ASSESSMENT OF THE KNOWLEDGE, ATTITUDE AND PRACTICE OF UNDERGRADUATE STUDENTS TOWARDS E-LEARNING

EDUGIE EMMANUELLA EMWANTA MED1404688

ENODOLOMWANYI WILSON OSASERE MED1407108

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CERTIFICATION

This is to certify that this research study titled **"KNOWLEDGE, ATTITUDE AND PRACTICE OF UNDERGRADUATE STUDENTS TOWARDS E-LEARNING IN A PANDEMIC"** was carried out by **EMWANTA EMMANUELLA EDUGIE** (matriculation number **MED1404688)** and **ENODOLOMWANYI WILSON OSASERE** (matriculation number **MED1407108)** under supervision in the Department of Public Health and Community Medicine, College of Medicine, University of Benin as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS).

_____

DR. O. E. OBARISIAGBON

PROJECT SUPERVISOR

MBBS, MPH, FMCPH

Senior Lecturer/ Consultant

Department of Community Health,

School of Medicine,

University of Benin,

Benin City, Nigeria.

_____

DR. A. I. OBI

HEAD OF DEPARTMENT

MBBS, MPH, FMCPH

Associate Professor/Consultant

Department of Community Health,

School of Medicine,

University of Benin,

Benin City, Nigeria.

DECLARATION

We hereby declare that this project titled: Knowledge, Attitude and Practice of Undergraduate Students Towards E-Learning, was carried out by the following persons under the guidance and supervision of Dr. O. E. Obarisiagbon

EDUGIE EMMANUELLA EMWANTA _____

MED1404688 Signature and date

ENODOLOMWANYI WILSON OSASERE _____

MED1407108 Signature and date

DEDICATION

This work is dedicated to the memory of Late Rev. Dr. Arnold Osaheni Emwanta, the reason I am where I am today, and to T. Abu, for being my daily source of joy and inspiration.

-Edugie Emwanta

To my family, for their never-ending love and support.

-Osasere Wilson Enodolomwanyi

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OSASERE WILSON ENODOLOMWANYI

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LIST OF ABBREVIATIONS

1. ANOVA: Analysis of Variance
2. BIA: Business and Information Administration
3. COVID-19: Coronavirus Disease 2019
4. E-learning: Electronic learning
5. ICT: Information and Communication Technology
6. LIS: Library and Information Science
7. M-learning: Mobile Learning
8. MMEL: Mixed-mode E-learning
9. NEARNet: Nigerian Education, Academic and Research Network
10. NOUN: National Open University of Nigeria
11. NPIs: Non-Pharmaceutical Interventions
12. NUNet: Nigerian Universities Network
13. PLS-SEM: Partial Least Squares-Structural Equation Modeling
14. PPE: Personal Protective Equipment
15. PolyNet: The Polytechnics Network
16. SPSS: Statistical Package for the Social Sciences
17. WHO: World Health Organization
18. Wi-Fi: Wireless Fidelity

DEFINITION OF TERMS

ASYMPTOMATIC: Asymptomatic refers to a person who is infected with a disease causing agent (such as a virus), but does not show any symptoms of the disease.

COMPLIANCE: This is defined as the extent to which individuals or organizations follow rules, regulations, guidelines, or standards set by a governing body or authority. In the context of health, compliance can refer to the extent to which individuals follow medical advice or treatment plans prescribed by their health care provider.

CONTAGIOUS DISEASES: A contagious disease is a type of infectious disease that can spread from one person to another.

DISTANCE LEARNING: A form of education in which the main elements include physical separation of teachers and students during instruction and the use of various technologies to facilitate student-teacher and student-student communication.

E-LEARNING: A learning system based on formalised teaching but with the help of electronic resources.

E-LIBRARY: A set of documents available through electronic means by the use of digital technologies that allow for the retrieval, archiving, preservation, and dissemination of those documents.

EPIDEMIC: The "unusual" occurrence in a community or region of disease, specific health-related behaviour (e.g., smoking) or other health-related events (e.g., traffic accidents) clearly in excess of "expected occurrence".

ISOLATION: Isolation refers to the physical separation of individuals who have or are suspected to have a contagious disease from those who are healthy, in order to prevent the spread of the disease.

LOCKDOWN: Lockdown refers to a measure used to restrict movement and gather people in one place during a public health emergency, such as an outbreak of a highly contagious disease.

MOBILE LEARNING: Education or training conducted by means of portable computing devices such as smartphones or tablet computers.

NON-PHARMACOLGIC INTERVENTION: Non-pharmacological interventions refer to interventions that do not involve the use of drugs or medications.

PANDEMIC: An epidemic usually affecting a large proportion of the population, occurring over a wide geographic area such as a section of a nation, the entire nation, a continent or the world.

PHYSICAL DISTANCING: Physical distancing refers to measures that aim to reduce close contact between people in order to prevent the spread of infectious diseases. Physical distancing measures include maintaining a minimum distance of at least 1 meter (3 feet) from others, avoiding large gatherings, and reducing face-to-face contact.

QUARANTINE: Quarantine refers to the separation and restriction of movement of individuals who have been exposed to a contagious disease, but who have not yet developed symptoms, in order to prevent the spread of the disease to others.

TECHNOLOGY: The application of scientific knowledge for practical purposes.

TRADITIONAL LEARNING: A setting where a teacher communicates with a group of students in a typical brick and mortar classroom set-up

WEB-BASED LEARNING: The type of learning that uses the Internet as an instructional delivery tool to carry out various learning activities.

ABSTRACT

Background: The growing influence of information technology on various aspects of life including education necessitates the developing countries to use E-learning for better distribution of teaching materials and interaction between students and teachers. In Nigeria, there was a surge in use of E-learning to continue education due to the COVID-19 pandemic. E-learning represents a vital paradigm on higher education unconstrained by time and place, offering new opportunities for the development of the educational processes. Its adoption is vital to bridge the learning gap between developed and developing countries.

Objectives: To assess the knowledge, attitude and practice of undergraduate students in University of Benin towards E-learning.

Materials and Methods: A descriptive cross-sectional study design was adopted for this study. Four hundred and twenty-five students were selected using multi-stage sampling technique. Data was obtained using a standardized semi-structured self-administered questionnaire comprising both open ended and close ended questions. Data was analysed using IBM SPSS version 25.0 software with statistical significance set at $p<0.05$ and 95% confidence interval.

Results: The mean age was calculated as 23.16 (±3.24) years. Of all the respondents, (62.8%) had good knowledge, while (37.2%) of respondents had poor knowledge. (97.2%) had a positive attitude, while 2.8% had a negative attitude. Challenges such as constant power failure, inadequate internet access, inadequate computer literacy skills and cost of data subscriptions were identified. 98.1% of respondents showed good readiness, while 1.9% showed poor readiness. The most commonly used E-learning tools were search engines, PowerPoint, virtual classrooms and mobile applications.

Conclusion: The majority of respondents had good knowledge, positive attitude and good readiness towards E-learning. The major challenges were constant power failure, inadequate internet access, inadequate computer literacy skills and cost of data subscriptions.

Keywords: Online, learning, technology

Word count: 287

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

The World Health Organization (WHO), on December 31, 2019, received a report of the presence of unknown causes of pneumonia disease in Wuhan, China. Later, this disease was defined as a novel Coronavirus disease.[1] The World Health Organisation (WHO) declared the outbreak a public health emergency of international concern on January 30, 2020 and recognised it as a pandemic on March 11, 2020.[2]

The disease is spread by air droplets or aerosols inhaled by people in close contact or within 1 meter of each other, and by touching eyes, nose, and mouth with infected hands.

Subsequently, several countries have had to implement global standard control strategies. These measures include travel restrictions, lockdowns or curfews, workplace hazard controls and closure of public facilities including pubs, gyms, and schools.[2] These strategies also endorse maintaining social distances of about 6 feet, basic hand hygiene including frequent hand washing for 20 seconds and use of alcohol-based hand sanitizers as well as the use of personal protective equipment (PPE) such as face masks.

The closure of schools could not be sustained because academic work was suffering and students had been at home for too long. The eventual reopening of schools necessitated the adoption of NPIs and a shift to Electronic learning (E-learning). These measures were also adopted by the University of Benin to ensure the continuation of academic work and mitigate the spread of COVID-19.

E-learning in its broadest sense refers to any learning that is electronically enabled.[3] E-learning is also called web-based learning, mobile learning, online learning, distributed

learning, computer-assisted instruction, and internet-based learning.[4] The introduction of E-learning is an innovative method that is capable of enhancing knowledge and also serves as a powerful tool for the acquisition of skills.[5] It is a platform to address contemporary instructional interests as it enhances self-responsibility to learn and promotes lifelong learning among students. The inclusion of such interactive learning activity is viewed as a mandatory component of undergraduate education accreditation standards in many countries.[6]

E-learning represents a vital paradigm in higher education unconstrained by time and place, offering new opportunities for the development of the educational processes, making it more flexible and cost-effective.[6]

The concept of E-learning is not a new thing. It has been applied all over the world in various ways including;

Online distance-learning courses: Here, the instructor conducts class sessions online— not via mail. This usually requires no face-to-face meetings between students and instructors in the classroom.

Traditional courses supplemented with technology: The instructor teaches all sessions in the classroom but incorporates technology in some or all classes, such as PowerPoint, web-based, multimedia, virtual library, and online testing.

Hybrid courses: The instructor here combines the elements of online distance-learning courses to replace some classroom sessions with virtual sessions, online forums, or web-based activities.[7]

At the University of Benin, E-learning has been used in different forms over the years including the E-library and Centre for Distance Learning which is an online school offering an undergraduate course in Accounting. Lecturers also employ the use of PowerPoint

presentations and web-based learning. With the emergence of COVID-19, the school has also adopted the use of Zoom lectures and WhatsApp-based classes.

Under proper conditions and with the right infrastructure, E-learning has the propensity for a myriad of advantages. E-learning allows access to the work of the best instructors, an extensive collection of resources, and provides a 24/7 approach. It serves as an equalizer in terms of access and equity.[6] Furthermore, students become fairly independent and they can study and read based on their own time. E-learning can be used in academic institutions to improve the efficacy of academic deliverance and make the learning sessions more captivating and retainable.[8] In addition, it has many advantages for both professors and students such as time convenience, easy and fast method to transfer skills and knowledge through the internet, and deliverance of audio, video, and graphs which all can enhance the learning experience. Facilitated group collaboration and cooperative learning, encourages dialogue, and creates a more engaging classroom for learning and solving educational problems. Another benefit of E-learning is cost-effectiveness. E-learning can result in significant cost reduction when we compare it to in-class traditional learning. Also, virtual classes reduce the negative impact on the environment that is caused by human beings such as reduction of paper usage, reduce travelling, and saving life during epidemic disease which we can stay in quarantine while education continues at home with E-learning.[9]

Factors exist which pose challenges to E-learning especially in developing countries. Learner's technical infrastructure limitations such as lack of bandwidth, computer hardware, and also lack of equal access to computing capability can create something of a digital divide among them. Lack of necessary skills to fully succeed in E-learning courses may also be a challenge as several people find it difficult to utilise the platforms used. Unreliable technology can hinder instructors' ability to monitor student activities which may lead to

poor comprehension. The power situation in the country such as the incessant power outage can also pose a serious problem to the use of E-learning.[5]

1.2 STATEMENT OF THE PROBLEM

The growing influence of information technology on various aspects of life including education necessitates developing countries to use E-learning for better distribution of teaching materials and interaction between students and teachers.[1] In Nigeria's educational system, both academics and students are faced with numerous challenges when it comes to adopting E-learning. These challenges range from the profound diversity in cultural backgrounds and languages among Nigerian citizens to the government's current lukewarm commitment to improving education by using ICT.[2] E-learning has been accepted and implemented in various forms in universities across the country. However, worthy of note is that Nigeria being a developing country poses several limitations to the full implementation, usage, and effectiveness of E-learning in tertiary institutions.

To bridge the learning gap between developed and developing countries, most African Universities have initiated E-learning projects.[3] In Nigeria, these initiatives include The Nigerian Universities Network (NUNet) Project, The Polytechnics Network (PolyNet) Project, The School Net Project, The Nigerian Education, Academic and Research Network (NEARNet), and The Teachers Network (TeachNet) Project.[4] However, internationally, there is no known universally acceptable strategy or successful implementation framework for higher education in developing countries. This is due to a lack of clear corporate E-learning strategy and policy.[5] The data from a survey supports these views, with 97.1% of respondents indicating they were unaware of any institutional or faculty policy on teaching and learning; 94.3% were unaware of any strategic plan for ICT integration in teaching and learning; and 91.4% were unaware of any clear set objectives for E-learning implementation.[5]

The most noticeable condemnation of E-learning is the complete absence of vital personal interactions, not only between learners and instructors, but also among college learners.[6] This

could affect the dissemination of information or create a gap in the understanding of the taught material. Poorly designed learning materials hinder the success of E-learning as these materials do not allow much interaction between students and lecturers.[7] Scholars have also emphasized similar views such as little or no real time interaction with the faculty, feeling of isolation and lack of adequate faculty training as limitations for E-learning in developing countries. There is a tendency to get distracted as well as multitask during online classes as some students are reluctant to take responsibility for their learning.[8] This is compounded by the relative lack of supervision from the instructors; a problem which would not exist in traditional models of learning. There is also little room for laboratory work and demonstrations.

The lack of adequate infrastructure has been outlined by researchers as a major limitation.[4, 9] Developing countries are plagued with poverty and as such tertiary institutions are usually underfunded and cannot afford to purchase the necessary materials to make E-learning possible.[1] Institutions in developing countries demonstrate a relative lack of computers, Wi-Fi, projectors etc. A study conducted showed that only 30% of students agreed that they were satisfied with the available E-learning infrastructure in their school.[6] Also, the students from these countries may be unable to afford smartphones, personal computers, and other necessary materials for E-learning. Learner's technical infrastructure limitations such as lack of computer hardware and also lack of equal access to computing capability can create something of a digital divide among them.[4] Availability of computers and stable internet connectivity were perceived as the key limitations of E-learning by 82% and 87% of students respectively.[1] In Nigeria, the power supply is often epileptic, and regular power supply is necessary for the effective running of E-learning services. This raises the cost at which institutions run these services as they have to rely on alternative power supplies. The epileptic power supply also makes learning tedious and frustrating for the student.[11] A study in Kwara

State showed that 55.8% of students strongly agree that constant power failure is a major constraint to E-learning adoption in Nigeria.[9]

Lastly, unlike the traditional mode of learning, E-learning requires some technological skill on the part of both the teachers and learners, which is grossly lacking at all levels of education in the country.[2] A study among students revealed that 28.9% cannot do much with computers, 37.3% can be described as beginners, 17.1% as intermediate, and 16.1% as advanced users. This data implied that most students at the university were generally inexperienced users of computers.[5] The layout of the E-learning platform, which made navigation difficult, was flagged as one of the challenges faced by students. Several scholars have identified ease of navigation as an important E-learning success factor.[5, 13] In a study among university students in Saudi Arabia, it was established that navigation is the second most important (after information quality) predictor of E-learning success.[4] This lack of technical skill is also shared by teachers. It was observed in a study that only 20% of lecturers indicated participation in computer-based training.[5]

As E-learning cannot replace students' coursework, especially laboratory work, clinical postings as well as practical demonstrations, under such circumstances, their study needed to be resumed from where it was suspended after the schools reopened.[15]

1.3 JUSTIFICATION OF THE STUDY

Closure of schools was necessary to curb the spread of COVID-19 as large gatherings are a major way the virus is spread. Universities in Nigeria are often overcrowded, especially public Universities like the University of Benin. This kind of environment would be a hotspot for the spread of COVID-19. However, schools had to continue with the academic session which made E-learning a must-do. The implementation of E-learning in Nigerian universities was hindered by certain economic and social factors. There was a greater emphasis on virtual learning with the use of Zoom, WhatsApp, and other social media platforms to facilitate teaching. This posed a problem as most students did not have proper prior exposure. As such, there was an inadequate understanding of E-learning as a method of learning. This study will help to appreciate the prior knowledge of E-learning among undergraduate students of the University of Benin. Also, seeing as this form of learning was new to students, it becomes imperative to evaluate their understanding of, attitude towards, and readiness to accept E-learning. In addition, this study will add to the existing literature.

1.4 OBJECTIVES

General Objective

To assess the knowledge, attitude and practice of undergraduate students in the University of Benin towards E-learning.

Specific Objectives

1. To assess the knowledge of E-leaning among undergraduate students in University of Benin.
2. To assess the attitude of undergraduate students towards E-learning in University of Benin.
3. To identify the challenges to E-learning among undergraduate students in University of Benin.
4. To assess the readiness of the undergraduate students in University of Benin towards E-learning.
5. To evaluate the level of participation of the undergraduate students towards E-learning in University of Benin.

1.5 RESEARCH QUESTIONS

What is the knowledge of E-learning among University of Benin undergraduates?

What are the E-learning techniques of use in University of Benin?

What is the attitude towards E-learning among University of Benin undergraduates?

What are the challenges encountered among University of Benin undergraduates while participating in E-learning?

What is the level of readiness towards E-learning among University of Benin undergraduates?

What is the level of participation towards E-learning among University of Benin undergraduates?

CHAPTER TWO

LITERATURE REVIEW

2.1 KNOWLEDGE OF E-LEARNING

A cross-sectional study on assessment of knowledge, attitude and practice towards e-learning among undergraduate medical students was done among 150 medical students (50 each from 1st, 2nd and 3rd year) of Andhra Medical College, Visakhapatnam, India in December, 2018. A pre-tested semi-structured questionnaire was administered to access the knowledge and practices. Students' responses in attitude were collected and rated on a 5-point Likert scale from 1=strongly disagree to 5=strongly agree. Data entry was done in Microsoft Excel 2010 and analysis was done using SPSS version 17. Results were displayed in the form of frequencies and proportions. Chi-square and ANOVA tests were used. A p-value of <0.05 was considered statistically significant.

While understanding the students' knowledge of software applications and internet usage, it was observed that 87.2% were competent in browsing the internet, 53.3% were competent in preparing power point presentations during presentations, 45.5% were competent in using Microsoft Excel.[16]

A mixed-method research on E-learning implementation strategies for an ICT-challenged Environment was carried out in the University of Ghana, Legon, Ghana in 2013. Purposive and convenience sampling techniques were utilised. Questionnaires, interviews, and focus-group discussions were implemented in data collection. Survey (questionnaire) data was captured using EPI-Data Software by defining the value and variable labels and doing manual data entry. Data from interviews and focus-group discussions were transcribed using Express Scribe.

The survey data showed that although most of the students could be described as either beginners (37.3%) or novices (28.9%), they had good task competencies in e-mail (76.3%), Internet usage (76.2%), word processing (75%), computer file management (71.2%) and spread-sheets (63.6%).[12]

A pilot study on Knowledge, Attitude and Practice towards e-learning among undergraduate medical students was conducted in 2015 among 21 students in Sri Ramachandra University, Porur, Chennai. A structured questionnaire was administered to students after an initial brief description and motive of the study. For easy understanding and earnest reciprocation, the questionnaire was set in easy English, it was divided into 10 parts and researchers were present for any clarification. A Likert scale was used to minimize mixed options and to score questions 1 and 2. Data analysis was done using SPSS – software version 17.

While assessing knowledge about computers, the survey revealed that 52% of students were confident about the use of Microsoft Word, 57% were confident in creating PowerPoint presentations, 33% were confident in using Excel sheet and 19% were confident in analysing data with statistical packages.[4]

A descriptive, cross-sectional, institution-based study on knowledge, attitude and practice in electronic learning was conducted among all medical students and teaching staff of governmental medical faculties in Khartoum, Sudan in 2013. A structured pretested self-administered questionnaire was distributed to 31 teachers and 345 students according to a stratified random sample. Data collected was analysed using SPSS version 20.

Regarding students, about 91.3% of the students were familiar with the concept of e-education. The media (53.3%) and colleagues (17.7%) were major sources of knowledge. A proportion of 72.8% of the students knew the importance of e-education, and 70.4% knew the electronic tools available.[22]

A descriptive study was carried out in 2017 in South-east Nigeria in four NOUN study centres namely: Awka (Abagana), Enugu in Enugu State, Owerri (Nekede) in Imo State and Umudike in Abia State. The study focused on awareness and usage of e-learning materials among students in the distance education programme of the National Open University of Nigeria (NOUN). The instrument for data collection was a 30-item self-constructed checklist titled, "Distance Education Students' Awareness and Usage of E-Learning Materials" (DESAUELM). It was validated by experts and the reliability co-efficient stood at 0.86 using the Cronbach Alpha. The data collected were analysed using frequencies and percentages. The acceptable level of percentage was 50% and above for items indicating positive that is, Aware (A), and for items indicating in Use (IU). On the other hand, any item which scored below 50% was regarded as negative that is, Not Aware (NA) and Not in Use (NIU).

While assessing the E-learning materials that the students were aware of, the respondents affirmed that they were aware of majority of the items which included computer, internet and e-mail, videophone systems, and teleconferencing devices among others. These items scored above 50% which is the acceptable level for awareness. The cluster percentage for awareness was 79.9%.[23]

A quantitative study was undertaken in University of Ilorin in 2011. This study investigated users' (students) acceptance and understanding of E-learning and m-learning resources and how these can affect motivation by gathering evidence on a broad range of learners' experiences. Questionnaire was used for data collection. All data were stored in a computerized database and processed using the Statistical Package for the Social Sciences (SPSS version 14.0).

On assessment of knowledge of E-learning tools, the most used tools were: Laptops (88%), groupware (88%), web-enabled handsets (82%), and E-library/Facebook/web 2.0 tools (65%). The least used were: hypermedia (4%) and blackberry (9%).[24]

A study conducted in 2019 analysed the readiness of accounting students to use m-learning and covered both tertiary and professional accounting institutions in Nigeria. The study employed the survey method through the administration of a series of questions in a well-structured questionnaire. The analyses of data for this study were conducted through descriptive statistics and inferential statistics. Specifically, the Analysis of Variance (ANOVA) test was carried out.

Findings depicted the skill level of accounting students in using a mobile device for m-learning, 39.47% indicated expertise in use, 51.22% showed average mobile skill and 9.30% indicated limited skills in the use of mobile devices. [25]

A descriptive cross-sectional study was undertaken in 2022 on the knowledge and uptake of E-learning among Nigerian students during the COVID-19 lockdown. The study was carried out among students of Ado-Odo Ota LGA. Students were identified using a stratified random sampling technique and a sample size of 383 students was used. Data was collected using a questionnaire and was analysed using IBM-SPSS version 25.0. Data was described as percentages/proportion, mean/average, and standard deviation and were presented as charts or tables.

Findings revealed that the knowledge of E-learning was generally poor (28.4%) but significantly increased with the level of education as 17.3% among primary pupils, 28.1% of junior secondary school students and, and 38.7% of senior secondary school students had heard of it.[26]

2.2 ATTITUDE TOWARDS E-LEARNING

An exploratory study was carried out in Algeria in 2020 on University E-learning during COVID-19 Pandemic, Perceived by Teachers and Students. The current exploratory research embodied a quantitative and qualitative approach through the use of a student questionnaire

and teacher survey to collect data. The used instruments allowed for the collection of quantitative data that were analysed by EXCEL alongside qualitative data in which themes and patterns were identified.

On a three-point Likert scale (disagree, uncertain, agree), students demonstrated various opinions about their experience of online learning on the Moodle platform. The majority of students 47.8% disagreed with the Ministry of Higher Education and Scientific Research's decision to switch to online education during the pandemic of the COVID-19.

When asked if the online learning experience was enjoyable, 65.2% of students disagreed, 21.7% were unsure while only 13% agreed to enjoy learning online. Interestingly, the majority of students 71.7% showed a great preference for learning inside the classroom. Students seemed to have contradicting views concerning online education because, on the one hand, they claimed that they can study online if better conditions are available (56.5%), but on the other hand, 52.2% indicated that it was hard for them to study online even if the required conditions are fulfilled. The majority of students (43.5%) were not optimistic that this learning experience would bring about the desired results while 41.3% were uncertain that teachers are positive regarding this type of education.[27]

A study was conducted in Saudi Arabia in 2016. The study was conducted to examine the attitudes of UBT students' in Dahban and Sari campuses towards E-learning by taking (371) students from four colleges and an English language centre. Stratified random sampling was used in choosing the study sample. To gather the primary data from respondents, a well-structured questionnaire, developed by the researchers was used. Data analysis was done using the Statistical Package for Social Sciences (SPSS) software.

Findings indicated that UBT male and female students had a high attitude towards E-learning although male students possessed a higher attitude towards E-learning than females.[28]

A global study was conducted in April, 2020 on E-learning during the lockdown of the COVID-19 pandemic. The stratified sampling method was adopted giving a sample size of 175 across the world. Online questionnaires using Google Forms were used in collecting data. While assessing the attitude of the students, 82.29% of students reported their willingness to learn from e-sources. 80.57% of students were of the opinion that E-learning is very useful during the quarantine time.[29]

A study involving Libyan students from two universities was conducted from 2011-2013; the study examined the students' experiences and perceptions of E-learning to gauge their acceptance of, and preparedness for, E-learning. The two institutions participating in this study were the University of Tripoli, located in Libya's capital, and a regional University of Al-Jabal Al-Gharbi. The participants (N=348) were undergraduate engineering students from the departments of Electrical Engineering and Petroleum Engineering at each of the universities. Data was collected through a paper-based questionnaire. The reliability of the quantitative data in this study was determined by finding Cronbach's Alpha of the pilot survey data using IBM SPSS v. 21.

Considering 'agree' with statements as indicators of positive attitudes, it was apparent that the range of percentages under the 'agree' category was 63-93%, as compared to 0-12% under the 'disagree' category. The analyses of the overall scores on the attitude scale indicated that students' overall responses to this scale were positive.

A comparative analysis indicated that the participating students in the urban and regional areas were positively disposed towards E-learning and believed in its benefits. The positive attitudes and the willingness of students to engage in E-learning courses suggest that future E-learning initiatives have great potential in Libya.[30]

A quantitative study on Perceptions and Attitude of Students toward E-learning in Kwara State University, Malete, Kwara State, Nigeria was carried out in 2020. The study adopted

the survey design. The population of the study comprised the entire undergraduate students in Kwara State University, Malete. 240 students participated in the online survey. A self-designed questionnaire was used for the collection of data. A test–re-test reliability of the questionnaire method of two weeks intervals was used and responses collected were subjected to Cronbach alpha. The overall reliability of the questionnaire returned an r = 0.87 which exceeds the minimum standard of 0.80 suggested for basic research (Wang and Tang, 2003). Descriptive statistics which include percentage and frequency count were used for the analysis of the data.

On analysis of students' attitude towards E-learning, majority of the respondents 123 (51%) agreed that they have a generally favourable attitude towards using E-learning tools, 106 (44.2%) agreed that it will be a good idea to use E-learning tools, 94 (39.2%) agreed that if available, they intend to use E-learning tools during the semester, 119 (49.6%) agreed that if available, they intend to use E-learning tools whenever possible for their coursework, 108 (45%) of the respondents agreed that they enjoy using ICT for their studies, 111 (46.3%) agreed that E-learning gives them the opportunity to acquire new knowledge, 127 (52.9%) agreed that E-learning increases the quality of learning because it integrates all forms of media, and 115 (47.9%) agreed that adopting ICT and E-learning allows for increased student satisfaction.[15]

A study was conducted in 2011 in the University of Nigeria, Enugu Campus, Nigeria. The main aim of the study was to evaluate gender perception and attitude towards E-learning. The data for this study was based on students' experiences of taking an online learning unit offered by the faculty of Business Administration. The methodological approach of this study employed an analytical method (correlational study). The study population consisted of undergraduate students of business in the university. The data for the study was collected through an online questionnaire prepared with Google Docs for the students to fill based on

their E-learning experience. The survey contained a mixture of Likert scale type questions. The data was analysed using SPSS. Descriptive statistics, Analysis of Variance (ANOVA), percentages and graphs were employed.

Because this research asked for comparison between two groups, gender (male and female), and the attitude towards E-learning acceptance, t-test was employed to analyse the relationship between gender of the respondents and their attitudes towards E-learning acceptance. The result showed that male and female did not differ significantly in attitudes toward E-learning acceptance. Female respondents were more likely to accept E-learning than male respondents but the evidence was not sufficient.[31]

A study was conducted in Babcock University, Ogun State, Nigeria in 2016. The research explicitly analysed the overall attitude of students towards E-learning in Nigeria. In this research, the mixed approach was used and a well-organised questionnaire and semi-structured interview were employed for data collection. Analysis of data was then carried out with Statistical Package for the Social Science (SPSS).

The findings of the study revealed 77.7% agreed with the notion that E-learning will positively affect their learning styles. Also, they knew about the future benefits of E-learning in the educational sector. Furthermore, 55.5% showed their perception regarding the quality of E-learning and 22.2% were cognizant of the advantages of E-learning.[32]

A social survey was used to assess the attitude of students towards E-learning in Nigerian universities in 2014. The population under study were undergraduate and postgraduate students in six universities in Southwest Nigeria namely: University of Lagos (UNILAG), OAU, Lead City University, Covenant University, University of Ado-Ekiti (UNAD) and Adekunle Ajasin University. Three hundred and eighty-seven students were randomly selected from six universities comprising two private, two State and two Federal Universities. Questionnaire was used to collect data. The reliability statistics of the sample variables

ranged between 0.604 and 0.891 for Cronbach's Alpha, therefore the data set was reliable since the values were above 0.5. Frequency counts, cross-tabulation, simple linear regression, and ANOVA were used for data analysis.

There was a generally favourable attitude towards using E-learning tools among 80% of respondents. While 88.6% believed that it will be a good idea to use E-learning tools. This suggests that students had a positive attitude towards E-learning since they believed that it was a good idea to make use of them. Of the respondents, 82.9% agreed that if available they intend to use E-learning tools during the semester, 80.4% agreed that they intend to use E-learning tools as frequently as possible if available and 88.6% agreed that if available they intend to use E-learning tools whenever possible for their course work.[3]

2.3 CHALLENGES TO E-LEARNING

A descriptive, cross-sectional study was conducted in Tehran University of Medical Sciences in 2017. The study focused on the challenges of E-learning systems: higher educational institutions perspective. Using a stratified random sampling method, 300 students were selected. A researcher-made questionnaire was used for data collection. The data obtained from the statistical population (n=300) were analysed using SPSS version 19.

According to the findings of this study, 40% of the participants had problems accessing the technology and 38% of them stated that they had skill challenges including the use of tools such as Yahoo Messenger, and the ability to use audio and video tools for online chat. In addition, only 26.4% had good preparation for the use of the E-learning system.[33]

A qualitative study was undertaken in 2020, which focused on exploring the critical challenges and factors influencing E-learning system usage during the COVID-19 pandemic. This study employed the interview method which was conducted with 30 students and 31 experts in E-learning systems at six universities from Jordan and Saudi Arabia. A thematic

analysis was used for identifying and classifying of E-learning adoption factors and challenges. The qualitative data obtained during the interview was analysed using the thematic analysis technique using the NVivo software. For conducting the thematic analysis process for this study, five steps were identified according to Braun and Clarke (2006), namely: familiarization with data, generating initial codes, searching for themes, defining and naming themes, and producing the final report.

All interviewees agreed that the E-learning system technical factor is one of the critical issues that should be addressed, as it could create an obstacle in the adoption of the system by many students. As stated by the interviewees: “It is obvious that when students feel that the E-learning system is friendly and easy to use then he believes that the system is useful and would enhance their performance.” All interviewees confirmed that financial support is one of the obstacles that face the E-learning projects because Jordanian universities have limited resources and have a large budget deficit. The interviewees pointed out that: “In case of financial troubles such as the current state of budget deficit, many projects could be detained because the Jordanian government is the sole source of universities’ financial support.”[34]

A study was conducted with the aim of comparing the iPad and other m-learning technologies in 2012. Students were solicited from a medium size private university in the Southwest of the United States. A total sample size of 76 was obtained. The survey instrument was designed by a focus group of five graduate students, two of which were contributing researchers. This was considered key since it focused on the student perspective to examine the potentials and challenges of using M-learning. The survey was distributed electronically using a snowball sample technique through e-mail. Analysis was done using percentages and frequencies.

Findings revealed that one of the biggest challenges of M-learning is what the devices have come to symbolize. More than half of the respondents (53.9%) considered mobile learning

devices to be more for entertainment than for education, 42.3% contended the devices were a distraction to learning while only 28.9% contended that they did not and 28.8% were neutral. Similarly, 46.1% stated that M-learning technologies encouraged plagiarism. This is contrasted with only 21.1% of students that did not and 32.8% were neutral. The percentages indicate that both distraction and plagiarism continue to be challenges regarding M-learning.

Perhaps some of the less apparent but equally important deficits were derived in students' more tacit feedback. One of these areas was the desire for more technology driven curriculum. Sixty-two percent of students expressed a desire for more technologically driven curriculum. Roughly, 80% of students in this survey thought mobile learning technologies were overpriced and most of the students (53.8%) stated that mobile learning technologies were outdated too quickly.[35]

A study was conducted in Namibia in 2020 with a focus on Investigating the E-learning Challenges Faced by Students during Covid-19 in Namibia. A mixed-method approach with qualitative dominance was adopted. Questionnaires that included both closed and open-ended questions were randomly distributed to students enrolled for the Business and Information Administration (BIA) programme via Google forms and a link distributed to students through WhatsApp class groups. Quantitative data were presented through frequency tables and figures, and thematic content analysis was used to analyse qualitative data.

Theme 1 - E-learning System Accessibility

Students reported experiencing challenges when attempting to access the E-learning platform. This could potentially be attributed to the unusually high volume of user traffic on the E-learning platform. Furthermore, internet network coverage is poor in most areas in Namibia (Taruvinga, Chikohora, Jere & van den Dool, 2020) which could have contributed to accessibility challenges.

Theme 2 - E-learning Platform Layout

The layout of the E-learning platform, which made navigation difficult, was flagged as one of the challenges faced by students.

Theme 3 - Resources to Access to Internet and Network

A number of students reported experiencing challenges with data costs, which impeded their ability to access the university E-learning platform. This was compounded by the fact that sometimes the E-learning system loads too slow, leading to some students aborting their attempts to use it. The issue of costs has been identified as a major factor impeding successful E-learning implementation in developing countries (Kibuku et al. 2020), including in Namibia (Ilonga et al. 2020).[36]

A comparative study of the challenges of E-learning in Nigerian Universities was conducted in 2018. The purpose of the study was to determine if there was a significant difference in the challenges faced by students in E-learning in Nigerian Universities. A total of two hundred and twenty eight students from nine Universities constituted the sample for the study. Simple random sampling technique was employed in selecting students from these universities in Nigeria. These universities were also randomly picked from the six geo-political zones of Nigeria and the federal capital territory. Questionnaire was used to elicit "Yes or No" answers to the questions. Frequency analysis using percentages was done and this was presented using column charts to compare responses of the students.

The findings of the study revealed that students from seven out of the nine universities confirmed their universities' lack of appropriate software, while the other two indicated that they had appropriate software. The findings of the study also revealed that most of the respondents in almost all the Universities under study indicated that sustainability of E-learning was not prioritized. This was because most developing countries followed the traditional instructor-centred approach, lacked infrastructure, and the implementation and full use of E-learning environments had not yet penetrated the existing educational organization.[37]

An exploratory study was conducted in 2018. This study on m-learning was designed to identify the extent to which the Open University of Nigeria used mobile phones to communicate with learners and to identify the challenges of mobile phone use for learning. Quantitative and qualitative methods were used in data collection and analysis.

Findings from the study presented challenges identified by the learners in ranking order: high running cost (45%), poor network (35%), low storage capacity (3%), abuse (3%), power supply and reliability (3%), and miscellaneous (7%).[38]

A study was conducted to investigate E-learning in Nigerian universities in 2014. A total of two hundred and twenty-eight students constituted the sample for the study. A simple random sampling technique was employed in selecting thirty–two students from one of each universities in the six geo-political zones of Nigeria mainly: Anambra State University Uli, University of Port Harcourt, Ahmadu Bello University Zaria, University of Lagos, Federal University of Technology Minna, Federal University of Technology Yola and 68 students of the University Abuja in the Federal Capital Territory of Niger, and they constituted the sample for the study. Questionnaire based on "Yes or No" constituted the instrument for the study. Percentages were employed in analysing the data that emanated in the study.

With regards to infrastructure, the finding of the study revealed that majority of the students reported that their Universities did not have E-learning library domain (55%), that their bandwidth were limited (51%) and that their electricity supply was limited (56%).With regards to the materials available for E-learning in Nigerian Universities, majority of the students said that the online materials and resources were not understandable (64%), the online materials were not interesting and engaging (61%), and that finally, the course activities did not help them learn (69%).[39]

A study assessing mobile learning technologies application for business education instruction in colleges of education in Delta State, Nigeria was conducted in 2019. Descriptive survey

research design was used. Purposive sampling and simple random sampling techniques were used. The entire 79 lecturers were used from the two colleges while 61 students were sampled from FCE (T) Asaba and 42 students from College of Education Agbor, making a total of 182. The instrument for data collection was a 50-item structured questionnaire. The instrument was face-validated by three experts using Cronbach Alpha. The reliability yielded a coefficient of 0.84. The data collected were analysed using frequency, mean and t-test statistics.

An assessment of the challenges undermining effective use of m-learning for instructional delivery in business education was done. The grand mean ratings of the responses of respondents on the 20 items range from 3.03 to 3.64 which are all greater than the cut-off point value of 2.50 on 4-point rating scale. This indicates that the 20 identified items are challenges undermining effective use of m-learning for instructional delivery in business education in colleges of education in Delta State. The grand standard deviation of the 20 items ranged from 0.59 to 0.93 which imply that the responses of the respondents are close to one another and the mean.

The challenges undermining effective utilization of m-learning technologies as found in this study include: the challenge of unstable power supply for constant charging of m-learning devices could be frustrating, poor internet connectivity is a major limitation in the use of m-learning technologies, fragile nature of most of the handheld devices is a challenge, techno phobia of being afraid of new technologies is a challenge of m-learning, fear of theft of m-learning technologies and associated information lost, m-learning cannot sustain the concentration span of students for long, frequent changes in device models and technologies functionality, accessibility and airtime recharge is a major barriers for end users of m-learning technologies and the challenges of poor battery life span are common phenomena in the use of m-learning among others.[40]

2.4 READINESS TO E-LEARNING

A descriptive, cross sectional study was undertaken to assess readiness of nursing students for e- learning in El Dawadmee Applied Medical Science, Shaqraa University, Egypt in 2016. A purposive sample of 113 female nursing students was used. Data was collected by using two tools; the first was concerned with collecting data related to sample characteristics; the second was a self-administered questionnaire. The Statistical Package for the Social Sciences (SPSS) version 15 was used to analyze the data. Frequencies and percentages were calculated for study sample characteristics. Descriptive statistics, including measures of central tendency and means were calculated for each subscale and total score of E-learning readiness scale. One way analysis of variance was used to compare E-learning readiness among different students groups.

The study found that the majority of nursing students revealed total high score level of E-learning readiness. Watching through each subscale, the average score was high, Technology Acceptance's average score was the highest. The Motivation average score was the lowest. Further, the study found that nursing students of different academic level (3rd to 8th level) showed statistically indifferent average score of E-learning readiness while, those with different preference to study through E-learning, showed statistically different average score of E-learning readiness.[41]

A quantitative research based on a survey was carried out in 2016. Four universities of Iran with arts majors were selected. The population of this research included 8103 students of Alzahra University, Tarbiyat Modares University, Tehran University, and Honor University. 347 students were selected by multistage cluster sampling. A questionnaire based on a five-point Likert scale was the instrument used in the investigation. It was previously used by Seraji and Yarmohammadi (2010). Cronbach alpha was used to determine the questionnaire

validity. Descriptive statistics (frequency table, histogram, mean and standard deviation) and inferential statistics (one-sample *t*-test) were used.

Results revealed that Art students were in a moderate level of readiness for applying E-learning.[42]

A descriptive qualitative research study was undertaken to assess first-year students' pedagogical readiness to E-learning and assessment at the University of South Africa in 2013. The sample for this study was drawn from a group of first-year undergraduate students who registered for signature courses that were being offered online at the University of South Africa. Purposive sampling was used to select the group because the intention was to get participants who are directly involved in E-learning. The students who participated in this study came from Unisa's five colleges namely: College of Human Sciences, College of Economic and Management Sciences, College of Law, College of Agriculture and Environmental Sciences, College of Science, Engineering and Technology. Data was collected by using focus-group and individual in-depth interviews. The researcher synthesised the final set of themes into a textural and structural description that represented the experiences of the participants.

Most of the students who responded to the focus-group interview schedules indicated that they need to be independent learners who are ready to take responsibility for their own learning as shown in the following statements: "I feel that E-learning has improved my performance. Using E-learning is a good idea because you can learn anything anywhere at any time without bothering about submission deadline". This statement alone indicates that the new technologies are attractive for distance teaching because they have the potential to overcome three major problems of traditional distance education: to rescue the isolated student from their loneliness by providing interaction with teachers, as well as with other peer students throughout the study process, to provide easy access to information resources.[43]

A descriptive method of causal-comparison and co-relational techniques were used to study the readiness and attitude of higher education students towards E-learning in 2011.

The sample consisted of 631 students studying in different faculties, i.e., arts (208), science (222) and commerce (201) – both boys and girls from degree colleges situated in Mumbai and affiliated to the University of Mumbai. A rating-scale to measure the higher education students' readiness for E-learning and attitude towards E-learning was prepared by the researcher and used for data collection. Descriptive and inferential techniques of analysis were used. In the descriptive analysis, the mean, median, standard deviation, mode, skewness and kurtosis were used. In inferential analysis, techniques like T-test, ANOVA and coefficient of correlation test were used.

Findings revealed that there was no significant difference in the higher education students' (arts, science and commerce) readiness for E-learning as well as in their attitude towards it. A significant difference was seen in the readiness for E-learning on the basis of gender. There was a strong positive relationship between readiness for and attitude towards E-learning among higher education students.[44]

A study was conducted to assess students' intention to adopt E-learning in the University of Nigeria, Nsukka in 2011. The sample subjects were selected to participate in the survey through purposive sampling. A total of fifty (50) students were sampled from a population of one hundred and fifty students (150) from the department of Library and Information Science Department. A semi-structured questionnaire was developed for data collection. Respondents were asked to rate their opinion about each item using 4-point Likert scale. Descriptive and Inferential statistics were used in analysis.

The study revealed that majority of the LIS students had the intention to adopt E-learning.[45]

A study was conducted among first- and second-year students of the Yenagoa Study Centre of the National Open University of Nigeria (NOUN) in 2019. A quantitative approach was

adopted to address the research questions and to establish whether a statistically significant relationship existed between individual innovativeness, E-learning self-efficacy, the independent variables; and E-learning readiness, the dependent variable. In total, 476 first- and second-year students of the university participated in the four-Likert-type scale survey. The research instrument which comprises 74 survey items was completed by 217 of the students. Statistical tools used for analysing data included both Pearson Product Moment Correlation coefficients and t-tests.

It was discovered that a strong positive and significant relationship was observed between individual innovativeness and E-learning readiness of the first- and second-year students; a statistically significant relationship was also found between E-learning self-efficacy scores and the E-learning readiness of the first- and second-year students; there was a statistically significant joint relationship between the three variables under investigation; findings equally revealed that male respondents had higher E-learning readiness than their female counterparts.[46]

A descriptive cross-sectional study of medical students in University of Nigeria Teaching Hospital, Enugu State, Nigeria was carried out in 2017. The study focused on assessment of student's perspectives of E-learning readiness, its predictors and also presents a model for assessing them. By proportional quota sampling, 284 students responded to a semi-structured self-administered questionnaire adapted from literature. Ethical issues were given full consideration. Analysis was with SPSS version 20, using descriptive statistics, ANOVA, Spearman's correlation, and multiple regression. Statistical significance was considered at $P < 0.05$.

Results showed that medical students are ready for E-learning, beyond reliance on the face-to-face approach (69.7%), expecting effective (51.1%), and quality improvement in their learning (73.1%). Having basic information and communications technology skills (68.9%),

access to laptops (76.1%), ability to use web browsers confidently (91.8%), with only few able to use asynchronous tools (45.5%), they consider content design important to attract users (75.6%), and agree they need training on E-learning content (71.4%). They however do not believe the university has enough information technology infrastructure (62.4%) or sufficient professionals to train them.[47]

A study was carried out in Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria in 2014 to verify the level of availability of online learning tools and to find out the level of readiness of both the teachers and students toward using it. Three research questions and three hypotheses were raised and tested for the study. Descriptive survey research design was adopted for the study. A sample of one hundred and twenty five respondents participated in the study. The research instruments were questionnaires; one designed for the teachers and the other for the students, both were tested for reliability using Cronbach Alpha formula and the reliability co-efficient of each yielded 0.82. The instruments were checked for face, content and construct validity by three experts in computer education and educational technology before administration. Data obtained were analysed using simple percentage and chi square statistical tools.

Findings from the study revealed that online learning tools are available at Adekunle Ajasin University Akungba- Akoko but the practice has not begun. Students and lecturers are equally ready to use online instructional method whenever it is introduced into the university system.[48]

2.5 LEVEL OF PARTICIPATION TOWARDS E-LEARNING

A cross-sectional study was carried out in South Korea in 2019 amongst 614 undergraduate students. The goal of this study was to examine the students' perceptions of E-learning, based on their experiences, and the mediating roles of academic engagement and digital readiness within the university context of an E-learning environment for academic achievement. The

data was collected as part of a larger study on the quality of undergraduate educational experiences at the university, particularly students' digital learning experiences. The survey was conducted through a self-administered online questionnaire using SurveyMonkey. The data was analyzed using descriptive statistics which was used to calculate the mean, standard deviation, correlations, independent t-test results, and ANOVA using IBM SPSS 23 software. Partial least squares-structural equation modeling (PLS-SEM) was adopted to test the research model.

The result of the study showed that although the students had a positive perception of E-learning experiences on campus, they need strong digital skills to perform academic work and commit to effortful participation in the context of academic learning in university E-learning environments.[49]

Another study was done in Korea in 2019 aimed at exploring factors, and indicators for measuring students' sustainable engagement in E-learning. A total of 737 students participated in this study. The first 218 students participated in the online survey for an exploratory factor analysis (EFA). A further 519 students participated in this survey for a confirmatory factor analysis (CFA). An online questionnaire was used to collect the data.

Following the exploratory and confirmatory analyses, it was shown that 6 factors, including psychological motivation, peer collaboration, cognitive problem solving, interaction with instructors, community support, and learning management were all factors that affected the participation of students in online learning.[50]

A similar study was carried out in 2016 in Italy with the aim of analyzing the emotions experienced by students within different E-learning contexts, and understanding the possible relationship with students' engagement or level of participation in online learning. The study made use of 78 participants who were Italian university students attending online courses. The data was collected through online self-report surveys.

The results showed that when e-learners experience positive emotions across synchronous learning activities, the level of engagement and participation significantly increase.[51]

In 2012, a study was done in Taiwan to examine the mediating processes in the relationship between learning style, participation and E-learning performance and the moderating effects of prior knowledge. The study was conducted in the context of software usage instruction using empirical data from 219 undergraduate students. Empirical data were used to test the research model. The data for learning style and prior knowledge were collected by administering questionnaires to four sessions of students on the same Mixed-mode E-learning (MMEL) course. Data collected was analyzed using structural equation modeling (SEM).

The study showed that students whose learning style was characterized as "sensory" participated online more frequently and for a longer duration. This higher level of online participation led to better E-learning performance.[52]

In Nigeria, several studies have been done that highlight the usage of online learning services by Nigerian undergraduates. These studies reflect the peculiar issues and characteristics of a developing country.

In a study carried out amongst final year polytechnic students in Federal Polytechnic, Ede, Osun State, a desktop review was done to explore and establish conceptions of how E-learning tools can enable and sustain students' engagement in the learning processes. A questionnaire was designed and distributed on the usage of E-learning among 60 final year students at the Federal Polytechnic.

Data collected and analyzed revealed that 100% use the internet for research work, 42.3% of students uses internet for socials such as face booking, twitter and many more while 57.7% of the students do not, also 13.6% use the internet for services such as advertising product or service while 86.4% do not. The review also showed that E-learning tools can enable and sustain students' content engagement through content presentation tools, critical engagement

through collaboration tools, self-regulated learning through assessment tools, and self-engagement through the variety provided by E-learning tools, on-task engagement through access to information.[53]

A study aimed at analysis of online learning in Nigerian higher education was carried out in 2020. The study used quantitative survey methods and a sample size of 1134 students of the three types of higher institutions in Nigeria (universities, polytechnics and colleges of education) was used. A questionnaire with semi-structured questions was sent via Google Forms and distributed through Facebook and WhatsApp. Data was presented using percentages and charts.

Results from the study showed that 1 in every 10 students did not partake in any form of E-learning during the pandemic. Also, two-thirds of all institutions that engaged in semester-based online learning were universities, closely followed by polytechnics and then colleges of education.[54]

In the year 2020, at Landmark University, Nigeria, a qualitative research was done. A descriptive research design was adopted because the research was an exploratory one and included the use of semi-structured interviews. A purposive sampling technique was done and the population of the study was made up of students in the College of Business and Social Sciences, College of Science and Engineering and College of Agricultural Sciences, between the levels of 200 and 500. About 70 students were selected to be interviewed, however, 15 agreed to be interviewed. Data collected was analyzed using thematic analysis.

The findings revealed that technology-related factors (ease of use, speed accessibility and service delivery), organization-related factors (training support and diversity), environment-related factors (attitudes of the users) and impact-related factors (learning experience, skill development, academic performance, and degree of engagement) influence the students' adoption of and participation in the use of E-learning facilities.[55]

Similarly, in 2020, a study was done to examine the extent to which E-learning delivery platforms were utilized to improve teaching/learning during COVID-19 lockdown in Private Universities in South-South Nigeria. An ex post facto survey design was used. The study population consisted of 4305 students of five private universities in South-South Nigeria. A sample size of 366 was selected using the Taro Yamane formula and a cluster sampling technique was used for the study.

The finding of the study showed that private university students made use of E-learning facilities during the COVID-19 lockdown because their schools had the facilities to do so. They were able to utilize the Zoom platform, while google classrooms which is an emerging technology in Nigeria was not fully utilized.[56]

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

This study was carried out among students of the University of Benin, Benin City, Edo State. Edo State is one of the 36 states in Nigeria. Benin City is the capital City of Edo State. It is

located in the South-South geopolitical zone of Nigeria and has a land mass of about 19,743 square kilometers bounded by Delta State in the South, Ondo State in the west, Kogi State in the North and Kogi State and Anambra State in the east.[57] The State was created in 1991 from the Northern portion of the defunct Bendel State, then in 1976 it was divided into Edo State and Delta State. Edo State consists of ethnic groups including Benin, Esan, Etsako, Owan and other smaller tribes, as well as a pool of different tribes who reside in the State. The State has seven (7) universities (one federal university, two State universities and four privately owned universities).

Benin City is metropolitan City and is bounded by latitudes 6^0 06' N, 6^0 30' N and longitudes 5^0 30' E, 5^0 45' E of the Greenwich meridian. It occupies a land area of 500^2 Km, situated 200miles by road East of Lagos, and 25 miles North of the Benin river. It has a population of 1,147,188 as at the 2006 census and a projected population for 2021 of 1,745,976. The City is comprised of 3 major local governments out of the eighteen local government areas of Edo State namely; Oredo, Egor, Ikpoba-Okha Local government areas. The Indigenous ethnic group is Benin and their language is Benin. The major business of the City includes transportation and petty trading, however there are two brewing factories, a petroleum storage depot, an Oil pipeline, a battery assembling factory, four small scale pharmaceutical production factories, etc. Benin City is home to some of Nigeria's institutions of higher learning namely; the University of Benin, College of Education Ekiadolor, Igbinedion, University Okada, and Benson Idahosa University.[57]

The University of Benin is a Federal tertiary education institution and was founded in 1970. It started as an institute of technology and was accorded the status of a full-fledged University by National University Commission on 1st July, 1971.The University is officially accredited and recognized by the National Universities Commission, Nigeria. The University offers courses at various levels: postgraduate undergraduate, diploma and certificate.

It has a student enrolment range of 40,000 - 44,999 students made up of both full-time and part-time students; and 4,000 – 4,499 academic staff. Faculties in the university include Agriculture, Arts, Education, Engineering, Law, Life science, Management, Pharmacy, Physical Science, Social science, Veterinary medicine and a college of medical science which comprises the school of Medicine, Dentistry, and Dentistry and Basic Medical Science.

3.2 STUDY DESIGN

A descriptive cross-sectional study design was adopted for this study.

3.3 STUDY POPULATION

The study was carried out amongst undergraduate students from all the faculties in the University of Benin, Ugbowo Campus, Benin City, Edo State.

3.4 SELECTION CRITERIA

3.4.1 Inclusion Criteria

The selection criteria included persons enrolled as Full time undergraduate students in all faculties in the University of Benin, Benin City that consented to the study.

3.4.2 Exclusion Criteria

Part-time Undergraduate students of the University of Benin were excluded from the study.

3.5 STUDY DURATION

The study was conducted between 2021 and 2023.

3.6 SAMPLE SIZE DETERMINATION

Sample size was calculated using the Cochran's formula for descriptive study.[58]

$$n = \frac{Z^2 pq}{d^2}$$

Where,

n = minimum sample size

Z = standard normal deviate = 1.96 at 95% confidence interval

p = prevalence of the characteristic of interest

q = 1-p

d = degree of precision desired set at 0.05

P was set at 21% based prevalence of use of mobile learning technologies for Business Education instructional delivery [40]

q = 1 – p

= 0.79

$$n = \frac{1.96^2 \; x \; 0.21 \; x \; 0.79}{0.05^2}$$

n = 255

Non Response rate

10% non-response rate was added to the sample size utilizing the formula of Non response rate

$$nf = \frac{n}{1 - nr}$$

Where;

n_f = Final Minimum Sample Size

n = Minimum Sample Size

nr = Non response rate at 10% = 0.1

Thus;

$$nf = \frac{255}{1 - 0.1}$$

= 283

DESIGN EFFECT

Using a design effect of 1.5

283 x 1.5 = 425

Therefore, the final sample size was 425

3.7 SAMPLING TECHNIQUE

Respondents who met the inclusion criteria were selected through multi-stage sampling technique.

Stage 1: Selection of Campus

The University of Benin has two campuses, namely; the Ugbowo Campus and Ekehuan Campus. A simple random sampling was done using a coin toss to select the Ugbowo Campus.

Stage 2: Selection of Departments

There are fifteen (15) faculties in the Ugbowo Campus of the University of Benin. All of the faculties were used. (See Appendix for list of faculties)

There are eighty-one (81) departments across the faculties in the University of Benin, Ugbowo Campus. A simple random sampling by balloting was used to select one department each from the fifteen faculties.

Stage 4: Selection of Respondents

The number of respondents per department was first calculated by proportional allocation:

$$\text{Proportionate allocation} = \frac{\text{Minimum sample size}}{\text{population size}} \text{ x Number of students in that department}$$

Where;

Population size = Total number of students across the selected departments, 9549.

Minimum sample size = 425

(See Appendix for proportionate allocation)

The number of levels in each department was used to divide the department into strata.

A systematic sampling technique was used to select students in each level.

The number of participants per class was obtained by dividing the number of students in each department with the number of levels in the department.

Sampling interval was computed for each level using

$$\text{Sampling Interval} = \frac{\text{Number of Students in department}}{\text{Sample size allocated to each level}}$$

(See Appendix for sampling interval)

Class list for each level was utilized as a sampling frame from which students were selected using a systematic sampling technique

The first student was selected by simple random sampling using a table of random numbers and after which, systematic sampling interval was used to select subsequent students.

3.8 DATA MANAGEMENT

3.8.1 TOOL FOR DATA COLLECTION

Data for this study was obtained using a standardized semi-structured self-administered questionnaire. The questionnaire for this study was adapted from two studies including; Assessing E-Learning Tools in an Academic Environment: A Study of Availability and Use among Undergraduate Students in a Nigerian University[59] and Perceptions and Attitude of

Students toward E-Learning in Kwara State University, Malete, Kwara State, Nigeria.[15] The questionnaire contained close and open-ended questions and was divided into the following sections:

SECTION A: Socio-demographic information

SECTION B: Knowledge of E-learning among undergraduate students of University of Benin

SECTION C: Attitude towards E-learning among undergraduate students of University of Benin

SECTION D: Challenges to E-learning among undergraduate students of University of Benin

SECTION E: Readiness towards E-learning among undergraduate students of University of Benin

SECTION F: Level of participation towards E-learning among undergraduate students of University of Benin

3.8.2 METHOD OF DATA COLLECTION

A standardized semi-structured self-administered questionnaire was used. Respondents were assured of confidentiality and informed consent was obtained from them.

3.8.3 PRETEST

The questionnaire was pretested among undergraduate students of Benson Idahosa University (BIU) in Benin City, Edo State. Ten percent (43) of the sample size was used. The aim was to test the questionnaire for the correctness and appropriate understanding by the respondents to aid in appropriate data collection. Appropriate corrections were made where necessary to the questionnaire before the commencement of the survey.

3.8.4 DATA ANALYSIS

Data collected was collated and screened for completeness after which they were serially entered into the IBM SPSS version 25.0 software for analysis with statistical significance set at $p<0.05$ and 95% confidence interval.

Univariate analysis was used to assess frequency of the variables which were expressed in frequency tables.

Bivariate analysis was used to determine association of selected socio-demographic data with knowledge, attitude, challenges, readiness and level of participation of undergraduate students towards E-learning in University of Benin.

Multivariate analysis using binary logistic regression was used to further determine significant predictors of outcome variables such as knowledge, attitude and readiness.

Age was grouped into three intervals. The categories were; 15-19 years, 20-24 years, 25-29 years and >29 years.

3.8.5 SCORING

KNOWLEDGE OF E-LEARNING

A total of 29 questions were used to assess knowledge. Relevant questions for scoring knowledge were identified and a score of 1 was assigned for correct responses and a score of 0 was given to incorrect responses; giving a total of 29.

Scores were computed into percentages and the respondents classified as having good knowledge if they scored ≥50% and poor knowledge if they scored 0-49%.

ATTITUDE TOWARDS E-LEARNING

Attitude was assessed with 11 questions using a 5 point Likert scale and mean scores. On the Likert scale, a mean score of 1.00 to 1.79 means strongly disagree, 1.80 to 2.59 means disagree, 2.60 to 3.39 means neutral, 3.40 to 4.19 means agree and 4.20 to 5.0 means strongly

agree.[60] The scores were also converted to percentages and respondents were grouped into having positive and negative attitude using the ≥50% and 0-49% cut-offs respectively.

READINESS TOWARDS E-LEARNING

Readiness was assessed with 6 questions each having a score of 1.

A score of 1 was assigned for correct responses and a score of 0 was given for incorrect responses.

A maximum score of 6 was calculated, converted to percentages and respondents were grouped into having good or poor practice using a cut-off of ≥50% and 0-49% respectively.

LEVEL OF PARTICIPATION TOWARDS E-LEARNING

Practice was assessed using adapted frequency tables to determine the frequency of use of E-learning tool and frequency of participation in E-learning activities. The tables were adapted from a Nigerian study titled Assessing E-Learning Tools in an Academic Environment: A Study of Availability and Use among Undergraduate Students in a Nigerian University.[59]

3.8.6 DATA PRESENTATION

Results obtained have been presented using prose, frequency tables and charts.

3.9 ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Ethics and Research Committee, University of Benin Teaching Hospital with protocol number ADM/E 22/A/VOL. VII/14831246. Informed

consent was also taken from the respondents before administering the questionnaires. Names and addresses were omitted to ensure confidentiality.

3.10 LIMITATION OF THE STUDY

The information that was obtained may have been based on self-reporting and was therefore subject to information bias. To minimize this effect, there was an assurance of full confidentiality of participants.

CHAPTER FOUR

RESULTS

A total of 425 respondents from among University of Benin undergraduate students participated in the study with a response rate of 100%. The results are presented in the following sections with the under listed specific objectives.

SECTION A: Socio-Demographic Characteristics of Undergraduate Students of University of Benin

SECTION B: Knowledge of E-Learning among Undergraduate Students of University of Benin

SECTION C: Attitude towards E-Learning among Undergraduate Students of University of Benin

SECTION D: Challenges to E-Learning among Undergraduate Students of University of Benin

SECTION E: Readiness towards E-Learning among Undergraduate Students of University of Benin

SECTION F: Level of Participation towards E-Learning among Undergraduate Students of University of Benin.

SECTION A:

SOCIODEMOGRAPHIC CHARACTERISTICS

Table 1; Sociodemographic Characteristics of Undergraduate Students of University of Benin

Variable	Frequency (n= 425)	Percent
Age(years)		
15-19	54	12.7
20-24	258	60.7
25-29	100	23.5
>29	13	3.1
Mean age ± SD (23.2 ± 3.2)		
Sex		
Male	201	47.3
Female	224	52.7
Ethnic group		
Benin	136	32.0
Igbo	76	17.9
Esan	63	14.8
Yoruba	44	10.4
Ijaw	19	4.5
Urhobo	18	4.2
Ebira	11	2.6
Efik	9	2.1
Etsako	9	2.1
Isoko	9	2.1
Afemai	8	1.9
Ibibio	6	1.4
Itsekiri	6	1.4
Ika	4	0.9
Ikwerre	2	0.5
Owan	2	0.5
Ukwuani	2	0.5
Igara	1	0.2
Religion		
Christianity	413	97.2
Islam	12	2.8
Marital status		
Single	401	94.4
Married	24	5.6

The results of the study conducted among University of Benin undergraduate students showed that of the four hundred and twenty-five students interviewed, fifty-five (12.7%) were aged between 15-19 years, two hundred and fifty-eight (60.7%) were aged between 20-24 years, one hundred (23.5%) were aged between 25-29 years and thirteen (3.1%) were aged greater than 29 years. The mean age was calculated as 23.2.

There was an almost equal proportion of males to females, with a male population of two hundred and one students (47.3%) and a female population of two hundred and twenty-four (52.7%) giving a ratio of 1:1.2.

The predominant ethnic groups represented were Bini, Ibo, Esan, and Yoruba with a population of one hundred and thirty-six (32.0%), seventy-six (17.9%), sixty-three (14.8%) and forty-four (10.4%) respectively.

A total of four hundred and thirteen (97.2%) respondents identified as Christians, while twelve (2.8%) respondents identified as Muslims.

In addition, four hundred and one (94.4%) respondents were single while twenty-four (5.6%) respondents were married.

Table 1 Contd; Sociodemographic Characteristics of Undergraduate Students of University of Benin…

Variable	Frequency (n= 425)	Percent
Faculty/Department		
Education/Curriculum and Instructional Technology	47	11.1
Accounting	45	10.6
Pharmacy	45	10.6
Computer Science	44	10.4
Microbiology	44	10.4
Law	39	9.2
Medicine	36	8.5
English And Literature	32	7.5
Mechanical Engineering	26	6.1
Public Administration	23	5.4
Agricultural Economics and Extension	15	3.5
Anatomy	13	3.1
Architecture	9	2.1
Dentistry	6	1.4
Veterinary Medicine	1	0.2
Level		
100	74	17.4
200	113	26.6
300	92	21.6
400	104	24.5
500	26	6.1
600	16	3.8

A total of forty-seven (11.1%) of the responses were gotten from the Faculty of Education, the department of Accounting accounted for forty-five (10.6%) responses, forty-four (10.4%) responses were gotten from the departments of Microbiology and Computer Science each while Veterinary Medicine had one response (0.2%).

Responses were gotten from hundred level through six hundred level students. Of the respondents, seventy-four responses (17.4%) were gotten from 100 level students, 200, 300, 400, 500 and 600 level students accounted for one hundred and thirteen (26.6%), ninety-two (21.6%), one hundred and four (24.5%), twenty-six (6.1%) and sixteen (3.8%) responses, respectively.

SECTION B:

KNOWLEDGE OF E-LEARNING

Table 2; Knowledge of E-Learning among Undergraduate Students of University of Benin

Variable	Frequency (n=425)	Percent
Respondents understanding of the term E-learning*		
Learning when there is electricity	122	28.7
Learning with the use of technology	191	44.9
Any learning that is electronically enabled	216	50.8
E-learning in the broadest sense concerns itself with learning that occurs on line through the internet, or using other facilities such as radio, television and telephone	319	75.1
Learning from home	96	22.6
Source of information*		
Television	174	40.9
School	206	48.5
Friends	148	34.8
Social media	316	74.4
Books	148	34.8
Internet	346	81.4
Forms of E-learning known*		
Web based learning	274	64.5
Distance learning	221	52.0
Mobile learning	307	72.2
Computer-assisted instruction	169	39.8
Distributed learning	123	28.9
Uses of E-learning*		
Taking notes	187	44.0
Chatting with friends	74	17.4
Submitting assignments	247	58.1
Online gaming	71	16.7
Online exams	254	59.8
Reading E-books	274	64.5
Searching educational resources	336	79.1
E-learning being used in school		
Yes	351	82.6
No	74	17.4

On the understanding of e-learning, one hundred and twenty-two (28.7%) of respondents defined e-learning as learning when there is electricity, one hundred and ninety-one (44.9%) of respondents defined e-learning as learning with the use of technology, two hundred and sixteen (50.8%) of respondents understood e-learning to be any learning that is electronically enabled, three hundred and nineteen (75.1%) of respondents understood e-learning to be learning that occurs online through the use of the internet and other facilities, while ninety-six (22.6%) of respondents defined e-learning to be learning from home.

Concerning their source of information about e-learning, one hundred and seventy-four (40.9%) of the respondents identified television as their source of information, two hundred and six (48.5%) identified school, one hundred and forty-eight (34.8%) identified friends, three hundred and sixteen (74.4%) identified social media, one hundred and forty-eight (34.8%) identified books and three hundred and forty-six (81.4%) identified the internet as their source of information.

On forms of e-learning respondents knew, two hundred and seventy-four (64.5%) identified web-based learning, two hundred and twenty-one (52.0%) identified distance learning, three hundred and seven (72.2%) identified mobile learning, one hundred and sixty-nine (39.8%) identified computer-assisted instruction and one hundred and twenty-three (28.9%) identified distributed learning as forms of e-learning.

When asked the uses of e-learning, one hundred and eighty-seven (44.0%) of respondents aid e-learning can be used for taking notes, seventy-four (17.4%) said e-learning can be used for chatting with friends, two hundred and forty-seven (58.1%) said e-learning can be used for submitting assignments, seventy-one (16.7%) respondents said e-learning can be used for online gaming, two hundred and fifty-four (59.8%) of respondents said e-learning can be used for online examinations, two hundred and seventy-four (64.5%) said e-learning can be

used for reading e-books, while three hundred and thirty-six (79.1%) of respondents said e-learning can be used for searching educational resources.

In addition, three hundred and fifty-one (82.6%) of respondents knew that e-learning was being used in their school while seventy-four (17.4%) respondents said e-learning was not being used.

Table 2 Contd; Knowledge of E-Learning among Undergraduate Students of University of Benin…

Variable	Frequency (n=425)	Percent
E-learning tools used in school*		
PowerPoint	209	49.2
Wi-Fi	92	21.6
E-library	202	47.5
Virtual classroom	215	50.6
Computer-based tests	254	59.8
E-library in school		
Yes	321	75.5
No	104	24.5
E-library easily accessible	**n=321**	
Yes	246	76.6
No	75	23.4
E-learning tools respondent can use*		
Virtual classrooms	246	57.9
Search engines	275	64.7
Ms-Word	261	61.4
Ms-Excel	147	34.6
WhatsApp	271	63.8
E-learning devices owned*		
Laptop	294	69.2
Smartphone	395	92.9
Tablet	71	16.7
CD-ROM	10	2.4
Webcam	34	8.0

*= Multiple Response Questions

When asked e-learning tools used in their school, two hundred and nine (49.2%) of respondents identified PowerPoint, ninety-two (21.6%) identified Wi-Fi, two hundred and two (47.5%) identified e-library, two hundred and fifteen (50.6%) identified virtual classroom, while two hundred and fifty-four (59.8%) identified computer-based tests as the e-learning tools used.

A total of three hundred and twenty-one (75.5%) of respondents said their school had an e-library, while one hundred and four (24.5%) of respondents said their school did not have an e-library.

On accessibility of the e-library to respondents, two hundred and forty-six (76.6%) respondents believed the e-library was easily accessible to them while seventy-five (23.4%) of the respondents believed the e-library was not easily accessible.

When asked what e-learning tool they could use, two hundred and forty-six (57.9%) of the respondents identified virtual classroom, two hundred and seventy-five (64.7%) of respondents identified search engines, two hundred and sixty-one (61.4%) identified ms-word, one hundred and forty-seven (34.6%) identified ms-excel, while two hundred and seventy-one (63.8%) identified WhatsApp as e-learning tools they could use.

When asked what e-learning devices they owned, two hundred and ninety-four (69.2%) said they owned a laptop, three hundred and ninety-five (92.9%) owned a smartphone, seventy-one (16.7%) owned a tablet, ten (2.4%) owned a CD-ROM, and thirty-four (8.0%) owned a webcam.

Table 2 Contd; Knowledge of E-Learning among Undergraduate Students of University of Benin…

Variable	Correct responses Freq (%)	Incorrect responses Freq (%)
Respondents understanding of the term E-learning*		
Learning when there is electricity	122 (28.7)	303 (71.3)
Learning with the use of technology	191 (44.9)	234 (55.1)
Any learning that is electronically enabled	216 (50.8)	209 (49.2)
E-learning in the broadest sense concerns itself with learning that occurs on line through the internet, or using other facilities such as radio, television and telephone	319 (75.1)	106 (24.9)
Learning from home	329 (77.4)	96 (22.6)
Forms of E-learning known*		
Web based learning	274 (64.5)	151 (35.5)
Distance learning	221 (52.0)	204 (48.0)
Mobile learning	307 (72.2)	118 (27.8)
Computer-assisted instruction	169 (39.8)	256 (60.2)
Distributed learning	123 (28.9)	302 (71.1)
Uses of E-learning*		
Taking notes	187 (44.0)	238 (56.0)
Chatting with friends	74 (17.4)	351 (82.6)
Submitting assignments	247 (58.1)	178 (41.9)
Online gaming	71 (16.7)	354 (83.3)
Online exams	254 (59.8)	171 (40.2)
Reading E-books	274 (64.5)	151 (35.5)
Searching educational resources	336 (79.1)	89 (20.9)
E-learning being used in school	351 (82.6)	74 (17.4)
E-learning tools used in school*		
PowerPoint	209 (49.2)	216 (50.8)
Wi-Fi	92 (21.6)	333 (78.4)
E-library	202 (47.5)	223 (52.5)
Virtual classroom	215 (50.6)	210 (49.4)
Computer-based tests	254 (59.8)	171 (40.2)
E-library in school	321 (75.5)	104 (24.5)
E-learning tools respondent can use*		
Virtual classrooms	246 (57.9)	179 (42.1)
Search engines	275 (64.7)	150 (35.3)
Ms-Word	261 (61.4)	164 (38.6)
Ms-Excel	147 (34.6)	278 (65.4)
WhatsApp	271 (63.8)	154 (36.2)

*= Multiple Response Questions

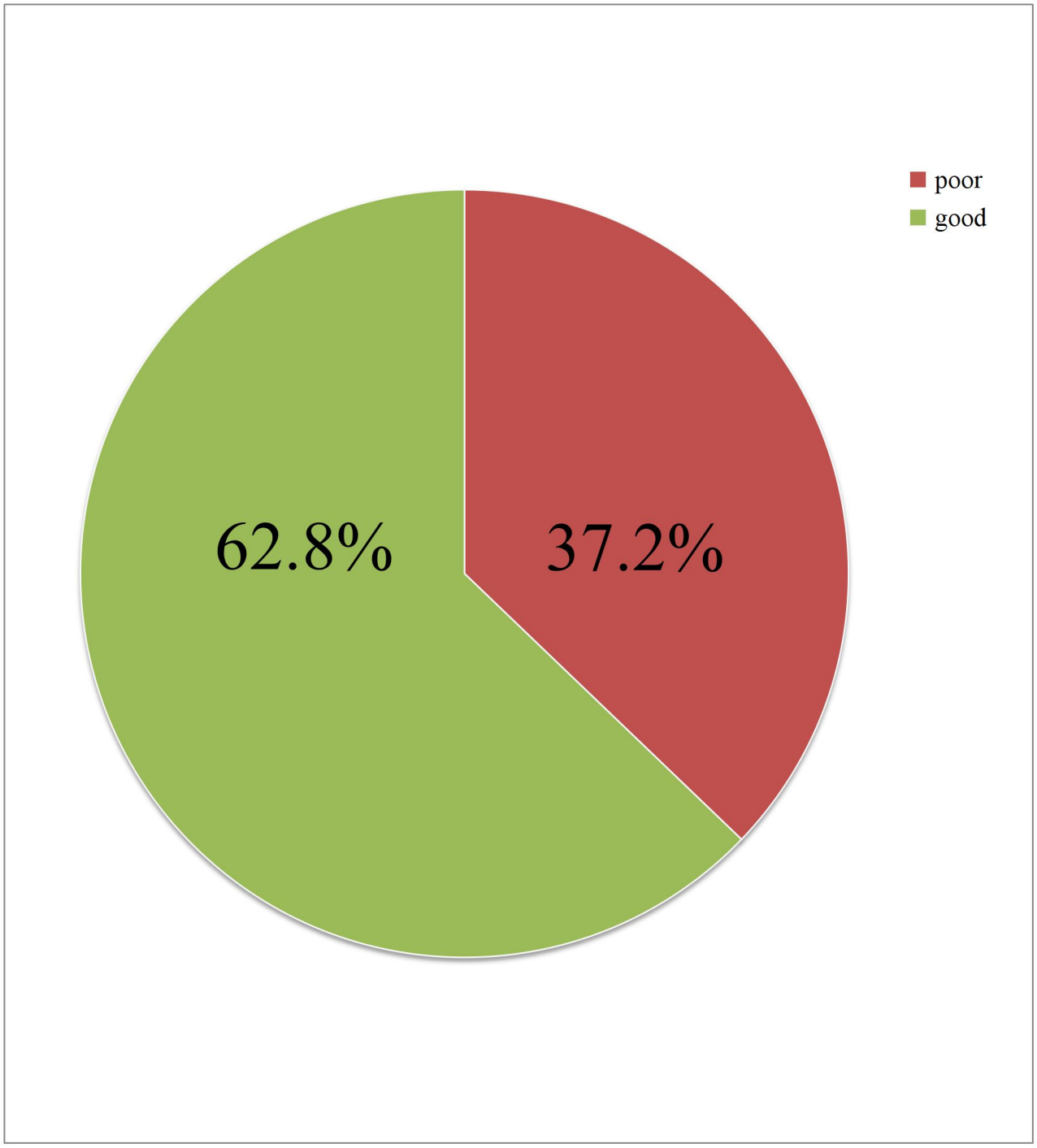

Fig 1: Pie-Chart Showing Knowledge of E-Learning among Undergraduates of University of Benin

On the assessment of the knowledge of E-learning, a greater percentage of respondents 267 (62.8%) had good knowledge, while 158 (37.2%) of respondents had poor knowledge.

Table 3; Association between Selected Sociodemographic Characteristics and Knowledge of E-Learning among Undergraduate Students of University of Benin

Variable	Knowledge of E-learning		$\chi 2$	p-value
	Good knowledge, (n=267) Freq (%)	Poor knowledge, (n=158) Freq (%)		
Age group(years)				
15-19	35 (64.8)	19 (35.2)	1.181	0.758
20-24	157 (60.9)	101 (39.1)		
25-29	66 (66.0)	34 (34.0)		
>29	9 (69.2)	4 (30.8)		
Sex				
Male	126 (62.7)	75 (37.3)	0.003	0.956
Female	141 (62.9)	83 (37.1)		
Faculty/Department				
Accounting	14 (31.1)	31 (68.9)	96.838	<0.01*
Agricultural Economics and Extension	11 (73.3)	4 (26.7)		
Anatomy	11 (84.6)	2 (15.4)		
Architecture	4 (44.4)	5 (55.6)		
Computer Science	24 (54.5)	20 (45.5)		
Dentistry	6 (100.0)	0 (0.0)		
Education/Curriculum and Instructional Technology	15 (31.9)	32 (68.1)		
English And Literature	22 (68.8)	10 (31.3)		
Law	31 (79.5)	8 (20.5)		
Mechanical Engineering	10 (38.5)	16 (61.5)		
Medicine	27 (75.0)	9 (25.0)		
Microbiology	41 (93.2)	3 (6.8)		
Pharmacy	40 (88.9)	5 (11.1)		
Public Administration	10 (43.5)	13 (56.5)		
Veterinary Medicine	1 (100.0)	0 (0.0)		
Level				
100	44 (59.5)	30 (40.5)	12.556	0.028*
200	80 (70.8)	33 (29.2)		
300	52 (56.5)	40 (43.5)		
400	58 (55.8)	46 (44.2)		
500	19 (73.1)	7 (26.9)		
600	14 (87.5)	2 (12.5)		

*= Statistically significant

In assessing the association between sociodemographic characteristics and e-learning, the results showed that, of the respondents, thirty-five (64.8%) of respondents aged between 15-19 years had good knowledge, one hundred and fifty-seven (60.9%) of respondents aged between 20-24 years had good knowledge, sixty-six (66.0%) of respondents aged between 25-29 years had good knowledge while nine (69.2%) of respondents greater than 29 years had good knowledge. This association was not statistically significant (p = 0.758).

A hundred and twenty-six (62.7%) of male respondents had good knowledge while one hundred and forty-one (62.9%) of female respondents had good knowledge. This association was not statistically significant (p = 0.956).

Among the students of the Accounting department, thirty-one (68.9%) had poor knowledge, this can be compared to the respondents from the Anatomy department where eleven (84.6%) of respondents had good knowledge and Microbiology where 41 (93.2%) of respondents had good knowledge. In the departments of Architecture, Curriculum and Instructional Technology, Mechanical Engineering and Public Administration, five (55.6%), thirty-two (68.1%), sixteen (61.5%) and thirteen (56.5%) of respondents had poor knowledge, respectively. However, in the departments of Agricultural Economics and Extension, Computer Science, Dentistry, English and Literature, Law, Medicine, Pharmacy and Veterinary Medicine, eleven (73.3%), twenty-four (54.5%), six (100.0%), twenty-two (68.8%), thirty-one (79.5%), twenty-seven (75.0%), forty (88.9%) and one (100.0%) of the respondents had good knowledge, respectively. This association was statistically significant (p = <0.001).

Regarding the respondents from 100 level, forty-four (59.5%) had good knowledge while eighty (70.8%) of the 200 level respondents, fifty-two (56.5%) of the 300 level respondents, fifty-eight (55.8%) of the 400 level respondents, nineteen (73.1%) of the 500 level

respondents and fourteen (87.5%) of the 600 level respondents also had good knowledge. This association was statistically significant (p =0.028).

Table 4; Logistic Regression Model for Determinants of Knowledge of E-learning among Undergraduate Students of University of Benin

FACTORS	B (REGRESSION CO-EFFICIENT)	ODDS RATIO	95% CI FOR OR		p-value
			LOWER	UPPER	
Age (years)	-0.001	0.999	0.898	1.112	0.990
Sex					
Male	0.047	1.048	0.652	1.684	0.847
**Female					
Faculty/Department					
Accounting	-18.256	1.179E-8	4.085E-9	3.400E-8	<0.01*
Agricultural Economics and Extension	-16.521	6.686E-8	1.513E-8	2.955E-7	<0.01*
Anatomy	-15.765	1.423E-7	2.506E-8	8.078E-7	<0.01*
Architecture	-17.815	1.832E-8	3.670E-9	9.151E-8	<0.01*
Computer Science	-17.355	2.903E-8	1.018E-8	8.279E-8	<0.01*
Dentistry	-0.458	0.633	0.000	0.000	1.000
Education/Curriculum and Instructional Technology	-18.179	1.274E-8	4.443E-9	3.652E-8	<0.01*
English And Literature	-16.660	5.816E-8	1.864E-8	1.815E-7	<0.01*
Law	-16.138	9.799E-8	3.078E-8	3.120E-7	<0.01*
Mechanical Engineering	-17.891	1.698E-8	5.079E-9	5.677E-8	<0.01*
Medicine	-16.753	5.302E-8	1.508E-8	1.864E-7	<0.01*
Microbiology	-14.704	4.113E-7	9.595E-8	1.763E-6	<0.01*
Pharmacy	-15.356	2.142E-7	6.016E-8	7.627E-7	<0.01*
Public Administration	-17.635	2.195E-8	2.195E-8	2.195E-8	<0.01*
**Veterinary Medicine					
Level in school					
100	-1.087	0.337	0.040	2.846	0.318
200	-0.631	0.532	0.071	3.997	0.540
300	-1.223	0.294	0.043	2.029	0.214
400	-1.487	0.226	0.034	1.509	0.125
500	-0.877	0.416	0.056	3.071	0.390
**600					

**= Reference category, Coefficient of determination – 23.7% to 32.3%

*= Statistically significant

The significant predictor of knowledge of E-learning among undergraduate students of University of Benin in this study was the Faculty/Department. The respondents from Accounting, Agricultural Economics and Extension, Anatomy, Architecture, Computer Science, Education/Curriculum and Instructional Technology, English and Literature, Law, Mechanical Engineering, Medicine, Microbiology, Pharmacy, Public Administration and Veterinary Medicine were more likely to have good knowledge than those in Dentistry. ($p = <0.01$)

SECTION C:

ATTITUDE TOWARDS E-LEARNING

Table 5; Attitude towards E-Learning among Undergraduate Students of University of Benin

Variable	0 Freq (%)	1 Freq (%)	2 Freq (%)	3 Freq (%)	4 Freq (%)	Mean
I feel confident in using computers	0 (0.0)	13 (3.1)	35 (8.2)	122 (28.7)	255 (60.0)	3.46
I enjoy using ICT for my studies	13 (3.1)	17 (4.0)	56 (13.2)	156 (36.7)	183 (43.0)	3.13
Using E-learning tools is a foolish idea	331 (77.9)	49 (11.5)	14 (3.3)	18 (4.2)	13 (3.1)	0.43
I believe that E-learning gives me the opportunity to acquire new knowledge	1 (0.2)	2 (0.5)	37 (8.7)	114 (26.8)	271 (63.8)	3.53
I believe that E-learning enhances my learning experience	2 (0.5)	4 (0.9)	38 (8.9)	98 (23.1)	283 (66.6)	3.54
I believe that convenience is an important feature of E-learning	10 (2.4)	13 (3.1)	28 (6.6)	134 (31.5)	240 (56.5)	3.37
E-learning increases the quality of learning because it integrates all forms of media	3 (0.7)	20 (4.7)	46 (10.8)	120 (28.2)	236 (55.5)	3.33
E-learning allows for increased student satisfaction	13 (3.1)	23 (5.4)	82 (19.3)	136 (32.0)	171 (40.2)	3.01
I feel E-learning has limited application in my course of study	125 (29.4)	103 (24.2)	68 (16.0)	67 (15.8)	62 (14.6)	1.62
I would be interested in studying courses that utilize E-learning	12 (2.8)	21 (4.9)	70 (16.5)	148 (34.8)	174 (40.9)	3.06
I feel E-learning should be used more by lecturers in my school	23 (5.4)	18 (4.2)	40 (9.4)	125 (29.4)	219 (51.5)	3.17

A total of three hundred and seventy-seven respondents (88.7%) strongly agree/agree that they feel confident in using computers, while three hundred and thirty-nine respondents (79.7%) strongly agree/agree that they enjoy using ICT for studies. A majority, three hundred and eighty respondents (89.4%) strongly disagree/disagree that using e-learning tools is a foolish idea. Almost all, three hundred and eighty-five respondents (90.6%) strongly agree/agree that e-learning gives the opportunity to acquire new knowledge, three hundred and eighty-one respondents (89.7%) strongly agree/agree that e-learning enhances their learning experience and three hundred and seventy-four respondents (88.0%) strongly agree/agree that convenience is an important feature of e-learning.

Majority of the respondents (83.7%) strongly agree/agree that e-learning increases the quality of learning, three hundred and seven respondents (72.2%) strongly agree/agree that e-learning allows for increased student satisfaction, while two hundred and twenty-eight respondents (53.6%) strongly disagree/disagree that e-learning has limited application in their course of study.

Majority of respondents (75.7%) strongly agree/agree that they would be interested in studying courses that utilize e-learning, and majority of respondents (80.9%) also strongly agree/agree that e-learning should be used more by their lecturers.

Table 5 Contd; Attitude towards E-Learning among Undergraduate Students of University of Benin

Variable	Correct responses Freq (%)	Incorrect responses Freq (%)
I feel confident in using computers	377 (88.7)	48 (11.3)
I enjoy using ICT for my studies	339 (79.8)	86 (20.2)
Using E-learning tools is a foolish idea	380 (89.4)	45 (10.6)
I believe that E-learning gives me the opportunity to acquire new knowledge	385 (90.6)	40 (9.4)
I believe that E-learning enhances my learning experience	381 (89.7)	44 (10.3)
I believe that convenience is an important feature of E-learning	374 (88.0)	51 (12)
E-learning increases the quality of learning because it integrates all forms of media	356 (83.7)	69 (16.3)
E-learning allows for increased student satisfaction	307 (72.2)	118 (27.8)
I feel E-learning has limited application in my course of study	228 (53.6)	191 (46.4)
I would be interested in studying courses that utilize E-learning	322 (75.7)	103 (24.3)
I feel E-learning should be used more by lecturers in my school	344 (81.0)	81 (19.0)

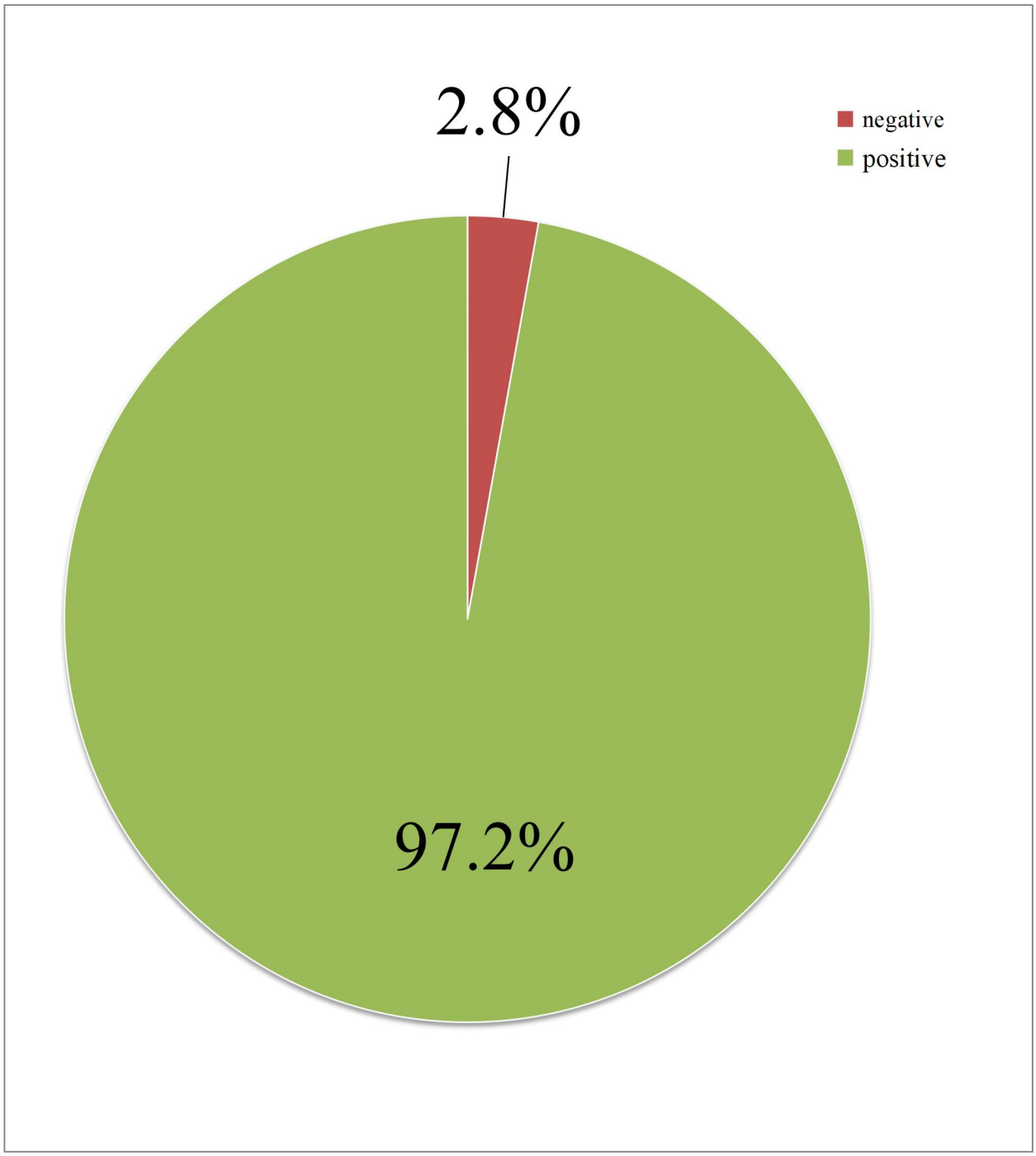

Fig 2: Pie-Chart Showing Attitude towards E-Learning among Undergraduates of University of Benin

On the assessment of the attitude towards E-learning among University of Benin undergraduates, a majority 413 (97.2%) had a positive attitude, while 12 (2.8%) had a negative attitude.

Table 6; Association between Selected Sociodemographic Characteristics and Attitude towards E-Learning among Undergraduates of University of Benin

Variable	Attitude towards E-learning		$\chi 2$	p-value
	Positive attitude (n=413) Freq (%)	Negative attitude, (n=12) Freq (%)		
Age group(years)				
15-19	49 (90.7)	5 (9.3)	11.046	0.011*
20-24	254 (98.4)	4 (1.6)		
25-29	98 (98.0)	2 (2.0)		
>29	12 (92.3)	1 (7.7)		
Sex				
Male	196 (97.5)	5 (2.5)	0.157	0.692
Female	217 (96.9)	7 (3.1)		
Faculty/Department				
Accounting	42 (93.3)	3 (6.7)	8.695	0.850
Agricultural Economics and Extension	15 (100.0)	0 (0.0)		
Anatomy	13 (100.0)	0 (0.0)		
Architecture	9 (100.0)	0 (0.0)		
Computer Science	43 (97.7)	1 (2.3)		
Dentistry	6 (100.0)	0 (0.0)		
Education/Curriculum and Instructional Technology	44 (93.6)	3 (6.4)		
English And Literature	31 (96.9)	1 (3.1)		
Law	39 (100.0)	0 (0.0)		
Mechanical Engineering	25 (96.2)	1 (3.8)		
Medicine	35 (97.2)	1 (2.8)		
Microbiology	44 (100.0)	0 (0.0)		
Pharmacy	44 (97.8)	1 (2.2)		
Public Administration	22 (95.7)	1 (4.3)		
Veterinary Medicine	1 (100.0)	0 (0.0)		
Level				
100	70 (94.6)	4 (5.4)	4.067	0.540
200	111 (98.2)	2 (1.8)		
300	89 (96.7)	3 (3.3)		
400	102 (98.1)	2 (1.9)		
500	26 (100.0)	0 (0.0)		
600	15 (93.8)	1 (6.3)		

*= Statistically significant

On the association between sociodemographic characteristics and attitude towards e-learning it was shown that among respondents aged between 15-19 years, forty-nine respondents (90.7%) had a positive attitude, two hundred and fifty-four respondents (98.4%) aged between 20-24 years had a positive attitude. Furthermore, it was shown than of those aged 25-29 years and those greater than 29 years, ninety-eight (98.0%) and twelve (92.3%) of respondents also had positive attitude, respectively. This association was statistically significant ($p = 0.011$).

Of the male respondents, one hundred and ninety-six (97.5%) had a positive attitude, while two hundred and seventeen (96.9%) had a positive attitude. This association was not statistically significant ($p = 0.692$).

A majority, forty-two (93.3%) of the respondents from Accounting department had a positive attitude to e-learning. All the respondents (100.0%) from the department of Agricultural Economics and Extension, Anatomy, Architecture, Dentistry, Law, Microbiology and Veterinary Medicine had a positive attitude. It was also shown that majority of respondents in the other departments (>90%) had a positive attitude to e-learning. This association was not statistically significant ($p = 0.850$).

Majority of respondents (>90%) across all the levels had a positive attitude towards e-learning. This association was not statistically significant ($p = 0.540$).

Table 7; Logistic Regression Model for Determinants of Attitude towards E-learning among Undergraduate Students of University of Benin

FACTORS	B (REGRESSION CO-EFFICIENT)	ODDS RATIO	95% CI FOR OR		p-value
			LOWER	UPPER	
Age (years)	0.120	1.127	0.822	1.545	0.457
Sex					
Male	0.221	1.248	0.361	4.313	0.727
**Female					
Faculty/Department					
Accounting	-16.195	9.263E-8	8.767E-9	9.787E-7	<0.01*
Agricultural Economics and Extension	-1.065	0.345	0.000	0.000	1.000
Anatomy	-0.426	0.653	0.000	0.000	1.000
Architecture	-0.495	0.610	0.000	0.000	1.000
Computer Science	-15.182	2.551E-7	1.425E-8	4.567E-6	<0.01*
Dentistry	13.198	539350.644	0.000	<0.01	0.997
Education/Curriculum and Instructional Technology	-16.198	9.230E-8	8.698E-9	9.796E-7	<0.01*
English And Literature	-15.523	1.813E-7	1.010E-8	3.252E-6	<0.01*
Law	-0.596	0.551	0.000	<0.01	1.000
Mechanical Engineering	-15.776	1.408E-7	7.204E-9	2.752E-6	<0.01*
Medicine	-1.239	0.290	0.000	0.000	0.999
Microbiology	-0.545	0.580	0.000	0.000	1.000
Pharmacy	-15.051	2.906E-7	1.605E-8	5.260E-6	<0.01*
Public Administration	-15.883	1.265E-7	1.265E-7	1.265E-7	<0.01*
**Veterinary Medicine					
Level in school					
100	15.595	5924487.317	0.000	0.000	0.993
200	16.398	13225044.742	0.000	0.000	0.993
300	15.760	6989515.936	0.000	0.000	0.993
400	16.062	9454358.973	0.000	0.000	0.993
500	29.474	6313856828980.938	0.000	0.000	0.991
**600					

**= Reference category, Coefficient of determination – 3.8% to 16.6%

*= Statistically significant

The significant predictor of attitude towards E-learning among undergraduate students of University of Benin in this study was the Faculty/Department. Respondents from Accounting, Computer Science, Education/Curriculum and Instructional Technology, English and Literature, Mechanical Engineering, Pharmacy and Public Administration were more likely to have positive attitude compared to those in Agricultural Economics and Extension, Anatomy, Architecture, Dentistry, Law, Medicine and Microbiology. ($p = <0.01$)

SECTION D:

CHALLENGES TO E-LEARNING

Table 8; Challenges to E-Learning among Undergraduate Students of University of Benin

Variable	SD Freq (%)	D Freq (%)	A Freq (%)	SA Freq (%)
Inadequate computer literacy skills	29 (6.8)	41 (9.6)	177 (41.6)	178 (41.9)
Lack of internet skills	41 (9.6)	77 (18.1)	184 (43.3)	123 (28.9)
Ignorance of ways of utilizing E-learning for receiving lectures	32 (7.5)	70 (16.5)	191 (44.9)	132 (31.1)
Lack of training on the use of E-learning tools	25 (5.9)	51 (12.0)	196 (46.1)	153 (36.0)
Inability to procure computers/smartphones	39 (9.2)	98 (23.1)	160 (37.6)	128 (30.1)
Lack of confidence for utilizing E-learning	39 (9.2)	127 (29.9)	183 (43.1)	76 (17.9)
Cost of data subscription	23 (5.4)	57 (13.4)	106 (24.9)	239 (56.2)
Lack of skills to take online continuous assessment	31 (7.3)	103 (24.2)	161 (37.9)	130 (30.6)
Inadequate internet access/low internet bandwidth	17 (4.0)	47 (11.1)	172 (40.5)	189 (44.5)
Constant power failure	30 (7.1)	19 (4.5)	108 (25.4)	268 (63.1)

More than two-thirds, three hundred and fifty-five, of the respondents (83.5%) strongly agree/agree that inadequate computer literacy skills are a challenge to e-learning amongst University of Benin students. A majority, three hundred and seven respondents (72.2%) strongly agree/agree that lack of internet skills is a challenge to e-learning. In addition, three hundred and twenty-three respondents (76.0%) strongly agree/agree that ignorance of ways of utilizing e-learning was a challenge to e-learning.

Other options that respondents strongly agreed/agreed were challenges include lack of training on the use of e-learning tools (82.1%), inability to procure computers and smartphones (67.7%), lack of confidence for utilizing e-learning (61.0%), cost of data subscriptions (81.1%), lack of skills to take online continuous assessment (68.5%), inadequate internet access (85.0%) and constant power failure (88.5%).

SECTION E:

READINESS TOWARDS E-LEARNING

Table 9; Readiness towards E-Learning among Undergraduate Students of University of Benin

Variable	Yes Freq (%)	No Freq (%)
I am comfortable using a computer and the internet	411 (96.7)	14 (3.3)
I know how to open, modify, save and upload documents and I am comfortable navigating web pages and sending and receiving E-mail	391 (92.0)	34 (8.0)
I own or have daily access to a computer with internet access	323 (76.0)	102 (24.0)
I am prepared to learn to study in an E-learning environment	397 (93.4)	28 (6.6)
I am prepared to learn the necessary skills required to be adept at E-learning	404 (95.1)	21 (4.9)
I am able to maintain a schedule and complete work without direct supervision	349 (82.1)	76 (17.9)

Almost all, four hundred and eleven (96.7%) of the respondents said they were comfortable using the computer and internet, three hundred and ninety-one (92.0%) 0f respondents knew how to open, modify, save and uploading documents. Majority, three hundred and twenty-three (76.0%) of the respondents said they owned a computer with internet access while three hundred and ninety-seven (93.4%) of respondents said they were prepared to learn to study in an e-learning environment.

Majority of respondents (95.1%) said they were prepared to learn necessary skills required to be adept at e-learning and majority of respondents (82.1%) said they were able to maintain a schedule and complete work without direct supervision.

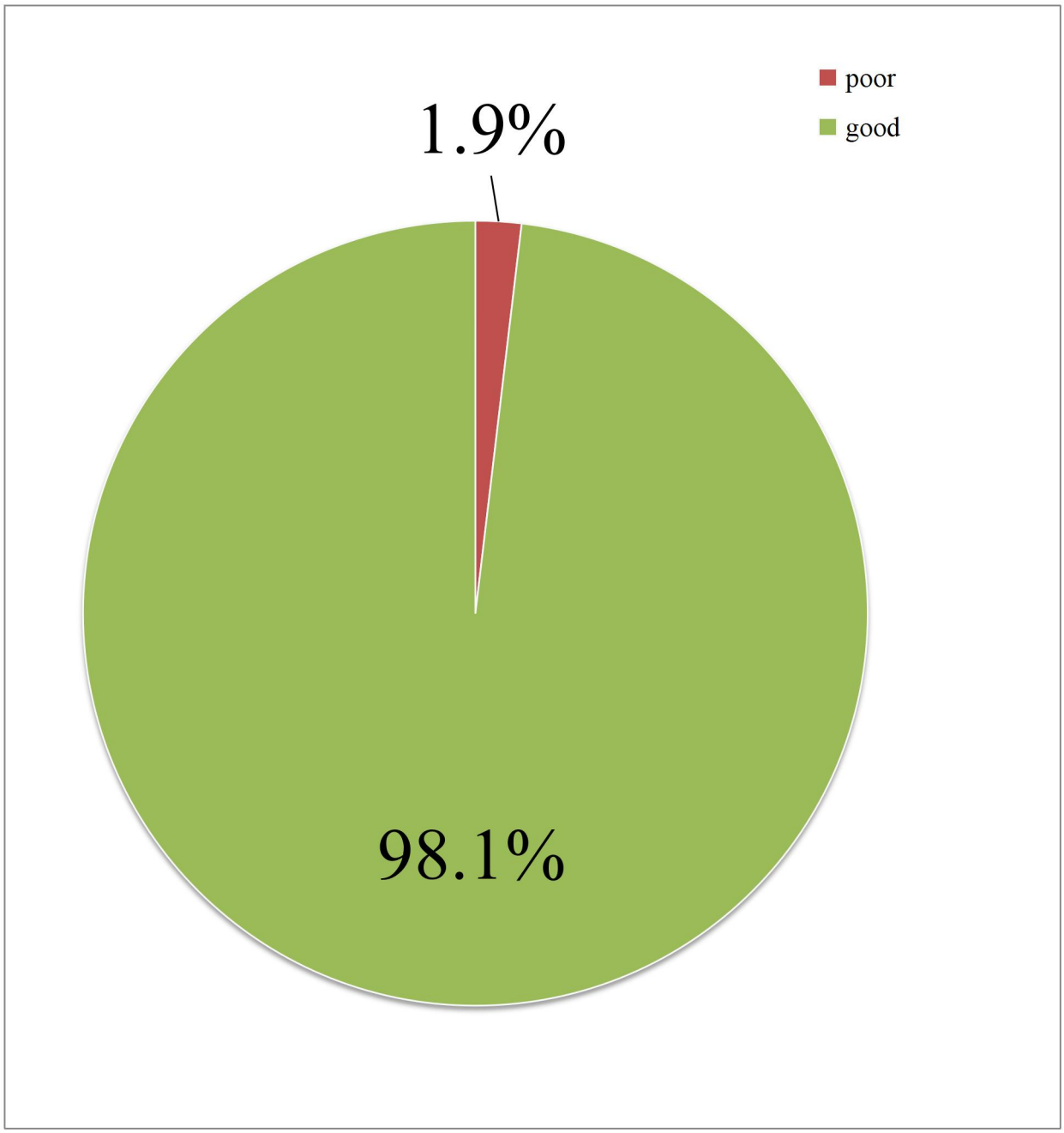

Fig 3: Pie-Chart Showing Readiness towards E-Learning among Undergraduates of University of Benin

On the assessment of the readiness towards E-learning among University of Benin undergraduates, 417 (98.1%) of respondents showed good readiness, while 8 (1.9%) showed poor readiness.

Table 10; Association between Selected Sociodemographic Characteristics and Readiness towards E-Learning among Undergraduates of University of Benin

Variable	Readiness towards E-learning		$\chi 2$	p-value
	Good readiness, (n=417) Freq (%)	Poor readines (n=8) Freq (%)		
Age group(years)				
15-19	51 (94.4)	3 (5.6)	8.393	0.039*
20-24	254 (98.4)	4 (1.6)		
25-29	100 (100.0)	0 (0.0)		
>29	12 (92.3)	1 (7.7)		
Sex				
Male	197 (98.0)	4 (2.0)	0.024	0.877
Female	220 (98.2)	4 (1.8)		
Faculty/Department				
Accounting	44 (97.8)	1 (2.2)	7.858	0.897
Agricultural Economics and Extension	15 (100.0)	0 (0.0)		
Anatomy	13 (100.0)	0 (0.0)		
Architecture	9 (100.0)	0 (0.0)		
Computer Science	43 (97.7)	1 (2.3)		
Dentistry	6 (100.0)	0 (0.0)		
Education/Curriculum and Instructional Technology	46 (97.9)	1 (2.1)		
English And Literature	32 (100.0)	0 (0.0)		
Law	38 (97.4)	1 (2.6)		
Mechanical Engineering	24 (92.3)	2 (7.7)		
Medicine	35 (97.2)	1 (2.8)		
Microbiology	44 (100.0)	0 (0.0)		
Pharmacy	44 (97.8)	1 (2.2)		
Public Administration	23 (100.0)	0 (0.0)		
Veterinary Medicine	1 (100.0)	0 (0.0)		
Level				
100	70 (94.6)	4 (5.4)	8.526	0.130
200	112 (99.1)	1 (0.9)		
300	91 (98.9)	1 (1.1)		
400	103 (99.0)	1 (1.0)		
500	26 (100.0)	0 (0.0)		
600	15 (93.8)	1 (6.3)		

*= Statistically significant

Majority of respondents (94.4%) between the ages of 15-19 years showed good readiness, two hundred and fifty-four respondents (98.4%) aged between 20-24 years had good readiness as well. It was also shown that of respondents aged 25-29 years and students aged greater than 29, majority (100.0% and 92.3% respectively) had good readiness. This association was statistically significant ($p = 0.039$).

Majority of the male respondents (98.0%) showed good readiness while 98.2% of female respondents showed good readiness. This association was not statistically significant ($p = 0.877$).

All (100.0%) of the respondents in Agricultural Economics and Extension, Anatomy, Architecture, Dentistry, English and Literature, Microbiology and Veterinary Medicine had good readiness towards e-learning, while majority (>90%) of students in the other departments had good readiness towards e-learning. This association was not statistically significant ($p = 0.897$).

Majority of students (>90%) across all levels also showed good readiness towards e-learning. This association was not statistically significant ($p = 0.130$).

Table 11; Logistic Regression Model for Determinants of Readiness towards E-learning among Undergraduate Students of University of Benin

FACTORS	B (REGRESSION CO-EFFICIENT)	ODDS RATIO	95% CI FOR OR		p-value
			LOWER	UPPER	
Age (years)	0.090	1.094	0.789	1.517	0.590
Sex					
Male	0.213	1.238	0.264	5.810	0.787
**Female					
Faculty/Department					
Accounting	-17.380	2.831E-8	0.000	0.000	0.998
Agricultural Economics and Extension	-0.518	0.596	0.596	0.596	<0.01*
Anatomy	0.128	1.136	1.136	1.136	<0.01*
Architecture	0.212	1.237	1.237	1.237	<0.01*
Computer Science	-17.511	2.483E-8	0.000	0.000	0.998
Dentistry	16.578	15843492.574	15843492.574	15843492.574	<0.01*
Education/Curriculum and Instructional Technology	-17.482	2.556E-8	0.000	0.000	0.998
English And Literature	0.116	1.122	0.000	0.000	1.000
Law	-17.705	2.045E-8	0.000	0.000	0.998
Mechanical Engineering	-18.986	5.681E-9	0.000	0.000	0.998
Medicine	-1.041	0.353	0.000	0.000	1.000
Microbiology	-0.170	0.844	0.000	0.000	1.000
Pharmacy	-17.341	2.944E-8	0.000	0.000	0.998
Public Administration	-0.071	0.931	0.000	0.000	1.000
**Veterinary Medicine					
Level in school					
100	17.466	38500733.570	0.000	0.000	0.998
200	19.043	186409754.624	0.000	0.000	0.998
300	18.668	128119243.327	0.000	0.000	0.998
400	18.876	157611179.574	0.000	0.000	0.998
500	35.501	2616583295050449.000	0.000	0.000	0.997
**600					

**= Reference category, Coefficient of determination – 3.7% to 22.0%

*= Statistically significant

The significant predictor of readiness towards E-learning among undergraduate students of University of Benin in this study was the Faculty/Department. Respondents from Agricultural Economics and Extension, Anatomy, Architecture and Dentistry were more likely to have good readiness compared to those in Accounting, Computer Science, Education/Curriculum and Instructional Technology, English and Literature, Mechanical Engineering, Pharmacy, Public Administration, Law, Medicine and Microbiology. ($p = <0.01$)

SECTION F:

LEVEL OF PARTICIPATION TOWARDS E-LEARNING

Table 12; Level of Participation towards E-Learning among Undergraduate Students of University of Benin

Frequency of Use of E-Learning Tools since Onset of COVID-19 Pandemic

Variable	Always Freq (%)	Occasionally Freq (%)	Seldom Freq (%)	Never Freq (%)	Mean
Search engine (Google, Google scholar, Yahoo, Bing)	329 (77.4)	88 (20.7)	7 (1.6)	1 (0.2)	1.25
PowerPoint	151 (35.5)	145 (34.1)	82 (19.3)	47 (11.1)	2.06
Virtual Classroom (Zoom, WhatsApp, Google Classroom)	168 (39.5)	188 (44.2)	42 (9.9)	27 (6.4)	1.83
Social Media	344 (80.9)	49 (11.5)	21 (4.9)	11 (2.6)	1.29
Personal laptop/Smartphone/Tablet	333 (78.4)	62 (14.6)	15 (3.5)	15 (3.5)	1.32
E-library	53 (12.5)	108 (25.4)	158 (37.2)	106 (24.9)	2.75
Wi-Fi	91 (21.4)	123 (28.9)	161 (37.9)	50 (11.8)	2.40
Mobile Applications (U-learn, Medscape)	169 (39.8)	147 (34.6)	67 (15.8)	42 (9.9)	1.96

When asked about the frequency of use of e-learning tools, majority of respondents (77.4%) indicated that they always use search engines while eighty-eight respondents (20.7%) indicated an occasional use of search engines.

About a third, one hundred and fifty-one, of the respondents (35.5%) indicated using PowerPoint always and one hundred and forty-five (34.1%) indicated using PowerPoint occasionally.

Concerning the use of virtual classrooms, one hundred and eighty-eight respondents (44.2%) reported using virtual classrooms occasionally, while one hundred and sixty-eight respondents (39.5%) reported using virtual classrooms always.

Majority of respondents (80.9%) said they always use social media while eleven respondents (2.6%) reported never using social media.

A large proportion, three hundred and thirty-three, of the respondents (78.4%) reported always using personal electronic devices, while fifteen respondents (3.5%) reported seldom and never using personal electronic devices each.

More than one-third, one hundred and fifty-eight, of the respondents (37.2%) reported seldom using an E-library, while fifty-three respondents (12.5%) always used the E-library. A small proportion, one hundred and sixty-one participants (37.9%) also reported seldom using Wi-Fi. It was also shown that one hundred and sixty-nine respondents (39.8%) reported always using mobile applications.

Frequency of Participation in E-Learning Activities since Onset of COVID-19 Pandemic

Variable	Always Freq (%)	Occasionally Freq (%)	Seldom Freq (%)	Never Freq (%)	Mean
Reading E-books	182 (42.8)	173 (40.7)	50 (11.8)	20 (4.7)	1.78
Taking Notes	146 (34.4)	173 (40.7)	95 (22.4)	11 (2.6)	1.93
Searching Educational	184 (43.3)	216 (50.8)	22 (5.2)	3 (0.7)	1.63
Watching/Listening to Video and Audio Recorded Lectures	157 (36.9)	128 (30.1)	106 (24.9)	34 (8.0)	2.04
Taking Exams Surveys	89 (20.9)	145 (34.1)	54 (12.7)	137 (32.2)	2.56
Submitting Assignments	150 (35.5)	162 (38.1)	78 (18.4)	35 (8.2)	2.00

When asked about the frequency of participation of e-learning activities since the onset of the COVID-19 pandemic, one hundred and eighty-two respondents (42.8%) reported always reading e-books, while twenty respondents (4.7%) reported never reading e-books.

Almost half, one hundred and seventy-three, of the respondents (40.7%) reported occasionally taking notes and one hundred and forty-six respondents (34.4%) reported always taking notes with e-learning tools.

About half, two hundred and sixteen, of the respondents (50.8%) reported always searching educational resources online, one hundred and fifty-seven respondents (36.9%) reported always listening and watching recorded audio and video lectures, while eighty-nine respondents (20.9%) reported always taking exams online. In addition, one hundred and sixty-two respondents (38.1%) reported occasionally submitting assignments online.

CHAPTER FIVE

DISCUSSION

In recent years, the world has witnessed a rapid transformation in education, with E-learning emerging as a powerful tool. This holds true for Nigerian tertiary institutions like the University of Benin as well, where E-learning has gained significant importance. E-learning has emerged as a game-changer in Nigerian tertiary institutions, offering numerous benefits such as increased accessibility, flexibility, engagement, cost-effectiveness, and digital skills development. By embracing E-learning, institutions can overcome traditional limitations, expand their reach, and enhance the overall quality of education. As Nigeria continues to invest in technology infrastructure and internet connectivity, the importance of E-learning in the country's tertiary institutions will only grow, contributing to a more inclusive and dynamic education system. With the results gotten from this study, several discussion points were raised and have been discussed below.

A total of four hundred and twenty-five respondents participated in this study. Almost all of the participants were between the ages of 20 and 29 years. This is probably because most of the people studying in universities are in the youth age group. There was an almost equal distribution between male and females, which may be because most people now see the importance of education both sexes. This is crucial as it is a key factor in assessing the level of development of a society. This is in consonance with a study which aimed at assessing the factors affecting adoption of E-learning which had almost equal male and female respondents.[61] The predominant ethnic group was Benin and this is most likely because the study was done in Benin City where this particular ethnic group is predominant. Almost all of the respondents were Christians and this is due to Christianity being the most commonly practiced religion in Southern Nigeria where the study was conducted. A significant

proportion of the participants were single which is in line with the World Bank statistics that place the average age of first marriage in Nigeria at 25 years and most of the respondents were around this age. Curriculum and Instructional Technology had the highest number of respondents and this is because this department has the highest number of students in the University of Benin. In addition, most of the respondents in this study were in 200 level which is similar to a study done on attitude of students towards E-learning in Kwara State.[15]

From this study, a majority of respondents understood the meaning of the term E-learning. This may be due to familiarity with digital technologies and personal experience with online learning. It is important that students of University of Benin understand the concept of E-learning in order to know the many ways by which it can be employed. This finding is similar to a study carried out among medical students and teaching staff in Khartoum, Sudan which showed that almost all of the students were familiar with the concept of E-learning. In addition, most of them were aware of the importance of E-learning and knew the available tools.[22]

On assessment of the E-learning tools that respondents are able to use, it was revealed that at least two-thirds of the respondents were able to use search engines, Ms-Word and Virtual classrooms. This may be because these tools are also used for other purposes outside E-learning. This result is in consonance with a study conducted in 2015 among medical students in Sri Ramachandra University, Porur, Chennai in which at least half of the respondents were confident about the use of Microsoft Word and confident in creating PowerPoint presentations.[4] The ability to use to use E-learning tools is a crucial part in navigating any E-learning activity as it makes the activity easy and seamless. Knowledge from global is readily available on the net and it is crucial that students are able to properly access sites. Particularly, the need for expertise using virtual classrooms like Google Meet and Zoom is increased as more teachers now see them as viable alternatives to traditional classroom-learning.

Almost two-thirds of the respondents of this study had good knowledge of E-learning. This may be due to the fact that in recent times, there has been an increase in the use of PowerPoint projections during teaching. Good knowledge of E-learning among the respondents is important as it is a crucial aspect in the proper implementation of tools and activities of E-learning. In other words, E-learning tools and techniques would not be properly utilized without the knowledge that they can be used for that purpose. This finding is in contrast with a Nigerian study with a generally poor level of knowledge.[25] It is important that measures are put in place to maintain or elevate this good knowledge such as provision of E-learning tools like computers and Wi-Fi in schools.

Also, as most of the respondents with good knowledge were in the age group of 20-24 years, they are more likely to spend time on their electronic devices and this was also evidenced by a vast majority of respondents selecting social media and internet as their source of information on E-learning. This is in line with the results of a study conducted among undergraduate students and teachers in Nigeria where the internet was shown to be the predominant source of obtaining knowledge of E-learning.[26]

Majority of the respondents in this study indicated that they enjoy using ICT for studies, believing that E-learning enhances learning experiences and student satisfaction. In addition, only about one-third felt E-learning had limited application in their courses while almost all felt E-learning should be used more by lecturers. This may be due to the flexibility, convenience and the vast amount of resources that ICT provides. These findings are in contrast with an exploratory study carried out in Algeria in 2020 among teachers and students in which almost two-thirds of the students disagreed that online learning was enjoying. In addition, a majority showed great preference for learning in classrooms.[27] The use of ICT for learning is important because it allows for knowledge sharing, increased motivation for knowledge and well as innovation and technological advancements. To foster increased use

of ICT for studies among students, it is recommended that ICT is incorporated in the learning curriculum for all levels of education.

Findings from this study revealed that almost all respondents had a positive attitude towards E-learning. The positive attitude may be attributed to how convenient E-learning is especially as most university students have at least a smartphone that they can use to engage in it. The attitude towards E-learning is a key factor that shapes its acceptance and use. These findings are in concordance with a Pakistani study among students of general and engineering universities where the overall students' attitude towards E-learning was positive.[62] These results are further emphasized by another study carried out in Kurukshetra University, India among undergraduate students where a positive attitude was also noted.[63] A positive attitude towards E-learning fosters easy dissemination of learning materials as E-learning platforms often facilitate interaction and collaboration among learners from around the world. This creates a global learning community where you can engage with individuals from diverse backgrounds, exchange ideas, and gain different perspectives. E-learning also makes education more accessible to a wider range of individuals. It eliminates barriers such as geographical limitations, physical disabilities, or personal constraints that may prevent someone from attending traditional classes. All these will further help in bridging the learning gap between developed and developing regions.

In the assessment of the challenges to E-learning, almost all of the respondents indicated that constant power failure was a major hindrance to the effective use of E-learning tools. Epileptic power supply in Nigeria is an issue that affects almost all sectors of life. It generally affects the effectiveness of E-learning as electricity is needed to charge and/or power various E-learning tools. Poor electricity also has the propensity to cause inconsistent communication as well as interruption of learning sessions. Inadequate internet access was also noted by

respondents to be an important challenge to E-learning. This represents another major challenge, particularly in Nigeria. The need for adequate internet access cannot be overemphasized in the context of E-learning. Internet access is needed in searching for and downloading learning materials, streaming educational videos, submitting assignments, and participating in virtual classes. Both of these findings are similar to the results of a study that focused on the challenges and prospects of E-learning at the National Open University of Nigeria which reported erratic power supply, high cost of software, and unavailability of internet access as impediments to E-learning.[63] These findings are further emphasized by another study conducted among students from six Nigerian universities. The study revealed that 51% of the students reported that their bandwidth was limited, while 56% reported that their electricity supply was limited.[39]

Results from this study revealed that almost all of the respondents said they were prepared to learn to study in an E-learning environment and to learn the necessary skills required to be adept at E-learning. This could be due to increased awareness of E-learning among undergraduate students and increased uptake of technology among young people. This is important as being in the "digital age", many young adults have at least a basic understanding and basic skills in the utilisation of technology for their day-to-day lives. A number of young adults possess personal mobile phones and computers, thus making it easier for students to pick up necessary E-learning skills. This finding contrasts with a similar study conducted in Egypt in 2016 among nursing students that found that although majority of the nursing students had a high level of readiness towards E-learning activities, only less than a third of these students preferred to use E-learning in their studies.[41] This is important as E-learning includes a great deal of self-learning and encourages innovation. With students being ready to learn in an E-learning environment and pick up necessary skills, technological innovation and advancements would be greatly encouraged.

Findings from this study showed that majority of the students of University of Benin have good readiness towards E-learning. This could be because the students understand the benefits of E-learning. However, these results are in contrast with a study conducted in Malaysia in 2021 amongst undergraduate Physiotherapy students which revealed that the students had a moderate level of readiness towards E-learning.[65] It is important that students are ready and eager towards E-learning as their participation is extremely vital to the success of E-learning. E-learning to a large extent depends on students' active participation as a lot of self-motivation and discipline is required. Thus, students need a high level of interest in E-learning activities. This highlights the importance of introducing internet and computer skills to students early, especially pre-university, to help further encourage the interest, uptake and the utilisation of E-learning facilities and skills. This understanding would help in ensuring that even future Nigerian university students would be encouraged to pick basic computer and technology skills to make them better ready to participate in E-learning activities.

This study also revealed that across all ages, levels and departments, there was no disparity in the students' readiness toward E-learning. The study also showed an almost equal percentage of males and females had good readiness toward E-learning. This could be explained that the majority of participants are of similar age groups and have increased access to technology thus making E-learning an appealing choice. This contrasts with the results of a Turkish study which showed more male students showed good levels of e-readiness. The study also showed disparities in levels of e-readiness among students of different departments and levels. It was found that students of nursing and physiotherapy departments had lower levels of E-learning readiness, while students in higher classes had higher levels of E-learning readiness. They postulated that these courses rely more on practical work and as such may have less experience with E-learning services.[66] The results of this study are important because it shows that UNIBEN students, irrespective of age, course, level or gender, show equal and

high readiness towards E-learning. This makes implementation of E-learning activities across all departments and levels easy as there would most likely be positive reception of E-learning by the students. This also makes it easier, if peradventure, any future lockdown protocols are put in place, students would be ready to continue academic work from remote locations. It should be noted that these E-learning measures should be implemented as soon as possible, to enable students familiarise themselves with self-motivation and independence necessary for E-learning to be successful.

In assessing the frequency of use of E-learning tools, this study revealed that the E-learning tools most commonly used included search engines, PowerPoint, virtual classrooms and mobile applications. The majority of the students also used social media always and had a personal internet-enabled device. A greater percentage of the students also reported seldom use of E-library and Wi-Fi. This could be because students mostly utilise tools readily available and accessible to them. A number of the students did not feel the E-library was readily available and this would greatly impact the frequency of its use. Wi-Fi is also not a readily available tool, leading to its low usage. The students also utilise tools they believe are most necessary to them. Search engines and PowerPoint as such are used on a daily basis. These findings contrast with the results revealed in a study conducted at Covenant University, Ogun State, Nigeria which showed that the most commonly used tool was the multimedia system.[59]

This study also showed that the most frequently performed E-learning activities included reading E-books, searching educational resources and taking notes. This also contrasted with the same study done in Covenant University where most of the students mainly used E-learning tools for downloading lecture notes.[59] In another study carried out among final-year students of a federal tertiary institution, it was shown that the students mainly used E-learning tools for their final-year projects.[53]

CONCLUSION

- Almost two-thirds of the undergraduate students of University of Benin had good knowledge of E-learning.

- Almost all of the undergraduate students of University of Benin had a positive attitude towards E-learning.
- The major challenges identified by the undergraduate students of University of Benin were constant power failure, inadequate internet access, inadequate computer literacy skills and cost of data subscriptions.
- Almost all of the undergraduate students of University of Benin had good readiness towards E-learning.
- The most used E-learning tools among the undergraduate students of University of Benin were search engines, virtual classrooms, social media and personal smart devices. In addition, the E-learning activities most participated in were reading e-books, searching educational resources and taking notes.

RECOMMENDATIONS

TO THE FEDERAL GOVERNMENT

- Revitalization of power sector to improve power supply to University of Benin and surrounding areas. This would increase E-learning utilization among students especially students who live in off-campus facilities as constant power failure has been identified as one of the major challenges to E-learning.
- Provision of more E-learning tools and facilities for the University of Benin as this would increase access to E-learning opportunities for both lecturers and students.
- Increase funding to education sector.
- Incorporate E-learning into basic education to facilitate E-learning at higher institutions. One of the major challenges identified was inadequate computer literacy skills and this can be mitigated if students are exposed to E-learning opportunities early.

TO THE MANAGEMENT OF UNIVERSITY OF BENIN

- Creation of a well-defined strategy that outlines the goals, objectives and plans for implementing e-learning across the institution. This strategy should be developed in consultation with faculty, students and other stakeholders, and should align with the overall educational goals of the university.
- Effective communication of the benefits of E-learning to faculty, students and other stakeholders. This can include highlighting the flexibility and convenience of e-learning, the opportunities for personalized learning, the potential for increased engagement and active learning, and the relevance of e-learning in preparing students for the digital age.
- Management should ensure that the necessary technological infrastructure, such as reliable and subsidized internet access, updated hardware and software, and

appropriate learning management systems (LMS), are in place to support e-learning initiatives. This includes providing access to computers, laptops, tablets, Wi-Fi and other devices for students and faculty, as well as training and technical support for their effective use.

- Increase awareness and accessibility of E-library to the students as some of the students did not know the school had an E-library, and some of the students that did know did not regard it as readily accessible.
- Universities should provide opportunities for faculty to receive professional development and training on e-learning pedagogy, instructional design, and effective use of technology in teaching. This can help faculty become more comfortable with e-learning tools and techniques and integrate them into their teaching practices.

TO THE STUDENTS OF UNIVERSITY OF BENIN

- Maximal utilization of available E-learning facilities especially the E-library.
- E-learning platforms often provide a variety of resources, such as lecture notes, readings, multimedia content and practice quizzes. Students should take advantage of these resources to supplement their learning and deepen their understanding of the course material.
- Students should create a schedule that includes dedicated time for online coursework, assignments, and studying. They should also avoid distractions and create a conducive learning environment to maximize their focus and productivity.
- E-learning platforms may offer self-assessment tools, such as quizzes or self-check activities. Students should take advantage of these opportunities to assess their

understanding of the material and identify areas that may require further review or improvement.

- Students can create online study groups or collaborate with fellow students to foster peer-to-peer learning. This can involve discussing course material, working on group projects, or providing feedback on each other's assignments. Peer-to-peer learning can enhance understanding and retention of the material, as well as foster a sense of community in the online learning environment.

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APPENDIX I

INFORMED CONSENT FORM

TITLE OF STUDY: Knowledge, Attitude and Practice of Undergraduate Students towards E-Learning.

INSTITUTION: University of Benin.

PRINCIPAL INVESTIGATORS: Edugie Emmanuella Emwanta

Osasere Wilson Enodolomwanyi

SUPERVISOR: Dr. (Mrs) O.E Obarisiagbon

SPONSORSHIP: This study will be self-sponsored.

PURPOSE OF THE RESEARCH: To assess the knowledge, attitude and practice of undergraduate students in the University of Benin towards E-learning.

PROCEDURES INVOLVED IN THE STUDY: In this study, respondents will be asked questions regarding- knowledge, attitude, challenges, readiness and level of participation towards E-learning.

CONFIDENTIALITY: All information obtained in the course of the survey will be treated with utmost confidence. The name of the participant will not be written on the questionnaire. All information obtained from the questionnaire will be coded in a file on the personal computer of the principal investigators and pass-worded.

COMPENSATION: There shall be no financial compensation for participation in this study.

VOLUNTARY PARTICIPATION: Your participation in this study is entirely voluntary and you may wish to withdraw from it whenever you choose. If you desire to withdraw from this study at any time, no punitive measures will be meted out against you on account of your

withdrawal. Your refusal to participate or withdraw from the study will not involve any negative consequences or loss of benefits to which you are otherwise entitled to.

RISKS: It is not expected that any harm will come to you because you participated in this study. The study does not entail any activity that would result in harm to you

BENEFITS: Results from this study will help to assess the knowledge, attitude and practice of undergraduate students in the University of Benin towards E-learning, and create awareness among relevant stakeholders and suggest measures for improvement.

FINANCIAL SPONSORSHIP: This study will be sponsored by both principal investigators.

The under-listed may be contacted in case you have any clarifications to make.

Edugie Emmanuella Emwanta

Department of Community Health,

School of Medicine,

University of Benin,

Benin City, Edo State, Nigeria.

Cell: +2348189007198

OR

Osasere Wilson Enodolomwanyi

Department of Community Health,

School of Medicine,

University of Benin,

Benin City, Edo State, Nigeria.

Cell: +2349054140932

APPENDIX II

QUESTIONNAIRE

QUESTIONNAIRE ON KNOWLEDGE, ATTITUDE AND PRACTICE OF UNDERGRADUATE STUDENTS TOWARDS E-LEARNING IN A PANDEMIC

Dear respondent,

We are final year medical students carrying out a one-year project which is designed to assess knowledge, attitude and practice of undergraduate students towards e-learning in a pandemic. All information given will be treated as confidential. Your participation is voluntary. Thank you.

SECTION A

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

1. Age as at last birthday _____years

2. Sex: Male ( ) Female ( )

3. Ethnic group ……

4. Religion: Christianity ( ) Islam ( ) Traditional ( ) others please specify ……..

5. Marital Status: Single ( ) Married ( ) Separated ( ) Divorced ( ) Widowed ( )Co-habiting ( )

6. Faculty/department: ……

7. Level in school: 100 ( ) 200 ( ) 300 ( ) 400 ( ) 500 ( ) 600 level ( )

SECTION B

KNOWLEDGE OF E-LEARNING

8. What do you understand by the term "E-learning"? (**Multiple response**) (a) Learning when there is electricity [ ] (b) Learning with the use of technology [ ] (c) Any learning that is electronically enabled [ ] (d) E-learning in the broadest sense concerns itself with learning that occurs on line through the internet, or using other facilities such as radio, television and telephones. [ ] (e) Learning from home [ ] (f) others please specify ……

9. What is your source of information (**Multiple response**) (a) television [ ] (b) school [ ] (c) friends [ ] (d) social media [ ] (e) books [ ] (f) internet [ ] (g) others please specify ……
10. What are the forms of E-learning that you know? (**Multiple response**) (a) Web based learning [ ] (b) Distance learning [ ] (c) Mobile learning [ ] (d) Computer-assisted instruction [ ] (e) Distributed learning [ ] (f) others please specify …….
11. What can E-learning be used for? (**Multiple response**) (a) Taking notes [ ] (b) Chatting with friends [ ] (c) Submitting assignments [ ] (d) Online gaming [ ] (e) Online exams [ ] (f) Reading E-books [ ] (g) Searching educational resources [ ] (h) others please specify……
12. Is E-learning being used in your school? (a) Yes [ ] (b) No [ ]
    If No skip to 14
13. What E-learning tools are used in your school? (**Multiple response**) (a) PowerPoint [ ] (b) Wi-Fi [ ] (c) E-library [ ] (d) Virtual classroom [ ] (e) Computer-based tests [ ] (f) others please specify …….
14. Does your school have an E-library? (a) Yes [ ] (b) No [ ]
    If No skip to 16
15. Is it easily accessible to you? (a) Yes [ ] (b) No [ ]
16. What E-learning tools can you use? (**multiple response**) (a) Virtual Classroom [ ] (b) Search engines [ ] (c) Ms-Word [ ] (d) Ms-Excel [ ] (e) WhatsApp [ ] (f) others please specify …….
17. What E-learning devices do you have? (a) Laptop [ ] (b) Smartphone [ ] (c) Tablet [ ] (d) CD-ROM [ ] (e) Webcam [ ] (f) others please specify…….

SECTION C

ATTITUDE TOWARDS E-LEARNING IN THE UNIVERSITY OF BENIN

This is a 5-point rating scale ranging from 0-4 (0 = strongly disagree, 1 = disagree, 2 = neutral, 3 = agree, 4 = strongly agree). Kindly rate your responses on the basis of the above criteria.

S/N		0	1	2	3	4
18	I feel confident in using computers					
19	I enjoy using ICT for my studies					

20	Using e-learning tools is a foolish idea					
21	I believe that e-learning gives me the opportunity to acquire new knowledge					
22	I believe that e-learning enhances my learning experience					
23	I believe that convenience is an important feature of e-learning					
24	E-learning increases the quality of learning because it integrates all forms of media					
25	E-learning allows for increased student satisfaction					
26	I feel E-learning has limited application in my course of study					
27	I would be interested in studying courses that utilize E-learning					
28	I feel E-learning should be used more by lecturers in my school					

SECTION D

CHALLENGES TO E-LEARNING AMONG UNDERGRADUATES OF UNIVERSITY OF BENIN

This is a 4-point rating scale. SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree. Kindly rate your responses on the basis of the above criteria.

S/N		SD	D	A	SA
29	Inadequate computer literacy skills				
30	Lack of internet skills				
31	Ignorance of ways of utilizing E-learning for receiving lectures				
32	Lack of training on the use of E-learning tools				
33	Inability to procure computers/smart phones				
34	Lack of confidence for utilizing E-learning				
35	Cost of data subscription				
36	Lack of skills to take online continuous assessment				
37	Inadequate internet access/ low internet bandwidth				

38	Constant power failure				

SECTION E

READINESS TOWARDS E-LEARNING AMONG UNDERGRADUATE STUDENTS OF UNIVERSITY OF BENIN

S/N	Question	Yes	No
39	I am comfortable using a computer and the Internet.		
40	I know how to open, modify, save and upload documents and I am comfortable navigating web pages and sending and receiving e-mail.		
41	I own or have daily access to a computer with Internet access.		
42	I am prepared to learn to study in an E-Learning environment.		
43	I am prepared to learn the necessary skills required to be adept at E-learning.		
44	I am able to maintain a schedule and complete work without direct supervision.		

SECTION F

UTILIZATION OF E-LEARNING AMONG UNDERGRADUATE STUDENTS OF UNIVERSITY OF BENIN

RATE THE FREQUENCY OF USE OF E-LEARNING TOOLS SINCE THE ONSET OF COVID-19 PANDEMIC

S/N	E-learning Tool	Always	Occasionally	Seldom	Never
45	Search engine (Google, Google scholar, Yahoo, Bing)				

46	PowerPoint				
47	Virtual Classroom (Zoom, WhatsApp, Google classroom)				
48	Social Media				
49	Personal laptop/Smartphone/Tablet				
50	E-library				
51	Wi-Fi				
52	Mobile Applications (U-learn, Medscape)				

RATE THE FREQUENCY OF PARTICIPATION IN E-LEARNING ACTIVITIES SINCE THE ONSET OF COVID-19 PANDEMIC

S/N	E-learning Activity	Always	Occasionally	Seldom	Never
53	Reading E-books				
54	Taking Notes				
55	Searching Educational Resources				
56	Watching/Listening to Video and Audio recorded lectures				
57	Taking Exams and Surveys				
58	Submitting Assignments				

APPENDIX III

LIST OF FACULTIES

1. Faculty of Arts
2. Faculty of Agriculture
3. Faculty of Engineering Sciences
4. School of Dentistry
5. Faculty of Education
6. Faculty of Engineering
7. Faculty of Engineering Sciences
8. Faculty of Law
9. Faculty of Life Science
10. Faculty of Management Science
11. Faculty of Pharmacy
12. Faculty of Physical Science
13. Faculty of Social Science
14. School of Basic Medical Sciences
15. School of Medicine

APPENDIX IV

PROPORTIONAL ALLOCATION

1. Department of Medicine: $\frac{425}{9549} \times 738 = 33$
2. Department of Dentistry: $\frac{425}{9549} \times 123 = 6$
3. Department of Agricultural economics and extension: $\frac{425}{9549} \times 337 = 15$
4. Department of English and Literature: $\frac{425}{9549} \times 794 = 36$
5. Department of Anatomy: $\frac{425}{9549} \times 350 = 15$
6. Department of Curriculum and Information Technology: $\frac{425}{9549} \times 1044 = 47$
7. Department of Mechanical Engineering: $\frac{425}{9549} \times 579 = 26$
8. Department of Architecture: $\frac{425}{9549} \times 196 = 9$
9. Department of Law: $\frac{425}{9549} \times 874 = 39$
10. Department of Microbiology: $\frac{425}{9549} \times 1002 = 45$
11. Department of Accounting: $\frac{425}{9549} \times 991 = 45$
12. Department of Pharmacy: $\frac{425}{9549} \times 1002 = 45$
13. Department of Computer Science: $\frac{425}{9549} \times 979 = 44$
14. Department of Political Science: $\frac{425}{9549} \times 509 = 23$
15. Department of Veterinary Medicine: $\frac{425}{9549} \times 31 = 1$

APPENDIX V

SAMPLING INTERVAL

$$\text{Sampling Interval } = \frac{\text{Number of Students in department}}{\text{Sample size allocated to each level}}$$

1. Faculty of Agriculture; Department of Agricultural Economics And Extension

$$\text{S.I } = \frac{337}{15} = 22.5$$

2. Faculty of Arts; Department of English And Literature

$$\text{S.I } = \frac{794}{36} = 22.1$$

3. School of Basic Medical Sciences; Department of Anatomy

$$\text{S.I } = \frac{350}{15} = 23.3$$

4. School of Dentistry; Department of Dentistry

$$\text{S.I } = \frac{123}{6} = 20.5$$

5. Faculty of Education; Department of Curriculum And Information Technology

$$\text{S.I } = \frac{1044}{47} = 22.2$$

6. Faculty of Engineering; Department of Mechanical Engineering

$$\text{S.I } = \frac{579}{26} = 22.3$$

7. Faculty of Engineering Sciences; Department of Architecture

$$\text{S.I } = \frac{196}{9} = 21.7$$

8. Faculty of Law; Department of Law

$$\text{S.I } = \frac{874}{39} = 22.4$$

9. Faculty of Life Sciences; Department of Microbiology

$$\text{S.I } = \frac{1002}{45} = 22.3$$

10. Faculty of Management Sciences; Department of Accounting

$$\text{S.I} = \frac{991}{45} = 22.0$$

11. School of Medicine; Department of Medicine

$$\text{S.I} = \frac{738}{33} = 22.4$$

12. Faculty of Pharmacy; Department of Pharmacy

$$\text{S.I} = \frac{1002}{45} = 22.3$$

13. Faculty of Physical Sciences; Department of Computer Science

$$\text{S.I} = \frac{979}{44} = 22.3$$

14. Faculty of Social Sciences; Department of Political Science

$$\text{S.I} = \frac{509}{23} = 22.1$$

15. Faculty of Veterinary Medicine

$$\text{S.I} = \frac{31}{1} = 31$$