 Reliability of focused group discussion guide questions

Table 3.4 Focussed group question guide reliability test

Reliability Statistics Test

Cronbach's Alpha	Cronbach's α Based on Standardized Items	Number of Items
0.847	0.806	18

Table 3.4 posted a Cronbach alpha of 0.806 which translates to reliability index of 80.6 % for the 18 items in the questionnaire. Stephanie (2022), observed that alpha value of 0.9 is excellent while lower than 0.5 > α unacceptable indicating that the alpha value is high enough and ready for data collection activity.

3.7. 3 Reliability of eLearning administrators interview questions guide

The eLearning administrators interview guide question was subjected to Cronbach alpha tests to determine its reliability. Findings is presented in Table 3.5

3.5 Elearning administrators interview question guide reliability test

Reliability Statistical Test

Cronbach's α	Cronbach's α Based on Standardized Items	Number of Items
0.693	0.719	9

Table 3.5 posted a Cronbach alpha of 0.719 which translates to reliability index of 71.9% for the 9 items in the questionnaire. Stephanie (2022), observed that alpha value of 0.9 is excellent while lower than 0.5 > α unacceptable. An alpha value of 0.719 is high enough. This indicate that the internal consistency of the questions was reasonably high and therefore ready for data collection exercise.

3.7.4 Reliability of Directors of quality assurance interview questions guide

The Directors of quality assurance interview questions guide underwent reliability test using Cronbach α test via SPSS. Stephanie (2022), observed that alpha value of 0.9 is excellent while lower than 0.5 > α unacceptable.

Table 3.6 Reliability test of Directors of quality assurance interview questions

Reliability Statistical Tests

Cronbach's α	Cronbach's α Based on Standardized Items	Number of Items
0.629	0.636	7

Table 3.6 posted a Cronbach alpha of 0.636 which translates to reliability index of 63.6% for the 7 items in the questionnaire indicating that the internal consistency of the questions was reasonable enough and ready for data collection activity.

3.7.5. Reliability of Deans of faculty interview questions guide

The reliability test using Cronbach α test was subjected to deans of faculty interview guide question via SPPS.

Stephanie (2022), observed that alpha value of 0.9 is excellent while lower than 0.5 > α unacceptable.

Table 3.7 Deans of faculty interview questions guide reliability test

Reliability Statistical Tests

Cronbach's α	Cronbach's α Based on Standardized Items	Number of Items
0.918	0.876	7

Table 3.3 posted a Cronbach alpha of 0.876 which translates to reliability index of 87.6% for the 7 items in the questionnaire indicating that the internal consistency of the questions was high enough and ready for data collection activity.

3.8 Data Collection Procedure

The researcher prepared questionnaires, interview guide questions and discussion themes early in advance thereafter sought for introductory letter from chairman of Educational Management, Policy and Curriculum Studies to enable National Commission of Science, Technology and Innovation (NACOSTI) to process permit for data collection exercise. The researcher also sought permission to Deputy Chancellors in charge of research divisions of different universities where data was collected. With approval letters, the researcher requested list of all student's names registered in the elearning portal from elearning section. The researcher used the list provided to identify respondents using random numbers in each of the subpopulation. The researcher approached the eLearning administrators who assisted in sending invites with background of information of research study to respondents through the announcement tool in the eLearning portal. The students were informed to check their mail and find details of research study, benefits, risks and their participation.

With the help of Chair of departments, the researcher was linked to class representative who assisted in distribution of questionnaires and were briefed on simple random sampling technique. For cohorts who were available during lecture sessions, the researcher was allowed to interact with students and give them consent form and thereafter a questionnaire using simple random sampling technique.

The researcher used students list provided by ICT /eLearning administrators to select at random five male and five female students from different faculties/schools to form focused group discussion in each of six universities. Participants were briefed on study to be carried out. They were also informed that the discussion session will last for 30 to 40 minutes. The researcher also provided the consent forms with elaborate information about benefits, risk, privacy, confidentiality. Participants who agreed to participate were given consent forms to fill. On material day scheduled for focused discussion session, the moderator introduced himself and the research assistant. The participants were also given a chance to introduce themselves by their first name, faculty /school they belong to. The moderator then gave brief background of the study, information required and informed them they were chosen because they have already done at least three university common units online. Thereafter the participants were given consent form to sign. The researcher highlighted ground rules of the session and also inform them, all their responses were valid whether positive or negative. The researcher also asked permission to record the session since assistant moderator was not able to write everything as they discussed. The assistant moderator was required to capture responses including quotes from participants. The moderator involved everyone including the introvert by asking them their opinion and also managing the extrovert by reminding them to restrict themselves to the topic/ question. At the end of session, the moderator invited the assistant moderator to ask questions that requires clarification and read the summary of captured information. Finally, the assistant asked if everything has been captured and thereafter the moderator sincerely thanked the participants before dismissing them.

3.9 Data Analysis Techniques

The study utilized mixed research methodologies in analyzing data in relation to students MOODLE features satisfaction. Studies by Cohen, Manion and Morrison (2007), stressed that researchers should to pay attentions verbal and nonverbal signals of the participant during interview in order to interpret correctly their responses. Cohen *etal*, (2007) posit that it is important to pinpoint common and distinctive themes for the purpose of information scrutiny and reporting.

Students and lecturer's questionnaire yielded quantitative data from closed ended questions and Likert ratings was subjected to descriptive statistical technique such measures of central tendency, ratios, percentages, proportion, ordinal regression by help of SPSS version 28 in analyzing the data. On the other hand, information captured from open ended questions will be organized into themes for easy comparison including the quotes.

For interviews several tables was created for comparing responses, including the notable quotes. The data was coded, examined for pattern or themes based on codes created across the interview's responses, outline and analyse themes and finally produced a report.

For the focused group discussion, transcribing was done using *Transcribe software*. According to Krueger (2002) transcribing involves listening the clip using quality play back equipment, identify moderator's statement, type unique comments word by word then producing a clear report using similar format in all the FGD sites for easy comparison and analysis. The clips were converted to text for data analysis.

McLeod (2019), on the other hand explicates that quantifiable data embraces the process of factually gathering and exploring data inform of numerals to predict,

describe or control variables under investigation. This utilizes inferential statistic used in data analysis. The raw quantitative data was generated and organized into table's prior entry into Statistical Package for Social Sciences (SPPS) for further statistical tests.

Table 3.3 Data analysis techniques

Hypothesis	Independent Variable	Indicators	Dependent Variable	Statistical analysis
$H0_1$	Ease of access MOODLE	Log- in time less than 10 seconds, procedure, locating eResources, Procedure to log in location of access, organization of eResources, access eResources anytime	Student satisfaction Level	Percentages Descriptive Ordinal regression Use of quotes and themes
$H0_2$	MOODLE feedback features	Feedback received within 48hrs Data base feedback response time. Satisfaction with quality feedback, Feedback from ICT received on time Course progress report received on time	Student satisfaction Level	Percentages Descriptive Ordinal regression Use of quotes and themes
$H0_3$	MOODLE communication features	Presence of lecturer-student communication, tools availability, Presence of student-student communication tools, presence of links to social media, ability to meet new classmates, Ability to participate in online discussions	Student satisfaction Level	Percentages Descriptive Ordinal regression Use of quotes and themes
$H0_4$	MOODLE interactivity features	How fast the interactive features able to open, Availability of varieties of interactive activities, Interactivity status of lecture notes, chances of participating and presence of poll quizzes	Student satisfaction Level	Descriptive Ordinal regression Use of quotes and themes
$H0_5$	MOODLE evaluation features	Quiz availability, gradebook, Presence of assignments, number of hits and views reports, Presence of workshop activities, Presence of quality of questions, adequacy of quizzes, Satisfaction with types of examination questions.	Student satisfaction level	Percentages Ordinal regression Use of quotes and themes

3.10 Ethical Considerations

Ethical consideration in study comprises of information such as informed consent privacy, anonymity, confidentiality, voluntariness, data protection, rapport and friendship, intrusiveness, researcher's potential effect to respondents and vice versa (Kothari, 2004; Mertler, 2016 and Sanjari, Fatemeh, Khoshnava, Mahnaz and Mohammad ,2014). The researchers disclose the possible harms and benefits surrounding the study to the participant. Participants were also guaranteed that the data to be gathered will not be shared to anyone but stored temporarily under secured password, analyzed and would finally be deleted. It is also imperative to ensure concealment of the respondents, in fact Mertler (2016) documented that researchers must assure the participants as to how their privacy and any personal particulars will be handled as part of the consent process.

The researcher informed respondents that they will be not required to disclose their personal details during telephone conversation which will be recorded. At the same time, the student's questionnaire would not bear name or any identification mark. For the focused group discussion, recording was done through audio mode. The clip was stored electronically using a secured password and was not shared with anyone. The recorded clip was then deleted after processing and transcribing of information. For the interview session the participant had an option to allow online or physical or telephone interview which was also be recorded. The clip was also not shared with anyone and participants were assured the information collected was purely for the current study and their names and any identifiable marks will not appear in any report.

There was the risk of COVID -19 infection especially for face to face interview and the researcher observed ministry of health guidelines strictly during data collection.

The researcher carried extra face masks and hand sanitizers for participants. During the physical interview session, there was no sharing of stationaries and the researcher also ensured one-meter rule social distancing. All the participants were briefed on the current study before being allowed to fill in consent form and they were informed that the study was purely for academic purpose and their participation was voluntary. They were also informed that they could choose not to participate including withdrawing from the study without giving reason. The researcher also informed them that no direct benefit or financial gain was attached for participating in the study.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTEPRETATION

4.1 Introduction

This chapter deals with data analysis, presentation and interpretation and interpretation of findings.

4.2 Return rates of respondents

The return rates of respondents for the current study is represented in table 4.1

Table 4.1 Return rates of the participants

Participant	Targeted Frequency	Actual Frequency	Return% (100%)
Students	1919	1349	70.30%
Deans of schools	12	8	66.67%
Dir. of quality assurance	6	3	50.00%
Lecturers	84	63	75.00%
Elearning administrators	15	7	58.33%
Focused group discussion	60	42	70.00%
Totals	**2096**	**1472**	

Figure 4.1 shows that the study targeted a total of 2096 participants and 1,472 responded. In the current study, 1919 year two students were picked through a comprehensive stratified sampling in all the six institutions. The researcher purposively picked 12 deans of faculties which comprised of 2 deans from each university because their division offer the university common units. For example,

communication skills, entrepreneurship, creative critical thinking, ethics and integrity course units fall under the faculty of arts while HIV /AIDS and drug abuse unit is offered by the faculty of medicine and health sciences, while introduction to computers is housed in school of science or ICT so the researcher opted to pick a maximum of two deans from each institution. Each university has one established post for a director of quality assurance and therefore a total of six directors were picked purposively in each of the six institutions. The researcher also selected 15 elearning administrators handling or supporting elearning of common units. A set of ten students from each of the ten institution were randomly selected through stratified sampling technique.

The return rates were as follows: 70.30% for second-year students, 66.67 % for the deans of schools, 50% for the directors of quality assurance, 75% of the lecturers involved in teaching common units, 58.33% of elearning administrators involved in day to day learning of common units and finally 70% of students scheduled for focused group discussion turned up for the exercise. Since responses from participants across the board met the required threshold, the researcher embarked on data analysis. According to qualtrics.com, 2022 acceptable response rate of the questionnaire should be above 50%. Nulty (2008) on the other hand noted the threshold for online survey response is 47% for a class of above 750 students while paper-based should be 65%. On account of the above statements, the return rate of participants ranged from 50 % to 70% met the minimum threshold, therefore the researcher proceeded to the next phase of data analysis.

4.3 Demographic information about participants.

The study generated data based on respondents' demographics, for example, student degree courses of study, students' gender, faculty/school of the dean, faculty/school of the lecturer, director of quality assurance university, eLearning administrator and type of university to inform and guide in the interpretation of study findings and hypothesis testing. Demographic data on the respondents were analyzed separately in the following categories: student demographic data, lecturer's demographic data, deans of faculty demographic, eLearning administrator demographic data, and type of university demographic data all these were presented separately for interpretation and discussion.

4.3.1 Demographic information on student’s degree course of study.

The degree course registered by the student affected how a student perceived online eLearning including the skills used during the online sessions using MOODLE LMS. Second-year students were chosen because had done at least three common units via MOODLE LMS and therefore they shared valuable information for the study. However, students registered for degree courses such as computer science, information technology, engineering & technology may have more advantage in online skills because their day-to-day course units involve the use and application of ICT skills compared to their colleagues registered for other degree programs such as education science, education arts, early childhood, chemistry, arts, and medicine who don't rely much on ICT in learning their respective course units.

Table 4.2 Demographic distribution of student's gender and degree cluster

	DEGREE PROGRAMME CLUSTER	MALE	FEMALE
1.	Education Science and Arts	201	127
2.	ICT,Mass Communication, Computer Science & Journalism	93	73
3.	Science related courses	42	30
4.	Medicine related courses	70	49
5.	Chemistry related courses	33	17
6.	Business related courses	101	184
7.	Arts related courses	66	77
8.	Engineering related courses	47	20
9.	Agricultural related courses	82	34
10.	Clothing and Textile	0	3
	Total	**735**	**614**
	Proportion in %	**54.48%**	**45.51%**

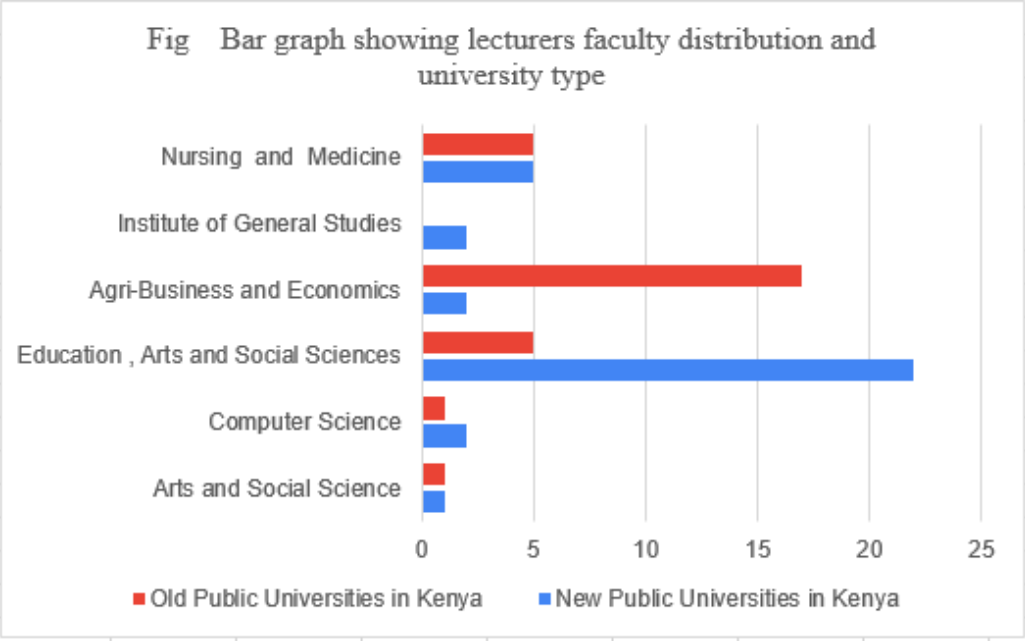
The above table shows the distribution of second-year students by gender across ten clustered degree programmes they are currently registered for such as education, ICT-related degrees, health sciences related degrees, chemistry related degree courses, business-related courses , arts-related courses, engineering-related courses, agricultural-related courses and clothing and textile.

4.3.2 Demographic information on lecturer's faculty /school and type of university.

Lecturers were key informants of students' perception on satisfaction with MOODLE features because they were involved in teaching common units , therefore they were in a better position to expound on students' perception in interacting with MOODLE features. However, some characteristics such as university faculty /schools may have influence on the perception of students' satisfaction levels on MOODLE features. For example, lecturers teaching computer science expect their students to have mastered

ICT skills compared to their colleagues pursuing education or medical degree programs**.** Type of university also had influence on MOODLE features available for example it was expected that old public universities had robust ICT infrastructure for supporting online learning activities which had improved over two to three decades compared to universities that were established less than 10 years ago. The proportion of lecturers from newly established universities was 53.97% while those from older universities were 46.03%.

Figure 4.3 Lecturer faculty distribution and university type.



The above shows the distribution of lectures teaching university common units across different schools or faculties and type of university (newly established institution or older university. The common units include communication skills, entrepreneurship, HIV and AIDS, critical thinking skills, ethics and integrity, introduction to ICT among others. These units are taught by lecturers represented in the schools and faculties listed.

4.3.3: Demographic information on dean's faculty and type of university.

The deans of faculty were drawn from respective institutions offering the common units. Such faculties or institutes or colleges include Arts and social sciences, Computer and ICT, Education, Agri-Business and Economics, institute of general studies, and finally school of Nursing and medicine.

Table 4.3 Distribution of dean of faculty and type of university

Faculty/school	**New Public University**	**Old Public University**	**Totals Dean**
Arts and Social Science	1	0	1
Computer Science & ICT	0	0	0
Education, Arts and Social Sciences	1	0	1
Agri-Business and Economics	0	1	1
Institute of General Studies	0	0	0
Nursing and Medicine	0	1	1
Total	2	2	4
Proportion	50%	50%	100%

The above table indicate distribution of deans of faculties who agreed to spare time for interview. The deans were fairly distributed in four different faculties namely education, arts, medicine and business which houses university common units.

4.3.4 University characteristic

The institution where data was collected was either categorized as an old or newly established university based on the number of years it has operated or existed since inception. The study chose at random three newly established and three old public universities.

Table 4.4: University Characteristic

	Name of the university	Year of establishment	Number of years since existence	Category
1.`	Dedan kimathi university of technology	2012	< 12	New established
2.	Egerton university	1987	> 20	Old university
3.	Jomo Kenyatta university of agriculture and technology	1994	> 20	Old university
4.	Kibabii university	2011	<12	New established
5.	Maseno university	2001	>20	Old university
6.	University of Kabianga	2013	<12	New established

Adopted from commission for university education report, 2014.

The above displays some characteristics of public institution. The oldest university opened its door in 1987 while the newly established institution was the University of Kabianga which was established in 2013. The old institution may have the advantage of more ICT infrastructural facilities and more wealth of experience in offering online learning compared to newly established universities.

4.3.5 Demographic on director of quality assurance University and type of university.

A total of 3 out of 6 directors of quality assurance responded by accepting interviews concerning the current study. The directors were distributed in both new and old universities in the proportion of 33.33% and 66.67% respectively (refer to table 4.5).

Table 4.5 Distribution of director of quality assurance and type of university

	New universities	**Old universities**
Number of Director of Quality Assurance	1	2
Proportion in %	33.33%	66.67%

A total of six directors of quality assurance were chosen to participate in the study but only three responded and granted the researcher time for interview sessions which translates to 50%.

4.3.6 Demographic information on eLearning administrator and type of university.

A total of 8 eLearning administrators responded to the study. The type of university they belong to may have an impact on their perception of MOODLE features satisfaction because old universities may have the advantage of heavy volume investment in ICT infrastructural facilities compared to newly establishing universities that may be struggling to expand ICT facilities.

. Table 4.6 Distribution of eLearning administrators and type of university

	New Public University	Old Public University
Elearning administrators	5	2
Proportion in %	71.4 %	28.6%

The above table shows the proportion of eLearning administrators who participated in the study. Newly established universities were represented by five elearning administrators (71.4%) and while those from old universities were 28.6%.

4.3.7 Demographic information of respondents and respective university type.

The study respondents who included the students, lecturers, elearning administrators, deans of faculties, and directors of quality assurance were picked from two categories of institutions in Kenya. Respondents from old universities may have more advantage compared to newly established universities due to robust ICT infrastructural investment over the years for offering eLearning including years of experience in elearning activities. The next table shows the distribution of respondents per university type.

Table 4.7 Distribution of respondents per university type

		Type of public university in Kenya	
	Category of respondent	**Newly established**	**Old University**
1.	Students	594	755
2.	Focused group participants	18	24
3.	Lecturers	34	29
4.	Deans of Faculty	5	3
5.	Director of quality assurance	1	2
6.	Elearning Administrators	5	2
	Totals	**657**	**815**
	Proportion	**44.63%**	**55.36%**

above table shows the respondents distribution across newly and old universities as follows: those from newly established universities were 44.63% and 55.36% were from older universities.

4.4 MOODLE features and common units

4.4.1 MOODLE features

The study focused on MOODLE LMS features which formed the independent variable for the study. These features included such as communication, feedback, interactive, evaluations MOODLE features on student's satisfaction in learning common units in public universities in Kenya.

4.4.2 Common units

The study aimed to interrogate the influence of MOODLE features on student's satisfaction in learning common units such as introduction to computers, entrepreneurship, creative and critical thinking, ethics, and integrity taught to year one

and year two undergraduate studies through an online technique using MOODLE learning management system.

4.5 Objective one

This examined influence of ease of access MOODLE LMS on student's satisfaction of MOODLE LMS on learning common units in public universities in Kenya.

4.5.1 Students responses on satisfaction with ease of access moodle features.

The table 4.8 shows the responses of students concerning the ease of access of MOODLE which influenced their satisfaction level. The table shows nine statements with their corresponding Likert scale such as Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) measuring satisfaction in percentages (%).

Table 4.8 Cross tabulation of student's satisfaction responses on MOODLE ease of access features

	Statements of ease of access MOODLE feature	SA	A	N O	D	S.D.	%
1.	I take less than 10 seconds to log in my eLearning portal after inserting my password	27.0%	47.2%	0.1	17.9%	7.7%	100%
2.	Procedure to log in my eLearning portal is easy.	26.6%	47.30%	0.4%	19.9%	5.9%	100%
3.	It is easy to locate all the features /tools in the MOODLE.	19.6%	46.7%	0.6%	26.6%	6.4%	100%
4.	eResources are well organized in the eLearning portal.	20.1%	47.9%	0.3%	25.3%	6.4%	100%
5.	I spend less than 10 seconds to open a learning resources of my interests.	18.5%	46.9%	0.3%	27.3%	7.0%	100%
6.	I can access MOODLE LMS any time.	0%	4.7%	22.0%	28.0%	45.2%	100 %
7.	Overall am satisfied with ease of access of eLearning resources.	16.7%	53.3%	0.4%	21.3%	8.1%	100%

From the above table, it is notable that a large percentage of students (strongly agree 27.0% and agree 47.5%) believe that it takes less than 10 seconds to log into MOODLE elearning portal whereas a smaller percentage of students (17.9% disagreed and 7.7% strongly disagreed) disagree that they can take less than 10 seconds to log into the MOODLE elearning portal after insertion of their passwords. This finding is also supported by Silva, Nunes, Sousa, and Cabral (2017) found that majority of students were contended with MOODLE LMS used in online educations. Contrary to the above finding, studies by Carvalho, Areal revealed that students experienced challenges to in log in into MOODLE learning management system compared to the Blackboard platform citing the complex design to operate and long procedure to log into the portal.

The second item that was highly rated is statement number two where approximately 27% of students strongly concurred and about 47.3% affirmed that the procedure for logging into the portal is easy whereas a low percentage of students (0.4% had no opinion, 19.9% disagreed and 5.9% of strongly disagreed) had a contrary opinion regarding the procedure to log into the portal. The 3rd statement wanted to establish if "eResources are well organized in the elearning portal." 20.1% of students strongly agreed, 47.9% agreed, 0.3% had no opinion, while 27.3% of students disagreed and partly 7.0% of students strongly disagreed that eResources are well organized in the elearning portal. Ghafor (2016) also found out that the more students were be happy

with MOODLE management system hence highly satisfied since they were able to access easily elearning materials and resources.

In item number six, it can also be seen that only a small proportion of students (partly 4.7%) indicated that can be able to access MOODLE LMS anytime while a larger proportion of students had a contrary opinion (28.0 % of students disagreed and 45.2% strongly disagreed). On further probing during focused group discussion, over 80% of students noted they can only access MOODLE when live classes are on but not during offline. They were also unable to access recordings of previous class sessions. This is in contrast with studies by Alhothli (2015) who found out that 100% of students were able to access MOODLE classes whenever they want and only a smaller percentage of students say 10% of students were unable to access MOODLE online classes at home. Costa, Alvelos, and Teixeira (2012) also established only 7% of students were not able to access MOODLE classes at home due to a lack of private internet connectivity. while 93% were satisfied with MOODLE LMS accessibility.

Studies by Szyrocka, Żywiołek, Nayyar and Mohd. (2023) established that elearning students can access read, and edit eResources anywhere and anytime using MOODLE LMS. This implies Kenya is lagging behind compared to Western countries offering online learning where ease of access is almost 100%, this means that unique and customized strategies must be adopted to improve the ease of access of MOODLE in public universities in Kenya such as seeking services of international internet providers and hosting MOODLE learning management servers in developed nations to support online access education.

Table 4.9: Descriptive statistics of students' responses on MOODLE ease of access

	Statement on MOODLE ease of access	Sample	Mean	Standard error	Variance
a)	I spent few seconds waiting to log into eLearning page after inserting my password.	1349	2.0667	.02385	.767
b)	Procedure to log in my eLearning portal is easy.	1349	2.0615	.02326	.730
c)	It is easy to locate all the features /tools in the MOODLE.	1349	2.2387	.02324	.729
d)	Teaching and learning resources are well organized that enable me to locate them easily.	1348	2.1899	.02284	.703
e)	I spend less than 10 seconds to open a learning resources of my interests for example PDF notes, PPT slides and video clips.	1349	2.2372	.02295	.711
f)	I can access MOODLE LMS any time.	1349	2.1466	.02219	.664
g)	Overall am satisfied with ease of access of eLearning resources.	1349	2.2216	.02270	.695

Table 4.9 Indicate descriptive statistics concerning statements on MOODLE ease of access features by the students. On the ranking of means, statement three had the highest mean of 2.2387 which implies that a large number of students agree it's easy to locate MOODLE features.

Students were required to give opining on the following statement "*I spent few seconds to log in the system after input of my Identity and password*". The findings was as follows.

Table 4:10 students opinion on waiting period to access the portal after input log in details

	Opinion on waiting period	**Frequency**	**Percent %**	**Valid Percent %**	**Cumulative Percent**
Valid	Strongly agree	466	34.5	34.5	34.5
	Agree	535	39.6	39.7	74.2
	Disagree	205	15.2	15.2	89.4
	Strongly disagree	143	10.6	10.6	100.0
	Total	**1349**	**100.0**	**100.0**	

The above shows 34.5% Strongly agree, 39.6 % Agree, 15.2% disagree while 10.6% strongly disagree. Overall 75% of students opined that they wait for few seconds after log in to the portal to access class. This means majority are satisfied with speed to access online class while 25% face challenges in log into the class.

While the statement on Table 4.9 regarding the procedure of login into the portal, if it was easy, attracted the lowest mean of 2.0615. This agrees with responses from students' focused group discussion who noted that sometimes they have difficulties in logging in to MOODLE LMS learning portal due to internet-related challenges. Infact, one female student from University B noted "*it is sometimes not easy to log in, due to annoying procedure in the MOODLE LMS where students are supposed to prove that they are not robots by clicking images which are sometimes not responsive*". A male student partially concurred with the above responses and observed that ease of access is partially challenging although one can take a few seconds to about five minutes to log in depending on the strength of the network to access live class sessions. Another student observed that it is very challenging to log into the MOODLE system especially for the first time and also the portal usually hangs or responds slowly when almost all the students are login into systems at the same time. This experience is common whenever users are sharing dedicated internet bandwidth from a common router in public universities usually due to a low threshold of internet bandwidth and overstrained server which cannot match the number of users. Log-in credentials may have a bearing on the ease of access and this statement was captured during a focused group discussion where a second-year participant from University C cited that "*passwords and username are sometimes not responsive and we waste a lot of time in re-setting them*". Elearning administrators from public universities vehemently contradict the above statement by noting that login credential is straightforward, for

example, the user name comprises the first part of the student university email address while the password is their registration number. "*Most of the time if a student presses the caps lock icon or any letter accidentally when logging in, especially when they are late for an online class for sure they will have difficulty in login and this causes frustration to a good number of students*" noted one eLearning administrator from university C.

Another ICT administrator from university B echoed that "*students are provided with easy to log password and user name and all registered students should be login to the online class since WIFI is available within a campus*". This statement was also supported another ICT administrator from university A who observed that "*Since the user name and password are simple to memorize, the procedure for resetting password is easy and can be done without limits*".

During focused group discussion, participants were requested to rate the ease of access to MOODLE learning management system on a scale of 0 to 10. Zero as lowest and 10 as highest value. Their responses were translated into percentages. Male student's rating had an average of 58.33% while for female students rating was 63.11% .

The above data indicate 63.11% of female students are satisfied with MOODLE ease of access features compared to 58.33% of their male counterparts. This scenario may have been so because females are known to be keen on the quality of items such as colours, appearances, shape and designs in MOODLE LMS compared to male gender who are merely interested with output. This finding is supported by studies done by Bempah, etal (2022) which established that females focus on quality while are

interested with outcome for example does it work or not. Gimenez and Grima (2016) also demonstrated that the female gender tends to be involved in MOODLE learning activities which influenced their performance compared to male students. Similar finding was documented by Arasanmi (2019) that gender, age, and experience play a influences on behavioral, social, and potential to use MOODLE elearning approach among students pursuing business-related studies. Female gender is known to be keen to details such as quality, fineness and appearance while male are okay with anything so long as they are happy with output or a device is working.

Studies by Oguguo, Nannim, Agah, Ugwuanyi, Ene, and Nzeadibe (2021) revealed that female students outperformed male students when using MOODLE and CAI4ME package in academic achievement at Nigerian University. Their finding is in contrast to studies done by Owolabi and Owolabi (2022) who found no significant difference among gender on achievement in Word processing using MOODLE LMS. Aditya and Permadi (2022) also posted similar findings in relation to the assessment of MOODLE features. Probable reason might be equal leverage in eLearning skills, conducive eLearning environment that does not disadvantage any of the gender, small classes endowed with adequate eLearning resources among other factors.

It is expected that older universities in Kenya with over 20 years since their establishment have robust infrastructure for offering online learning compared to newly established universities. This partly explains the teething problem experienced by students in newly established universities offering online education such unstable and limited network coverage, lack of state of art eLearning instructional rooms, congested servers among other challenges. Such new institutions need to invest heavily in internet infrastructure to match the demand of ever-increasing students being contributed by higher transition from basic education to tertiary levels. The university management in public institutions in Kenya must deliberately expand their budget allocation towards online learning activities to prevent learners from falling into the trap of the digital divide in the current 23rd century.

Although the above data in Table 4.10 is skewed towards female student gender concerning ease of access, there are also mixed reactions from students across the institution sampled. The following comprises their sentiments.

"*There is a lot of anxiety and data issues when online class is about to take off."(*second-year student University A).

"*Our server is sometimes very slow*". (second-year student University C).

"I am always nervous due to my level of computer skills". (2nd -year student University C).

"I sometimes become excited and look forward to online classes". (2nd -year student University F*).*

"Very frustrating sometimes since I have to wait until my lecturer unmute. my microphone to be given a chance to ask a question or speak". (second-year student University F),

"Online classes are a nightmare to me due to accessibility". (second-year student University B*).*

"Only those students with good smartphones can access and enjoy online sessions".

"Some servers would only accept a certain number of students". (second-year student University E).

"Time wastage is common as you can take even 10 minutes before joining an online class or even our lecturers may have challenges in accessing portals and sometimes postpone the class". (second-year student University D*).*

Participants were also asked "***Would you prefer an online class offered through MOODLE learning management system or a physical class***? " and surprisingly approximately 17.42% of students maintained they would prefer eLearning compared to over 80% who would prefer physical classes. This means there are some underlying issues militating against the use of technology in accessing learning.

A female student from University C insisted "*I would rather have online class because it enables me to multitask during online sessions, for example, breastfeeding*". Other frustrations captured by students concerning ease of access include : Postponement of the online class by lecturers without explanation, electricity may go off disrupting online classes leading to deferment of the online class, lack of communication between instructors and students during online class, for example, "*my lecturer might mute his/her microphone accidentally and continue lecturing as if everything is okay during online class, the MOODLE LMS may stop working altogether for some hours among other reasons*" (second-year male student, university B).

Essel and Osafo (2017) found out the following challenges associated with MOODLE: uploading assignments, accessing online classes, use of interfaces, accessing elearning resources, and navigating within MOODLE platform. Chewe and Chitumbo (2012), suggested to circumnavigate MOODLE LMS challenges at the University of Zambia, three things must happen: equip trainers with elearning skills who will in turn to train their students, secondly carry out sensitization to all university staff and lastly implement MOODLE elearning in phases. Universities in Africa have no option but to deliberately incur heavy investment in eLearning infrastructure to avoid widening the digital gap with learners in Europe and other developed counties. This can be done progressively by addressing challenges in phases.

Silva et al. (2017) and Demirkan (2014) found larger proportion of students (approximate 80%) favored MOODLE LMS classes due to ease in access and higher satisfaction rate. Carvalho et al. (2011) castigated MOODLE LMS due to logging in difficulties of the eLearning portal. This has been thorn in the flesh in majority of institutions in Africa where eLearning is not given preference and prominence it deserves when it comes to prioritization of needs in a university.

The above finding is worrying as far as MOODLE classes are concerned simply because accessibility issue. Ease of access of MOODLE LMS portal is the first step for any student to claim that he/she has attended a class, otherwise the system will record the truancy of the student. Of all the Kenyan institutions sampled in the study, none can claim that it has managed to satisfy her students 100% on accessibility. Only about 60% of public universities have specific internet -hotspots where learners can access the internet during peak hours.

While some students are engaged in online learning sessions, others are busy accessing social media platforms for entertainment competing for the same internet resources with students engaged in active online classes making MOODLE classes ineffective due to unstable internet network as supply exceeds demand. This causes a lot of frustration as some students are disconnected from online classes while in some the system hangs and are unable to continue with online learning class sessions. To resolve this issue, a dedicated server with network threshold of over 40 Megabits per second should be made available exclusive for online classes. Hussan (2016) point out that the most critical item required for eLearning is a server which can be: dedicated type, cloud server type or a joint/common server. This hardware work in tandem with appropriate LMS such as MOODLE, eLearning support and finally partnering with vendors. In our Kenyan situation, organization such as KENET are supposed to fill this void as the come as a package by providing appropriate servers, internet bandwidth, eLearning training and after sale support.

If students are unable to access the internet, then eLearning sessions cannot take place despite having state of art devices and eLearning skills for online classes. This further leads to dissatisfaction with MOODLE LMS class which may have negative impact on level of satisfaction in learning. Directors of quality assurance from different public universities in Kenya had mixed reactions to student's satisfaction with the MOODLE ease of access features and the following comprises their responses when asked to what extent are students satisfied with ease of access features.

"*Our students are generally satisfied since WIFI is available and is used for online classes unless unforeseen challenges like electricity power blackout interfere with online classes"* (Director of quality assurance, University B).

"*Majority of students are satisfied because they have been trained on the use of eLearning features*" (Observed by a director of quality assurance from university A).

"*Only a few keep on complaining they cannot access the portal but they always get help from the eLearning support team. Those who are unable to complete their full registration by signing nominal roll are unable to access eLearning classes*" (Director of quality assurance, University C).

"*Sometimes accessing eLearning becomes a challenge when there is a power blackout but we have put in place in the required infrastructure for online learning, including a standby generator in case of power failure, so it is the responsibility of our students to attend online lectures. If they have an issue, eLearning and ICT officers are available*" (Director of quality assurance, university E).

Although the above statement borders blaming the students for not being prepared for online classes, the known fact is that the majority of universities lack adequate infrastructure to manage eLearning activities due to dwindling capitation of budgetary allocation from the government of Kenya every year. Studies by Tarus, Gichoya, and Muumbo, (2015) revealed the following challenges affecting online learning in Kenya's public universities: limited ICT infrastructure (92%), financial constraints (87%), expensive internet (73%), lack of eLearning policies (85%), deficient content development skills (71%), lack of interest and commitment (66%) and lack of time for developing eResources (79%).

The panacea for the above myriad issues includes partnering with international companies who have invested locally to offer online learning solutions, the government allocating more resources towards budgetary allocation to higher institutions of learning, and grants from developed counties to support online education.

Sentiments from eLearning administrators is encouraging as far as ease of access MOODLE LMS portal is concerned. The following was captured during interview sessions. When asked to comment on rating of accessibity of MOODLE by students, One of the eLearning administrators from University A, observed that "*I would give a rating of 4 out of 5 (80%) ease of access satisfaction rate by students to eLearning since they receive eLearning class links early in advance*". This sentiment is also shared by approximately 83.3% of deans of faculties who noted that students are satisfied with MOODLE ease of access features. Other statements captured from eLearning administrators include:

"*Females complain not being able to log in faster, but generally students can take less than a minute during off-peak hours and between 5-10 minutes during high peak hours*." (eLearning administrator, university C).

"*Students' can access online learning using university WIFI or mobile data where the strength location is good. (*eLearning administrator, university B).

"*Online classes are accessed seamlessly but sometimes affected by the expiry of certificates and network challenges from our service provider but only disrupted for few hours*". (shared sentiments from eLearning administrators, university, A C, D, and E).

The above responses and sentiments to a large extent show that status of online classes in our public universities in Kenya that cannot be delinked from status of internet infrastructural investment in public universities in Kenya. Some factors are manageable within the institution but some are beyond the control of users such as network failure, expiry of software certificates, and obsolete software. This has a greater ramification on the satisfaction level in using MOODLE LMS features in an online class which is expected to run without a hitch.

4.5.2 Testing hypothesis one

$H0_1$: There is no significant relationship in accessing modular object oriented dynamic learning environment learning management system and student's satisfaction on learning of common University units.

The study aimed to investigate if there is a relationship between accessing Modular Object-Oriented Dynamic Learning Environments and students' satisfaction in learning common units in public universities in Kenya. Ordinal regression statistics was employed to establish the relationship between the two variables. Alpha was set at alpha 0.05. Value more that p=0.05 indicate statically significant relationship while p-values less than 0.05 indicates the result is not statistically significant and will lead to rejection of null hypothesis. (Kothari ,2013). The statistic is presented in the next table.

Summary of findings on Moodle ease of access.

The following table display satisfaction level of students on ease of access MOODLE learning management portal**.**

Table 4.11 Ordinal regression parameter estimates of on students' satisfaction with ease of access features.

Parameter Estimates

Parameter Threshold	B	Std. Error	95% Confidence Interval		Hypothesis Test			Exp(B)	95% Conf. Interval for Exp(B)	
			Lower	Upper	Wald X^2	Df	Sig.		Lower	Upper
Extremely Satisfied	-1.862	1.1365	-4.089	0.366	2.684	1	**.101**	0.155	.0170	1.442
Very Satisfied	-.067	1.0479	-2.121	1.987	.004	1	**.949**	.935	0.120	7.293
Moderately Satisfied	1.604	1.0784	-0.510	3.717	2.212	1	**.137**	4.972	0.601	41.161
Slightly Satisfied	2.762	1.1424	0.523	5.001	5.844	1	**.016**	15.828	1.687	148.542
MOODLE Ease of Access features	0.272	.4183	-0.548	1.092	.424	1	**.515**	1.313	.5780	2.980
(Scale)	**32.721[a]**									

Dependent Variable: OVERAL MOODLE STUDENTS SATISFACTION

The above table represents the test model for the overall ordinal regression indicates that the significant value for overall MOODLE ease of access feature satisfaction was 0.515, which is greater that P≥ 0.05. This show average positive value which results to not rejecting the null hypothesis. P value of extremely satisfied was p=0.101, very satisfied P value was 0.949, moderately satisfied P= 0.137, slightly satisfied P= 0.16. The overall ease of access satisfaction was p=0.515.

This implies there is no relationship between ease of access MOODLE students and student's satisfaction.

This implies that there is no significant relationship between MOODLE ease of access features and students' satisfaction with the learning of common University units.

Studies by Essel and Osafo (2017) also found that undergraduate students from Ghana experiences serious challenges in accessing MOODLE LMS classes. Papadakis, Kalogiannakis, Sifaki, and Vidakis (2018) arrived to almost similar findings by observing that students from Greece were using inferior learning devices leading to myriad of challenges which affected MOODLE usability and fidelity to teaching. Mwatilifange and Mufeti (2022) on the other hand established that students were unable to access MOODLE online classes due to lack of appropriate ICT devices and requisite computer software's. Gitonga and Wambua (2020) observed that Skype and MOODLE system were widely implemented by Kenyan universities during Covid -19 lockdown period. This made it possible for students to access some form of online learning at the comfort of their homes that was mediated using various learning management systems and platforms such as: MOODLE, Google class, WebEx, Big blue button, Sakai, Zoom class, Skype, Blackboard learn. Although to some extent almost all public universities in Kenya struggled to offer online learning, Awandu (2021) decried that course units offered online which demanded learners to carry out practical learning activities such as physical sciences, natural sciences, and medical science were heavily disrupted during covid-19 pandemic in Kenya and the learners were forced at later date to attend practical sessions.

This clearly shows that public universities in Kenya are still at the infancy stage as far as accessing online learning is concerned especially for science-related programmes that demand learners to carry out experiments and practical's in physical laboratories. This is in contrast to numerous universities and high school institutions in both developed and developing countries that are currently utilizing shared virtual laboratories in conducting student experiments in sciences, physics, and engineering disciplines. This means Kenyan institution of higher learning needs serious investment in online learning infrastructure to be at par with developed countries.

4.6 Objective two

This was to establish the influence Modular Object-Oriented Dynamic Learning Environment feedback features on student's satisfaction in learning of University common units.

4.6.1 Students responses on feedback features

Students satisfaction with MOOODLE feedback was gauged using six statements captured in table 4.12. Likert scale was provided to measure corresponding level of satisfaction .

Table 4.12: Students responses on MOODLE feedback features.

	Statements on MOODLE feedback feature	S. A.	A.	N.O.	D.	S. D.
1.	I receive comments from my tutor on time.	20.2%	42.2%	0.4%	27.3%	9.9%
2.	MOODLE databases provide feedback faster	1.3%	91.9%	4 %	2.4%	0.3%
3.	I receive get my course feedback without delay.	18.3%	44.6%	0.9%	31.9%	4.4%
4.	My queries are responded by ICT support team within 48 hours.	12.0%	44.8%	0.7%	30.1%	12.5%
5.	Iam satisfied with my reports since I can view my grade and guarantees confidentiality.	17.9%	46.6%	0.6%	26.9%	7.9%
6.	Overall am satisfied with MOODLE online feedback	12.9%	53.0%	0.3%	27.1%	6.7%

Table 4.12 shows the perception of students in terms of satisfaction in relation to MOODLE feedback features associated with common units in public universities in Kenya. Although there is notable up and down in elements highlighted in the statements focusing on MOODLE feedback features, feedback rating on MOODLE data base indicated approximately 93.2 % of students are happy and therefore satisfied. ICT support feedback and feedback from instructors ranged between 56% to 66% meaning students were moderately satisfied. Studies by Teo et al. (2019), also found out that MOODLE quick feedback and responses are important for young students today. Findings from this study differed that of Akakandelwa and Mkulama (2017) who noted that instructors never provide feedback to their student's through MOODLE LMS. This was also echoed by Makokha and Mutisya (2016) who documented that in one of the public universities in Kenya, lecturers teaching

communication skills handle over 300 undergraduate students per session through MOODLE online classes. If this is the scenario, how is it humanly possible for the same instructor to provide quality feedback to over 300 students on time?

This is part of the challenges of online learning in Kenya's public universities where lecturer to student ratio is still high. This is against CUE standards and guidelines that require lecturer to student ratio to be 1:30 in teaching humanities and arts subjects such as communication skills, ethics and integrity among other course units. (KIPPRA Report, 2022)

A rejoinder by ICT administrators whose mandate is to offer learners support online quickly absolve themselves from issues relating to feedback to students. One of the ICT administrator was quoted saying "*We normally responds to all queries 8 am to 5 pm daily depending on the nature of responses. Those that are beyond our scope we escalate to relevant offices*". (elearning administrator University, B). This is a positive statement that should be encouraged as it boosts students' satisfaction in the course of eLearning studies. Das and Biswas (2018) noted that learning support services is essential as it reduces dropout rates of online learning students. Sentiments from ICT administrators of almost all the public universities in Kenya eLearning agree that they have an ICT policy that tasks them to respond to learner's queries within 48 hours. This activity of providing prompt feedback among the pillars of online education practice that must be embraced by online tutors. (Tanis, 2020). Feedback to learners whether positive or negative is important to students' progress in learning. Positive feedback will always encourage higher performance while negative feedback will

make students to reflect where they lost track and recollect themselves towards attaining higher marks in subsequent examinations.

Several studies have demonstrated between correlation between quality feedback and students' academic attainment. (Hölbl and Welzer ;2011, Zhang, Ravindran, and Osmonbekov, 2022 and Fukkink, Trienekens, and Kramer, 2011. At the same time, not all feedback received by students supports learning. This was confirmed by studies by Keuning, Jeuring, and Heeren (2018) who found out that feedback provided does not necessarily assist learners to overcome academic challenges.

Study by Wisniewski et al in Ramírez, Luque, Vidal and Morales (2022) established that the effect of quality feedback on students' academic performance was 48%. It means there are other underlying factors that determine their achievement than merely comments from peer and their instructors. Therefore, feedback contribute to almost half (48%) of factors that play pivotal role in academic achievement and therefore all instructors, lecturer and teachers should be encouraged to provide feedback to their learners at all times.

Large student's population enrolled to learn common units continue to make it difficult for lecturers to create time and provide quality feedback to learners online. University managers should rethink the way forward such as hiring extra lecturers or staggering common units within the programme instead of making it mandatory for all first years and second years to enroll for them at the same time. Instructors can also encourage peer feedback which seems to be trending in institutions that have embraced online

learning. Gilbert, Whitelock, and Gale (2011) emphasized the use of peer feedback through MOODLE learning management system generates a wealth of discourse that cannot match the output of a single course instructor.

Table 4.13 Students descriptive statistics of MOODLE feedback features

	Statement on MOODLE feedback features	Sample	Mean	Std .Err.	Std Dev
a)	I receive comments from my tutor on time.	1349	2.2803	.02476	0.9098
b)	MOODLE databases provide feedback faster	1349	4.7782	.02135	0.7858
c)	I receive get my course feedback without delay.	1349	2.2520	.02272	0.8331
d)	My queries are responded by ICT support team within 48 hours.	1349	2.4500	.02401	0.8817
e)	Iam satisfied with my reports since I can view my grade and guarantees confidentiality.	1349	2.2651	.02355	0.8652
f)	Overall am satisfied with MOODLE online feedback	1349	2.2854	.02135	.78427

Table 4.13 indicate the descriptive statistics of student's opinions on MOODLE feedback features. Statistics suggest that students were able to get immediate comments from databases after they submit quizzes or questions using MOODLE LMS

.

This statement attracted the highest mean of 4.7784 which implies the majority of students are happy with the feedback which they receive from databases in relation to the answers which they submit. This is in contrast to the statement which relates to students receiving feedback progress of "my course" on time which attracted the lowest mean of 2.2520. This means that the students are highly satisfied with the feedback they receive from databases prompt while for the course progress, teachers and instructors take time to populate the grade book hence delaying feedback lowering their satisfaction concerning "feedback progress on my course". This finding was also echoed by Murphy and Cornell (2010) that college students want feedback well-timed, precise and given to them via individual tutorials. Rigopoulos, (2022) on the other hand also established that quality feedback and marking has an effect to student satisfaction with online education.

Lecturers in public universities in Kenya also added their voice on student satisfaction and these are their responses.

Figure 4.4: Lecturers responses on students' satisfaction with MOODLE feedback features.

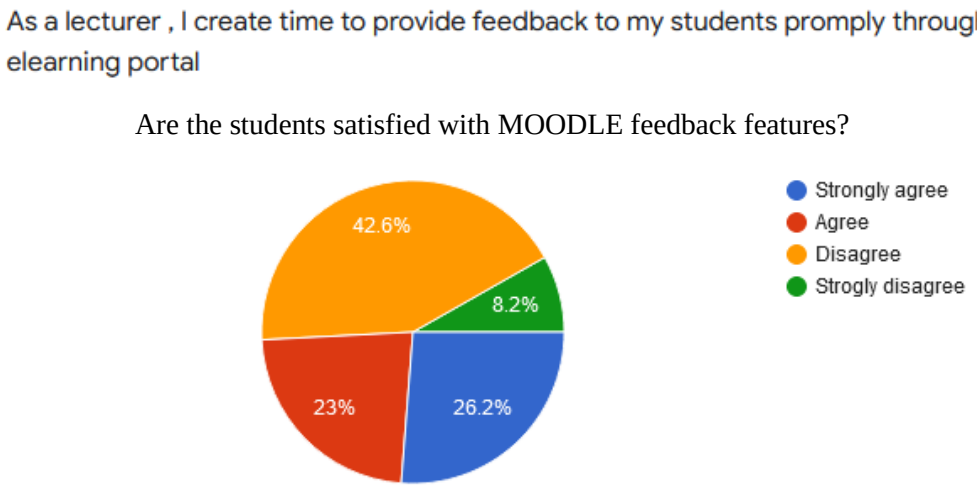


Figure 4.4. above indicates about 26.2 % of lecturers strongly agree that undergraduate students were satisfied with MOODLE feedback feature. Also 23 % of lecturers concur that students were elated with MOODLE feedback features. This finding concurs with 75% of deans of faculties who believed that lecturers normally provide feedback to students since they had not received complaints regarding the same. Responses from students involved in focused group discussion sharply differ with above findings and the following comprised their opinion regarding feedback they receive from their tutors. These were some of the sentiments captured.

"*We don't receive feedback from our lecturers*". (second-year student, university A, C, and E)

"*Majority of lecturers ignore our questions posted online*" (second-year student, university B)

"*I have never received any comment or feedback from my course instructor regarding questions I have ever asked"*. (60% of second-year students, university B)

"*Majority of lecturers don't even give us a chance to ask questions during online lectures due to time constraints*". (90 % of second years, university D)

"*Chat questions by lecturers go unanswered*". (female second-year student, university E)

These reactions from online learning students is very alarming and often leads to low satisfaction to the course unit being taught. It is perceived that this type of learning inclines towards teacher dominated session. This is against the spirit of the Centre for Teaching Excellence at the University of South Carolina (2021.) that advocates for timely, educative, and sensitive feedback should be given to learners at all times. This

Center emphasizes that students should get comments in relation to academic activities timely and those who have not performed to their expectation should also be handled with care to avoid crushing their self-esteem.

Singh (2022) also emphasize comments from tutors help learners to improve their self-confidence, passion for learning, and self-awareness concerning what is being imparted. Sibgatullina, Ivanova and Yushchik (2022) also concur that constructivists believe that feedback boosts learners academic achievement. Grigoryeva, et al (2021) posit that MOODLE system provides feedback to all users. Studies by Yildiz, Murat and Uzunboylu (2018) confirm that MOODLE feedback provides controlled learning. Prompt, precise, reflective comments from lecturers motivate students to re-look deeply their work and identify what was missing? What needs to be added or deleted? What should be corrected or revised? among other guidance.

Sentiments from directors of quality assurance in public universities in Kenya on absolve universities of any omission concerning feedback. The following comprised their opinions:

"*Feedback features is provided in the systems and both lecturers and students have been trained how to use them*". (Director of quality assurance, university A)

"*Students are always satisfied because they can view their marks or performance on their individual portal*".

"*Every semester individual student can be able to access their results in their portal*." (Director of quality assurance, university C)

"*Lecturers always address their questions or clarification either during lectures or through chat messaging."* (Director of quality assurance, university A, B, and E)

The above statements appear to be defensive from university management as far as feedback issues is concerned. This implies that the students and the university administrators are reading from a different script. To bridge the gap, the university management should provide a listening ear to the student by conducting customer service surveys periodically to improve the inefficiency pointed out by students. This may ultimately improve learner's satisfaction level on MOODLE feedback features.

Elearning administrators in on the other hand were asked "**How fast do you respond to a learner's query or assistance?"** These were their responses:

"*We offer 24/7 learners support services, but generally response is done 8 am -5 pm as the come*" (elearning administrator, University E).

"*We respond on 1st come 1st served basis*." (elearning administrator, University B).

"*Once students have raised a ticket, they ought to indicate if the priority of the inquiry or service needed is either high, medium, or low. All the tickets with high priority are addressed as fast as possible by a team of eLearning officers, then medium inquiries, and finally low priorities in that order*". (elearning administrator, University A).

"*Our policy is clear that all user's inquiries must be responded to as soon as possible and once they are responded, the user should also indicate if the issue was resolved, if not it is escalated for further assistance*." (elearning administrator, University B).

"*Students questions are responded as they are received*." (elearning administrator, University D).

Pham, et al (2019) noted that there is a relationship that exist between the quality of elearning support service and student satisfaction. Ali etal (2022), also arrived at the same conclusion that the quality of ICT support service has positively contributed to student e-learning satisfaction. The above statements from elearning administrators capture the aspiration of every learner which should be sustained throughout that the academic discourse. If all the above is adopted, dropout rates of online learners may reduce drastically since their online needs or queries are resolved on time. This is very commendable as it may greatly improve learners' satisfaction with MOODLE online learning activities thereby improving overall academic performance in common units.

4.6.2 Testing hypothesis two

$H0_2$: There is no significant relationship between modular object oriented dynamic learning environment learning management system feedback features and student's satisfaction on learning of common University units.

The study sought to establish if there is a relationship between accessing modular object-oriented dynamic learning environment and students' satisfaction in learning common units in public universities in Kenya. Ordinal regression statistics were used to test if such a relationship exists at alpha 0.05. Any value less than 0.05 ($p \leq 0.05$) indicates the result is not statistically significant which means the null hypothesis was rejected. A p-value more than 0.05 ($p \geq 0.05$) means the result is statistically significant and the null hypothesis is not rejected (Degu and Yigzaw, 2006; Cohen et al,2007; Chian, Rajiv and Price 2015). The outcome is represented in Table 4.13a)

4.6.3 Summary of finding on MOODLE feedback features and student's satisfaction

Table 4.14a) Ordinal regression parameter estimates of on students' satisfaction with MOODLE feedback features.

Parameter Estimates

										C. I. for Exp(B)
			95% C.I.		Hypothesis Test					
Parameter Threshold	B	Std. Error	Lower	Upper	Wald X^2	Df	Sig.Val	Exp(B)	Lower	Upper
Extremely Satisfied	-2.683	1.3673	-5.269	-.012	3.857	1	.0501	.068	.006	.978
Very Satisfied	-0.902	1.2833	-3.428	1.627	.493	1	0.482	.407	.043	5.016
Moderately Satisfied	0.758	1.2815	-1.851	3.279	.352	1	0.554	2.135	.175	26.37
Slightly Satisfied	1.915	1.3243	-.691	4.517	2.190	1	.149	6.774	.516	90.71
MOODLE Feedback features	-0.066	0.4515	-0.971	0.829	.022	1	.885	.946	.486	2.279
(Scale)	29.531[a]									

Dependent Variable: OVERAL MOODLE STUDENT SATISFACTIONs

Model: (Threshold): MF - MOODLE FEEDBACK FEATURE (MF1, MF2, MF3……MF6)

14 b) : Tests of Model Effects

	Type III Statistics		
Source	**Wald Chi-Square**	**Deg Freedom**	**Sig. Value**
MOODLE Feedback features	.022	1	.885

Dependent Variable: Overall MOODLE students' satisfaction

Model: (Threshold), MOODLE Feedback

The Pearson's Chi-square tests in Table 4.14a) and 4.1b) above show the parameters (measurement of perceived satisfactions) of the influence of MOODLE feedback features on students' satisfaction level in learning common units in public universities in Kenya. The significant value for the extremely satisfied parameter, moderately satisfied parameter, slightly satisfied parameter, and very unsatisfied parameter is always above p= 0.05. Table 4.13b) also indicates that the overall significant value for MOODLE feedback feature was 0.885 which was greater than P≥ 0.05. This means implies that the null hypothesis was not rejected hence there is no significant relationship between MOODLE feedback features and students' satisfaction with the learning of common University units.

This is in contrast to findings by Kurniawan and Septiana (2021) that established that MOODLE LMS facilitate students to interact with their instructors and eResources where both generate feedback to students in terms of learning progress. Horvat, etal

(2015) also found that female students consider the following factors in gauging satisfaction with MOODLE features: time that elapses to get a response and the quality of feedback that they receive for a particular course. This finding is almost similar to studies carried out by Pérez, Bedia, and Piqueres (2019) at the University of Cantabria Spain who found out that the quality of eResources in MOODLE is the most crucial feature that influence the students´ satisfaction in learning a course unit and the perceived academic achievement. Umek, Aristovnik, Tomaževič, and Keržič (2015) on the other hand pointed out that the eCourse regulations at university in Slovenia outlined that its compulsory that feedback should be given to learners and learners to should provide feedback to lecturers on the method of teaching conducted during the academic year. Wongsate and Rutaikarn (2019) also concurs that MOODLE web enables tutors to give learners feedback through email chats, phone calls, and webboard. This kind of response from users is missing in public universities in Kenya due to weak guidelines and lack of commitment from course instructors. If this is implemented and adopted it can enhance overall quality teaching of the online courses and thereby increase learner satisfaction and motivation in using MOODLE in learning common units.

4.7 Objective three

This objective intended to find out the influence of Modular Object-Oriented Dynamic Learning Environment communication tools features on student's satisfaction in learning University common units.

4.7.1 Students responses on MOODLE communication features

The study sought opinions of students on different communication features found in MOODLE learning management system through questionnaire and their responses is reflected on the next table.

Table 4.15 Cross tabulation of Students' responses on MOODLE communication features.

	Statements of MOODLE communication feature	S.A.	A.	N.O.	D.	S. D.
1.	I am satisfied with variety of comm. tools that are available in my online portal such as forums, blogs, chats.	20.2%	51.6%	0.2%	21.7%	6.1%
2.	I am satisfied with communication with my course lecturer online.	14.6%	46.7%	0.3%	31.1%	7.3%
3.	I am satisfied with communication with my classmates.	18.5%	47.0%	2.7%	25.7%	5.9%
4.	I am satisfied with discussion forums as it allows everyone to participate.	18.1%	49.9%	1.6%	23.9%	6.4%
5.	I am satisfied on carrying out assignments through Wiki and blogs.	15.9%	47.1%	0.7%	26.5%	9.6%
6.	I am able to revisit online discussion.	1.0%	3.8%	92.4%	2.0%	0.7%
7.	I am able to access social media sites from eLearning portal.	9.3%	28.7%	0.7%	50.2%	11.1%
8.	I am able to meet new classmates online.	1.1%	4.0%	0.5%	1.2%	93.1%
9.	Overall, I am satisfied with MOODLE communication tools.	15.0%	52.4%	1.6%	25.4%	5.6%

Table 4.15 indicate 20.2% strongly agree they are satisfied with MOODLE communication features, about 51.6% of learners concur that they are satisfied with MOODLE communication features, whereas 0.2% of student learners were neutral, about 21.7% disagreed while 6.1% strongly disagreed that they are satisfied with MOODLE communication features such as forum, blogs, and chats.

This is supported by a higher mean of 4.8019 as highlighted in Table 4.15. These findings were also in agreement with sentiments from focused group discussions concerning MOODLE communication features. A male student was quoted saying "*There are a variety of tools that we use in MOODLE portal when the class is ongoing such as public chats, private chart, microphone, raising hand icon, mute and unmute icon, blogs, webcam, video conference chat box, sharing screen and discussion forums".*

Some of the features mentioned above, only become active when the online session is in progress but some can still be used when the class has ended such as chats and discussion forums. Although these features are available for communication via MOODLE LMS there was also mixed reaction from the focused group students' *discussions.* For example, one learner noted:

"We normally enjoy communicating among ourselves through private chats but we are always frustrated when lecturers ignore or deny us to speak or ask questions during ongoing class session". Another student was quoted saying that "*Our lecturers only respond to few chats obviously ignoring many chats and sometimes they don't bother to answer back any question raised through the chat box or may respond to a question*

after two weeks. This is very frustrating and they need to be told. (second-year student, University B)

The above sentiments depict the frustration that online learners go through. This implies that the method of teaching goes against ingredient of the learner-centered technique as expounded by Chidubem and Adewunmi (2020) that demonstrated that learner-centered method leads to higher student performance compared to the teacher-centered method. The majority of students also complained that their online instructor regulates who to speak, when to speak and sometimes they ignore students who have clicked "raise hand icon" when an online class session is ongoing. This ultimately causes frustration as students are not allowed to ventilate their consents or point of view and this actions lowers their satisfaction with the course unit at hand and to some extent developing negative attitude towards MOODLE online classes.

Responses from focused group discussions displayed resentment concerning lecturer – student's communication. A frustrated student was quoted saying

"*Lectures don't respond to our chats".* Another respondent observed "*Sometimes sms becomes locked and one cannot communicate with anyone within the portal"*. In a rejoinder another student observed, "*lecturer control who talks by unmuting and some even refuse to unmute students when session is ongoing".* These are some of the pitfalls that lecturers make while teaching online which seems to be against the spirit of student-centered learning as expounded by Richmond (2014).

To improve communication between lecturers and students, one female student proposed that "*I would like in future MOODLE portal to provide split screen so that introverts can seek attention to lecturers without being dominated by extroverts*". This is a good proposal that MOODLE designers should update in the LMS so that learners can choose their personality as the login. This will ensure all learner characteristics are considered by the instructor when online class is ongoing.

It can also be noted in the table 4.8 above presented, learners cannot revisit online discussion forums once they miss the lesson. One student complained, "*Sometimes a student can miss an online lecture due to genuine reason, but why make it difficult for such learners not to have a chance to follow activities that were done previously online*?". This in my view is a genuine concern and elearning administrators have a leeway to customize MOODLE LMS such that students can be able to access recorded clips of a lecture that may have been housed in an archive database with identifiable markers.

Social media integration into MOODLE LMS seems to be another elephant in the house. When students were asked to comment on their satisfaction with the integration of social media applications with MOODLE learning management system, approximately 9.3% of learners "strongly agreed" that they are elated with its integration. Approximately 28.7% of students concur they are happy with MOODLE social media applications. At the same time, about 0.7% of students were neutral while about 50.2% of the students "disagreed" including 11.1% who "strongly disagreed" that they are satisfied with mobile applications integrated with MOODLE LMS. Social media applications such as WhatsApp, Tiktok, hangout, facebook, telegram, snapchat,

twitter, Instagram, clubhouse, discord, likee, and snapshare are popular among youths and adolescence learners and can be used positively for generating, editing, and sharing eResources such video clips, photos, documents. Several studies have explored on types of social media and their application in online learning. (Friedman and Friedman,2013; Korucu and Atun,2017; Ansari and Khan, 2020). Although the above findings over-emphasized and demonstrated role of integrating popular social media applications in education, same is missing in MOODLE LMS customized in public institution of Kenya because of misconception that these social media applications are for merely entertainment and not for scholarly purposes.

Kotzer and Elran (2012), agrees that MOODLE LMS interconnects popular social media applications with learners. This finding is reinforced by Allen (2015) who maintained that students prefer sharing knowledge and carrying out discussions on social media platforms instead of using institutional VLE. This means if social media is well integrated with MOODLE learning management system, it will enable the students to collaborate in their respective virtual communities to share eResources, learning objects, and entertainment content to advance knowledge.

Table 4.16 Descriptive statistics showing students satification with MOODLE communication features indicators

Statements on MOODLE communication features	Sample	Mean	Std. Error	Std. Dev.
a) I am satisfied with variety of communication tools that are available in my online portal such as forums, blogs, chats	1349	4.801	.0222	0.815
b) I am satisfied with communication with my course lecturer online	1349	2.318	.0223	0.821
c) I am satisfied with the communication with my classmates	1349	2.274	.0251	0.924
d) I am satisfied with discussion forums as it allows everyone to participate	1349	2.235	.0238	0.876
e) I am satisfied on carrying out assignments through Wiki and blogs	1349	2.321	.0239	0.880
f) I am able to revisit online discussion	1348	2.144	.0199	0.733
g) I am unable to access social media sites from eLearning portal	1350	2.653	.0223	0.822
h) I am able to meet new classmates online	1349	4.801	.0201	0.740
i) Overall, I am satisfied with MOODLE communication tools	1349	2.265	.0228	0.838

Table 4.16 shows a large numbers of students are elated with varieties of MOODLE communication tools. These results also collaborate with lecturer's opinions of the same as displayed in Figure 4.3 where 16.4 % of them "Concur" and 36.1 % "affirmed " that undergraduate students are satisfied with MOODLE communication features. The data also suggests that students are unable to access social media through MOODLE LMS

Summary of findings on MOODLE communication features and student's satisfaction.

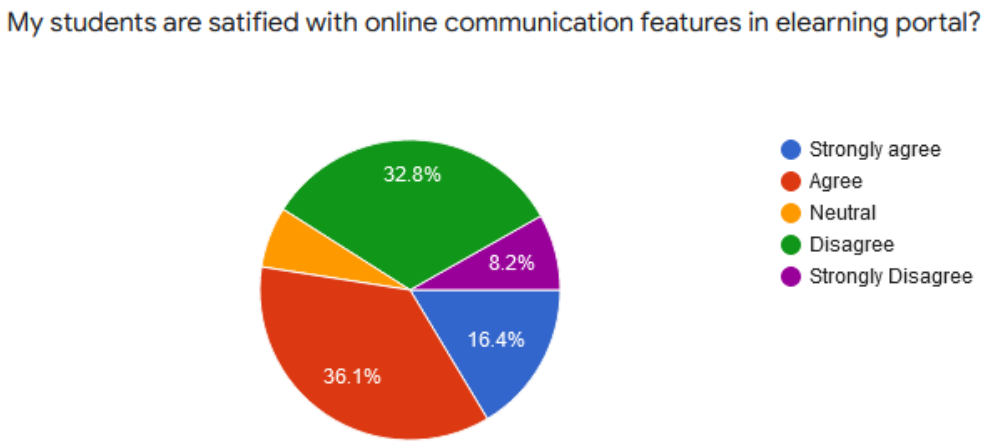
Table 4.17 Students Satisfaction with of communication tools

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	316	23.4	23.4	23.4
Agree	657	48.6	48.7	72.1
Disagree	267	19.8	19.8	91.9
Strongly Disagree	109	8.1	8.1	100.0
Total	1349	99.9	100.0	

Table 4.17 indicated student's opinions on satisfaction with MOODLE communication features and approximate 23.4% of students "concur", about 48.6% of students "affirmed", while 19.8% of students "did not support " including 8.1% "vehemely opposed " that they are satisfied with MOODLE communication features. From these percentages, it can be viewed that those who "strongly agreed" and those who "agreed", are more compared to those who "disagreed" or "strongly disagreed". This implies the majority of students are satisfied with MOODLE communication features. Hölbl and Welzer (2015), on the other hand, disagree with the above findings and assert majority of MOODLE communication tools remains unused by students using MOODLE LMS. Akakandelwa & Mkulama (2017), on the other hand, established that undergraduate students in universities in Zambia experienced difficulty in using MOODLE as a communication tool. This implies either there is a gap in elearning

skills on the student's part or the MOODLE communication design and elearning gadgets used lacked interoperability.

Figure 4.5 Lecturers responses on student's satisfaction with MOODLE Communication features.



The chart above indicates the lecturer's opinions on learners s' satisfaction with MOODLE communication features as represented in percentages. Approximately 16.4 % of lecturers "strongly agreed", about 36.1% "agreed", around 6.5% of lecturers were neutral, while 32.8% "disagreed and approximately 8.2% of lecturers "strongly disagreed" that 'my students are satisfied with MOODLE communication features in the elearning portal". Similar findings were also documented by Widodo and Slamet (2021) who established that 30% of lecturers "strongly agreed" and 70% "agreed" that MOODLE LMS made communication easy. Walker, Brown, Moore, and Hughes (2011) established only 14% of students adopted the use of MOODLE chat feature while 8 % of students used MOODLE wiki feature. Rueda, Cervantes, and Larios (2020) noted that MOODLE LMS improves discussion forums and online examinations. Similar findings were echoed by Heinrich, Thomas, and Kahu (2022) by

underscoring that MOODLE LMS features to enhance communication between students and teachers by use of Discord and Teams chat applications by connecting them regardless of their physical location.

Similarly, 50 % of deans of schools in public universities in Kenya also echoed that the most of students are satisfied with MOODLE communication features since the number of complaints received from students is not alarming. This finding was also supported by 75% of directors of quality assurance in public universities in Kenya. A director from University B was quoted "*Our students are satisfied with features since they can communicate with their lecturers in class, especially by asking questions*." This was supported by a director from University C who noted both students are satisfied with the MOODLE elearning system since the majority have smartphones with good storage space and that our institution has invested in internet infrastructure and all our students have been trained on elearning skills.

A director from University E observed, "*our elearning system runs smoothly, and complains received from students are addressed as they are received*". The above sentiments were also supported by elearning administrators who pointed out that: The chats and comments section in MOODLE LSM is easy to use, there are no major issues for communication especially when internet bandwidth is at the required threshold therefore majority of learners are satisfied. It was also pointed out that sometimes online learning speed is slow, especially during peak hours when the

system becomes overloaded. At the same time, an eLearning administrator from University B noted that

"*fresh undergraduate students are given six hours continuous training on eLearning skills when they report and those who can complete all the training sessions, have minimal problems compared to those who don't attend at all who may have a lot of challenges in using the MOODLE features including communication tools*".

There has been a notable improvement in MOODLE learning management system over the years in terms of design and application since its initial introduction to users and consumers in 2009. For example, in May 2017 during the launch of MOODLE 3.3, the MOODLE Founder and CEO Dr Martin Dougiamas, was quoted "I'm very happy to see the next step in Moodle's evolution……. our community has been asking for and helping to develop." (Moodle news, 2017) He emphasized that MOODLE communications features are now more enriched for all users to adopt the use emoji characters in forum discussions and during messaging. This is very encouraging because more and more youths have embraced in communicating messages using emoji's which are simply the use of images in communicating instead of typing long words to communicate information.

.4.7.2 Testing hypothesis three

$H0_3$: There is no significant relationship between modular object oriented dynamic learning environment learning management system communication features and student's satisfaction on learning of common University units.

The study sought to establish if there is a relationship between accessing modular object-oriented dynamic learning environment and students'

satisfaction in learning common units in public universities in Kenya. Ordinal regression statistics were used to test if such a relationship exists at alpha 0.05. Any value less than 0.05 ($p \leq 0.05$) indicates the result is not statistically significant which means the null hypothesis was rejected. A p-value more than 0.05 ($p \geq 0.05$) means the result is statistically significant and the null hypothesis is not rejected (Degu and Yigzaw, 2006; Cohen etal,2007; Chian, Rajiv and Price 2015). The outcome is represented in Table 4.18

Summary of findings

Table 4.18a) Ordinal regression of student's responses on their satisfaction with MOODLE communication features.

Parameter Estimates

			95% C.I.	Wald	Hypothesis Test				95% Wald C.I. for Exp (B)	
Parameter Threshold	**B**	**Std. Error**	**Lower**	**Upper**	**Wald X^2**	**Df**	**Sig.**	**Exp(B)**	**Lower**	**Upper**
Extremely Satisfied	-2.361	1.2620	-4.834	.113	3.500	1	**.061**	.094	.008	1.119
Very Satisfied	-.576	1.1988	-2.925	1.774	.231	1	**.631**	.562	.054	5.894
Moderately Satisfied	1.083	1.2046	-1.278	3.444	.809	1	**.369**	2.954	.279	31.321
Slightly satisfied	2.237	1.2407	-.195	4.669	3.251	1	**.071**	9.366	.823	106.580
MOODLE Communication features	.049	.4029	-.740	.839	.015	1	**.902**	1.051	.477	2.314
(Scale)	23.080[a]									

Dependent Variable: OVERT (Overall MOODLE features student's satisfaction)
Model: (Threshold), MC1, MC2,…….MC9)

Table 4.18b): Tests of Model Effects of MOODLE communication features

Source	Type III		
	Wald Chi-Square	**DF**	**Sig.Value**
MOODLE communication Features	.015	1	.902

Dependent Variable: Overall MOODLE satisfaction
Model: (Threshold), MOODLE communication features

The Walds's Chi-square tests in Table 4.18a) and Table 4.18b) above show the parameters of the influence of MOODLE communication features on students' satisfaction in learning common units in public universities in Kenya. The significant value for extremely satisfied, very satisfied, moderately satisfied, and slightly satisfied was always above p=0.05 showing a statistically significant relationship. The significant value for the overall MOODLE communication feature was 0.902 which indicates it was greater than P=0.05 This means the relationship between the MOODLE communication features and student satisfaction was statistically significant and therefore the null hypothesis was not rejected. This confirmed that there is no significant relationship between MOODLE feedback features and students' satisfaction with the learning of common University units.

Wezer (2010) on the other hand established that online students prefer using the conventional method of communicating to their lecturers such as using emails and phone calls since lecturers do not respond to their issues through MOODLE communication tools. This is rather interesting and it seems alternative communication outside MOODLE learning management system works best for some of the users. The explanation for this is that their lecturers are not on log on to MOODLE LMS platform all the time and therefore students' take initiative to communicate with their instructors using communication links available to them. To overcome this challenge, MOODLE designers should create a link to the instructor's mobile phone for alerting them there is a MOODLE communication query that needs their attention.

In a related study, Pérez, Bedia, and Piqueres (2019) pointed out that offline communication features in MOODLE negate meaningful interaction between teacher and student that exist in the physical classroom and they further suggest hybrid learning can resolve this problem. Similarly, Hölbl and Welzer (2015) noted that learners are not enthusiastic about integrating social medial applications such as WhatsApp, Instagram, likee chats, wikis, blogs, facebook forums, and other communication features in the elearning platform citing limited time, unaware they exist for use, some perceive them that they not meant for them to use unless compelled by the course teacher.

Hasan (2019) rubber stamps that MOODLE learning management systems enable communication between students to students registered in the same

course but interestingly it does not permit group chats and online meetings. These findings were also supported by Maslov, Nikou, and Hansen (2021) who argued that MOODLE learning management system has a weak communication tools, especially group communication. In contrast to the above findings, studies by Essel and Osafo (2017) revealed that 82.5% of students at the University of Ghana prefer participating in MOODLE chatroom while 74.7% prefer sending emails to lecturers and colleagues through MOODLE platform.

To increase students' satisfaction with MOODLE LMS communication features, the following can be implemented in the portal: lecturers should not lock the thread for discussion but should be left open to allow participation by all students for a day or two, secondly, the elearning portal should be customized to allow chats and short message service to flow seamlessly throughout the online class session, all lecturers should be compelled to respond students questions within shortest possible time, the LMS system messaging to be seamlessly compatible with students smart phone because sms sent through the phone takes longer time to be received by instructors compares to short message service sent from a laptop. Once the above is implemented, students' satisfaction in learning common units will increase and become enjoyable.

4.8 Objective four

To evaluate the influence of Modular Object-Oriented Dynamic Learning Environment interactivity features on of satisfaction of learning University common units.

4.8.1 Students responses on MOODLE interactive features

The researcher soughted views of student's satisfaction on MOODLE interactive features in learning common units at public university in Kenya. And their responses were captured in the following table.

Table 4.19 Cross tabulation of MOODLE interactivity features and student's satisfaction

	Statements of MOODLE interactivity feature	S.A.	A.	N.O.	D	S. D.
1.	System responds immediately I click an eResources	13.6%	3.3%	50.4%	17.2%	15.4%
2.	Lecture notes are very interactive online	22.1%	43.1%	0.0%	26.3%	8.4%
3.	Links to eLearning resources open immediately I click	16.7%	41.9%	0.7%	31.9%	8.7%
4.	There are different tools for interacting with my classmates online	16.3%	44.7%	1.2%	29.0%	8.7%
5.	I have more chances of participating online and interact with my teacher	14.3%	41.6%	0.4%	34.4%	9.3%
6.	There are a number of eLearning resources that I can open, view, listen whenever I feel like	15.8%	50.3%	0.4%	27.3%	6.2%
7.	Discussion forums help me to interact with my classmates	17.9%	50.3%	0.8%	24.5%	6.4%
8.	Am satisfied with interactive activities such as polls, quizzes, drag and drop, flash cards, interactive videos, animations, games e.t.c	15.3%	49.9%	0.1%	25.7%	9.0%

From the analysis of percentages in the above table, students seem to be satisfied to some extent with MOODLE interactivity features. It can be noted larger proportion of

students indicated that discussion forums allow them to interact with each other due to higher percentages recorded in statement seven where 17.9% strongly agreed, 50.3% of students agreed, 0.4% had no opinion, 24.5% disagreed while 6.4% of students strongly disagreed with the statement. Discussions is one of the student-centered methods of learning where they share their opinions while the instructor assists in moderating and guiding the learning session. If the topic is discussable, it will motivate the learners to carry one meaning they would continue interacting online. The second rated item is statement number two "lecture notes are very interactive online" showing 22.1% of students concurred, 43.1% of students affirmed while 26.3% of students disagree and 8.4% of students strongly disagreed with the statement that lecture notes are very interactive in MOODLE online platform. This finding was supported by studies done by Marcen, Fošner, and Knežević (2022) involving 150 learners in a mathematical course and their analysis revealed a strong positive correlation ($r = 0.843$) between the time dedicated by learners in solving interactive exercises and the final score.

This finding was however contradicted by studies by Odhiambo and Acosta (2009) who concluded that learning management systems used in Kenya for offering online learning are not interactive citing evidence of heavy presence of uploaded hardcopies of lecture notes information of PDF.

Another finding from the above table 4.17, indicates that the majority of students are not satisfied with the speed of opening an eResources on the MOODLE LMS portal. Probable reasons for the slow response of MOODLE LMS include an overload of the system since a large number of students enrolled in a common unit may be scrambling

for a given eResources, limited internet bandwidth that cannot support a large of students at ago, limited space in the server since every online learner in opening the common eResources among other reasons hence causing frustration leading to low satisfaction with the feature. This is also supported by Ally (2016) who observed that online learners enrolled in the same subject including their tutors have serious interactivity issues especially while using MOODLE LMS citing customization of media resources.

Table 4.20 Descriptive statistics of MOODLE interactives features

	Statements on MOODLE interactive features	N	Mean	Std E.	Std. D	Variance
a)	System responds immediately I click an eResources	1349	3.8599	.03864	1.4191	2.014
b)	Lecture notes are very interactive online	1349	2.2128	.02405	.88339	.780
c)	Links to eLearning resources open immediately I click	1349	2.3514	.02409	.88486	.783
d)	There are different tools for interacting with my classmates online	1349	2.3388	.02433	.89351	.798
e)	I have more chances of participating online and interact with my teacher	1349	2.3996	.02335	.85769	.736
f)	There are a number of eLearning resources that I can open, view, listen whenever I feel like	1349	2.2498	.02198	.80743	.652
g)	Discussion forums help me to interact with my classmates	1349	2.2172	.02290	.84098	.707
h)	Am satisfied with interactive activities such as polls, quizzes, drag and drop, flash cards, interactive videos, animations, games e.t.c	1349	2.2884	.02277	.83632	.699

Table 4.20 shows descriptive statistics of students' satisfaction with MOODLE interactive features. Item one sought to know if MOODLE system responds immediately a student who click an eResources recorded the highest mean of 3.8599

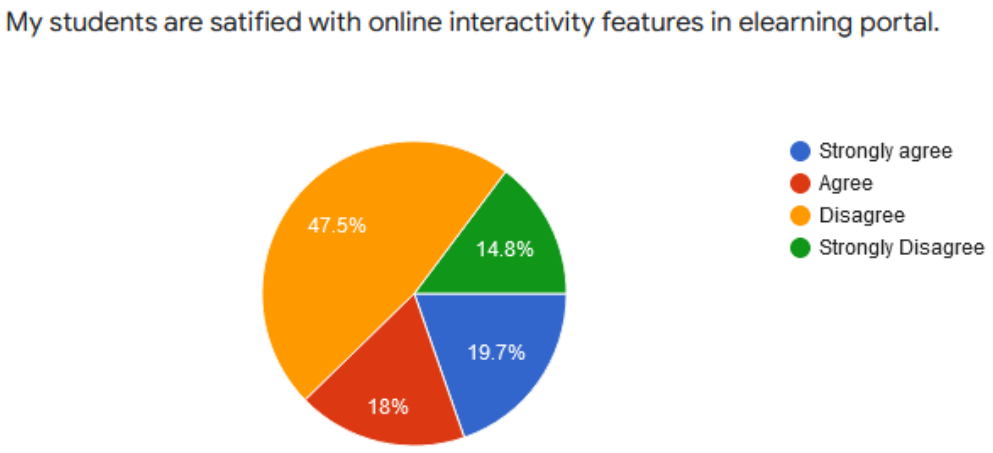
while a statement indicating that lecture notes are very interactive recorded the lowest mean of 2.2172. The rest of the statements had almost similar means. Analysis from the table strongly indicates lecture notes found in the MOODLE portal of public universities in Kenya are not interactive. Similar findings were noted by Odhiambo and Acosta (2009) who observed that lecturers upload PDF notes which are sometimes difficult to open. Students' responses from focused group discussions also confirmed lecturer notes found in MOODLE platform are not interactive at all. One of the students noted "Although there are a variety of interactive activities such as hot potato, gaming, drag and drop, lecture notes are not interactive" This was also supported by the majority of elearning administrators from public universities in Kenya who opined that lecturers and other content creators don't bother to make elearning Resources interactive since MOODLE LMS has all the tools and resources for ensuring interactivity.

This statement is also echoed by Sonia, Bouziane, and Alvarez (2014) assert that MOODLE platform provides interactive teaching and learning sessions at Paris Descartes University. Okenese (2017), on the other hand, observed that 78 percent of learners echoed MOODLE enriched students'- lecturer interaction and also a student-eResources interaction at the University of Otago, New Zealand. A similar finding was put forth by Marwa (2016) who established that 73.89 percent of eLearning students in Tanzania MOODLE supports interactive learning

Research studies by Hajjar (2017), and Barge & Londhe (2014), also revealed MOODLE heightens lecturers –student's interactions. This is however disagreed by students in public universities who observed there is very little interaction among them as lecturers block private chatting among the students in MOODLE LMS while online lectures are in progress. The only time they can interact is during the guided discussion but students complained that this activity is also programmed to end at a specific time while they prefer the forum to remain open for even up to five days.

Lecturers in public universities in Kenya also added their voice into student's perception of satisfaction with interactive MOODLE features and their responses

Figure 4.6 Lectures responses on students' satisfaction with MOODLE interactive features.



From the above pie chart, it can be noted over 19.7% of lecturers strongly agreed that undergraduate students are satisfied with MOODLE interactive features, approximately 18% of lecturers agreed with the statement, whereas about 47.5% of lecturers disagreed and 14.8% of lecturers strongly disagree that students are satisfied

with MOODLE LMS interactive features. This finding concurs with students' rating of satisfaction with MOODLE interactives features in Table 14.8 which had a higher mean of 3.8599. Studies by Marwa (2016) disagreed with the above finding where they noted that 73.89 % of eLearning students in Tanzania agree that MOODLE supports interactive learning.

Mir, Iqbal and sham (2022) established that online students using interactive video incorporated to MOODLE LMS reported higher satisfaction levels compared to students exposed to different class organization. on the other hand, concluded that incorporating interactive video in MOODLE LMS permits a deeper understanding of concepts which enables active learning and engagement to occur thereby increasing interactivity. This finding was also supported by about 33.3% of directors of quality assurance in public universities who unanimously noted that students are satisfied with MOODLE LMS interactivity. One of the directors from University C was quick to mention that "it is the responsibility of lecturers and ICT administrators to ensure interactivity of eResources is implemented". The above conclusion was also supported by almost 83.3% of deans of schools by concurring that their respective students are satisfied with MOODLE LMS interactivity. Studies by Rodrigues, Brandão, and Brandão (2010) on the other hand, concluded the MOODLE LMS enhances interactivity by noting that 50% of teachers rated i-assign as very good and 42% of teachers rated i-assign as an excellent tool for making MOODLE learning management system very interactive.

Ally (2016) noted that MOODLE learning management system in universities in Tanzania lacked critical interactivity between eResources, students, instructors, and

interface due to poor MOODLE customization. Mir, Zafar, and Shams (2021) concluded students taught with MOODLE interactive video were more satisfied compared to students in other settings. Similar finding was also reported Devi , Subetha, Rao , Morampudi (2022) by emphasizing interactive videos in MOODLE LMS boost students engagement , achievement and fulfillment .Yang (2022) on the other hand concluded that MOODLE learning management platform provides a highly interactive online environment in Japanese universities

4.8.2 Testing hypothesis four

$H0_4$: There is no significant relationship between interactive features of modular object oriented dynamic learning environment learning management system and student's satisfaction on learning of common University units.

The study sought to establish if there is a relationship between accessing modular object-oriented dynamic learning environments and students' satisfaction in learning common units in public universities in Kenya. Ordinal regression statistics were used to test if such a relationship exists at alpha 0.05. Any value less than 0.05 ($p \leq 0.05$) indicates the result is not statistically significant which means the null hypothesis was rejected. A p-value more than 0.05 ($p \geq 0.05$) means the result is statistically significant and the null hypothesis is not rejected (Degu and Yigzaw, 2006; Cohen etal,2007; Chian, Rajiv and Price 2015). The outcome is represented in Table 4.21

Summary of findings in MOODLE interactive features and student's satisfaction.

Table 4.21a) Ordinal regression of students' satisfaction with MOODLE interactive features.

Parameter Estimates

Parameter	B	Std. Error	95% Wald C.I. Lower	95% Wald C.I. Upper	Hypothesis Test Wald x^2	df	Sig.	Exp(B)	95% Wald C. I. for Exp(B) Lower	95% Wald C. I. for Exp(B) Upper
Extremely Satisfied	-2.288	.9388	-4.128	-.448	5.941	1	.015	.101	.016	.639
Very Satisfied	-.500	.8557	-2.177	1.177	.342	1	.559	.606	.113	3.244
Moderately Satisfied	1.163	.8768	-.556	2.881	1.758	1	.185	3.198	.574	17.834
Slightly satisfied	2.316	.9267	.499	4.132	6.245	1	.012	10.133	1.648	62.304
MIT	.087	.3221	-.544	.718	.073	1	.787	1.091	.580	2.051
(Scale)	23.991[a]									

Dependent Variable: OVERT –Overall MOODLE features students' satisfaction

Model: (Threshold), MIT - MOODLE interactive features satisfaction.

a. Computed based on the Pearson chi-square.

Table 4.21b): Tests of Model Effects of MOODLE interactive features

Source	Type III		
	Wald Chi-Square	**Df**	**Sig.**
MOODLE interactive features	.073	1	0.787

Dependent Variable: OVERT
Model: (Threshold), MOODLE interactive features 0,1,2….7

The ordinal regression tests in Table 4.21a) above show the parameters of the influence of MOODLE interactive features on students' satisfaction in learning common units in public universities in Kenya. The significant value for satisfaction level was more than a p-value of 0.05. Table 4.21b) which represents the model of the overall chi-square test on MOODLE LMS interactive feature had a significant value of 0.787 which was greater than P≥ 0.05. This means it was not statistically significant and therefore the null hypothesis was not rejected. This implies that there is no significant relationship between MOODLE interactive features and students' satisfaction with the learning of common University units.

A further investigation found out that 16.5% of students agreed that eResources responds when the command is given, 40.6% of students observed that interactive links do not open immediately when clicked and finally the majority of students indicated there are few interactive activities found in

MOODLE LMS. Similar findings was documented by Ally (2016) in Tanzanian university where MOODLE LMS was blamed for little interactivity even among students registered in the same course unit, also between instructors and learners, and finally between students and eResources in the platform. This finding is also consistent with studies by Makokha and Mutisya (2016) who noted that 87% of online modules in MOODLE platform were class notes were not interactive at all. Similar findings were echoed by Annamalai, N., Ramayah, T., Kumar, J. A., & Osman, S. (2021) that revealed that students in Malaysian university MOODLE was dominated by inadequate interactive learning activities.

This is in contrast to Obel (2018) and Rodrigues, Brandão, and Brandão (2010) who opined that MOODLE LMS offers links that learners may access eResources and enable users to interact with the server which ultimately provides feedback concerning teaching activity. Similar findings were observed by Sonia, Bouziane, and Alvarez (2014) that MOODLE platform provides engaging atmospheres for teaching and learning, particularly by backing up interactive learning sessions. Pérez, Bedia & Piqueres (2019) also echoed that student-student and students –teacher interactions have more impact on the perception of learning goals than mere acquisition of knowledge. According to Okenese (2017), 78 percent of students at the University of Otago, New Zealand indicated MOODLE improved lecturer-student interactions and also between students and eResources. Marwa (2016), also echoed similar findings and noted that 73.89 percent of students in Tanzania

agreed that MOODLE supports interactive learning. Ally (2016), on the other hand, contradicted their findings and concluded that MOODLE lacked critical interactivity due to poor customization and configuration. This finding is supported by Odhiambo and Acosta (2009) who observed that the majority of LMS in Kenya lacked critical interactive features.

Kurniawan and Septiana (2021) also established that 43.5 % of students concur MOODLE learning management system facilitates interaction and communication between students and lecturers at Universitas of Bhinneka. This was also supported by Rodríguez, Pérez, and Machuca (2019) carried out a study of the use of a Teaching Assistant System (system) which was embedded in MOODLE LMS and established that students were extremely enthusiastic to interact and collaborate with their course mates in groups. This also indicates that the majority of learners were satisfied TA System linked to MOODLE learning management system. Almahasees, Mohsen, and Omar (2021) contradict this finding and emphasized that MOODLE learning management does not encourage interaction between instructors and their corresponding students. Peerapolchaiku, Suealek, Rojpibulstit. (2021) suggest that MOODLE LMS needs to be upgraded to enhance student-teacher interaction and thereby cultivate students' creativity and critical thinking abilities.

Maslov, Nikou, and Hansen (2021) on the other hand reiterated discussion forum in MOODLE LMS is such s difficult to use and to navigate. In education circles, a lack of interactivity between the instructors and learners

and also between learners and learning objects cannot guarantee learning has taken place. The above challenges experienced by learners which show limited interoperability might be due to poor customization of the MOODLE LMS with interactive features by ICT personnel, lack of skills to make eResources interactive by content designers and instructors, lack of time and motivation by lecturers to make eResources interactive and also lack of knowledge and skills to enhance the interactivity of eResources and users may have a direct impact on satisfaction by students.

4.9 Objective five

To determine the influence of Modular Object-Oriented Dynamic Learning Environment evaluation tools features on students' satisfaction in learning University common units.

4.9.1 Students responses on MOODLE evaluation features

The study examined influence of MOODLE evaluation features on students satification in learning common units in public universities in Kenya. The following table reflects students satification with MOODLE evaluation features.

Table 4.22 Crosstabulation on student's responses with MOODLE evaluation features indicators

	Statements of MOODLE evaluation features	S.A.	A.	N.O.	D.	S. D.	%
1.	Satisfaction with type of questions at the end of each unit.	26.3%	57.4%	0.56%	11.7%	4.04%	100%
2.	Satisfaction with variety of assignment.	1.4%	4.9%	81.3%	12.0%	0.4%	100%
3.	Satisfaction with discussion marks.	18.9%	47.0%	1.71%	20.1%	12.83%	100%
4.	Satisfaction with grade book.	6.7%	26.6%	1.13%	45.6%	19.7%	100%
5.	LMS quizzes assist to improve my performance	23.4%	54.8%	1.4%	14.9%	5.5%	100%
6.	Quizzes meet minimum threshold	0.31%	1.6%	93.2%	4.9%	0.0%	100%
7.	MOODLE ensures my grade confidentiality	35.2%	47.3%	1.8%	12.7%	3.0%	100%
8.	Generally, am satisfied with LMS evaluation tools	17.9%	60.8%	1.2%	14.7%	5.4%	100%

From the above table, item seven "since no other students……confidentiality" was highly rated with approximately 35.2% of undergraduate students strongly agreed, about 47.3% agreed, only1.3 % had no opinion, approximately 12.7% disagreed while about 3.0 % of students strongly disagreed with the statement. The second rated satisfaction was statement number five where 23.4% of students strongly agreed, about 54.8% agreed, partly 1.4% had no opinion, whereas 14.9% disagreed and 5.5% of students strongly disagreed with the statement that MOODLE quizzes help me boost my performance. The lowly rated satisfaction was statements six and two that "MOODLE quizzes provided are adequate" and "am satisfied with MOODLE assignment" respectively. This finding is in contrast to studies done by Wiradharma (2020) who established that 98.63 % of undergraduate students are satisfied with MOODLE online discussion assignments given by teachers.

Peerapolchaikul, Suealek, and Rojpibulstit (2019) also arrived at the same conclusion that students enjoy MOODLE quizzes at Thammasat University in Thailand. Similarly, studies by Jeljeli, Alnaji, and Khazam (2018) established that MOODLE learning management system contributed more to improving students' academic performance compared face book and traditional paper-based learning.

Febliza, etal (2022) established that MOODLE quiz features in the learning management system can produce valid, consistent, and hands-on criteria for evaluating communication skills course units. Sodoké, Raîche, Nkambou, and Riopel (2007), concluded that online examination is an almost new phenomenon in Africa. Maina Oboko and Waiganjo (2017) found out that MOODLE LMS does not support individual assignments but only collaborative activities in higher institutions of learning in Kenya.

Table 4.23 MOODLE evaluation Descriptive statistics on learner's satisfaction.

	MOODLE statement	Sampl	Mean x	STD. Error	Std. DEV	Vari.
a)	Am satisfied with questions that appear at the end of course unit.	1348	1.9517	.02267	.79689	.623
b)	Am satisfied with online assignment on each topic	1347	4.7749	.02365	.79303	.612
c)	Am satisfied how tutor marks for awarded during group discussions.	1345	2.2080	.02421	.88453	.754
d)	Am satisfied with my report on grade book	1344	1.8779	.02247	.82344	.665
e)	Quizzes in LMS enhance my academic achievement	1348	2.0204	.02268	.83773	.720
f)	Quizzes in each unit are meet threshold required	1347	4.7635	.02156	.79711	.637
g)	MOODLE ensure my performance confidentiality	1347	2.7568	.02282	.84495	.719
h)	Am satisfied with LMS evaluation tools	1346	2.1949	.02139	.78477	.641

Table 4.23 reflects students' opinions in public universities in Kenya on MOODLE evaluation feature found in the elearning platform. Scanning through the means it can be seen that satisfaction with MOODLE assignments attracted higher mean of 4.7749, followed closely by statement 'quiz adequacy with 4.7635. The third item students seem to be satisfied MOODLE LMS ensures confidentiality which had a value of 2.7568. The fourth item satisfaction with marks awarded which had a mean of 2.2080. Others include MOODLE quiz boost my performance, satisfaction with questions and grade book reports.

Gamage, etal (2022) established MOODLE LMS encourages collaborative learning among the students and at the same time enhance online evaluation and assessments Deepak (2017) also found out that lecturers from Kajaani University of Applied Science use assignment, feedback, forum, lesson and quiz for evaluating the students. Barge and Londhe (2014) on the other hand established that 78% of students were happy with MOODLE short tests while 65 percent indicated they were elated with multiple related questions. Jawad (2014), found both teachers and students were satisfied with MOODLE evaluation tools at Iraq universities. Although various tools are used in the evaluation of online learners, Yassine, Kadry and sacilia . (2016) asserts MOODLE LMS lack of integrated learning assessment tools that can evaluate educational goals and envisage a learner's academic success against a particular goal. Kaupp, Frank, and Watts (2013), reported that MOODLE has an inbuilt weakness in grading learning outcomes and the process is cumbersome causing delays in releasing grades to learners hence lowering student satisfaction. Although the overall MOODLE evaluation feature attracted an average mean of 2.0949 at Kenyan public universities, Jawad (2014) found both teachers and students were satisfied with MOODLE evaluation tools at Iraq universities. Although students in public universities in Kenya are excited during learning activities unfortunately the same enthusiasm is consciously missing during examination and evaluation sessions which is normally characterised by anxiety, mixed feelings, and exam phobia. These might be factors contributing to examination malpractices such as coming to examination with unauthorized materials, extra mobile phones with digital notes, and invisible hearing devices among other tactics of cheating in examinations.

Over 68% of students noted that exam malpractices are observed during end-of-semester examinations conducted online and more males compared to female students are involved in examination cheating done through MOODLE learning management system. Gamage, etal (2022) contradict the above findings by emphasizing that MOODLE LMS ensures academic integrity and examination ethos is maintained by the use of artificial intelligence. Muriuki (2020) noted it was a groundbreaking in Kenya after the University of Nairobi conducted its first-ever online examination in 2020 during the COVID-19 pandemic when over twenty masters of art students did sit for environmental law and environmental policy examinations from different locations within the country.

Dr Collins Odote, The Centre Director at UoN noted "***We used Google platforms to administer our exams-first we invited our students to Google Classroom so that we can see all of them and then we used Google Meet to monitor or invigilate the process***". This demonstrated a possibility that online examinations can be conducted for even undergraduate students by use of examination monitoring technologies such as web cameras, safe browsers, and non-browser software which enhances examination supervision and invigilation. Subekti (2021) on the other hand established that 68% of teachers strongly agreed that MOODLE learning management system assists them in conducting evaluation and assessment of students while 14% disagreed.

Peiping (2016) recommends the following concerning MOODLE evaluation-related activities: examiners should ensure stable interconnectivity in the MOODLE platform, both students and lecturers should be proficient in elearning skills, instructors to provide an appropriate threshold of evaluation activities to students to minimize fatigue in marking, instructors to design a comprehensive marking guide and limit student usability rights in MOODLE platform, for example, the non-editing user.

The study sought the lecturer's opinions on students' satisfaction the with online examinations through MOODLE learning management systems and approximately 64.2 % of lecturers noted that students were either extremely satisfied, satisfied, or moderately satisfied. A similar finding was reported in South Africa by Majola and Mudau (2022) who documented that "lecturers reported that student challenges in examinations in South African universities comprised of time allocated to examination, examination security, internet stability, access to mobile data, elearning skills and eLearning support from ICT administrators.

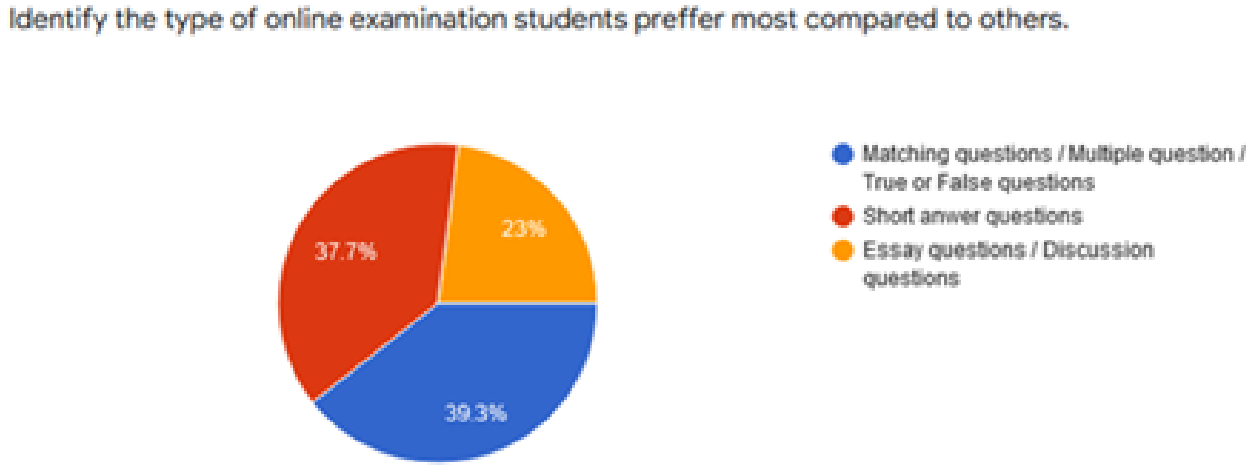
Baranova, Kobicheva, Tokareva, and Bryant (2021) also found related results in that old teachers faced serious ICT technical issues in the procedures of student assessment online and they were also apprehensive about the reliability of students' results including internet connectivity and lack of proper invigilation.

Ahmed, Thowiba, Saeed, Hesham, Khalek, and Zinadah (2021) found out that MOODLE learning management systems were widely used in online examinations compared to other computer applications. Their studies also pointed out that e-exam regional centers recorded the following challenges: speed of internet was reported in 99% of centers, internet cost was reported in 82% of centers, and validity of students results in 68% of the centers.

Although online learning and teaching have made great strides over the years, institutions in developing countries continue to face the traditional basic requirement of offering online education such as internet connectivity, stability, and speed. If these issues can be resolved, online student assessment and evaluation through MOODLE learning management system would run smoothly throughout examination sessions with similar enthusiasm that is experienced during online classes.

The study also wanted to establish lecturers' opinions in public universities on the types of examination students prefer online through MOODLE learning management system. The figure 4.7 shows the lecturer's responses.

Figure 4.7 Lecturers responses on preffered MOODLE examination by students



From Figure 4.5. approximately 39.3% of lecturers reported that students preferred matching /multiple questions, 37.7% of lecturers opined that students preferred short answer questions while 23% noted that students enjoy essay and discussion questions examinations.

This finding is collaborated by 70% of students during focused group discussion who observed that they prefer multiple choice and short answer questions when requested to "comment on the type of examination they prefer during online examination in MOODLE platform". The study also found that less than 25% preferred discussion or essay questions as they give them latitude to express themselves.

Frankl and Bitter (2012) established the following problems reported by students associated with online examinations: technical-related issues at 45%, time constraints at 25%, problems with questions at 22%, and typing problems at 20%.

4.9.2 Students bad experience with MOODLE examinations

The following comprises of experiences shared by participants they encountered during MOODLE examination-related activities**.**

*"There are some course units that should not be examined online for example mathematics, statistics, accounting, and economics". (*second-year students, University B*). On* probing further students noted, "You *have to do calculations elsewhere and then attach to the examination portal page, and sometimes the attachment refuses to be uploaded. This is very frustrating*". *(second-year female student, university B).*

Adnir etal (2020) on the other hand established contradictory findings by insisting that MOODLE online exams have minimal stress and are more dependable and reasonable compared to conventional paper and pencil examinations.

"*Time usually not enough for calculation and the portal may close when you are in the middle of the response unlike for the physical examination, the invigilator may add extra five or ten minutes*" (second-year male student, university D)

"Although *description questions are good, they consume a lot of time*". (second-year male student, university B)

"*I hate online examinations due to rampant cheating*. (second-year female student university E). On probing further, they revealed that one usually comes with more than one smartphone with class notes which is easy to open and refer to during examination. The researcher wanted to know the extent of cheating in an online examination and these were the responses "*It is easy to cheat"*. Second-year student, university B. Another female participant noted that *"*3 *out of 5 of my close friends have admitted to having cheated at least once in an online examination since the university cannot use the webcam to check all students during the examination session*." (Second year, female student university B). Studies by Henderson & Crawford (2020) also found online examinations are associated with unnecessary anxiety and rampant cheating. Noorbehbahani, Mohammadi, and Aminazadeh, (2022) pointed out that the most appropriate strategy to discourage examination cheating online is to reduce cheating motivation.

The study sought to know what improvement can be done to increase satisfaction with MOODLE evaluation features and the specific question asked "*What do you think can be done to improve your satisfaction with online examination done through MOODLE LMS platform*?" These were the responses "*increase examination time*" (Female student, university A) on further probing why they needed more time, over 50% of students agreed they wasted a lot of time login into the examination portal including an unstable internet network.

"*Do away with multiple questions*". (second-year male student, university B).

"*Introduce more expression questions*". (Second-year male student, university E). *For discussion questions, more space should be provided for answering the question instead of typing elsewhere and dragging to space provided since it is too much tedious, time-consuming and some phones cannot allow you to drag the answer into the space provided*" (second-year female student, university A)

Haider, Hussein, and Saed (2022) established that stable internet services ensure efficiency in online assessments and testing.

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4.9.3 Director of quality assurance and dean of school's responses on student's satisfaction with MOODLE evaluation features

The study sought the opinion of directors of quality assurance, deans of schools, and eLearning administrators on the satisfaction of students with MOODLE evaluation features and these are their responses: Approximately 66.67% of directors of quality assurance noted that students are not satisfied with evaluation features as it consumes a lot of time and encourages examination cheating while 33.33% observed that students are satisfied with assessment conducted online. Some of the reasons why students are not satisfied include: a lack of suitable smartphones or laptops, expensive data bundles, elearning skills, and poor attitude towards online learning activities. On the other hand, a third of the deans of schools observed that students are satisfied to some extent with MOODLE examinations while two-thirds insisted that our students are not satisfied with MOODLE examinations citing unpreparedness, rampant

cheating, smartphones with limited storage space, and occasionally electricity power hitch.

4.10 Testing hypothesis five

$H0_5$: There is no significant relationship between modular object-oriented dynamic learning environment learning management system evaluation tools and student's satisfaction on learning of common University units.

The study sought to establish if there is a relationship between accessing modular object-oriented dynamic learning environment and student's satisfaction in learning common units in public universities in Kenya. Ordinal regression statistics were used to test if such a relationship exists at alpha 0.05. Any value less than 0.05 ($p \leq 0.05$) indicates the result is not statistically significant which means the null hypothesis was rejected. A p-value more than 0.05 ($p \geq 0.05$) means the result is statistically significant and the null hypothesis is not rejected (Degu and Yigzaw, 2006; Cohen et al,2007; Chian, Rajiv and Price 2015). The outcome is represented in Table 4.22.

4.10.1 Summary of findings MOODLE evaluation features and student's satisfaction

This highlights the students level satisfaction in MOODLE evaluation features in public universities in Kenya where data was subjected to ordinal regression test statistics.

Table 4.24a): Ordinal regression of students' satisfaction with MOODLE evaluation features

Parameter Estimates

Parameter Threshold	B	Std. Error	95% Confi. Interval Lower	Upper	Hypothesis Test Wald X^2	Df	Sig.	Exp(B)	95% Wald Confidence Interval for Exp(B) Lower	Upper
Extremely Satisfied	-1.094	1.6072	-4.244	2.056	.463	1	**.496**	0.335	0.014	7.818
Very Satisfied	.709	1.5721	-2.372	3.790	.204	1	**.652**	2.033	0.093	44.278
Moderately Satisfied	2.393	1.6115	-0.765	5.551	2.205	1	**.138**	10.946	0.465	257.600
Slightly satisfied	3.554	1.6521	0.316	6.792	4.627	1	**.031**	34.942	1.371	890.509
MOODLE Evaluation Features	.511	.5557	-0.578	1.600	.847	1	**.357**	1.668	0.561	4.955
(Scale)	27.394[a]									

Dependent Variable: OVERT: Overall MOODLE features students' satisfaction
Model: (Threshold) MOODLE evaluation features (MEV1,MEV2….MEV8)

a. Computed based on the Pearson chi-square.

Table 4.24b) Test of model effects on MOODLE evaluation features.

Tests of Model Effects

Source	Wald Chi-Square	Df	Sig.
MEV	0.847	**1**	**0.357**

Dependent Variable: OVERT Overall MOODLE students' satisfaction

Model: (Threshold), MEV - MOODLE evaluation feature

The ordinal regression tests in Table 4.22a) above show the parameters of the influence of MOODLE evaluation features on students' satisfaction in learning common units in public universities in Kenya. The significant value for all the parameters was over always greater than P= 0.05. For example, extremely satisfied had significant value of 0.496, very satisfied had significant value of 0.652, moderate satisfied had a score of 0.38 while slightly satisfied parameter had a significant value of 0.031. The overall MOODLE evaluation significant value was **0.357.** This implies the null hypothesis was not rejected therefore the study concluded the no significant relationship between MOODLE evaluation features and student's satisfaction with learning of common University units.

Some of the factors that lead to low levels of MOODLE evaluation satisfaction in public universities in Kenya include tensions and anxiety concerning online examinations, limited time allocation during online examinations, slow and non-responsive systems, difficulties in editing answers, inefficient smartphones brands,

especially in handling examination questions that demand drag and drop items, uploading difficulties, unstable internet connectivity, online learning skills among others.

Sentiments from focused group discussions indicate that over 75% of students are requesting the universities to do away with online assessment completely as it encourages cheating, internet infrastructural challenges, limited elearning support services, poor invigilation exercise, and poor customization of examination interface pages among other reasons. On further probing students revealed that more male learners compared to female learners are involved in online examination malpractices which involve smuggling extra smartphones which they use to communicate with their collaborators through short message services, sharing images and photos through WhatsApp, Instagram, and Hangout icons. This is in contrast to findings by Adanir etal (2020) who established that Turkish students were more satisfied than Kyrgyzstan students with MOODLE online examination citing: its reliability, minimal stress, and reasonable compared to physical pen and paper examination. Niragudi (2021) on the other hand demonstrated that positive attitude toward MOODLE online examination is favored by the following factors: being male gender students, students residing in urban areas, students whose parents have possess postgraduate education, and also students pursuing computer science-related degree program are likely to have a positive attitude towards online assessment.

Although the majority of students suggest they want online semester exams to be scrapped altogether, a cross-section of students said they prefer online quizzes to be up scaled as it assists them in understanding the taught content since a student can

resubmit the responses without limit until they are satisfied with a given score. This finding is closely related to studies done by Essel and Osafo (2017) which established 77.7% of students at the University of Ghana prefers taking quizzes and test on MOODLE platform.

Studies by Awandu (2021) on the other hand exposed weaknesses in Kenya's public universities in terms of teaching and assessment preparedness that the majority of institutions experienced during covid-19 pandemic period session. The online evaluation had a myriad of challenges and the majority of learners especially from rural areas with challenges of 3G and 4G networks were totally unable to register to attend online classes. Some who managed had a rough time during examinations, some students were also unable to access the MOODLE LMS portal and therefore did not upload their responses. Major reasons pointed out include poor network connectivity, expensive mobile data bundles, and a lack of stable power supply to facilitate online classes and assessments.

Hölbl, Welzer, Nemec, and Sevčnika (2011) found out that 92% of learners were satisfied with MOODLE evaluation features because it guaranteed the privacy of individual grades and marks. Awandu (2021) also reiterated online examination supervision provided the opportunity for rampant cheating in examinations. It was also reported some institutions with poor infrastructure suspended online assessments and resorted to physical examinations. Few public universities were prepared to manage online examinations by either resorting to using webcams, non-browser software, or monitoring exam sessions in computer labs/rooms among other strategies.

Sonia, Bouziane, and Alvarez (2014) observed at The Paris Descartes University the MOODLE LMS have a link to question banks and activities in which learners can use digital devices to respond to a variety of questions when a learning session is ongoing enabling tutors to pick learners learning progress and prompt feedback.

Peiping (2016) did a study of interactive evaluation on MOODLE platform in distance education at Kunming University in China and established that MOODLE evaluation interactive feature enable learners to partake in classroom teaching with passion provided that the following condition is met: adequate internet connectivity, learners and tutors are equipped with savvy skills, tutors to put into control number evaluation activities to minimize fatigue, instructors to provide comprehensive evaluation criteria among others. Alvarez and Villamañe (2022) on the other hand conducted a study involving 26 tutors at the University of the Basque Country Spain using MOODLE evaluation features and analyzed the MOODLE grade book in their courses and the study revealed that it was challenging to use MOODLE grade book in evaluating different courses.

Studies by Waheed, Kaur, Noor, and Qazi (2013) at the University of Malaya in Kuala Lumpur, Malaysia observed that the majority of students concurred that MOODLE evaluation tool for submitting assignments and viewing individual grades is stress-free. This is also echoed by Ssekakubo, Suleman, and Marsden (2013), who noted that students prefer to use MOODLE features such as chat room assignments, course outlines, and announcements, implying they are satisfied with them on the other hand García, Molina and Pons (2010) found out female's students were more active in using wikis and uploading assessment documents compared to male students at University

of Valencia, Spain. Sharma and Holbali (2022) observed that challenges associated with language assessment include:

security, time limitation, internet accessibility, ethical aspects, digital literacy and expertise, technological failures, and learning outcomes

Studies by Hongjiang and Mahenthira (2016) established that one of the determinants of students' satisfaction with MOODLE evaluation features is the ease of completing assignments online. Hasan (2019) on the other hand observed that MOODLE learning management system operated through a mobile phone interphase does not allow students to view previous examinations, or material display before registering for the course such as books, presentations, and course outlines. This lowers motivation and by extension their satisfaction with the MOODLE features.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section provides the summary of the findings, discussions, conclusions and recommendations of the study.

5.2 Summary of the study

The discovery of the internet and advancement in the field of information communication and technology (ICT) has revolutionized the way teaching, learning, and research are being conducted globally. Institutions of higher learning in developing countries in Africa have resorted to adopting efficient and cost-effective ICT solutions for conducting online learning. One of such solution is the use of a modular object-oriented dynamic learning environment (MOODLE) learning management system which is among the free open-source software that has been adopted by public universities in Kenya.

Kenya has 41 public higher institutions of learning comprising of 35 fully fledged universities, five public university constituent colleges, and one specialized degree-awarding university called National Defense University established in 2021. Out of this 17 universities (41.46%) have adopted MOODLE LMS for offering either full-time online programmes or university common units, especially to undergraduate students. Common units such as communication skills, entrepreneurship, HIV and AIDS, critical thinking skills, ethics and integrity, and introduction to computer and ICT at offered online using MOODLE LMS platform since it is economical and cost-effective

in teaching large classes of undergraduate students who cannot all fit in one physical lecture hall.

In the recent past after the outbreak of COVID-19, all the education institution in Kenya was closed for a while and almost all the institution of higher learning was required to conduct online classes. Although online learning was adopted in some institutions in Kenya from 2010 onwards scanty information about MOODLE learning management system features exist.

MOODLE LMS has several features and tools that all online users have to interact with them in one way or another for teaching and learning to take place. Although there are numerous study findings about the perception, attitudes, and challenges of online learning and distance education, there is scanty information on online platforms especially MOODLE LMS in local public universities in Kenya. The current study, therefore, seeks to investigate the student's satisfaction level of MOODLE LMS features in learning common units in public universities in Kenya.

The primary data for the study was collected using the following tools: students' questionnaires, lecturer's questionnaire, focused group discussion, and interview guide for the following: deans of faculties, directors of quality assurance, and elearning administrators. The study was guided by the constructivism theories of Jean Piaget and Lev Vygotsk*y*.

The study employed a mixed methodology research approach that involved the triangulation of both qualitative and quantitative methods. Descriptive and

inferential statistics were used for data analysis through statistical packages for social sciences.

The study had five objectives which guided the study. The following were the objectives:

i.) To determine the relationship between ease of access of Modular Object-Oriented Dynamic Learning Environment and students' satisfaction in learning of University common units.

ii.) To establish the relationship between Modular Object-Oriented Dynamic Learning Environment feedback features and students' satisfaction in learning of University common units.

iii.) To examine the relationship between Modular Object-Oriented Dynamic Learning Environment communication tool features and students' satisfaction in learning University common units.

iv.) To evaluate the relationship between Modular Object-Oriented Dynamic Learning Environment interactivity features and students' satisfaction in learning University common units.

v.) To determine the relationship between of Modular Object-Oriented Dynamic Learning Environment evaluation tool features and student satisfaction in the learning of University common units.

The following comprises of null hypotheses formulated in order to measure the above objectives.

H01: There is no significant relationship between ease of accessing modular object-oriented dynamic learning environment learning management system and student's satisfaction in learning common University units.

H02: There is no significant relationship between modular object oriented

dynamic learning environment feedback features and students' satisfaction level with learning common university units.

H03: There is no significant relationship between modular object-oriented dynamic learning environment communication features and students' satisfaction in learning common university units.

H04: There is no significant relationship between modular object-oriented dynamic learning environment interactive features and students' satisfaction in learning common university units.

H05 There is no significant relationship between modular object-oriented dynamic learning environment evaluation tools and students 'satisfaction in learning of common University units.

Objective one was to determine the ease of access of MOODLE features on students' satisfaction in learning university common units in public universities in Kenya. The null hypothesis tested established there is no relationship

between ease of access to MOODLE features and student satisfaction. The level of significance was 0.515.

The second objective was to examine the influence of Modular Object-Oriented Dynamic Learning Environment feedback features on students' satisfaction in learning University common units in public universities in Kenya. The null hypothesis tested found there is no significant relationship between modular object-oriented dynamic learning environment learning management system feedback features and students' satisfaction with learning of common University units. The significant level was 0.884

The third objective aimed to establish the influence of Modular Object-Oriented Dynamic Learning Environment communication features on students' satisfaction with the learning of University common units. The hypothesis tested confirmed that is no significant relationship between Modular Object-Oriented Dynamic Learning Environment learning management system communication features and students' satisfaction with learning of common University units. The significant level was at 0.902.

The fourth objective evaluated the influence of Modular Object-Oriented Dynamic Learning Environment interactivity features on students' satisfaction in learning University common units in public universities in Kenya. The hypothesis tested revealed that there is no significant relationship between interactive features of Modular Object-Oriented Dynamic Learning

Environment learning management systems and students' satisfaction with the learning of common units in public universities in Kenya. The significant level was at 0.787.

The fifth objective on the other hand sought to determine the influence of Modular Object-Oriented Dynamic Learning Environment evaluation tools features on student satisfaction in learning of common units in public universities in Kenya. The hypothesis tested revealed that there is no significant relationship between evaluation features of Modular Object-Oriented Dynamic Learning Environment learning management systems and students' satisfaction with the learning of common units in public universities in Kenya. The significant level was at 0.357.

5.3 Findings for the Study

5.3.1 MOODLE LMS ease of access features and student's satisfaction

There is no significant relationship between Modular Object-Oriented Dynamic Learning Environment learning management system ease of access features and student's satisfaction on learning of common University units in public universities in Kenya. The level of significance was P=0.515

The study established student satisfaction level with ease of access MOODLE LMS range from low to high (23% to 75%) that 74.2 % in learning common units in public universities in Kenya.

5.3.2 MOODLE feedback features and student's satisfaction

There is no significant relationship between MODULAR OBJECT-ORIENTED DYNAMIC LEARNING ENVIRONMENT learning management system feedback features and student's satisfaction on learning of common University units. The significant *level was 0.884*.

The study revealed moderate students satisfaction level (62.4 %) with MOODLE feedback features on students satisfaction in learning common units in public universities in Kenya.

The study also noted that 93% of students agree that they receive feedback from their databases promptly. Another finding of that study is that 65% of students are generally satisfied with Moodle feedback features. This finding was also similar to that proposed by lecturers teaching common units in public universities in Kenya.

The study also noted that instructors are selective in queries or clarifications that they respond to instead of all student requests. The students also complained that their chat questions directed to lecturers go answered. This lowers their motivation and consequently their satisfaction.

5.3.3 MOODLE communication features and student's satisfaction

There is no significant relationship between Modular Object-Oriented Dynamic Learning Environment learning management system communication features and students' satisfaction with learning of common University units.

The significant level was at P= 0.902.

The study revealed that medium to high (60- 71.8%) student's satisfaction level with MOODLE COMMONUCATION features on learning common units in public universities in Kenya,

71.8% agrees that there is a variety of communication features available in MOODLE LMS portal such as chats, forums, blogs, discussion links, microphone, mute and unmute icons, raise hand icon, and many more. The study also noted that 38% of students are unable to access social media sites

Another key finding is that 95% of students complained they are unable to revisit online discussions at a later date.

The study also established 67.4% of students are generally satisfied with Moodle's communication features. The majority of students complained that the instructor control who to speak and when to speak and sometimes ignore them even after clicking the raise hand icon when online class is in progress triggering frustration and lowering their motivation and satisfaction in learning common units.

Another key finding noted is that there is over dominance of extroverts is common in an online class session and a cross-section of participants suggested joining the portal should allow the learner to choose to log in as an extrovert or introvert and the lecturer screen should be split into the two categories for balanced engagement.

5.3.4 MOODLE interactive features and students' satisfaction

There is no significant relationship between Modular Object-Oriented Dynamic Learning Environment learning management system interactive features and

student's satisfaction on learning of common University units in public universities in Kenya. *The significant level was at 0.787*

The study found out low students satisfaction (16.5%) with MOODLE interactive features on learning common units in public universities in Kenya.

Key findings of the study revealed that 16.5% of students in public universities in Kenya agreed that eResources responds when a command is given to a specific resource.

The study also established that 65% of students agree that lecture notes are interactive for learning common units in public universities in Kenya.

Another key finding of the study is that 65% of students agree that there is a variety of interactive activities in the MOODLE LMS such as pools, quizzes, drag and drop, flashcards, interactive videos, animations, hot potato, and games.

The study also found that the majority of eLearning administrators and directors of quality assurance noted that eResources are not interactive because the content creators lack skills or enough time to make them interactive.

5.3.5 MOODLE evaluation features and student's satisfaction

There is no significant relationship between Modular Object Oriented Dynamic Learning Environment learning management system evaluation features and student's satisfaction on learning of common University units in public universities in Kenya. *The significant level was at 0.357.*

The study shows low students satisfaction level (16.5%) with MOODLE LMS evaluation features on learning common units in public universities in Kenya.

.However, 35% of students are not satisfied with reports being generated on their grade books. This might be due to the subjective allocation of marks by instructors since some of the indicators used learners may not be aware of for example allocation marks for participation, and viewing eResources among others.

The study also revealed that about 83% of students are satisfied with the confidentiality of their marks since their classmates cannot view them.

The study found that over 78% of students in public universities are generally satisfied with MOODLE LMS evaluation features such as assessment, confidentiality, and variety of assessments provided which help to build their confidence in passing end-of-semester examinations.

Another finding of the study is that the majority of learners suggested that universities should do away with online end-of-semester examinations as it encourages cheating.

The study also found that although over 70% possess smartphones about 30 % of those phones are not suitable for online assessment due to their limited space.

The majority of students prefer multiple questions, true or false questions, and short answer questions for quizzes. And questions that demand drag and drop should not be administered since the quality of their smartphone is not responsive to such questions.

The study also revealed that not all course units should be assessed online especially those that demand calculations such as mathematics, accounting, and engineering.

Another key finding noted is that more males gender compared to females are involved in cheating online examinations due to confidence compared to female gender who are a bit fearful.

Another key finding is that the majority of female students don't do well in online examinations due to low confidence in the use of MOODLE features and anxiety build which is counterproductive during the examination. This is in contrast to the male gender who appears to be relaxed and exhibit a lot of confidence in using evaluation features

5.4 Conclusions of the study

The students are moderately satisfied with the ease of access features since the procedure is easy to log in and takes more than 10 seconds. Sometimes they are unable to log in due to system related factors and students related factors . This implies that MOODLE LMS is still an efficient, economical, and reliable approach available for higher institutions in Kenya managing to teach and learn in the phase of ever-increasing student enrolment.

The majority of learners are not satisfied with MOODLE LMS feedback features. Learners complain that they hardly get feedback on queries and issues raised through MOODLE LMS. For effective teaching to take place learners should receive feedback

from their instructors regarding progress and also students should provide feedback for quality lectures and eResources used in learning common units.

MOODLE LMS communication features are not fully exploited or used by both students and their instructors. Learners get frustrated and disappointed if lecturers deny them the opportunity to speak when an online class is in progress.

MOODLE learning management system interactivity of eResources is low. This implies that the MOODLE designers and content developers have the opportunity to make teaching and learning interactive to boost students' motivation and satisfaction.

The is low satisfaction with MOODLE evaluation features due to alleged massive cheating, time management, a non-responsive system in editing responses later, and difficulties in drag-and-drop responses among others.

Finally, the study suggests that there is a slight difference between male and female students on MOODLE features satisfaction in learning common units. This is also confirmed by eLearning administrators who observed that while male students seek more support from eLearning administrators, females tend to seek support from male students instead of contacting ICT unless it is a private issue for example portal activation after registration/fee payment.

5.5 Recommendations of the Study

The following recommendation is informed by an analysis of data collected in relation to the study.

i). Public universities in Kenya to strengthen their partnership with international internet service providers and digital gadget manufacturers with local presence for learners to benefit from affordable internet service and to provide quality and affordable eLearning gadgets respectively.

ii). Frequent training on elearning skills among all users be done periodically and frequently. This implies that Universities should discontinue a single session of 6 hours of continuous elearning skills training that is carried out during first-year orientation.

iii) All universities to upgrade their internet infrastructure to match elearning demand and distribute Wi-Fi- hot spots areas within university environs for learners to access online classes. Upgrading the internet implies dedicated bandwidth for online learning to create stability during peak hours.

iv) Universities should consider integrating social media software in MOODLE LMS since its popularity amongst the students for sharing eResources.

5.6 Suggestions for further research

i) To carry out a comparative study to establish if there is a difference in examination performance of students subjected to MOODLE elearning approach, face-to-face, and blend between learning in public universities in Kenya.

ii) A study to be carried out to establish why male students are more involved in examination cheating than female students while using MOODLE LMS.

iv) A study to be carried out to establish if all students can be mainstreamed into online learning in n public universities.

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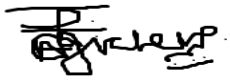
APPENDICES:

Appendix I: Introduction Letter

UNIVERSITY OF NAIROBI
Faculty of Education
Department of Educational Management, Policy and Curriculum Studies
Telegram: "CEES"
Telephone: 020-2701902
Email: dept-edadmin@uonbi.ac.ke P.O. Box 92-00902, Kikuyu

Ref: UON/CEES/SOE/A&P/……
Dated 1st October 2021

Re: **Request to participate in filling in questionnaire for PhD Thesis**
Dear Sir / Madam,
I hereby solicit your assistance towards a research that I am undertaking as part of my Ph.D. studies at University of Nairobi. This research seeks to establish the influence of MOODLE learning management system use in offering UCU units online. I will be grateful if you can spare few minutes either filling in questionnaire or participate in focused group discussion or being interviewed by clicking the link below. The information that you will provide will contribute significantly towards the research. I will appreciate if you will complete filling in the consent form and submit by 5th October 2021.
Thank in advance.
Yours sincerely,



Mwangi Gicheru.
gichmwangi@gmail.com 0704140784

Appendix II: Student's perception questionnaire on influence of Modular Object Oriented Dynamic Learning Environment on student's satisfaction in learning common University units in public universities in Kenya.

	Part I	: **Bio data** 1. Kindly indicate the undergraduate programme you are pursuing Bachelor of …… 2.Indicate your gender by the ticking one box Male ( ) , Female( ) 3.Indicate your age bracket by ticking one box below 15- 25 Years ( ), 26- 30 Years ( ), 31-40 Years ( ) , Over 41 Years ( )				
	PART II: MOODLE FEATURES SATISFACTION					
	Section A: MOODLE LMS ease of access and satisfaction Below are statements regarding features/tools in the MOODLE learning management system. Indicate your opinion by ticking the appropriate box in the table provided. Please tick once against each of the statements 1-10 below **KEY**: **SA**- Strongly Agree, **D**- Disagree, **NO**- No Opinion, **A**- Agree**, SD** -Strongly Disagree.					
	Statements on ease of access feature of MOODLE LMS	SA	D	NO	A	SD
1	I Spent few seconds to log in MOODLE eLearning portal					
2	The procedure to log in to eLearning portal is easy.					
3	It's easy to locate all MOODLE features/tool.					
4	eResources are well organized enable me to locate them easily.					
5	I spend less than 10 seconds to open and view or listen an eResources of my choice e.g. pdf, video clips e.t.c.					
6	I can access eLearning portal anytime I feel like.					
7	Overall am satisfied with ease of access of eLearning resources.					
	Section B: Below are statements regarding **MOODLE LMS feedback on students' satisfaction**. Kindly					

	indicate your opinion by ticking the appropriate box in the table provided. Please tick once against each of the statements 1-7 below **KEY**: **SA**- Strongly Agree, **D**- Disagree, **No**-No Opinion **A-** Agree**, SD** -Strongly					
	Statements on MOODLE LMS feedback on student's satisfaction	**SA**	**A**	**NO**	**D**	**SD**
1	I usually receive responses to my questions from my lecturers on time					
2	I usually get my course progress on time					
3	MOODLE databases provide feedback immediately I submit my quizzes or questions.					
4	Questions that are addressed to ICT support are responded within 48 hours					
5	Iam satisfied with "my reports "where I can check my grade as this tool saves time and ensures confidentiality.					
6	Overall am satisfied with feedback that I receive during my study					
	Section C: Below are statements regarding **MOODLE LMS communication features on students' satisfaction**. Kindly indicate your opinion by ticking the appropriate box in the table provided. Please tick once against each of the statements 1-7 below					
	Statement on Communication tools features of MOODLE LMS and student's satisfaction	**SA**	**A**	**NO**	**D**	**SD**
1.	Am satisfied with variety of communication tools that are available in my online page such as forums, blogs, chats					
2.	Am satisfied with the way I communicate with my course lecturer online					
3.	Am satisfied with the way I communicate with my classmates					
4.	Am satisfied with discussion forums as it allows everyone to participate					
5.	Am satisfied on carrying out assignments in MOODLE through Wiki, blogs					

6.	Am able to revisit previous discussion and previous lesson.					
7.	It's difficult to access social media sites from eLearning portal					
8.	Overall am satisfied with MOODLE communication tools					

Section D: Below are statements regarding **Interactivity of MOODLE LMS and satisfaction**. Kindly indicate your opinion by ticking the appropriate box in the table provided. Please tick once against each of the statements 1-8 below

KEY: SA- Strongly Agree, **A-** Agree**, NO –** No opinion, **D-** Disagree, **SD** -Strongly Disagree

	Statement on Interactivity tools features of MOODLE LMS and satisfaction	**SA**	**A**	**NO**	**D**	**SD**
1.	MOODLE systems respond immediately I click a link online					
2.	Lecture notes are interactive in MOODLE system					
3.	Links open immediately I click					
4.	There are different tools for interacting with my classmates online					
5.	I have more chances of participating online and interact with my teacher					
6.	There are a number of eLearning resources that I can open, view, listen whenever I feel like					
7.	Discussion forums help me to interact with my classmates freely.					
8.	Am satisfied with interactive activities such as polls, quizzes, drag and drop, flash cards, interactive videos, animations, games e.t.c					

Section E Below are statements regarding **MOODLE LMS Evaluation tools feature on student's satisfaction**. Kindly indicate your opinion by ticking the appropriate box in the table provided. Please tick once against each of the statements 1-10 below.

KEY : **SA**- Strongly Agree, **A**- Agree, NO -No opinion **D**- Disagree , , **SD** -Strongly Disagree

Statements on MOODLE LMS Evaluation features and satisfaction		**SA**	**A**	**NO**	**D**	**SD**
1.	Am satisfied with the quality of questions that appear at the end of each topic.					
2.	Am satisfied with assignment on course units online because they are challenging.					

3.	Am satisfied how lecturers assigned marks for participating in discussion.					
4.	Am satisfied with report being generated on my grade book					
5.	MOODLE quizzes boost my academic performance					
6.	MOODLE quizzes provided at eLearning portal are adequate					
7.	Since no other students can view my marks, am satisfied with confidentiality					
8.	Overall am satisfied with MOODLE LMS evaluation features					

General student's satisfaction level with MOODLE features in learning common units.

	KEY: **ES**- Extremely satisfied, **VS**- Very Satisfied, **MD**- Moderately Satisfied , **SS** –Slightly Satisfied , **NS**- Not Satisfied (Tick one box)	**TICK ONE BOX**				
	Overall satisfaction with MOODLE learning management system features	**ES**	**VS**	**MS**	**SS**	**NS**
	a) How would you rate your overall satisfaction using MOODLE features for learning common units online?					

	b) Please indicate two reasons for your answer in a) above **1.** **2.** **Thank you for your time in answering the questionnaire.** **Click the SEND button**

Appendix III: Lecturers views Questionnaire on Moodle Student's Satisfaction in Teaching University Common Units (Tick One Box).

1.In your own opinion are eLearners satisfied with ease of access features found in MOODLE? **Strongly Agree** ☐ , **Agr** ☐ , **Dis** ☐ **ee** , **Strongly disagree**.☐

2.In your own opinion do you provide online feedback to eLearners on MOODLE promptly? **Strongly agree** ☐ , **Agree** ☐ , **Disagre** ☐ , **Strongly Disagree** ☐

3.Are students satisfied with online feedback you provide to them?

Strongly agree ☐ , **Agree** ☐ , **Disagree** ☐ , **Strongly Disagree**.☐

4.Are students satisfied with online communication features? **Strongly agre** ☐ **, Agree** ☐ **, Disagree** ☐ , **Strongly Disagree** ☐

5.Are students satisfied with online interactive features? **Strongly agree** ☐ **, Agree** ☐ **, Disagree** ☐ , **Strongly Disagree** ☐

6.Are students generally satisfied with online evaluation features? **Strongly agree** ☐ **, Agree** ☐ **, Disagree** ☐ , **Strongly Disagree** ☐

7.Rank the order in which students prefer the following types of assessment mode (Indicate one numeral e.g. 1,2,3,4,5 in each box based on learner's preference)

*Multiple choice questions.☐

*Essay questions ☐

*Matching questions ☐

*Short answer question ☐

*True or false questions ☐

8.Between male and female student who are more satisfied with MOODLE online

Classes?. Males ☐ Females ☐

9.What do you think can be done to increase student's satisfaction on learning common units online?

Appendix IV: ELearning administrators interview questions on MOODLE features students' satisfaction.

1.What can say about efficiency of MOODLE LMS in delivering eLearning?

2. On a scale of 1-5 how would you rate student's satisfaction with ease of access to eLEARNING portal? 5 being highly satisfied.

3.Are the students able to locate eLearning resources without difficulty?

4.How fast do you respond to learner's query or assistance?

5.What is your opinion on learner's satisfaction with MOODLE communication features?

6. What is your opinion on learner's satisfaction with interactive features on the eLearning platform?

8. What duration are you supposed to responds to leaners queries?

7.What can you say about learner's satisfaction with MOODLE evaluation features?

8.Between male and female students, which gender do you think are more satisfied with MOODLE features?

9.Between male and female students, which gender do you receive more queries on learner's support? Thank you very much for your time.

Appendix V: Dean of Schools' / Faculty Interview Questions on MOODLE Features Students' Satisfaction.

1.Between face to face and online learning mode which would you recommend university to teach common units to undergraduate students?

2.What is your opinion on student's satisfaction in accessing eLearning portal?

3. What can say regarding student's satisfaction with online evaluations?

4.What can you say regarding use of communication features in the online platform?

5.In your opinion are students satisfied with interactive online activities in the eLearning portal?

6. Between male and female students, which gender do you think are more satisfied with online learning?

7.What do you think can done to increase student satisfaction in learning common units online?

Appendix VI: Directors of Quality Assurance Interview Questions on MOODLE Features Students' Satisfaction.

1.Between online and face to face learning which mode attracts a lot of complaints from students?

2.In your own opinion between online and face to face learning which learning mode students are more satisfied for learning common units?

3.To what extents are students satisfied with:

a) Ease of access features

b) Feedback features

c) Interactive features

d) Communication features

4.Between male and female students, which gender is more satisfied with online learning.

5.On a scale of 1-5 . how would you rate student's satisfaction with online?

evaluation /assessment? 5 being higher rating.

6.What do you think can done to increase student satisfaction in learning

common units online?

7.In future would you recommend online learning or face to face learning of common units to University management?

Appendix VII: Focused group discussion guide Preliminaries

Moderator introduces himself and the assistant moderator to participants.

Brief introduction/background of focus group topic

Focus group participant's introduction and ice breakers

General rules to be observed.

Sub Theme A: MOODLE ease of access features

i)General experience between online and physical learning of university common units

ii)Thought on ease of accessing online learning

iii)Opinion on satisfaction on accessing online learning.(on scale of 1 to 10)

iv)Use of probing questions if need arises

Sub Theme B : Communication Features

i)Favorite communication features in MOODLE platform

ii)Satisfaction with communication features

iii)Improvement needed on communication features.

Sub Theme C: MOODLE Interactive Features

i)Thought of MOODLE interactive activities

ii)Satisfaction with MOODLE interactive features

iii)Improvement that could make interactivity interesting

Sub Theme D: MOODLE Evaluation Features

i)Opinion between online and physical examinations

ii)Pros and cons of online examination

iii)Satisfaction with online examination

iv)Use of probe questions where necessary

Sub Theme E: Gender MOODLE Features Satisfaction

i)Opinion of male students on MOODLE features satisfaction

ii)Opinion of male students on MOODLE features satisfaction

iii)Use of probe questions where necessary

Is there anything we have forgotten that we should have discussed in relation to MOODLE satisfaction?

Wrap up, Summary of discussion responses by assistant moderator.

Final thoughts and thanking the participants.

Appendix VIII: Consent Form Interview for Directors of Quality Assurance

You have been selected to participate in a research study on influence of MOODLE features on student's satisfaction in learning university common units in public universities in Kenya. This is a PhD Research study conducted by Erick Gicheru Mwangi, a student at University of Nairobi which focuses on MOODLE features such as: ease of access, feedback features, communication tools feature, interactivity features, evaluation tools and gender satisfaction in using the platform. The interview should take approximately 20-30 minutes.

PARTICIPATION

Your participation in this study is voluntary . You may decline or withdraw from taking part in the research study at any time without giving reason. You may choose not to answer any specific question you do not wish to respond to.

The interview will be recorded since the researcher cannot write everything during the interview.

BENEFITS

You will receive no direct benefits or cash rewards from participating in this research study. However, your responses will be helpful in providing details of MOODLE online learning satisfaction.

RISKS

There are no risks involved in participating in this study.

Some emotional distress might occur when answering questions relating to your personal experience in some aspects.

CONFIDENTIALITY

The information that you will provide in the interview will only used for this study. The recorded audio clip will be kept safe electronically under secure password. The recording will be deleted after the information has been processed.

MODE OF INTERVIEW

You are required to choose one the following mode of interview suiting your conveniency

☐ **Phone interview** ☐ **online interview** ☐ **physical interview (Tick one)**

CONTACT

If you have questions at any time about the study or the procedures, you may contact my research supervisors: Professor J. Kalai via email : jkalai@uonbi.ac.ke. and Dr Rosemary Imonje vial email : imonje77@gmail.com

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. By clicking on the *agree* icon it indicates that

- You have read and understood the above information related to the study.
- You voluntarily agree to participate in the study.

☐ Agree

☐ Disagree.

After completing the above, click **submit** button

Appendix IX: Consent Form Interview for Deans of Schools/Faculties

You have been selected to participate in a research study on influence of MOODLE features on student's satisfaction in learning university common units in public universities in Kenya. This is a PhD Research study conducted by Erick Gicheru Mwangi, a student at University of Nairobi which focuses on MOODLE features such as: ease of access, feedback features, communication tools feature, interactivity features, evaluation tools and gender satisfaction in using the platform. The interview should take approximately 20-30 minutes.

PARTICIPATION

Your participation in this study is voluntary . You may decline or withdraw from taking part in the research study at any time without giving reason. You may choose not to answer any specific question you do not wish to respond to.

The interview will be recorded since the researcher cannot write everything during the interview.

BENEFITS

You will receive no direct benefits or cash rewards from participating in this research study. However, your responses will be helpful in providing details of MOODLE online learning satisfaction.

RISKS

There are no risks involved in participating in this study.

Some emotional distress might occur when answering questions relating to your personal experience in some aspects.

CONFIDENTIALITY

The information that you will provide in the interview will only used for this study. The recorded audio clip will be kept safe electronically under secure password. The recording will be deleted after the information has been processed.

MODE OF INTERVIEW

You are required to choose one the following mode of interview suiting your conveniency

☐ **Phone interview** ☐ **online interview** ☐ **physical interview (Tick one)**

CONTACT

If you have questions at any time about the study or the procedures, you may contact my research supervisors: Professor J. Kalai via email : jkalai@uonbi.ac.ke. and Dr Rosemary Imonje vial email : imonje77@gmail.com

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. By clicking on the *agree* icon it indicates that

- You have read and understood the above information related to the study.
- You voluntarily agree to participate in the study.

☐ Agree

☐ Disagree.

After completing the above, click **submit** button

Appendix X: Consent Form for Lecturer's Questionnaire

You are being selected to participate in a research study by filling in online questionnaire on influence of MOODLE features on student's satisfaction in learning university common units in public universities in Kenya. This is a PhD Research study conducted by Erick Gicheru Mwangi, a student at University of Nairobi which focuses on MOODLE features such as: ease of access, feedback features, communication tools feature, interactivity features, evaluation tools and gender satisfaction in using the platform. Filling in the online questionnaire should take approximately 10 minutes to complete.

PARTICIPATION

Your participation in this study is voluntary . You may decline or withdraw from taking part in the research study at any time without giving reason. You may choose not to answer any specific question you do not wish to respond to.

BENEFITS

You will receive no direct benefits or cash rewards from participating in this research study. However, your responses will be helpful in providing details of MOODLE online learning satisfaction.

RISKS

There are no risks involved in participating in this study.

Some emotional distress might occur when answering questions relating to your personal experience in some aspects.

CONFIDENTIALITY

Your responses will be sent to a link at SurveyMonkey.com where data will be stored in a protected electronic format. Survey Monkey does not collect or store identifying information such as your name, email address, or IP address. Consequently, your responses will remain anonymous and confidential. No one will be able to trace you or your answers and no one will know whether or not you participated in the study.

CONTACT

If you have questions at any time about the study or the procedures, you may contact my research supervisors: Professor J. Kalai via email : jkalai@uonbi.ac.ke. and Dr Rosemary Imonje vial email : imonje77@gmail.com

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. By clicking on the *agree* icon it indicates that

- You have read and understood the above information
- You voluntarily agree to participate in the study

☐ Agree

☐ Disagree.

After completing the above, click **submit** button

Appendix XI: Interview Consent Form for Elearning Administrators

You have been selected to participate in a research study on influence of MOODLE features on student's satisfaction in learning university common units in public universities in Kenya. This is a PhD Research study conducted by Erick Gicheru Mwangi, a student at University of Nairobi which focuses on MOODLE features such as: ease of access, feedback features, communication tools feature, interactivity features, evaluation tools and gender satisfaction in using the platform. The interview should take approximately 20-30 minutes.

PARTICIPATION

Your participation in this study is voluntary . You may decline or withdraw from taking part in the research study at any time without giving reason. You may choose not to answer any specific question you do not wish to respond to.

The interview will be recorded since the researcher cannot write everything during the interview.

BENEFITS

You will receive no direct benefits or cash rewards from participating in this research study. However, your responses will be helpful in providing details of MOODLE online learning satisfaction.

RISKS

There are no risks involved in participating in this study.

Some emotional distress might occur when answering questions relating to your personal experience in some aspects.

CONFIDENTIALITY

The information that you will provide in the interview will only be used for this study. The recorded audio clip will be kept safe electronically under secure password. The recording will be deleted after the information has been processed.

MODE OF INTERVIEW

You are required to choose one the following mode of interview suiting your conveniency

☐ **Phone interview** ☐ **online interview** ☐ **physical interview (Tick one)**

CONTACTs

If you have questions at any time about the study or the procedures, you may contact my research supervisors: Professor J. Kalai via email : jkalai@uonbi.ac.ke. and Dr Rosemary Imonje vial email : imonje77@gmail.com

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. By clicking on the *agree* icon it indicates that

- You have read and understood the above information related to the study.
- You voluntarily agree to participate in the study.

☐ Agree

☐ Disagree.

After completing the above, click **submit** button

Appendix XII: Consent Form for Student's Questionnaire

Am pleased to inform you that you are been selected to participate in an online research study on influence of MOODLE features on student's satisfaction in learning university common units in public universities in Kenya. This is a PhD Research study conducted by Erick Gicheru Mwangi, a student at University of Nairobi which focuses on MOODLE features such as: ease of access, feedback features, communication tools feature, interactivity features, evaluation tools and gender satisfaction in using the platform. Filling in the online questionnaire should take approximately 30 minutes to complete.

PARTICIPATION

Your participation in this study is voluntary . You may decline or withdraw from taking part in the research study at any time without giving reason. You may choose not to answer any specific question you do not wish to respond to.

BENEFITS

You will receive no direct benefits or cash rewards from participating in this research study. However, your responses will be helpful in providing details of MOODLE online learning satisfaction.

RISKS

There are no risks involved in participating in this study other than those encountered when using digital screens.

Some emotional distress might occur when answering questions relating to your personal experience in some aspects.

CONFIDENTIALITY

Your responses will be sent to a link at SurveyMonkey.com where data will be stored in a protected electronic format. Survey Monkey does not collect or store identifying information such as your name, email address, or IP address. Consequently, your responses will remain anonymous and confidential. No one will be able to trace you or your answers and no one will know whether or not you participated in the study.

CONTACT

If you have questions at any time about the study or the procedures, you may contact my research supervisors: Professor J. Kalai via email : jkalai@uonbi.ac.ke. and Dr Rosemary Imonje vial email : imonje77@gmail.com

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. By clicking on the *agree* icon it indicates that

- You have read and understood the above information
- You voluntarily agree to participate in the study
- You are 18 years of age or older

☐ Agree

☐ Disagree.

After completing the above, click **submit** button

Appendix XIII: Consent Form for Focused Group Discussion

Am pleased to inform you that you are been selected to participate in a focused group discussion on influence of MOODLE features on student's satisfaction in learning university common units in public universities in Kenya. This is a PhD Research study conducted by Erick Gicheru Mwangi, a student at University of Nairobi which focuses on MOODLE features such as: ease of access, feedback features, communication tools feature, interactivity features, evaluation tools and gender satisfaction in using the platform. The focused group discussion will take approximate 60 minutes.

PARTICIPATION

Your participation in this study is voluntary . You may decline or withdraw from taking part in the research study at any time without giving reason. You may choose not to answer any specific question during the online discussion.

The online discussion will be recorded to enable researcher to capture all information since the assistant moderator cannot write everything during discussion.

You may choose to log in using audio mode (only your voice will be heard) or video mode where you will be visible.

BENEFITS

You will receive no direct benefits or cash rewards from participating in this research study. However, your responses will be helpful in providing details of MOODLE online learning satisfaction.

RISKS

There are no risks involved in participating in this study.

CONFIDENTIALITY

The information that you will provide in the interview will only be used for this study. The recorded audio clip will be kept safe electronically under secure password. The recording will be deleted after the information has been processed.

CONTACT

If you have questions at any time about the study or the procedures, you may contact my research supervisors: Professor J. Kalai via email : jkalai@uonbi.ac.ke. and Dr Rosemary Imonje vial email : imonje77@gmail.com

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. By clicking on the *agree* icon it indicates that

- You have read and understood the above information
- You voluntarily agree to participate in the study
- You are 18 years of age or older

☐ Agree

☐ Disagree.

Appendix XIV: Public and constituent colleges using MOODLE for eLearning

1.Cooperative University

2.Dedan kimathi University of science and technology

3.Egerton University

4.Jaramogi Oginga Odinga University of science and technology

5.Jomo Kenyatta University of agriculture

6.Karatina University

7.Kibabii University

8.Laikipia University

9.Maseno University

10.Masinde Muliro University

11.Multi Media University

12.Pwani University

13.Taita Taveta University LMS

14.Technical University of Mombasa

15.Tharaka University College E-learning

16.University of Kabianga

17.Moi University

Appendix XV: List showing distribution of partipants for the focused group discussion

List showing schools /faculties where students will be sampled for online focused group discussion			
University	**Colleges /Faculties /Schools**	**Male**	**Female**
Kibabii University	1.Business & Economics 2.Computing & Informatics 3.Education & Social science 4.Nursing 5.Science	5	5
University of Kabianga	1.Agricultural science and natural resources 2.Business and economics 3.Education, arts and social sciences 4.Health sciences 5.Science and technology	5	5
Dedan Kimathi University of Technology	1.Business, management and economics 2.Computer sciences & IT 3.Engineering 4.Nursing 5.Science	5	5
Jomo Kenyatta of Agric & Technology	1.Agriculture & Natural resources 2.Engineering and technology 3.Health Sciences 4.Human resources and development 5.Pure and applied sciences	5	5
Egerton University	1.Agriculture 2.Arts and Social Sciences (FASS) 3.Commerce (FOC) 4.Education and Community Development Studies (FEDCOS) Engineering and Technology (FET) 5.Environment and Resources Development (FERD) 6.Health Sciences (FHS) 7.Law (FOL) 8.Faculty of Science (FOS) 9.Faculty of Veterinary Medicine and Surgery (FVMS)		

		5	5
Maseno University	1.Agriculture &food security 2.Business & Economics 3.Computing and informatics 4.Development & strategic studies 5.Environment and earth sciences 6.Mathematics, statistics and actuarial sciences 7.Planning & Architecture 8. Education 9.Public Health & Community Development 10. Physical & Biological Science 11.Medicine 12.Arts And Social Sciences	5	5

Appendix XVI: Permit License from NACOSTI for data collection

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 822778

Date of Issue: 02/December/2021

RESEARCH LICENSE

This is to Certify that Mr.. Erick Gicheru Gicheru Mwangi of University of Nairobi, has been licensed to conduct research in Bungoma, Kakamega, Kericho, Kisumu, Nairobi, Nyeri on the topic: INFLUENCE OF MODULAR OBJECT ORIENTED DYNAMIC LEARNING ENVIRONMENT FEATURES ON STUDENTS' SATISFACTION IN LEARNING COMMON UNITS IN PUBLIC UNIVERSITIES IN KENYA. for the period ending : 02/December/2022.

License No: **NACOSTI/P/21/14749**

822778

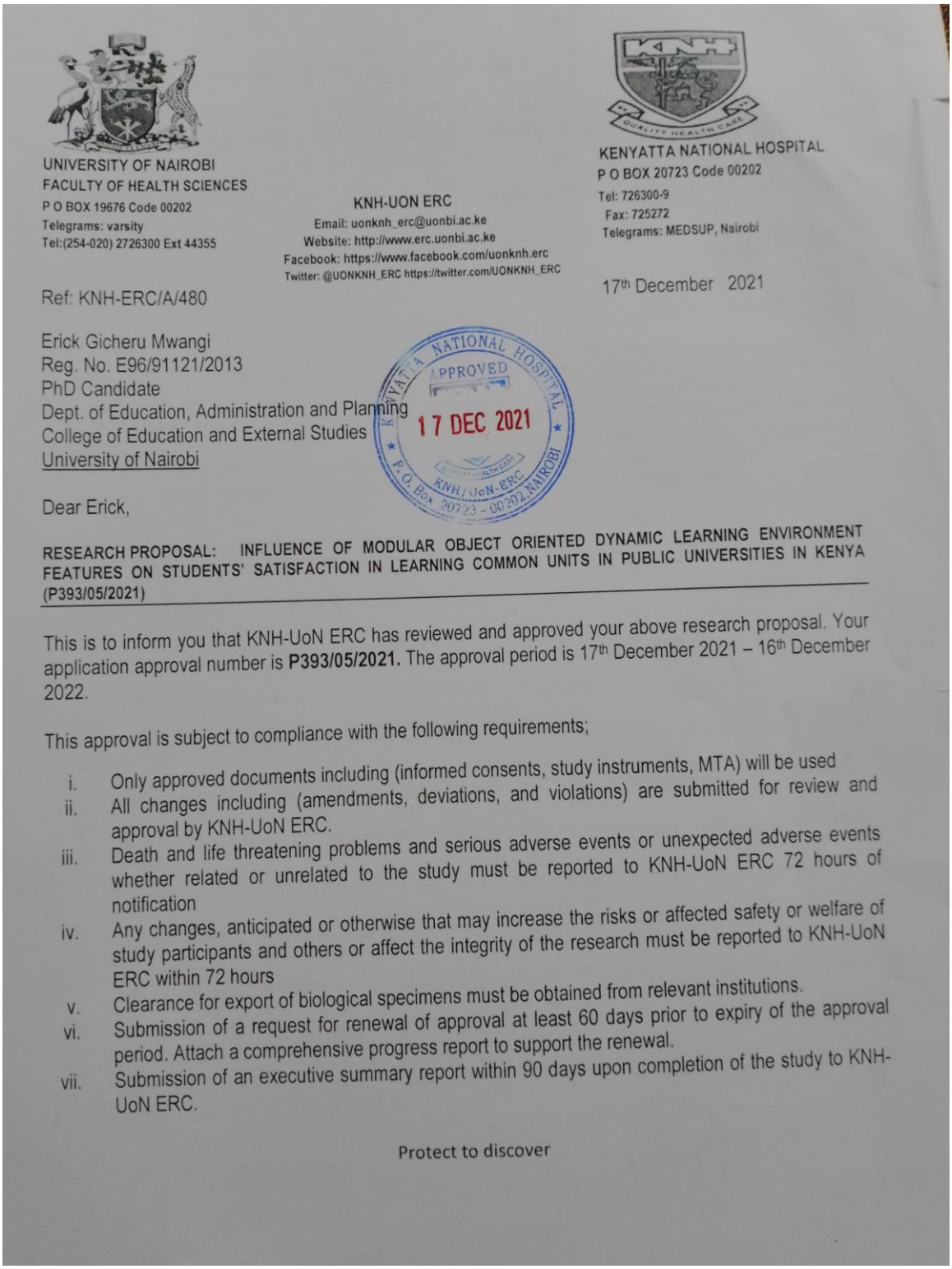
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix XVII: Approval Letter from KNH –UON Ethics Review committee



UNIVERSITY OF NAIROBI
FACULTY OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/480

17th December 2021

Erick Gicheru Mwangi
Reg. No. E96/91121/2013
PhD Candidate
Dept. of Education, Administration and Planning
College of Education and External Studies
University of Nairobi

KENYATTA NATIONAL HOSPITAL APPROVED 17 DEC 2021 KNH/UoN-ERC P.O. Box 20723 - 00202 NAIROBI

Dear Erick,

RESEARCH PROPOSAL: INFLUENCE OF MODULAR OBJECT ORIENTED DYNAMIC LEARNING ENVIRONMENT FEATURES ON STUDENTS' SATISFACTION IN LEARNING COMMON UNITS IN PUBLIC UNIVERSITIES IN KENYA (P393/05/2021)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P393/05/2021.** The approval period is 17th December 2021 – 16th December 2022.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Protect to discover

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

PROF. M.L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Dean-Faculty of Health Sciences, UoN
The Senior Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information, KNH
The Chair, Dept. of Education, Administration and Planning, UoN
Supervisors: Dr. Rosemary K. Imonje, Dept. of Education, Administration and Planning, UoN
Prof. Jeremiah M. Kalai, Dept. of Education, Administration and Planning, UoN

Appendix XVIII: Authorization letter from Dedan Kimathi to Undertake Research

DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY
Private Bag-10143, Dedan Kimathi
Telephone: 061-2050000, Cell phone: 0708 802869,
E-mail: dvcaf@dkut.ac.ke Web: www.dkut.ac.ke
Office of the Deputy Vice Chancellor, Administration &Finance

DEKUT/DVC/2021 16 th December, 2021

Mr.Erick Gicheru
P.O Box 195-
80108 KILIFI-
KENYA.

Dear Mr. Mwangi,

REF: **AUTHORITY TO UNDERTAKE RESEARCH AT DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY.**

This is to acknowledge receipt of your letter dated 7th December, 2021 requesting to carry out research in Dedan Kimathi University of Technology.

On behalf of DeKUT Management, permission is hereby granted to carry out the intended research. In carrying out your research, you are required to maintain confidentiality of the University information which should only be used for purposes of your study.

Further, you are asked to share your findings with the University for continuous improvement of our services and leafing environment.

Thank you for choosing Dedan Kimathi University of Technology.
Yours faithfully.

Prof. E. N. Magiri
Deputy Vice Chancellor (A&F)
cc: Vice Chancellor
Registrar (AA&R)
Ag. Registrar (A&F) Director, RICML

Appendix XIX: Authorization Letter from Egerton University to collect data

EGERTON
P.O. Box 536-20115
Egerton, Kenya

UNIVERSITY
Tel: (051) 2217806
E-mail: dvcaa@egerton.ac.ke

OFFICE OF THE DEPUTY VICE - CHANCELLOR (ACADEMIC AFFAIRS)

EU/AA/DVC/CORR/128 **11th January 2022**

Erick Gicheru Mwangi
P.O Box 195-80108
KILIFI
e.gicheru@pu.ac.ke

Dear Mr. Mwangi

RE: REQUEST TO COLLECT PhD DATA

Reference is made to your letter dated 11th January, 2021 on the aboe subject.

Permission is hereby granted for you to collect data from Egerton University second year undergraduate students, elerning administrators, lecturers teaching common University units, Director of Quality Assurance and Dean, Faculty of Arts and Social Sciences for your research topic entitled **"Influence of moodle learning management system on student's satisfaction in learning common units in Public Universities in Kenya."**

This research is purely for academic purposes which must be treated with utmost confidentiality and will not be used otherwise. It is expected that upon completion of the study, you will provide a copy of the report for our retention.

Yours sincerely,

Prof. Micah C. Chepchieng
AG. DEPUTY VICE CHANCELLOR (ACADEMIC AFFAIRS)

MCC/smw

"Transforming Lives through Quality Education"

Appendix XX: Authorization letter from Jomo Kenyatta University for data collection.

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
P.O. Box 62000-00200 Nairobi Kenya, Tel: +254-067-5870001-4, +254-67-53-52711,
Office of the Registrar (Administration)

JKU/ACA/3D

20TH DECEMBER, 2021

Mr. Erick Gicheru
P.O. Box 195 – 80108
KILIFI
Email: e.gicheru@pu.ac.ke
Tel. 0704 140784

Dear Mr. Gicheru

RE: PERMISSION TO COLLECT DATA

Reference is made to your letter dated 6th December, 2021 requesting for permission to collect data for your PhD research project entitled **"Influence of Moodle Learning Management System on Student's Satisfaction in Learning Common Units in Public Universities in Kenya".**

Approval has been granted for you to collect data from the specified target group only on the understanding that all the data collected will be for academic purpose only and will be kept confidential throughout the project and after completion of the project. This is also on condition that the University Library will receive a copy of your final thesis for future reference.

Yours sincerely,

DR. ROSE M. GITHU, PhD
AG. REGISTRAR (ADMINISTRATION)
RG/mw

Copy to: Deputy Vice Chancellor (Administration)

Appendix XXI: A Letter from University of Kabianga for Data Collection

UNIVERSITY OF KABIANGA
ISO 9001:2015 CERTIFIED
OFFICE OF THE DIRECTOR OF RESEARCH, LINKAGES & EXTENSION

Tel. No. +254 20 217 2665 P.O. BOX 2030-20200
Email address:- research@kabianga.ac.ke KERICHO

REF: UoK/DIR/RLE/RNA/10VOL.3/105 **DATE:** 11TH JANUARY, 2022

MR. ERICK GICHERU,
P.O. BOX 195-80108,
KILIFI.

Dear Mr. Gicheru,

SUBJECT: AUTHORIZATION TO COLLECT DATA AT UNIVERSITY OF KABIANGA (UoK)

In reference to the above, your request to collect data at UoK is gladly acknowledged. In addition, your interest to carry out part of your PhD research at the University is very much appreciated.

By this letter, you are granted authorization to collect data at UoK as requested. However, this authorization is only effective on the fulfillment of the following, on your part:

1) This authorization is only valid after your consultation with the Deputy Vice-Chancellor (Planning, Research and Development) prior to start of data collection and signing a commitment document/ letter for you to submit to UoK a copy of final report/ approved thesis on conclusion of the work. This will ensure that UoK benefits from the findings/ recommendations of your work with regard to research outputs and improvement of service delivery to our customers, in particular the students.

On behalf of UoK Management, I take this opportunity to wish you success in your research work and overall, your future career.

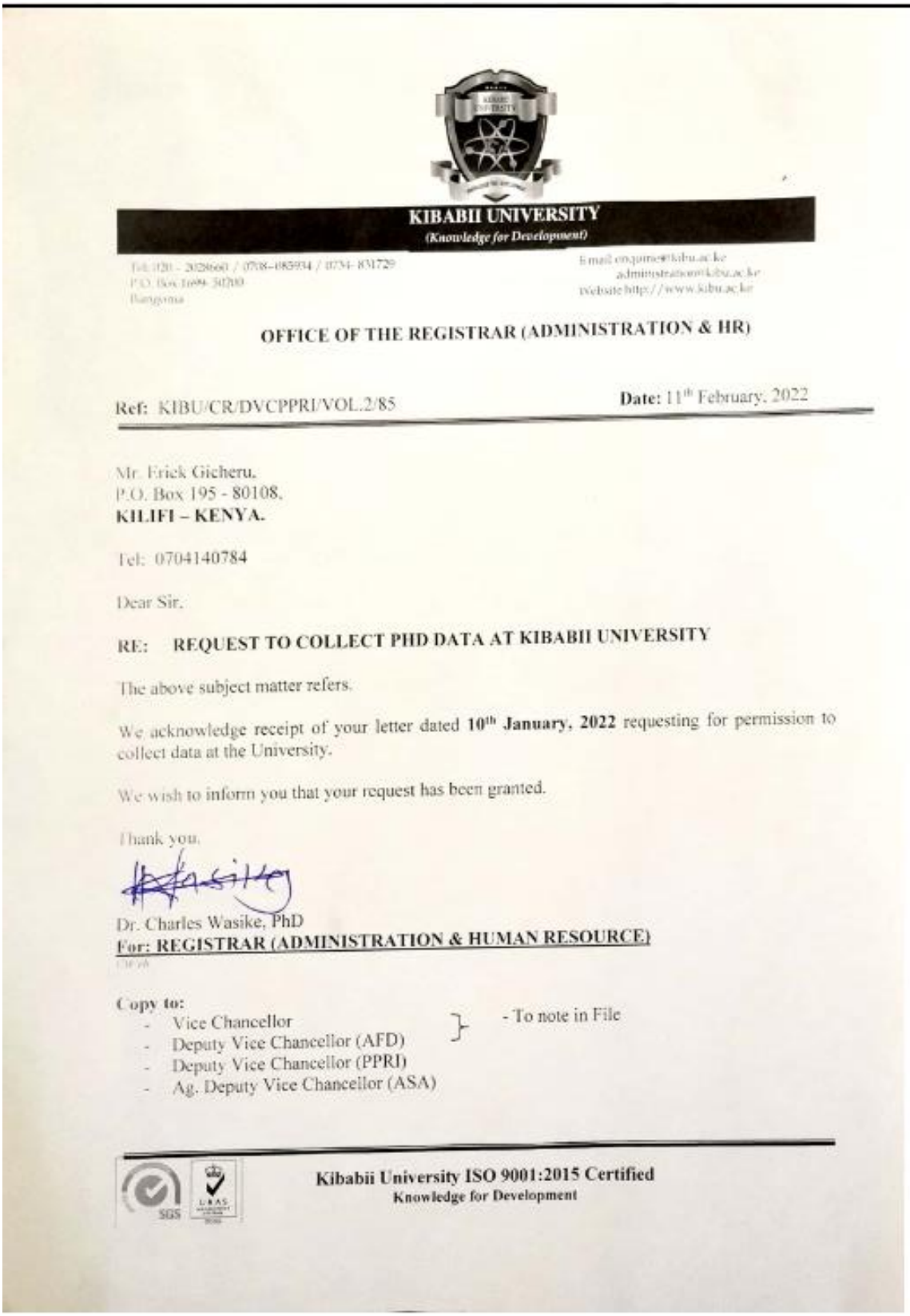
Yours sincerely,

UNIVERSITY OF KABIANGA
OFFICE OF DIRECTOR
11 JAN 2022
RESEARCH LINKAGES & EXTENSION
KERICHO

PROF. ISSA MWAMZANDI, PhD.
DIRECTOR: RESEARCH, LINKAGES & EXTENSION

IM/ck

Appendix XXII: A Letter from Kibabii University for Data Collection



KIBABII UNIVERSITY
(Knowledge for Development)

Tel: 020 - 2028660 / 0708-085934 / 0734-831729
P.O. Box 1699-50200
Bungoma

E-mail: enquiries@kibu.ac.ke
administration@kibu.ac.ke
Website: http://www.kibu.ac.ke

OFFICE OF THE REGISTRAR (ADMINISTRATION & HR)

Ref: KIBU/CR/DVCPPRI/VOL.2/85 **Date:** 11th February, 2022

Mr. Erick Gicheru,
P.O. Box 195 - 80108,
KILIFI – KENYA.

Tel: 0704140784

Dear Sir,

RE: REQUEST TO COLLECT PHD DATA AT KIBABII UNIVERSITY

The above subject matter refers.

We acknowledge receipt of your letter dated **10th January, 2022** requesting for permission to collect data at the University.

We wish to inform you that your request has been granted.

Thank you.

Dr. Charles Wasike, PhD
For: REGISTRAR (ADMINISTRATION & HUMAN RESOURCE)

Copy to:
- Vice Chancellor
- Deputy Vice Chancellor (AFD)
- Deputy Vice Chancellor (PPRI)
- Ag. Deputy Vice Chancellor (ASA)

} - To note in File

Kibabii University ISO 9001:2015 Certified
Knowledge for Development

Appendix XXIII: Authorization letter from Maseno University for data Collection

MASENO UNIVERSITY
OFFICE OF THE VICE-CHANCELLOR
(DIRECTORATE OF PUBLIC RELATIONS & MARKETING)

Tel: 254-057-351622
Fax: 254-057-351221
Email: directorpr@maseno.ac.ke

Private Bag
MASENO, Kenya

Ref: MSU/DPR/E11/02 **Date:** 9/02/ 2022

To :
ERICK GICHERU
P.O.BOX 195-80108
KILIFI
0704140784
e.gicheru@pu.ac.ke

Dear Sir,

REF: REQUEST TO COLLECT PHD DATA

As pertains your letter received on 10th January, 2022 on the above subject.

I am pleased to inform you that permission is herein granted to you to proceed with the said activities.

Kindly keep away from lecture halls and other areas hosting academic programmes. Make sure that you adhere to all Covid-19 protocols during the exercise.

Dr. Owen McOnyango
Director, Public Relations & Marketing

CC: Director Student Affairs
Chief Security Officer

Keep safe: Wear your mask properly, Wash your hands with water and soap or Sanitize and Keep Social Distance.

Excellence