PERCEPTION, ATTITUDE AND SATISFACTION OF UNDERGRADUATE STUDENTS ON E-ASSESSMENT OF UNIVERSITIES IN NIGER STATE, NIGERIA

BY

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M.TECH/SSTE/FT/2018/8167

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ABSTRACT

E-assessment plays a significant role in the educational sector offering lecturers innovative ways of assessment. E-assessment provide Students with immediate and targeted feedback on their work, allows Students' more than one attempt at an answer, present questions in a predetermined or random order, be used for diagnostic, formative or summative assessment, direct students to additional reading or resources if they are having difficulty, increases students' digital literacy, increases student engagement, and record highly detailed information. Unfortunately, Nigerian universities are yet to fully explore e-assessment in their educational activities, which may be due to inexperienced students with computer or with the online assessment method, students not having access to computers and internet connection, also poor technical infrastructure development. Hence, this study assessed undergraduate students' perception, attitude and satisfaction on e-assessment in universities in Niger State, Nigeria. The study adopted a descriptive survey research design. Samples of 380 Students were selected using Multi stage Sampling Technique. The study was guided by 6 research questions and three corresponding research hypotheses. A researcher-designed structured questionnaire was used for data collection that was validated by four experts. The questionnaire was pilot tested and the data obtained were subjected to statistical analysis using Cronbach Alpha Correlation Formula and reliability coefficients of 0.75, 0.81, and 0.74 were obtained for perception, attitude and satisfaction of e-assessment respectively. Descriptive statistics of Mean and Standard Deviation were used to answer the research questions. Findings of the study revealed students' positive perception, attitude to e-assessment with grand means of 3.73 and 3.30 respectively, students' satisfaction of e-assessment with a grand mean of 3.39. Independent samples t-test analysis showed that $t = 0.068$, $p>0.05$ indicating no significant difference in the mean response of male and female university students' level of perception of e-assessment, $t = 0.011$, $p>0.05$ indicating no significant difference in the mean response of male and female university students' level of attitude of e-assessment. However, Independent samples t-test analysis reported that $t = 0.011$, $p<0.05$ indicating a significant difference in the mean response of male and female university students' satisfaction of e-assessment. In light of the findings, it was recommended that University management should collaborate with experts in ICT and education to develop 21st-century learners centred applications for assessment with interactive elements to correct challenges and anomalies faced by students with immediate feedback that can further strengthen the use of e-assessment in tertiary institutions.

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CHAPTER ONE

1.0 **INTRODUCTION**

1.1 Background to the Study

Education is one of the most powerful things in life. It allows us to find the meaning behind everything and helps improve lives in a massive way. Education gives us an understanding of the world around us and offers us an opportunity to use that knowledge wisely. Irrespective of race, creed, and gender, education makes it possible for people to stand out among equal with all the other persons from different walks of life. According to Halili (2019), education is the process of facilitating learning, or the acquisition of knowledge, skills, values, morals, beliefs, and habits. Educational methods include teaching, training, storytelling, and discussion-directed research (Saurombe *et al.,* 2017).

Education frequently takes place under the guidance of educators; however, learners can also educate themselves (Shulga *et al.,* 2021). Education can take place in formal or informal settings and any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational (Diamond & Spillane, 2016). In this 21st Century, Preschool or kindergarten, primary school, secondary school, and ultimately higher education are the most typical phases of formal education and most of these educational settings use information communication technology to impart knowledge (Koh & Chai, 2014). Almost all higher institutions today are Information Communication Technology (ICT) inclined; this is base on the importance of ICT in the academic world (Ohei *et al*., 2019). The importance of information and communication technology (ICT) in the field of education has proved its worth round the globe (Akbar & Qureshi, 2015). The outcome of this realization resulted into an increased number of

computers and networking in educational institutes (Tümen-Akyildiz, 2020). In addition, a number of researchers have claimed that the place it has gained today will remain on an increase in the future (Gao, 2021).

Today, information and communication technologies expand further to encompass computers and computer-related products, email, multimedia messaging service (MMS), and other forms of communication (Larkin *et al.*, 2012). It is similar to Information Technology (IT) but focuses primarily on communication technologies (Mandal & Jirli, 2016). This includes the internet, wireless networks, cell phones and other communication media. The use of communication media will be effective through the use of scientific, technological and engineering discipline and management technique. According to Nitchot *et al*. (2021), ICT include the use of the following techniques such as scientific, technological and engineering discipline and management which effectively helps in handling information, its application and association with social, economic and cultural matters. Socially, ICT aims to empower students who are unable to assess technological gadget outside the school premises by ensuring sufficient access to those students, also equip learners with the appropriate social skills required to work together with fellow ICT learners for a productive learning experience (Ratheeswari, 2018). Economically, application of ICT to learning has the power to improve skills that will motivate and engage students, to enable them relate learning to entrepreneurship, thereby providing self-employment for tomorrow's workers, while strengthening teaching techniques in a cultural setting (Ukpe, 2013). Culturally, it's objectives is to assist students to appreciate the beauty of culture, foster global citizenship through world wide

networks that make it possible for people to take diverse classes through the use of ICT (Al-Rahmi *et al*., 2014).

Information and communication technologies are influencing all aspects of life. The influences are felt more and more at schools, because ICTs provide both students and teachers with more opportunities in adapting learning, teaching to individual needs, and also helps to determine the primary aim and objectives of knowledge impacted as stated in the curriculum (Eze *et al*., 2018). Society is forcing schools respond to this technical innovation. Ratheeswari (2018) states the potentials of ICTs in increasing access and improving relevance, quality and means of assessment of education in developing countries.

According to Huda *et al*. (2017), assessment which could also mean evaluation, plays a major role in student learning. There are many new approaches to assessment with an emphasis on the process of learning along with the product of learning. del Mar Sánchez-Vera and Prendes-Espinosa (2015) says advancement in information and communication technology has thrown open numerous possibilities for assessing students' learning and providing feedback. Assessment can be classified into various types or approaches based on the purpose, they include: formative; summative; diagnostic; and authentic assessment. Formative assessment which provides feedback and information during the instructional process while learning is taking place. Summative assessment takes place after the learning has been completed and provides information and feedback that sums up the teaching and learning process. Diagnostic assessment helps you identify your students' current knowledge of a subject, their skill sets and capabilities, and to clarify misconceptions before teaching takes place. Authentic assessment describes the multiple

forms of assessment that reflect student learning, achievement, motivation, and attitudes on instructionally relevant classroom activities. It emphasizes what students know, rather than what they do not know or requires students to develop responses instead of selecting them from predetermined options. An authentic assessment usually includes a task for students to perform and a rubric by which their performance on the task will be evaluated. Performance assessment is one which requires students to demonstrate that they have mastered specific skills and competencies by performing or producing something. Assessment in this century has gone beyond pen and paper to electronic assessment which is thriving in many higher institutions today (Okada *et al.,* 2019).

Farzin and Dahlan (2016), explain e-assessment in its broadest sense as the use of information technology for any assessment-related activity. This definition embraces a wide range of student activity ranging from the use of a word processor to on-screen testing. Due to its obvious similarity to e-learning, the term e-assessment is becoming widely used as a generic term to describe the use of computers within the assessment process. E-assessment can be used to assess cognitive and practical abilities. Cognitive abilities are assessed using e-testing software; practical abilities are assessed using e-portfolios or simulation software. An e-testing system comprises two components: an assessment engine and an item bank. E-assessment is becoming widely used. It has many advantages over traditional (paper-based) assessment some of which are: lower long-term costs, instant feedback to students, greater flexibility with respect to location and timing, and improved reliability (machine marking is much more reliable than human marking). Some of the disadvantages are: they are expensive to establish and not suitable for every type of assessment (such as extended response questions). Presently, almost all tertiary

institutions in Niger State use e-assessment to evaluate students (Osuji, 2010). Higher institutions in Niger State using e-assessment comprises of Federal University of Technology Minna, Ibrahim Badamasi Babangida University Lapai, and College of Education Minna. Students in these schools are from different socio-economic backgrounds which also affect students' perception, attitudes and satisfaction towards e-assessment (Umar & Wilson, 2019).

Perception refers to the way sensory information is organized, interpreted, and consciously experienced (Abbasi *et al*., 2020). Perception is made of the buttom-up and top-down processing. Bottom-up processing opined that perceptions are built from sensory input. On the other hand, top-down processing is the interpretation of those sensations which is affected by available knowledge, experience, and thoughts that tell the nature of stimuli (Oderinu *et al.*, 2020). Stimuli are any units of inputs from objects that are perceived by any one of the five senses-vision, sound, touch, taste and smell (Amaya *et al.*, 2020). These five senses are unique to each individual depending on the quality of human's sensory receptors (for instance, eyesight or hearing) and the intensity of the stimuli to which one is exposed. Perception consists of three elements which are exposure, attention and interpretation. It begins with receiving information from outside, selecting information, organizing information and end with interpreting the information (Olalla-Soler, 2019). The information received, include diverse amount of variables that affect or expose the students (for instance, the nature of e-assessment, its operation and so on). Furthermore, students will perceive information differently in accordance with their needs, expectations and past experiences. Also, this perceptual step is facilitated by schema which is the set of knowledge and beliefs held by various students. This schema

provides a filtering procedure for a student who concentrates on only a small amount of the original stimuli. In addition, students then organize information in physical configuration which is now interpreted into a logical picture. Finally, after the conclusion of the selection and organization process, student interprets the chosen stimuli. This process is unique to student because it serves as a basis of expectation and previous experiences. The continuous existence of these variables determines the perception of individual student and this process is part of the source of students' attitude.

According to Adewole-Odeshi (2014), attitude is an inner psychic state influencing behaviour. Inner state of a student can be understood from his/her actions and words. For instance, one may presume that a student actively avoiding a computer has a negative attitude towards it. Attitude is not an inborn, instinct phenomenon; it mainly depends upon a student's experience and its impact in a new situation (Unger & Meiran, 2020). Consequently, attitudes are formed in the process of experience and their change is possible due to the internal and external factors. In other words, attitude towards e-assessment in this study is the ways of thinking and feelings of undergraduate students towards conducting or taking computer-based test. This attitude is enforcing the actualisation of using ICT in education and most especially in assessing the ability of students in any examination is the ballpoint fulcrum (Falode & Ayodele, 2019).Thus, for a successful implementation of Nigerian curriculum for Senior School Certificate Examination, it is extremely important for the school administrators to have the knowledge, skills, attitudes and values that the curriculum for Senior School Certificate Examination requires.

In simple term, an attitude is the way a student thinks, feels and acts toward some aspect of the environment (e-assessment) as well as a complex mental concept of motivational, emotional, perceptual and cognitive processes to evaluate an object of thought and response in certain ways (Petty *et al.*, 2014). The attitude can be anything that students discriminate and hold in mind and thereby express in either positive or negative way (Huda *et al.*, 2017). Student's lifestyle is dramatically influenced by attitudes which are consisted of three elements: cognitive (beliefs), affective (feelings) and behavioral (response tendencies) which determine to what extent students become satisfied or dissatisfied (Hansmann *et al.,* 2020)

Satisfaction is defined by Napitupulu *et al.* (2018) as an emotional response or affection toward an object. Satisfaction is seen as an expression of fulfillment of an expected outcome influenced by prior expectation regarding the level of quality. According to Francis *et al.* (2019), satisfaction is a decision made from joyful experiences received as a result of consumption-related fulfillment, which might include levels of under or over fulfillment. This definition highlights the decision level of satisfaction which is focusing on fulfillment which can vary from one student to another. However, in spite of the divergent views expressed by different schools of thought and disciplines on the concept of satisfaction, there exists across a number of disciplines a convergence of opinion that satisfaction is generally considered the difference between what a student expect or desire compared to what he/she actually experienced (Alqurashi, 2019).

Gender refers to the social attributes and opportunities associated with being male and female, the relationships between women and men and girls and boys, and the relations between women and between men (Clark & Horton, 2019).These attributes, opportunities

and relationships are socially constructed and learned through the socialization processes. Gender is not based on sex, or the biological differences between men and women. Gender is shaped by culture, social relations, and natural environments like higher institution (Hyde *et al*., 2019). Thus, men and women in various parts of the world have established diverse gender roles on beliefs, conventions, customs, and laws; these gender stereotypes were protected and instilled in the lives of students by tertiary institution (Sam *et al.*, 2019). Tertiary institution is post-secondary education. Tertiary education, according to Aboagye *et al.* (2021), is an institution of higher learning that trains certain subjects in higher learning capacity. Nigeria's desire for higher education is channeled through high-level personnel education, self-sufficiency, national applicability, and international knowledge. In order to achieve this goal, the Federal Republic of Nigeria (FRN) divided higher education institutions into phases, which included Universities, Polytechnics, Monotechnics, and colleges of education, among others (Falode *et al.*, 2018).These higher institutions have being given the obligation to equip students. One of the ways through which equipping of students is effective is through consistent evaluation. Universities have now adopted e-assessment to check the progress of their student's perception, attitude and satisfaction even to the mode of assessment. The perception, attitude and satisfaction expression of male and female students might probably not be the same because it is possible to have a high or low response base on learner's gender of e-assessment (Moskowitz & Dewaele, 2021). Hence, this study investigates perception, attitude and satisfaction of undergraduate students on e-assessment of universities in Niger State, Nigeria.

1.2 Statement of the Research Problem

Higher institutions in Nigeria have the responsibility to constantly attract, develop and graduate competent, knowledgeable and talented individuals through the provision of accessible, relevant, high and quality mode of evaluation. More and more institutions, especially the Universities, are adopting new mode of assessment (Kubaev, 2020). As it becomes clearer that the growth of internet offers real opportunities for improving the rate at which wide range of learners can be assessed, there is need to clarify these issues with special focus on electronic assessment initiatives (Tchamyou *et al.,* 2019). Presently, the population of the students in universities especially in Niger State is becoming high and the traditional mode of assessment (paper based) is not effective to hold the challenge (Falode *et al.,* 2021). For optimum assessment, electronic assessment could be used to supply immediate and focused feedback on student's work, allow students' more than one attempt at an answer, present questions in a predetermined or random order, increase student's digital literacy. There are abundant benefits attached to the use of different electronic mode of assessing students which can be easily accessed, but students in developing country like Nigeria, especially students in Niger State universities have not been using it, could it be that students in universities in Niger State have negative perception? If they have positive perception, what is their attitude? If they have right attitude, are they satisfied with electronic mode of assessment?

Therefore, the study investigates perception, attitude and satisfaction of undergraduate students on e-assessment of universities in Niger State, Nigeria.

1.3   Aim and Objectives of the Study

The aim of this study is to investigate the perception, attitude and satisfaction of undergraduate students on e-assessment in the two Universities in Niger State, Nigeria. The objectives of the study are to:

1. Determine the perception of undergraduate students of e-assessment in Universities in Niger State.

2. Examine how gender influences the perception of undergraduate students of e-assessment in Universities in Niger State.

3. Find out whether undergraduate students have positive attitude towards e-assessment in Universities in Niger State.

4. Find out how gender influences the attitude of undergraduate students' towards e-assessment in Universities in Niger State.

5. Determine the satisfaction of undergraduate students' in e-assessment in Universities in Niger State.

6. Investigate how gender influences the satisfaction of undergraduate students towards e-assessment in Universities in Niger State.

1.4   Research Questions

The study attempts to answer the following research questions:

1. What is the perception of undergraduate students on e-assessment in Universities in Niger State?

2. Does gender affect the perception of undergraduate students towards e-assessment in Universities in Niger State?

3. Are undergraduate students having positive attitude towards e-assessment in Universities in Niger State?

4. Does gender affect undergraduate students' attitude towards e-assessment in Universities in Niger State?

5. What is the satisfaction level of undergraduate students in e-assessment in Universities in Niger State?

6. **Does** gender affect the satisfaction of undergraduate students in e-assessment in Universities in Niger State?

1.5   Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance

Ho_1:   There is no significant difference between male and female undergraduate students' perception level of e-assessment in Universities in Niger State.

Ho_2:   There is no significant difference between male and female undergraduate students' attitude in e-assessment in Universities in Niger State.

Ho_3:   There is no significant difference between male and female undergraduates students' satisfaction of e-assessment in Universities in Niger State.

1.6   Significance of the Study

Findings of this research study would be of great benefits to Students, Lecturers, School administrators, Parents, Government and Non-governmental organizations, Researchers, and other relevant stakeholders.

Students would benefit from this research, because it would also help them to improve on their learning skills like critical thinking and problem solving. Also, this research will motivate the students on the positive needs of technological gadgets thereby improving

their mindset. It will enlighten them on usage of technological tools such as phones (in preparation for e-assessment) can be used for informative and educational purpose rather than using them for only entertainment purpose. They can download different e-assessment mode online and use it to complement their normal school e-assessment mode, which would enable them to be up to date and have more understanding about the course.

Lecturers in tertiary institutions would gain a lot from the findings of this research as they would be aware of the educational importance of e-assessment in this era, thereby exploring it for upgrading their lecture materials, interacting and passing relevant information on their courses to their students, improving on their mode of setting questions in e-assessment to measure the course contents in the university.

School administrators and policy makers will benefit from the findings of this study in the sense that they will be enlightened on the instructional values of e-assessment, thereby making policy that would be of assistance to the school.

Parents would benefit from this research as it would enable them to use their technological tools such as phones and their personal computers to help their children downloads relevant materials in their fields of study which would also help them influence their wards' perception positively, and improve their performance and interest. Findings of this research will also be of great help and a reference to upcoming researchers who would like to embark on related work in the future. Finally, the findings of this study could stir up Governmental and Non-Governmental organizations including other relevant stakeholders in the field of technology and

education to emphasize the academic benefits of e-assessment during seminars, meetings, workshops and conferences so that the staff and the students would be aware of the existence of e-assessment and its usefulness in academic setting.

1.7 Scope of the Study

The scope of this study is to assess the perception, attitude and satisfaction of undergraduate students on e-assessment in Universities in Niger State. The content of this study was limited to e-assessment of undergraduate students of Universities in Niger State. The variables of this study include; perception, attitude, satisfaction, e-assessment and gender. Students from the Faculty of Education and Art, IBBU Lapai, and School of Science and Technology Education, FUT Minna were used for this study; because they are common to Federal University of Technology, Minna and Ibrahim Badamasi Babangida University Lapai in Niger State. This research work lasted for 6 weeks, during this period; the researcher administered the questionnaire and also retrieved them immediately after they are filled, after which the data received were analyzed.

1.8 Operational Definition of Terms

Attitude: is an inner psychic state influencing behaviour.

E-assessment: is the use of information technology for any assessment related activity.

Information and Communication Technologies (ICT): encompass computers and computer-related products, email, multimedia messaging service (MMS), and other forms of communication.

Perception: the way sensory information is organized, interpreted, and consciously experienced.

Satisfaction: is an emotional response or affection toward an object.

CHAPTER TWO

2.0   **LITERATURE REVIEW**

This chapter centres on the review of related relevant literature which was reviewed under three sections of conceptual framework, theoretical framework and empirical studies.

2.1   Conceptual Framework

The conceptual framework presents the research in relation to relevant literature while considering major variables including independent, dependent and moderating variables. Student's perception of e-assessment, student's attitude of e-assessment, and student's satisfaction of e-assessment formed the dependent variables of the study. Student's gender constitutes the moderating variables. Both the dependent and moderating variables are geared toward e-assessment which is the independent variable of the study. Figure 2.1 shows the conceptual framework diagram of the variables for the study.
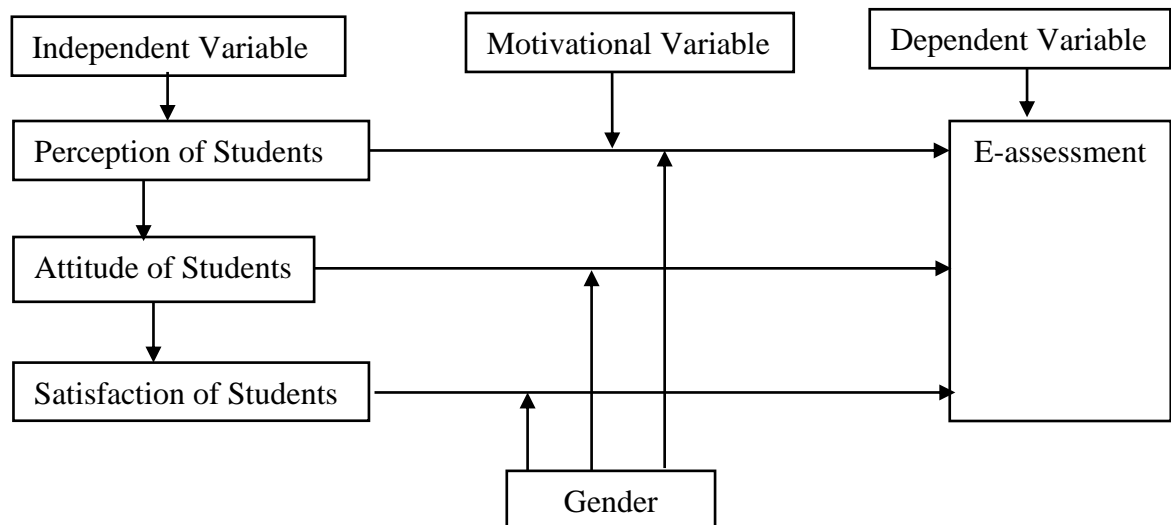
Figure 2.1: Conceptual framework diagram of variables
Source: Developed by the researcher

2.1.1 Information and communication technology

The term Information and communications technology (ICT) stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage, and audiovisual systems, that enable users to access, store, transmit and manipulate information (Khyade & Khyade, 2018). The acronym ICT is also used to define convergence of audiovisual and telephone networks with computer networks through a single cabling or link system. There are great economic encouragement to combine the telephone network with the computer network system using a single unified system of cabling, signal distribution, and management (Parker, *et al.,* 2016). ICT is an umbrella term that includes any communication device, encompassing radio, television, cell phones, computer and network hardware, satellite systems and so on, as well as the various services and appliance with them such as video conferencing, distance learning and virtual classroom (Beena & Mathur, 2012).

Information Communication Technology (ICT) contains a lot of actions involving the acquisition, storage, processing and information dissemination through the use of suitable hardware and software designed for such purpose (Idowu & Esere, 2013). According to Scherer *et al.* (2019), ICT and Information Technology (IT) are comparable concepts that can be interchangeably used. ICT can be seen as device, software and materials that help to encode, decode, and transmit information.

In all fields of human endeavour ICT is useful and can transform conventional education systems in order to bring gain and advantages to higher institutions as a whole, most

importantly for younger generation (Teck, *et al.,* 2019). Higher institutions use diverse set of ICT tools to communicate, create, disseminate, store, and manage information. In some contexts, ICT has also become integral to the teaching-learning interaction, through such approaches as replacing chalkboards with interactive digital whiteboards, using students' own Smart phones or other devices for learning during class time, and the "flipped classroom" model where students watch lectures at home on the computer and use classroom time for more interactive exercises; all of these aspects encompass to mean information and communication technology in education (Remón *et al.,* 2017).

2.1.2 Information and communication technology in education

The introduction of Information and Communication Technology (ICT) to education is seen as a crucial development in teaching and learning process (Mfon *et al.,* 2018). The ability of teachers to administer and disseminate knowledge has been extended through technologies and has also provided new opportunities for students to enhance the new knowledge in different aspects (Tajik *et al.,* 2016). Information and Communication Technology (ICT) has taken a vital role in all spheres of human life and their role in the educational development has been seen to be pervasive. This clearly shows that ICT now serves as a backbone for the development of a society in all aspects (Nedomova & Doucek, 2015). This means for a nation that desires growth, ICT cannot be left out because it will go a long way in the development of a nation generally.

National development is the means through which the people's welfare can be improved by eliminating illiteracy, ignorance and poverty and providing amenities like education, transportation and health care. This is made possible through the use of ICT which helps in achieving development in an economy and ensuring progress in other sectors such as

health, education, banking and agriculture (Yinusa-Afolabi, 2015). The development is enhanced through networking; people are able to interact with each other in real-time as a result of availability of low price of computer technologies (Nwana *et al.,* 2017). The low price of computers and internet connectivity brought these technologies to university campuses and then to the lecturers and students' homes. Lecturers' usage of ICT has expanded through internet, chat, e-mail, programming, online teaching and learning and other educational materials (Dahlstrom *et al.,* 2014). This implies that the cost of material which is avoidable as attracted lecturers to adopt ICT technologies for their teaching purposes. Also, Idowu and Soretire (2020), suggest that educational policies should be delivered to all computer teachers in schools so that the teachers in schools would be able to implement the philosophy and objectives of computer education for digital economic growth, regular in-service training on modern teaching, employment of qualified teachers to enhance effectiveness in process of implementation.

Information and Communication Technology (ICT) refers to a range of technologies that are applied in the process of gathering, storing, editing, retrieving, and transferring information in various forms. In recent years, there has been an exponential growth in the use of ICT tools and this has made great impact both on society and on people's daily lives (Cecere *et al.,* 2014). It is therefore not surprising to see the increasing interest, attention and investment being put into the use of ICT in education all over the world (Enang & Abdulrahman, 2018). Notably, ICT has improved the communication between lecturers and students, and the interaction between different educational resources (Kaware & Sain, 2015). Also, Bala (2018) asserted that the use of ICT in higher education enhances student-centred learning. Ever since Universities were founded by

the colonialists and nationalists, there has been a need for distance education for learners who could not access regular university programmes because of their employment and family commitments (Arvin *et al.,* 2013). These categories of learners are those who could not meet strict regular University programmes criteria and continually depend on open distance learning. Etor *et al*. (2013) summit that, some of the goals of open and distance education as stated by the Federal Republic of Nigeria in the National Policy on Education (FRN) are to provide access to quality education and equity in educational opportunities for those who otherwise would have been denied, but this goal could only be met through the proper use of open educational resources (OER). Lecturers in higher institutions in Nigeria fit into this by helping the government to create suitable materials for this set of people so that the federal government can meet their targeted goals in that area. Agbetuyi and Oluwatoyo (2012) opined that ICT is now regarded as a utility such as water and electricity and hence, has become a major factor which must be considered in socio-economic development of every nation especially in Nigeria. Aworanti (2016) posited that opinion shared by scholars point to conclusive evidence that ICT has some real and material applications for a country like Nigeria because the country can use ICT to transform and modernize their economy. When appropriately used, it can help expand access to education, make education more relevant to the work place, and create an active process connected to real life to raise the quality of education.

ICT can make available information for all, as long as one has a computer and has access to network; one can access information from any part of the world which may help to remove the challenges of purchasing expensive textbooks before one can get access to information. Mathipa and Mukhari, (2014) added that ICT can also provide access

anytime and anywhere by making possible offline teaching. Online course and learning materials, for instance, can be released and be accessed by students at any time of the day. In addition, ICT can facilitate certain types of innovation such as teleconferencing technologies which allow instructor (lecturer) to pass information simultaneously to multiple and geographically dispersed learners. Through internet and World Wide Web, a wealth of teaching and learning materials are made available in almost every subject and in a variety of media (Joshi *et al.,* 2010). These materials can then be accessed from anywhere at any time by an unlimited number of students. ICT also facilitates access to resource to persons all over the world. ICT has made impression on the quality and quantity of teaching, learning and research in institutions using it (Oyebolu & Lemo, 2013). The different locations of students does not stop learning, provided they have some computer devices like web cam equipped computer and software or website that provides a means of communication between users at different locations. From the foregoing it can be understood that ICT has become a universal tool in education that can serve a range of purposes for effective teaching, learning and research (Gulati & Yates, 2012).

2.1.3 Benefits of information and communication technology in higher education

The application and use of ICT is beneficial in improving Nigeria's educational system and giving lecturers a good teaching experience and students a better education (Onasanya *et al.,* 2010). When the workforce is advanced to technologically, it will lead to the expansion of ICT in Nigeria, with the potential to progress military technology and telecommunications, media communications and expert ICT professionals who will be well equipped to solve IT problems in Nigeria and other parts of the world (Heide &

Simonsson, 2011). The capacity to use computers efficiently has become a crucial part of everyone's education. This demand for computer and ICT literacy skill has increased in Nigeria, because employers realize that with the acquired skills workers can boost their efficiency and can go about their work efficiently. Employees on the other hand have also seen the need to be computer literates as they realized that computer can be a treat to their jobs, and having these required skills their jobs can be secured (Kaifi *et al.,* 2012). Undoubtedly the need for educational institutions to make sure that lecturers are able to display appropriate levels of information and technology literacy, the ability to discover an issue, situate and assess relevant information so as to solve a problem. This means that for a lecturer to fit properly into the academia, he or she will need to familiarise him/herself with the use of ICT and is also required to be equipped with the basic skills so as to meet up with present-day qualities and requirement to remain relevant in the academic environment. Institutions now see the need to train and re-train their workers to establish or enhance their knowledge of computers and other ICT facilities (Egoeze *et al.,* 2014).

ICT has also transformed the relationship between students and lecturers to a more open and friendly one (Rambe & Bere, 2013). The thought of sharing knowledge and the attitude of using new resources for teaching are enhanced by using ICT which has also helped the lecturers to communicate better with the students and allow them to access more information on a particular concept. Al-Rahmi *et al.* (2014) opine that, ICT transforms the role of the lecturer from being the solitary provider of information seeing that students can source for information elsewhere apart from the class which therefore makes both the teaching and learning more interactive and interesting to the learners.

Jethro *et al.* (2012) assert that through active teaching, ICT enhances teaching and learning to serve as tools for taking student information, writing of examination, calculation and breakdown of information inform of learning management system.

In Nigeria educational institutions, especially higher institutions, the mode of delivery of knowledge is as not met up with the curriculum requirement, though with the National Policy development on ICT in education Nigeria has the possibility of attaining towards improvement for the sector (Achimugu *et al.,* 2010). Also, Achimugu *et al.* (2010) added that ICT is yet to be fully implemented into the curriculum across all levels of education in Nigeria, but there is hope of its future implementation since it has been stated out in National Policy in Education.

2.1.4   Information and communication technology tools in education

Information and communication technology has become an indispensable tool for quality education in the society. There is abundant evidence in the literature that ICT is a critical key to quality education for all. In education, ICT has become a subject of study on its own right. It is also having a remarkable impact across all curriculum areas. According to Hashim *et al.* (2010), in education information and communication technology can be used to aid management and administrative activities, as an object of instruction for teaching and instructional purposes. The use of ICT is effective on instruction for teaching if instructors are provided with necessary knowledge and skills with which is for dissemination of information in educational system and to effectively perform in the world of academic (Mumcu, 2010).

Agbetuyi and Oluwatayo, (2012) stressed that, in Nigerian educational system, it is an interesting thing that ICT is also a transformational tool that has promoted shift to a

learner centered environment. The quality of education and training has been improved as technological tools increases lecturers and learners' motivation and engagement, facilitating the acquisition of basic skills. The use of technological tools such as videos, televisions and multimedia computer software that merge text sound and colorful moving image is to provide challenging and authentic content that engages the student to be more involved (Ajloni & O'Toole, 2021). More notably, Ajloni and O'Toole (2021) suggested that, networked computers with internet connectivity serve as a channel to increase learners' motivation as it combines the media richness and interactivity with other tools with the opportunity to connect with real people and participate in real world events.

2.1.5 Concept of electronic assessment

Electronic assessment, also known as digital assessment, e-assessment, online assessment or computer-based assessment, is the use of information technology in assessment such as educational assessment, health assessment, psychiatric assessment, and psychological assessment (Alsadoon, 2017). This covers a wide range of activity ranging from the use of a word processor for assignments to on-screen testing. Specific types of e-assessment include multiple choice, online/electronic submission, computerized adaptive testing and computerized classification testing.

Different types of online assessments contain elements of one or more of the following components, depending on the assessment's purpose: formative, summative and diagnostic. Instant and detailed feedback may (or may not) be enabled (Brookhart, 2011).

In formative assessment, often defined as 'assessment for learning', digital tools are increasingly being adopted by schools, higher education institutions and professional

associations to measure where students are in their skills or knowledge (Perrotta & Whitelock, 2017). Also, Bennett suggested that this can make it easier to provide tailored feedback, interventions or action plans to improve learning and attainment. Gamification is one type of digital assessment tool that can engage students in a different way whilst gathering data that teachers can use to gain insight (Deterding *et al.,* 2011).

In summative assessment, which could be described as 'assessment of learning', exam boards and awarding organizations delivering high-stakes exams often find the journey from paper-based exam assessment to fully digital assessment a long one (Char & Collier, 2015). Furthermore, Char and Collier (2015), admit that practical considerations such as having the necessary ICT hardware to enable large numbers of student to sit an electronic examination at the same time, as well as the need to ensure a stringent level of security are among the concerns that need to be resolved to accomplish this transition. E-marking is one way that many exam assessment and awarding bodies, such as Cambridge International Examinations, are utilizing innovations in technology to expedite the marking of examinations (Ramakrishna *et al.*, 2012). In light of this Ramakrishna *et al.* (2012), opined that e-marking can be combined with electronic examinations, whilst in other cases students will still hand-write their exam responses on paper scripts which are then scanned and uploaded to an e-marking system for examiners to mark on-screen.

E-assessment is becoming more widely used by exam awarding bodies, particularly those with multiple or international study centres and those which offer remote study courses (Crisp, 2012). Industry bodies such as the e-Assessment Association (eAA), founded in 2008, as well as events run by the Association of Test Publishers (ATP) that focus

specifically on Innovations in Testing, represent the growth in adoption of technology-enhanced assessment. In psychiatric and psychological testing, e-assessment can be used not only to assess cognitive and practical abilities but anxiety disorders, such as social drccanxiety disorder, i.e. SPAI-B (Shukla *et al.,* 2019). Cognitive abilities are assessed using e-testing software, while practical abilities are assessed using e-portfolios or simulation software (Mustakerov & Borissova, 2011). Early adopters include the University of Cambridge Local Examinations Syndicate, (which operates under the brand name Cambridge Assessment) which conducted its first major test of e-marking in November 2000. Cambridge Assessment has conducted extensive research into e-assessment and e-marking (Mustakerov & Borissova, 2011).

E-marking can be used to mark examinations that are completed on paper and then scanned and uploaded as digital images, as well as online examinations (Ramakrishna, *et al.*, 2012). Multiple-choice exams can be either marked by examiners online or be auto-marked where appropriate. When marking written script exams, e-marking applications provide markers with the online tools and resources to mark as they go and can add up marks as they progress without exceeding the prescribed total for each question and help to check academic dishonesty (Ramakrishna *et al.*, 2012).

Academic dishonesty, commonly known as cheating, occurs in all levels of educational institutions. In traditional classrooms, students cheat in various forms such as hidden prepared notes not permitted to be used or looking at another student's paper during an exam, copying homework from one another, or copying from a book, article or media without properly citing the source. Individuals can be dishonest due to lack of time

management skills, pursuit for better grades, cultural behavior or a misunderstanding of plagiarism (Schwartz, *et al.,* 2013).

2.1.5.1 Benefits of e-assessment

When e-assessment is at its best, students receive instant and individual feedback on their work allowing them to form an accurate picture of their progress through the relevant module and to build their confidence (Jiao & Brown, 2012). The employment of e-assessment makes it far more realistic for college students to get this timely and applicable feedback given the work already experienced by teaching staff. The feedback given may be increased by technology because it might contain links to interactive material, any reading, videos and so on. So students may be directed to have interaction in self-reliant learning tailored for his or her specific difficulties (Jiao & Brown, 2012). E-assessment can provide students with immediate and targeted feedback on their work, allow students' more than one attempt at an answer, present questions in a predetermined or random order, be used for diagnostic, formative or summative assessment, direct students to additional reading or resources if they are having difficulty, increase students' digital literacy, increase student engagement, and record highly detailed information (Jordan, 2013).

2.1.5.2 E-assessment challenges

Nekoueizadeh and Bahrani, (2013) suggest that implementation of e-assessment in higher education could face some challenges like; inexperienced students with computer or with the online assessment method, students not having access to computers and internet

connection, also poor technical infrastructure development. They also provided solutions to challenges stated above, such as; students need training before the start of any assessment to be familiar with e-assessment, adequately equipped laboratory with internet access should be made available in various institutions, government should provide the necessary equipments to set up and run e-assessment systems. Frewen, *et al.,* (2011) discussed the difficulty in scoring and correcting questions with student's open response such as paper and pencil examination where students express their view on the question given. Moreover, the computer will be appropriate for short answer question, which might not be suitable for assessing group project. Assessing group project is a difficult job, because it requires monitoring of the communication skills, evaluate the group work, assess each member and the whole group, and provide a feedback. It is hard to use computer in this task. However, SPARK (Self Peer Assessment Resource Kit) is an academic open source project that is designed to support the evaluation of effective group work, which has been used in many universities in different contexts. Some teachers are unfamiliar with technology, or most of them are using E-assessment for first time. Therefore, instructors in the higher institutions need special training on the principles of assessment to be confident for using E-assessment system.

2.1.6 Principles of assessment in higher institutions

Assessment principles and practices across all sectors of education have several characteristics in common. Assessment inevitably shapes however students approach learning, as well as what they target and their attitude toward the process of learning. Therefore, Baker *et al.* (2012) suggests the following principles; firstly, assessment of

student learning begins with educational values which should drive process of learning (educational mission) instead of been treated as an exercise.

Also, assessment is more effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time, this implies that assessment also checks student's performance as well as their academic success. Furthermore, assessment works best when the programs it seeks to improve have clear, explicit stated purposes. This means that, assessment should have precise stated goals and agreement. In addition, assessment requires attention to outcomes and experiences that lead to those outcomes. This is talking about the product or end result of student's performance. Moreover, assessment works best when it is connected. This connection is to monitor the progress of individual students in order to ensure continuous improvement. Specifically, assessment fosters wider improvement when individual representatives from educational community are involved. This means that, the questions are subjected to a serious check both from member of an institution and experts outside the community to offer better information. Assessment makes a distinction once it begins with problems with use and illuminates questions that individuals extremely care about. Assessment can lead to improvement once it's a part of a bigger set of conditions that promote modification. Finally, he opined that, through assessment, educators meet responsibilities to students and to the general public.

2.1.7 Concept of perception

Perception (from the Latin *perceptio*) is the organization, identification, and interpretation of sensory data so as to represent and perceive the given data, or the surroundings (Glavas & Godwin, 2013). In relation to this, all perception involves signals

that bear the system, that successively result from physical or chemical stimulation of the sensory system. As an example, vision involves putting the membrane of the attention, smell is mediate by odor molecules, and hearing involves pressure waves.

Perception is not solely the passive receipt of those signals, however it is also formed by the recipient's learning, memory, expectation, and attention (Stedman & Adams, 2012). Perception is viewed in two processes; firstly, the sensory input, that transforms this low-level data to higher-level data (for instance; extracts shapes for object recognition). Secondly, perception is connected with a human ideas and expectations (or knowledge), restorative and selective mechanisms (such as attention) that influence perception. Perception depends on advanced functions of the system, however subjectively looks principally easy as a result of this process happens outside individual's awareness. The sensory activity systems of the brain alter people to examine the world around them as stable, even if the sensory data is often incomplete and speedily varied. Human and Animal brains are unit structured in an exceedingly standard approach, with totally different areas process different sorts of sensory data (Teufel *et al*., 2010). A number of these modules take the shape of sensory maps, mapping some facet of the world across a part of the brain's surface. These totally different modules are unit interconnected and they influence one another. As an example, taste is powerfully influenced by smell.

The process of perception begins with an object in the universe, termed the distal stimulant. These sensory organs remodel the input energy into neural activity; a method known as transduction. This raw pattern of neural activity is named the proximal stimulant. These neural signals area unit transmitted to the brain and processed (Engineer *et al.*, 2011). The ensuing mental re-creation of the distal stimulant is that the perceptual

experience. In relation to this study, using the e-assessment as example, the e-assessment is the distal stimulant. Once a student gets enlightened on e-assessment, light from this enlightenment enters the student's eye and stimulates the retina, that stimulation is the proximal stimulus. The image of e-assessment which was reconstructed by the student's brain is the percept (Gupta & Chowdhury, 2015). Also, Gupta and Chowdhury (2015), suggest that sensory modality is the different kind of sensation such as warmth, sound, and taste.

According to Zittoun (2016) who opine that a psychologist Bruner, developed a model of perception through which individuals bear the following method to make opinions; when an individualencounter a concept or innovation, the individual is open to learn about the concept. The second step involves collecting information about the concept through which the individual discovers some related fact that help in categorization. Finally, fact turns out to become less open and precise. Also, concepts that do not agree with the individual's initial perceptions are ignored; this brings clarity and a consistent, positive perception. In relation to this study, the student is the individual while the concept is e-assessment.

According to Saks and John (2011) there are three factors which influence perception, which include; perceiver, target, and the situation. The perceiver is influenced by experience, motivational state and finally emotional state. The perceiver is defensive after clarity. In this case, the student is the perceiver. Then, the target is e-assessment. When there is a complexity about the target, much interpretation is needed. The situation will determine the level of information needed on the target. In relation to this study, the situation is level of the student.

2.1.8 Concept of attitude

In psychology, an attitude refers to a set of emotions, beliefs, and behaviors toward a particular object, person, thing, or event (Ogini, 2018). Attitudes are often the result of experience or upbringing, and they can have a powerful influence over behavior. While attitudes are enduring, they can also change. Psychologists define attitudes as a learned tendency to evaluate things in a certain way. This can include evaluations of people, issues, objects, or events. Such evaluations are often positive or negative, but they can also be uncertain at times. The components of attitude are the cognitive component which reflects your thoughts and beliefs about the subject, affective component which shows how the object, person, issue, or event makes you feel finally, the behavioral component declares how attitude influences your behavior (Alsadoon, 2017).

Attitudes can also be explicit and implicit. Explicit attitudes are those that we are consciously aware of and that clearly influence our behaviors and beliefs. Implicit attitudes are unconscious but still have an effect on our beliefs and behaviors.

According to Kurniawan *et al.* (2019), there are a number of factors that can influence how and why attitudes form. Here is a closer look at how attitudes form. Attitudes form directly as a result of experience. They may emerge due to direct personal experience, or they may result from observation. Socially, roles and norms can have a strong influence on attitudes. Social roles relate to how people are expected to behave in a particular role or context. Social norms involve society's rules for what behaviors are considered appropriate. Furthermore, attitudes can be learned in a variety of ways. In addition, Operant conditioning can also be used to influence how attitudes develop. Imagine a

young man who has just started smoking. Whenever he lights up a cigarette, people complain, chastise him, and ask him to leave their vicinity. This negative feedback from those around him eventually causes him to develop an unfavorable opinion of smoking and he decides to give up the habit. Finally, people also learn attitudes by observing people around them. When someone you admire greatly espouses a particular attitude, you are more likely to develop the same beliefs. For example, children spend a great deal of time observing the attitudes of their parents and usually begin to demonstrate similar outlooks.

2.1.8.1 Attitude of students towards electronic *examination*

According to Alsadoon (2017), he summits that there is an excellent transformation from the normal mode of assessment to the trendy methodology of the utilization of Computer-based testing (CBT). Computer-based testing (CBT) is gaining quality over the normal paper and pencil test (PPT) because of several benefits that computer-based assessment provides. There are several factors associated with student characteristics, such as students' perspective, learning vogue, laptop familiarity and take a look at anxiety.

Researchers have performed giant scale reviews of studies examining variations in performance of CBT and paper-based version of tests and have usually found that once CBT is comparable in format to paper and pencil tests, it has little effect on student's test performance (Kurniawan *et al.,* 2019). The performance of student in electronic examination inevitably plays a role in such an environment as one of the many ways available to assess student learning outcome. According to Farzin and Dahlan, (2016), students' intention to use an e-examination system was influence by computer literacy.

According to Ogini (2018), he opine that studies conducted indicated a preference for CBT over PPT which as inflated anxiety amongst those who are not familiar with the use of computer, this has pose a challenge to instructors to test examinees by means of computers, this suggests that appropriate software design should be made available.

2.1.9 Concept of satisfaction

According to Gökalp and Topal (2019), they summit that satisfaction is concept with multiple meaning and application which can be complex to understand. It can express itself through the following disciplines such as sociology, economics, religion, law, psychology, urban and regional planning, marketing, music, and entertainment among others. Satisfaction in its nature is generally subjective and value-laden because it is based on set standard, which can be expectations, cherished values and beliefs among others (Sirgy, 2021). The subjective nature of the concept largely accounts for the different parameters which is use to measure satisfaction in various spheres of life. The level of satisfaction or what constitutes satisfaction to an individual or group could be a function of many inter-related factors including the social class like ethnicity or economic divisions to which they belong (Nardi & Ranieri, 2019). Satisfaction could also be the reflection of individual's psychological make-up, the belief and value systems, and environmental and cultural factors to mention a few all in relation to the context-specific satisfaction like job, consumption of products or services and life itself.

According to Razinkina *et al.* (2018), satisfaction is partitioned into components which include; response (emotional or cognitive), response pertains to a particular focus (expectations, product, consumption, experience, service, etc.), and response occurs at a

particular time (after consumption, after choice, based on accumulated experience). In relation to this study, every student in the university response either positively or negatively to a service, product or experiences. These experiences are the bases for students' perception and foundation for their attitude towards e-assessment and whether they are satisfied with the mode of assessment or not. The mode of assessment which is e-assessment produces a response through the various experiences the students encounter.

2.2   Theoretical Framework

The theory that backs this study is the diffusion Theory of Innovation and Instructional Technology.

2.2.1 Diffusion of innovation (DOI) theory

Everett M. Rogers proposed the Diffusion of Innovation (DOI) theory. Rogers' theory of diffusion of innovations attempts to explain how, why, and at what rate new ideas and technology spread. According to Goh and Sigala (2020), Rogers diffusion of innovations hypothesis is the best applicable for studying technology uptake in higher education and educational environments. Similarly, the purpose of this study is to investigate perception, attitude and satisfaction of undergraduate students on e-assessment of universities.

Diffusion, according to Rogers, is the process through which a new concept, practice, or object gets communicated to an individual or other unit of adoption. An innovation's novelty can be measured in terms of knowledge, persuasion, or a decision to adopt. Innovators, early adopters, early majority, late majority, and laggards are the five adopter types described by the theory that indicate relative innovativeness (Scott & McGuire,

2017). Earlier adopters include innovators, early adopters, and early majority, while late majority and laggards are late adopters. DOI is made up of four basic components: invention, communication channels, time, and the social system.

a. The innovation-decision process

The degree to which an individual adopts new ideas before other members is referred to as innovativeness. Goh and Sigala (2020), defined the innovation-decision process as a search for and processing of information in which a person is motivated to reduce ambiguity regarding the benefits and drawbacks of a new idea. The innovation-decision process, according to Goh and Sigala (2020), consists of five steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. These stages usually follow one another in a chronological succession. Figure 2.3 depicts a model of the five steps in the innovation-decision process.
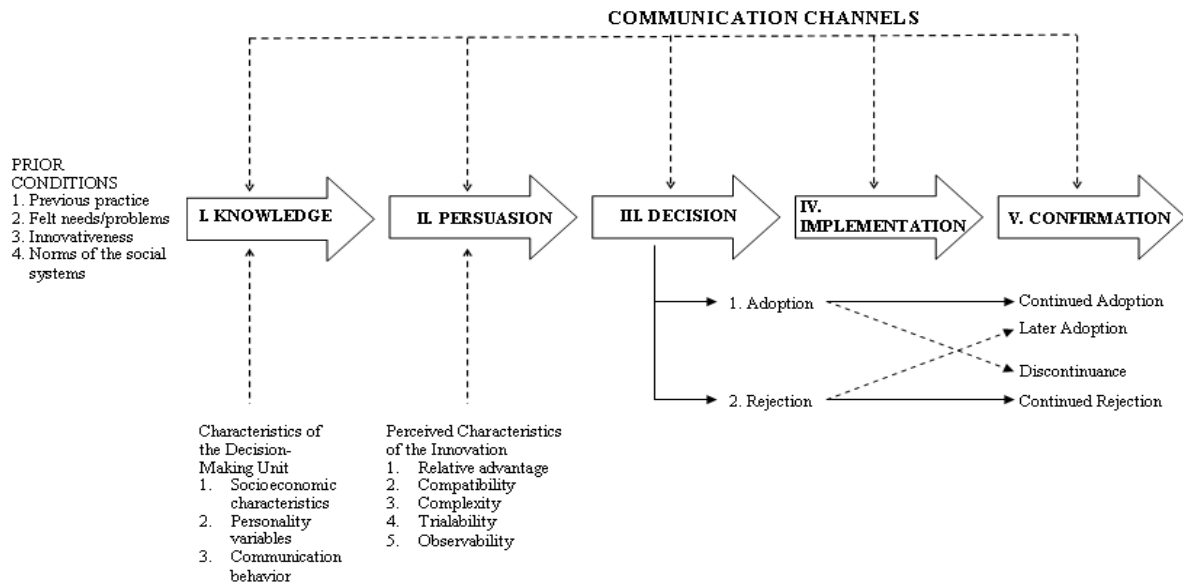
Figure 2.2: A Model of the five stages in the Innovation-Decision Process
Source: Rogers, (2003)

i. The Knowledge Stage

The knowledge stage is where the innovation-decision process begins. In this stage, a person becomes aware of e-assessment existence and begins to make findings on it. Because of e-assessment multidisciplinary character, there is now more knowledge and information about it. There are three sorts of knowledge, according to Rogers: awareness-knowledge, how-to-knowledge, and principles-knowledge.

ii. Awareness-knowledge

This entails a working understanding of e-assessment technologies. Individuals have learned more, studied, and gained important knowledge on e-assessment, which has led to the usage of it, and increase in e-assessment research worldwide, and the prevalence of the phrase electronic assessment for education in the previous decade. Tseng *et al.* (2020), backed this up by stating that people's comprehension and awareness of e-assessment has grown more detailed and widespread over the world

How-to-knowledge: How-to-knowledge is the technical know-how for effectively and efficiently applying e-assessment. Students who have learned about e-assessment and are aware of current e-assessment technologies may not employ them in their daily educational tasks if they do not understand how to use them properly. This was backed up by Kopcha (2012), who claimed that even students with technical expertise may have negative perception towards e-assessment because they do not understand how to use it properly. As a result, mere awareness of e-assessment for education is insufficient; knowledge of how to employ e-assessment technology successfully for education must also be obtained.

Principles-knowledge: This knowledge includes the operating principles that explain why and how e-assessment works, as well as the advantages of using e-assessment in education. The main hurdle to fully utilizing technology in teaching and learning, according to Kopcha (2012), is educators' lack of vision on why or how to use technology in the classroom. Similarly, Sahin (2006) stated that both how-to and know-why experience are required to effectively employ a new technology. Because of a lack of proper knowledge on the importance, benefit, and justification for the use of e-assessment in education, providing awareness of its benefits to students will improve its utilization. The provision of knowledge about the benefits of e-assessment to students will improve the use of e-assessment in education. This is because a lack of adequate knowledge about the importance, benefit, and reason for the use of e-assessment may cause adopters to have a negative attitude toward the innovation, affecting their perception to adopt it.

iii. The Stage of Persuasion

At the persuasive stage, students weigh the benefits and drawbacks of e-assessment, determining whether they are ready to use e-assessment in education or not. According to Rogers, a student's perception to use e-assessment does not necessarily translate into its use. This is because, according to Rogers (2003), the following properties, which are vital for the persuasion stage, lead to the usage of e-assessment: relative advantage, compatibility, complexity, trialability, and observability.

The degree to which the use of e-assessment for education is regarded as important, advantageous, and superior to earlier technologies is referred to as relative advantage. The degree of relative advantage, according to Rogers (2003), can be quantified in terms

of economics, social-prestige aspects, convenience, and satisfaction. E-assessment present questions in a predetermined or random order, making educational assessment more effective and efficient. E-assessment provides information quickly and immediate feedback on the learner's submitted work (Fahimirad & Kotamjani, 2018).

The widespread adoption and implementation of e-assessment for education has been aided by the use of new technologies. The desire for students to be adequately evaluated, as well as the goal of making education accessible and open to all, has boosted the use of e-assessment. Most University students have been trained to use smart phones, laptops, tablets, software applications, learning platforms, search engines, and web browsers on a daily basis; however, because most e-assessment applications are automated and built on the advancement of previously used ICT technologies, the use of e-assessment does not necessitate extensive training and skill acquisition.

iv. The stage of making a decision

A university student may choose to adopt or reject the e-assessment innovation at the decision step of the innovation decision process. Adoption denotes a student's decision to completely utilize e-assessment for education, whereas rejection denotes a student's decision not to fully utilize e-assessment innovations for education. The student may decide to use an innovation, but subsequently change his or her mind and decide not to use it again; this is referred to as a discontinuation decision. When students with a vision for using technology in education face setbacks, Kopcha (2012) suggests that they discontinue their efforts to integrate technology. The student may decide not to use the innovation at first, but later decide to do so, which is known as later adoption.

v. The Stage of Implementation

E-assessment innovation is used for education throughout the implementation stage. For the successful implementation of e-assessment technology, students may require technical assistance at this time. Reinvention can also happen during the implementation stage, which refers to how much an e-assessment innovation is updated (modified) or available to a student when it is being used. An e-assessment platform like exe learn, for example, allows students to develop personalised learning content for students and include interactive features into the curriculum (Wadhwa, 2017).

vi. The Stage of Confirmation

Discontinuance may occur at this stage, since the decision to use e-assessment technologies may be overturned if the student encounters any difficulty or annoyance while using e-assessment technologies or if their expectations for the innovation are not realized and they are dissatisfied with e-assessment's performance.

b. Channels of communication

Communication channels are the second component in the spread of innovations process. Communication is the method by which university students develop and communicate knowledge and ideas on the use of e-assessment innovation with one another, either through mass media or interpersonal means. According to Kwafo (2019), the majority of respondents who were aware of e-assessment learned about it from seminars, magazines, and the media. Furthermore, according to Mori *et al.* (2017) poll, 69% of males who have heard about ML claim they learned about it from mainstream media, 19% from

entertainment, and 19% from friends or family. University students are homophily, or similar in certain traits such as beliefs, education, socioeconomic standing, and obligations, communication, which is common concerning the use of e-assessment. These communication processes will contribute to students' perception and attitude of technology advancement.

c. Time

E-assessment will not be used by all university students at the same time. The time dimension is present in the innovation diffusion process, adopter classification, and adoption rate (Sahin, 2006). Innovators, Early Adopters, Early Majority, Late Majority, and Laggards are the different types of adopters in the innovation diffusion process.

Students that are always on the cutting edge of incorporating e-assessment into education are the innovators. Early adopters who are committed and ready to use e-assessment for education are known as innovators. They are the first to have positive perception towards e-assessment, and they are willing to take the risks that come with it.

Those in positions of leadership in the higher education system are considered early adopters. Early adopters are university administrators, curriculum planners, and policymakers who are active in the use of e-assessment from conception through integration into the university system, as well as in the preparation of seminars to educate lecturers on the use of e-assessment in universities.

The late majority consists of one-third of all university students who are hesitant to use e-assessment and will wait until the bulk of students have done so. This set of students

are not always ready to use e-assessment until they have been convinced and persuaded, as well as examined the benefits and drawbacks of using e-assessment and determined that it is safe. Laggards are students who want to make sure that e-assessment for education works and are being used by other students before adopting it. They prefer to stick to the old ways of evaluation, but they are often forced to use the e-assessment innovation first.

Figure 2.3 depicts the adopter categorization based on innovativeness.
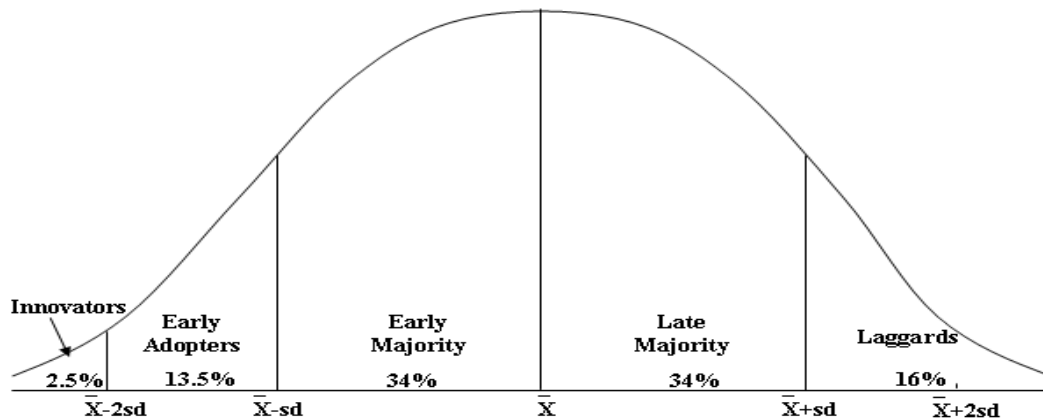
Figure 2.3: Adopter Categorization Based on Innovativeness
Source: Rogers, (2003)

Early adopters, according to Rogers (2003), have a greater social position than later adopters. Income, wealth, occupational reputation, social class identity, and academic qualifications are all factors that influence one's status. However, around two-thirds of these studies demonstrate a favorable association between social position and innovativeness. This is corroborated by Agbatogun's (2013) research, which found that instructors with higher academic qualifications do not use emerging digital technology in their classroom instruction.

d. System of Social Relations

A social system is a collection of interconnected units that work together to solve problems in order to achieve a common purpose (Rogers, 2003). The use of e-assessment for education by university students is influenced by the students' perception, attitude, satisfaction, and gender in a social structure such as a university.

2.3   Empirical Studies

Zineldin *et al. (*2011), in their research work entitled, 'assessing quality in higher education: New criteria for evaluating students' satisfaction'. The aim of this research is to present a new quality assurance model (5Qs) and to examine the major factors affecting students' perception of cumulative satisfaction. A total of 1641 complete and usable questionnaires were received. Frequency analysis, factor analysis and reliability analysis were used for analysing the data collected. Inspection of scree plot and eigenvalues enabled the analysis to reduce the 39 quality attributes to seven factors. The results can be used by higher education institutions to re-engineer and re-design creatively their quality-management processes and the future direction of their more effective education quality strategies.

Similarly, Tella and Bashorun (2012), investigated the attitude of undergraduate students towards computer based test in university of Ilorin, the objective of the study is to find out the general attitude of undergraduate students on computer based examination. A case study design was adopted and sample sizes of 2,209 undergraduate students were selected from seven out the entire faculties and data was collected through computer based test attitudinal survey and a focus group discussion. The investigation revealed that the

students have positive attitude towards computer based test. More than averages of the respondent prefer computer based test to paper-pencil test. Respondent also demonstrate strong perception of increase in their performance as a result of taking computer based test. On the other hand, problems such as shortage of computer, lack of skills, and loss of data in the process of writing computer based test, slow network and hazards of reading on the screen were also identified.

Hillier *et al.,* (2014) in a study entitled, 'the very idea of e-exams: student (pre) conceptions', for this study, they used descriptive survey research design. Data was analysed using Man-Whitney's U Test across programs (discipline groups), gender and by level of experience of computerised exams. The survey was conducted with the intention of uncovering pre-conceived ideas held on the part of students with regard to the idea of e-exams ahead of a planned series of e-exam trials. Finding of this research shows a range of concerns expressed by students both for and against the idea of exams that provide the planners of e-exam approaches valuable insights into the attitudes of one of the most significant stakeholder groups.

Bandele *et al.,* (2015) carried a study titled "Opinions of undergraduates on the use of electronic examination in a Nigerian university". Data were collected using a 25-item opinionnaire, and analysed using means, standard deviations, t-test and one-way ANOVA, tested at 0.05 level of significance. Results showed that the undergraduates favoured the use of e-exams in the university. It was recommended that the university should embrace e-exams and extend same to degree programmes for quality examinations and valid examination results, provide adequate human and material resources for effective operations of e-exams, and prepare the undergraduates

electronically to enable them gain proficiency in computer and operation of e-exams for desirable success of the system.

Cigdem and Oncu (2015), in a study entitled, 'E-Assessment Adaptation at a Military Vocational College: Student Perceptions', for this study, they used descriptive survey research design. A model derived from Technology Acceptance Model 2 (TAM2) was proposed to examine perceptions about the e-assessment system. A structural equation modeling analysis employed to examine relationships among age, type of high school student graduated from, computer ownership, course grade, technological complexity, content of questions in online quizzes, perceived usefulness and intention to use. Also, content analysis was performed on qualitative data. Findings revealed that perceived usefulness had great influence on behavioral intention – substantiating the TAM literature. Student perceptions were neither overly optimistic nor pessimistic qualitatively. The overall implication is that to boost use of e-quizzes, it is imperative to help students recognize that e-quizzes are useful to them.

Dammas (2016), examined the attitude of the students towards CBT at KAU, Jeddah, Saudia Arabia. The researcher examined the possibility of using student feedback in the effectiveness of this method in assessment. The findings showed that the majority of respondents have positive attitude towards CBT, (83.7 %) of students said they were competent with the use of computer due to their prior experience. Regarding test administration, they reported that there are some errors in the chemical equations, formulas, construction in the exam sections, and inadequate time. Nevertheless, they

achieved the exam successfully and reached satisfaction through CBT features such as direct scoring, validity, and transparency in grading.

Da'asin (2016), investigated, 'attitude of ash-shobak university college students to e-exam'. The results showed positive attitudes among students towards E-exam, but there were some negative attitudes ascribed to the high-level of anxiety and stress among students, and over exams ability to raise the efficiency of students' achievement or limit cheating. The results also showed no statistically significant differences in students' attitudes attributed to the variables of gender and GPA. Accordingly, the researcher recommends using the electronic version of the intermediate university certificate exam. Thus, the researcher also recommends avoiding the negative impact of the exam, and developing it to raise efficiency in measuring the students' achievement.

Topal (2016), in a study entitled, 'examination of university students' level of satisfaction and readiness for e-courses and the relationship between them'. The data were analyzed by methods of descriptive statistics, independent t-test and regression analysis in the SPSS program. According to the survey the satisfaction level of the students is moderate; when the sub-dimensions were examined, satisfaction was high in the instructor-student interaction and environment design sub-dimensions while it was moderate in the course content and teaching process, materials used and communication tools, and attitude towards e-learning sub-dimensions. Moreover, the satisfaction levels of learners who were self-directed, had high motivation and could control their own learning appeared to be affected positively. In conclusion, to increase the satisfaction level of the students it would be useful to increase the number of materials used in the e-courses; give more importance to interaction; and use more tools such as animation, virtual classroom, video,

forum, survey, chat and email. In order to increase satisfaction, student readiness should be considered, students should be able to use technology effectively.

Ranganath *et al.,* (2017) carried out a research on Medical students' perceptions of E-assessment: multiple choice questions used as a tool of assessment for preclinical years. A survey research design was used. The population for the st/udy is 280 students which consist of year 2, 3, and 5 students of Oman Medical College (OMC). The study encompassed four phases, namely; affective factors, validity factors, practicality, and reliability and security. Finding from this study revealed that most students preferred MCQs based E-assessment. However it is evident that the exam system needs to be improved in areas of preparation of well-constructed MCQs, its reliability and validity, practical and technical problems and also regarding the security of the exam system to prepare medical students global competent.

Bahar and Asil (2018), examined 'attitude towards e-assessment: influence of gender, computer usage and level of education'. An e-assessment scale was used with a sample of 853 associate degree, undergraduate and graduate students to investigate the influence of gender, computer usage and level of education on attitude towards e-assessment. A mimic modelling approach was utilised following a confirmatory factor analysis, and the analysis found university students who used computers for a longer period of time had significantly higher scores on two e-assessment dimensions than those who used computers less. Males exhibited significantly more positive attitudes to e-assessment than females on test characteristics, individual characteristics and technical factors but not social and environmental factors. Level of education had no influence on attitude towards e-assessment.

Sözen and Guven (2019), in their study entitled, 'the effect of online assessments on students' attitudes towards undergraduate-level geography courses'. The study was designed in a quasi-experimental model with experiment and control groups. The study also implemented pre-tests and post-tests. Geography Attitude Scale developed by Sözen and Guven (2019) was used as data collection tool. The study's sample consists of 70 students whose majors are Primary School Teacher in Faculty of Education. An online assessment tool was implemented for seven weeks in experiment group, while the control group did not receive the said tool. The study found that using online assessment tools significantly improved students' attitude towards geography course.

Bahati *et al*. (2019), investigated on measuring learner satisfaction with formative e-assessment strategies. The results show that, in general, the students were satisfied with the quality of their engagement and the quality of feedback across all the formative e-assessment activities offered. The results also show that the student satisfaction varied between and within the formative e-assessment strategies. However, the gap between the student satisfaction mean ratings across all formative e-assessment strategies was marginal and could not help researchers decide upon which formative e-assessment strategy that stood out as the most preferred one. Learner satisfaction with different formative e-assessment strategies was positively correlated to each other at various levels but no relationship was found between students' scores on the final course exam and learner satisfaction with formative e-assessment strategies. In the end, the results indicated that a sustained and integrated use of the all three formative e-assessment strategies (online knowledge survey, online student-generated questions and peer-responses, and electronic reflective journals) should be used in the context of hybrid

courses. The study also suggests further studies that would widen, diversify both the scope and research instruments to investigate learner satisfaction with formative e-assessment strategies.

Shraim (2019), in his research work entitled, Online Examination Practices in Higher Education Institutions: Learners' Perspectives. Opined that, online examinations commonly known as electronic examinations (e-exams), are becoming increasingly implemented in higher education institutions in Palestine. However, learners' perspectives on these exams remain unexplored. This study therefore examines learners' perceptions of the online examination practices at Palestine Technical University-Kadoorie. An online questionnaire survey of 342 undergraduate students elicited their perceptions of the relative advantages of online examinations in terms of pedagogy, validity, reliability, affective factors, practicality and security. The results show that online exams were perceived to have significant benefits over traditional, paper-based examinations, including reliability of grading and efficiency in terms of time, effort and money spent on the exam process. Conversely, participants identified many challenges facing the successful implementation of online exams regarding security, validity and fairness issues. The findings also indicate that e-exams are particularly suitable for formative assessment, for measuring learning rather than the summative assessment of learning. The successful implementation of online exams depends on designing them to be valid, reliable, secure and flexible.

Khan and Khan (2019) in a study entitled, online assessments: Exploring perspectives of university students. This study highlighted that students did not comprehend the need for online assessments. Concerns regarding technological incompetence of students and

teachers alongside distrust in the technology infrastructure were stressed. Students felt online assessments were restrictive for the science courses and had resulted in falling grades; probably due to the increasing dependence on multiple choice questions. Students also expressed the importance of constructive, timely and personalized feedback. Students need to be convinced of the usefulness of the transition to online assessment before they agree with it. It is evident through this study that student acceptance would increase with a gradual transition towards online assessments alongside technological training for both students and faculty. Active individualized interaction with instructors is important to students, furthermore preferences and concerns emphasized by students should be addressed to successfully integrate online assessments into higher education.

Afacan *et al.,* (2020) in their study entitled, Learners' Perceptions of Online Exams: A Comparative Study in Turkey and Kyrgyzstan. First, it aimed to investigate students' perceptions of online exams at a state university in Turkey, and at a state university in Kyrgyzstan. Second, the study compared the results. Structured as a mixed study, the research was conducted during the 2018-2019 fall term. The participants were 370 undergraduate students taking first-year courses online. Quantitative data considered learners' perception scores gathered via a survey, whereas qualitative data considered learners' opinions in response to an open-ended question. According to the quantitative analysis, learners' perceptions differed according to gender, major, and prior online course experience variables. In addition, Turkish and Kyrgyz learners differed in that Turkish learners found online exams less stressful and more reliable and fairer than traditional paper-based exams when compared with their Kyrgyz counterparts. The qualitative analysis provided important results for future planning in both institutions.

2.4   Summary of Reviewed Literature

In this chapter, essential part of this literature has been methodically reviewed for this study based on a guarded and systemic consideration of both international and national literature for possible information regarding the area of study. Different concepts relating to area of study were defined in terms of a range of key headings that covered information communication technology, perception of students of e-assessment, attitude and satisfaction of students in e-assessment among others. The literature search was confined to specific studies of the towering possible quality and the ones addressing issues of specific concern to this research. It enhances support for operative assessment of the perception, attitude and satisfaction of e-assessment, as well as individual opinion with various forms of e-assessments. The literature based upon the fact that e-assessment improves the manner and quality of assessing learners in Universities, enhance their attitude of the learners and increase their satisfaction, also reduce various anomalies that are obtainable in e-assessment.

Similarly, the literature reviewed, addressed the theoretical frameworks which underpinned this research work. Diffusion Theory of Innovation and Instructional Technology was reviewed with respect to perception, attitude and satisfaction of undergraduate students of e-assessment in Universities.

The literature reviewed concluded with the empirical studies which reviewed similar studies undertaken by other researchers regarding perception, attitude and satisfaction of undergraduate students of e-assessment in Universities both within and outside Nigeria. However, the literatures empirically studied, showed that no single study specifically focused on the assessment of undergraduate perception, attitude and satisfaction of

undergraduate mathematics students on e-assessment in Niger State Universities in Nigeria. This study is therefore special in terms of the variables content, geographical area and the nature of schools covered.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1   Research Design

The research design employed in this study was a descriptive survey design. Erickson, (2017) summits that, strategic information are collected using a pre-designed questionnaire which is associated with a deductive research approach called descriptive survey design. Since questionnaires were used to collect the needed and valuable data from the respondents (undergraduate students) on their perception, attitude and satisfaction on e-assessment of Universities in Niger State. Therefore, descriptive survey research design was appropriate for this study.

3.2   Population of the Study

The population for this study comprises 35,679 students which were the entire students of Federal University of Technology Minna, (FUT) and Ibrahim Badamasi Babangida University Lapai, (IBBU) in Niger State. The distribution of the population of undergraduate students according to Universities is shown below. The target population for this study comprises the faculty of Education and Art IBBU Lapai and the school of Science and Technology Education FUT Minna.

Table 3.1: Population Distribution of students in Federal University of Technology, Minna across the nine schools

S/N	Schools	Population
1	School of Agriculture and Agricultural Technology	2975
2	School of Electrical Engineering and Technology	1810
3	School of Environmental Technology	3804
4	School of Information and Communication Technology	1096
5	School of Life Sciences	2205
6	School of Physical Sciences	4293
7	School of Science and Technology Education	1791
8	School of Infrastructure, Process Engineering and Technology	3036
9	School of Entrepreneurship and Management Technology	499
	Total	**21,509**

Source: Information Technology Service (ITS) FUT, Minna (2021)

Table 3.2: Population Distribution of students in Ibrahim BadamasiBabangida University, Lapai across the six faculties.

S/N	Schools	Population
1	Faculty of Management Studies (FMS)	4034
2	Faculty of Agriculture	594
3	Faculty of Languages and Communication	1217
4	Faculty of Natural Science (FNS)	3584
5	Faculty of Applied Technology (FAT)	777
6	Faculty of Education and Art	3964
	Total	**14,170**

Source: Information Communication Technology (ICT) IBBU, Lapai (2021)

Table 3.3: Population Distribution of targeted students in School of Science and Technology Education FUT, Minna and Faculty of Education and ArtIBBU, Lapai.

S/N	School/Faculty	Male	Female	Population
1	School of Science and Technology Education FUT, Minna	1352	439	1791
2	Faculty of Education and Art IBBU, Lapai	3131	833	3964
	Total	**4483**	**1272**	**5,755**

Source: Developed by the researcher

3.3   Sample and Sampling Techniques

The sample for the study consisted of all the 200level students both from faculty of Education and Art (IBBU) Lapai and School of Science and Technology Education

(FUT), Minna. Multi-stage sampling technique was employed in this study. At first, Purposive sampling procedure was used to select the faculty and the school of Education. This was because, education students could only be found in the faculty/school of education. Thereafter, proportionate stratified sampling was used to select an even percentage of the students across the departments in faculty/school of Education. After this, purposive sampling procedure was used to select 200 level students in the selected institutions because students at this level had fresh experience of e-assessment, and were thus already familiar with the concept of e-assessment. Thereafter, simple random sampling technique was used to select the 380 respondents using the Krejcie and Morgam (1970) Table for determining sample size as a guide to this study, which is presented in Table 3.4 below.

Table 3.4: Sample size of students in school of science and technology education FUT, Minna and faculty of Education and Art (IBBU), Lapai.

S/N	School/Faculty	Population
1	School of Science and Technology Education FUT, Minna	190
2	Faculty of Education and Art IBBU, Lapai	190
	Total	**380**

Source: Developed by the researcher

3.4   Research Instrument

The research instrument that was used in this study was questionnaire. The questionnaire was used to check the perception, attitude and satisfaction of the 200 level students from

the faculty of Education and Art, (IBBU) Lapai, and the school of Science and Technology Education, (FUT) Minna. The questionnaire was designed by the researcher and titled "Questionnaire on undergraduate students' perception, attitude and satisfaction on e-assessment (QUSPASE)''. In constructing the questionnaire, effort was made to see that the instructions were precise and clear to the respondents. It was divided into two sections; section A, which consists of demographic information about the respondents, and section B, consisting of three parts. Part 1 consists of statements to assess undergraduate students' perception on E-assessment; using Likert scale of Strongly Agree (SA) awarded 5 points, Agree (A) awarded 4 points, Undecided (U) awarded 3 points, Disagree (D) awarded 2 points, and Strongly Disagree (SD) awarded 1point scale. Part 2 consists of statements of undergraduate students' attitude on e-assessment; using Likert scale of Strongly Agree (SA) awarded 5 points, Agree (A) awarded 4 points, Undecided (U) awarded 3 points, Disagree (D) awarded 2 points, and Strongly Disagree (SD) awarded 1point scale. Part 3consists of statements of undergraduate students' satisfaction on e-assessment; using Likert scale of Strongly Agree (SA) awarded 5 points, Agree (A) awarded 4 points, Undecided (U) awarded 3 points, Disagree (D) awarded 2 points, and Strongly Disagree (SD) awarded 1point scale.

3.5   Validity of the Instrument

The instrument was validated by four experts, one from Department of Psychology, College of Education Minna, two from the Department of Educational Technology, College of Education Minna, one from Department of Computer Science, Ibrahim Badamasi Babangida University (IBBU) and one from the Department of Mathematics (IBBU) for face and content validity in terms of clarity, suitability, use of language,

logical arrangement of the items among others. Based on their suggestions and recommendations, some items were modified while some items were also added and some were removed completely.

3.6   Reliability of the Instrument

A pilot test was conducted to test the reliability of the instrument. A total number of 20 students from Mechanical Engineering Department, Federal University of Technology Minna, who were part of the population but not part of the targeted sample for this study, were selected for the pilot test since they share related characteristics. The administration was done once and a reliability coefficients of 0.75 for perception, 0.81 for attitude and 0.74 for satisfaction variable, was obtained using Cronbach Alpha formula to measure the internal consistency and how closely related a set of items are as a group. Based on the coefficient obtained, the instrument was considered reliable.

3.7   Method of Data Collection

Permission was taken through the collection of Letter of Introduction from the Head of Department of Educational Technology (FUT), Minna. This was done for maximum cooperation from the school authority, students of the Departments of Education, and Agricultural Science and Sciences. The questionnaire was administered by the researcher with the help of trained research assistants to guide the respondents on any difficult aspect of the questionnaire. Two trained research assistants, one from each of the schools assisted in the administration and collection of the completed copies of questionnaire.

3.8   Method of Data Analysis

The data collected from the sampled students was analyzed using descriptive statistics. The descriptive statistics was used to provide answers to the research questions using mean and standard deviation. In section B (part 1) of the questionnaire, the mean response below 3.0 was adjudged as not agree, while mean response of 3.0 and above was adjudged as agree. Similarly, in section B (part 2), a mean response below 3.0 was adjudged as not agree, while mean response of 3.0 and above was adjudged agree. Also, in section B (part 3), a mean response below 3.0 was adjudged as not agree, while mean response of 3.0 and above was adjudged agree. An independent sample t-test analysis was used to test for perception, attitude and satisfaction of undergraduate students, in the research hypotheses; the significant difference was ascertained at alpha level of 0.05. The Statistical Package for Social Science (SPSS Version 23) was used for the analysis.

CHAPTER FOUR

4.0   **RESULTS AND DISCUSSION**

4.1   Research Questions

Six research questions raised in chapter one were answered using Mean and Standard Deviation. The answers to the questions are presented as follow:

4.1.1   Research question one

What is the perception of undergraduate students on e-assessment in Universities in Niger State?

Mean and Standard Deviation were used to answer research question one as shown in Table 4.1

Table 4.1: Mean and Standard Deviation on undergraduate students'perception on e-assessment

S/N	Items	N	$\bar{X}$	Std.	Decision
1	E-exam is an effective method for assessing one's amount of knowledge.	380	3.80	1.47	Agree
2	Online assessment gives me immediate feedback about my performance.	380	4.30	1.06	Agree
3	Online assessment provides faculty with feedback to improve learning.	380	3.50	1.43	Agree
4	Online assessment provides a unbiased grading.	380	3.60	1.40	Agree
5	Online assessment helps in improving the quality of assessment education.	380	3.95	1.25	Agree
6	Online assessment enhances self-learning.	380	3.85	1.06	Agree
7	Online assessment reduces exam stress.	380	3.30	1.38	Agree
8	Online assessment improves my technical skills.	380	3.70	1.42	Agree
9	I prefer online assessment rather than the traditional one	380	3.45	1.29	Agree
10	Online assessment is appropriate for all subjects.	380	3.85	1.43	Agree
	Grand Mean		**3.73**		**Agree**

Decision Mean = 3.0

Table 4.1 presents the perception of undergraduate students on e-assessment in Universities in Niger State. From the table, all the items had a mean above 3.0 which

implies positive perception to the items. The table further revealed that the grand mean score response to the 10 items was 3.73, which was above 3.0. This implies that undergraduate students had positive perception on e-assessment in Universities in Niger State.

4.1.2 Research question two

What is the mean and standard deviation of male and female undergraduate students' perception on e-assessment in Universities in Niger State?

Mean and Standard Deviation were used to answer research question two as presented in Table 4.2

Table 4.2: Mean and Standard Deviation of male and female undergraduate students' perception on e-assessment.

Gender	N	Mean	Std. Deviation	Mean Difference
Male	229	37.29	4.17	
				0.03
Female	151	37.32	4.11	

Table 4.2 shows the mean and standard deviation of male and female undergraduate students' perception on e-assessment in Universities in Niger State. From the table, the mean with standard deviation of male students were $\bar{X}$ = 37.29 with SD = 4.17 while the mean with standard deviation of female students were $\bar{X}$ = 37.32 with SD = 4.11 with a mean difference of 0.03 in favour of the female students. This shows that female students had higher mean rating than their male counterparts on their perception on e-assessment in Universities in Niger State.

4.1.3 Research question three

What are the undergraduate students' attitudes towards e-assessment in Universities in Niger State?

Mean and Standard Deviation were used to answer research question three as presented in Table 4.3

Table 4.3: Mean and Standard Deviation on undergraduate students' attitude towards e-assessment

S/N	Items	N	X	Std.	Decision
1	E-exam is suitable for assessing students at any course	380	2.35	1.49	Disagree
2	E-exam serves as an accurate and reliable assessment method	380	4.10	1.26	Agree
3	E-exam enables me to identify the problems and weaknesses that students suffer from.	380	2.60	1.47	Disagree
4	E-exam serves as a flexible assessment method	380	2.70	1.55	Disagree
5	E-exam improves the quality of the teaching-learning process	380	3.05	1.57	Agree
6	E-exam enables educational institutions to save cost	380	3.85	1.06	Agree
7	E-exam makes me feel less stressed than paper-based exam.	380	3.30	1.38	Agree
8	E-exam enables me to show a better academic achievement.	380	3.70	1.42	Agree
9	E-exam is an effective method for assessing one's skills	380	3.45	1.29	Agree
10	E-exam is an effective method for assessing one's amount of knowledge	380	3.85	1.43	Agree
	Grand Mean		**3.30**		**Agree**

Decision Mean = 3.0

Table 4.3 presents the attitude of undergraduate students towards e-assessment in Universities in Niger State. From the table, item 2, 5, 6, 7, 8, 9 and 10 had mean above 3.0 which implies that undergraduate students had positive towards the items, while item 1, 3 and 4 had a mean below 3.0 which implies that undergraduate students had negative attitude towards the items. The table further revealed that the grand mean score response to the 10 items is 3.30 which is above 3.0. This implies that undergraduate students had positive attitude towards e-assessment in Universities in Niger State.

4.1.4 Research question four

What is the mean and standard deviation on male and female undergraduate students' attitude towards e-assessment in Universities in Niger State?

Mean and Standard Deviation were used to answer research question four as presented in Table 4.4

Table 4.4: Mean and Standard Deviation on male and female undergraduate students' attitude towards e-assessment

Gender	N	$\bar{X}$	Std. Deviation	Mean Difference
Male	229	32.95	4.45	
				0.00
Female	151	32.95	4.34	

Table 4.4 shows the mean and standard deviation of male and female undergraduate students' attitude towards e-assessment in Universities in Niger State. From the table, the mean with standard deviation of male students are $\bar{X}$ = 32.95 with SD = 4.45 while the mean with standard deviation of female students are $\bar{X}$ = 32.95 with SD = 4.34with a

mean difference of 0.00. This shows that both male and female students had the same mean rating on their attitude towards e-assessment in Universities in Niger State.

4.1.5   Research question five

What is the satisfaction level of undergraduate students in e-assessment in Universities in Niger State?

Mean and Standard Deviation were used to answer research question five as presented in Table 4.5

Table 4.5: Mean and Standard Deviation on undergraduate students' satisfaction level of undergraduate students in e-assessment

S/N	Items	N	$\overline{X}$	Std.	Decision
1	Online questions are clear and appropriate to the course and its evaluation method.	380	2.66	1.60	Disagree
2	Sufficient guidance was provided to female students prior to the online exam.	380	4.14	1.23	Agree
3	Online exams are times for you and your opinion to be taken.	380	2.79	1.50	Disagree
4	Time set for the online test is sufficient	380	2.89	1.57	Disagree
5	College takes into account the needs and desires of students when scheduling examinations online.	380	3.24	1.55	Agree
6	Equal opportunity and fairness of the electronic tests encourage female students.	380	3.85	1.06	Agree
7	The online test is characterised by diversity in the difficulty of the questions and taking into account individual differences.	380	3.30	1.38	Agree
8	Method for assigning grades to test questions is appropriate.	380	3.70	1.42	Agree
9	Exam questions cover all parts of the course content.	380	3.45	1.29	Agree
10	In general, you are satisfied with the experience of electronic exam.	380	3.85	1.43	Agree
	Grand Mean		**3.39**		**Agree**

Decision Mean = 3.0

Table 4.5 presents the undergraduate students' satisfaction level of undergraduate students in e-assessment in Universities in Niger State. From the table, item 2, 5, 6, 7, 8, 9 and 10 had mean above 3.0 which implies that undergraduate students are satisfied with items, while item 1, 3 and 4 had a mean below 3.0 which implies that undergraduate students are not satisfied with items. The table further revealed that the grand mean score response to the 10 items is 3.39 which is above 3.0. This implies that undergraduate students are satisfied with the use of e-assessment in Universities in Niger State.

4.1.6 Research question six

Does gender affect the satisfaction of undergraduate students in e-assessment in Universities in Niger State?

Mean and Standard Deviation were used to answer research question six as presented in Table 4.6

Table 4.6: Mean and Standard Deviation of male and female undergraduate students' satisfaction on e-assessment.

Gender	N	$\bar{X}$	Std. Deviation	Mean Difference
Male	229	32.93	4.36	
				2.36
Female	151	35.28	4.80	

Table 4.6 shows the mean and standard deviation of male and female undergraduate students' satisfaction on e-assessment in Universities in Niger State. From the table, the mean with standard deviation of male students are $\bar{X}$ = 32.93 with SD = 4.36 while the mean with standard deviation of female students are $\bar{X}$ = 35.28 with SD = 4. 80 with a mean difference of 2.36 in favour of the female students. This shows that female students

had higher mean than their male counterparts on their satisfaction on e-assessment in Universities in Niger State.

4.2 Testing of Research Hypotheses

Three research hypotheses were formulated and tested at 0.05 level of significance using independent samples t-test as follows:

4.2.1 Hypothesis one

There is no significant difference between male and female undergraduate students' perception level of e-assessment in Universities in Niger State.

In testing hypothesis one, the mean response of male and female undergraduate students' perception on e-assessment in Universities in Niger State was analysed using independent sample t-test as presented in Table 4.7.

Table 4.7: Independent samples t-test of male and female undergraduate students' perception on e-assessment

Gender	N	Df	$\bar{X}$	Std. Deviation	t-value	p-value
Male	229		37.29	4.15		
		378			0.068	0.945 [ns]
Female	151		37.32	4.11		

NS: Not Significant at 0.05 (p>0.05)

Table 4.13 shows the independent samples t-test results of male and female undergraduate students' perception on e-assessment. From the table, the t-value = 0.068, p = 0.945. The p-value is greater than the level of significance, hence hypothesis one was not rejected. This indicates that there is no significant difference in between male and female undergraduate students' perception level of e-assessment. This implies that male

and female students had a positive perception of e-assessment in Universities in Niger State.

4.2.2 Hypothesis two

There is no significant difference between male and female undergraduate students' attitude in e-assessment in Universities in Niger State.

In testing hypothesis two, the mean response of male and female undergraduate students' attitude towards e-assessment in Universities in Niger State was analysed using independent sample t-test as presented in Table 4.8.

Table 4.8: Independent samples t-test of male and female undergraduate students' attitude towards e-assessment

Gender	N	Df	$\bar{X}$	Std. Deviation	t-value	p-value
Male	229		32.95	4.42		
		378			0.011	0.991 [ns]
Female	151		32.95	4.34		

 NS: Not Significant at 0.05 (p>0.05)

Table 4.8 shows the independent samples t-test results of male and female undergraduate students' students' attitude towards e-assessment. From the table, the t-value = 0.011, p = 0.991. The p-value is greater than the level of significance, hence hypothesis two was not rejected. This indicates that there is no significant difference between male and female undergraduate students' students' attitude towards e-assessment. This implies that male and female students had positive attitude towards e-assessment in Universities in Niger State.

4.2.3　Hypothesis three

There is no significant difference between male and female undergraduates students' satisfaction of e-assessment in Universities in Niger State.

In testing hypothesis three, the mean response of male and female undergraduate students' satisfaction of e-assessment in Universities in Niger State was analysed using independent sample t-test as presented in Table 4.9.

Table 4.9: Independent samples t-test of male and female undergraduate students' satisfaction of e-assessment

Gender	N	Df	$\overline{X}$	Std. Deviation	t-value	p-value
Male	229		32.93	4.36		
		378			4.946	0.000[*]
Female	151		35.28	4.80		

*: Significant at 0.05 (p<0.05)

Table 4.9 shows the independent samples t-test of male and female undergraduate students' satisfaction of e-assessment. From the table, t-value = 4.946, p = 0.000. The p-value is less than the level of significance, hence hypothesis three was rejected. This indicates that there is a significant difference between male and female undergraduate students' satisfaction of e-assessment in favour of the female undergraduate students. This implies that female undergraduate students were more satisfied with e-assessment than their male counterparts.

4.3　Summary of Findings

The following were the summary of findings:

(i)   undergraduate students had positive perception on e-assessment in Universities in Niger State;

(ii)   undergraduate students had positive attitude towards e-assessment in Universities in Niger State;

(iii)   undergraduate students are satisfied with the use of e-assessment in Universities in Niger State;

(iv)   male and female students had positive perception of e-assessment in Universities in Niger State;

(v)   male and female students had a positive attitude towards e-assessment in Universities in Niger State;

(vi)   female undergraduate students were more satisfied with e-assessment in Universities in Niger State.

4.4   Discussion of Findings

The findings of this study revealed that undergraduate students had positive perception on e-assessment in Universities in Niger State. This agrees with the findings of Bandele *et al.* (2015), who reported that the undergraduates favoured the use of e-exams in the university. It also agrees with the Cigdem and Oncu, (2015) study which revealed that perceived usefulness had great influence on behavioral intention – substantiating the TAM literature. Similarly, Ranganath *et al.* (2017) study revealed that most students preferred MCQs based E-assessment. In addition, the findings of Afacan *et al.* (2020) revealed that Turkisk learners found online exams less stressful and more reliable and fairer than traditional paper-based exams when compared with their Kyrgyz counterparts.

The findings of this study disagree with that of Khan and Khan, (2019), who highlighted that students did not comprehend the need for online assessments.

Findings emanating from this study also revealed that undergraduate students had positive attitude towards e-assessment in Universities in Niger State. This finding agrees with the finding of Tella and Bashorun (2012) study which revealed that the students have positive attitude towards computer based test. Similarly, Dammas (2016) study revealed that the majority of respondents have positive attitude towards CBT, (83.7 %) of students said they were competent with the use of computer due to their prior experience. The study of Da'asin (2016), also revealed that, positive attitudes among students towards E-exam, but there were some negative attitudes ascribed to the high-level of anxiety and stress among students, and over exams ability to raise the efficiency of students' achievement or limit cheating. The finding of this study also agrees with Bahar and Asil (2018), revealed that, males exhibited significantly more positive attitudes to e-assessment than females on test characteristics, individual characteristics and technical factors but not social and environmental factors. Level of education had no influence on attitude towards e-assessment. Also, finding of this study agrees with Sözen and Guven (2019), that revealed that using online assessment tools significantly improved students' attitude towards geography course.

Undergraduate students are satisfied with the use of e-assessment in Universities in Niger State. This is in accordance with the findings of Bahati *et al*. (2019), the results indicated that a sustained and integrated use of the all three formative e-assessment strategies (online knowledge survey, online student-generated questions and peer-responses, and electronic reflective journals) should be used in the context of hybrid

courses. Also, this agrees with the findings of Topal (2016), which revealed that, the satisfaction level of the students is moderate; when the sub-dimensions were examined, satisfaction was high in the instructor-student interaction and environment design sub-dimensions while it was moderate in the course content and teaching process, materials used and communication tools, and attitude towards e-learning sub-dimensions. The findings of this study disagree with that of Agboola *et al.,* (2019) which revealed that students were not satisfied with the Provision of timeliness and promptness of information and the service quality; students were not satisfied with the accessibility to electronic databases, and the way information needs of users are being met.

Finding emanating from this study also revealed that male and female students had positive perception of e-assessment in Universities in Niger State. This finding agrees with the findings of Afacan *et al.* (2020) revealed that the quantitative analysis, learners' perceptions differed according to gender, major, and prior online course experience variables. Likewise, Bichi *et al.* (2020) showed that students' gender had a significant influence on their perception of difficult topics in mathematics [t (198) =2.34, P =0.020, α = .05] and the nature of students' schools had no significant influence on their perception of difficulty in mathematics [t (198) = -.444, p = 0.657, α = .05].

In addition, Hillier *et al.* (2014) study revealed that a range of concerns expressed by male and female students both for and against the idea of exams that provide the planners of e-exam approaches valuable insights into the attitudes of one of the most significant stakeholder groups. Also, the findings of Afacan *et al.* (2020) revealed that Turkisk male and female learners found online exams less stressful and more reliable and fairer than traditional paper-based exams when compared with their Kyrgyz counterparts.

Another finding of this study reported that male and female students had a positive attitude towards e-assessment in Universities in Niger State. The findings of this study agree with Tella and Bashorun (2012) study which revealed that male female students have positive attitude towards computer based test. More than averages of the respondent prefer computer based test to paper-pencil test. Similarly, Dammas (2016) study revealed that the majority of respondents have positive attitude towards CBT, (83.7 %) of male female students said they were competent with the use of computer due to their prior experience.

Finding of this from the study also showed that female undergraduate students were more satisfied with e-assessment in Universities in Niger State. This agrees with the findings of Azeez *et al.* (2016) study which revealed that male female students in Bells University of Technology were more satisfied with their hostel accommodation compared to students of Crescent University. Similarly, Wagwu and Obuezie (2018) study revealed that the mean difference between the male and female students over satisfaction in the utilization of EIRs was not statistically significant at .05 and there is no significant difference in the satisfaction of students over utilization based on age. The findings of this study disagree with that of Agboola *et al.,* (2019) study which revealed that male and female students were not satisfied with the Provision of timeliness and promptness of information to users.

CHAPTER FIVE

5.0   CONCLUSION AND RECOMMENDATIONS

5.1   Conclusion

E-assessment as one of the major innovative mode of assessing students in the fourth educational revolution has been integrated into education and utilised in all level of education in western world. The study concluded that most undergraduate students had positive perception on e-assessment in Universities in Niger. It is clear from the study that male and female undergraduate students had positive attitude on e-assessment. However, male and female undergraduate students had positive perception and attitude on e-assessment.

The study concluded that most undergraduate students were satisfied with e-assessment in Niger State Universities. Furthermore, the undergraduate students had positive perception, attitude and are satisfied with e-assessment irrespective of their gender.

5.2   Recommendations

Based on the findings of this study, the following recommendations are made:

i.   University management should enact workable policies on utilisation of e-assessment and monitor their level of compliance to the policies.

ii.   University management should collaborate with experts in ICT and education to develop 21st-century learners centred applications for assessment with interactive elements to correct challenges and anomalies faced by students with immediate feedback that can further strengthen the use of e-assessment in tertiary institutions.

iii.   E-assessment should be used to reduce the gender gap that exists in the use of ICT tools. Therefore, male and female students should be properly enlightened on the use of e-assessment to enhance their academic performance.

iv.   Male and female students could perform equally well where enabling environment with adequate infrastructure are provided, therefore, university management should provide conducive and enabling environment to students for them to effectively use e-assessment.

v.   Students had positive perception, attitude and are satisfied with e-assessment, therefore, higher institutions should organise orientation programmes, seminars where psychological and ICT experts will make aware of the opportunities that e-assessment can provide in improving their performance.

5.3   Suggestions for Further Studies

Based on this study, the following suggestions can be considered by future researchers;

(i)   This study was carried out on students in Niger Universities to get in-depth information on students' perception, attitude and satisfaction on e-assessment. Therefore, similar studies could be replicated in other states;

(ii)   research could be carried out to assess students' perceived readiness and utilisation of e-assessment in Nigerian universities;

(iii)   assessment of students' self-efficacy on the use of e-assessment in Nigerian's tertiary institutions could also be investigated;

(iv)   studies can also be conducted to investigate multi-predictor factors influencing students' utilisation of e-assessment in tertiary institutions in Nigeria.

5.4   Contributions to the Body of Knowledge

The study has increased the pool of knowledge in the following ways:

(i)   the study has enlightened university lecturers on the opportunities that e-assessment can provide for educational assessment thereby increasing their level of satisfaction students on e-assessment;

(ii)   the study has also enhanced university students' perception and attitude to use e-assessment through quality examinations and valid examination results, provide adequate human and material resources for effective operations of e-exams;

(iii)   the study has ensured the preparedness of undergraduates electronically to enable them gain proficiency in computer and operation of e-exams for desirable success of the system.

(iv)   the study increases the body of knowledge and lays the basis for further researches on e-assessment.

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INSTRUMENT OF THE STUDY

Questionnaire on undergraduate students' perception, attitude and satisfaction on e-assessment

Dear Respondent,

This questionnaire is designed to get your responses on the above subject matter. Electronic assessment (e-assessment) is the use of computer or any other electronic device to assess (test or examine) the academic performance of a learner. It is also known as computer-based test (CBT) or on-screen examination. Your response shall be respected and treated with utmost confidentiality. Below are some items that you are kindly requested to read through and respond to accordingly.

Instructions: this questionnaire has two sections (A & B). Please read the items in each of these sections and tick(√) where appropriate.

SECTION A: Personal Data

1. Name of School:…………………………………………………………........
2. Gender: Male ( )   Female ( )
3. Level:………………………………….

SECTION B

1. Mathematics students' perception on E-assessment

   Note:SA(Strongly Agree); A(Agree); U(Undecided); D(Disagree); SD(Strongly Disagree)

S/No	Items	SA	A	U	D	SD
1.	E-exam is an effective method for assessing one's amount of knowledge.					

S/No	Items					
2.	Online assessment gives me immediate feedback about my performance.					
3.	Online assessment provides faculty with feedback to improve learning.					
4.	Online assessment provides a unbiased grading.					
5.	Online assessment helps in improving the quality of assessment in higher education.					
6.	Online assessment enhances self-learning.					
7.	Online assessment reduces exam stress.					
8.	Online assessment improves my technical skills.					
9.	I prefer online assessment rather than the traditional one					
10.	Online assessment is appropriate for all subjects.					

2. Mathematics students' attitude towards E-assessment.

Note:SA(Strongly Agree); A(Agree); U(Undecided); D(Disagree); SD(Strongly Disagree)

S/No	Items	SA	A	U	D	SD
1.	E-exam is suitable for assessing students at any course					
2.	E-exam serves as an accurate and reliable assessment method					
3.	E-exam enables help to identify the problems and weaknesses that students suffer from.					
4.	E-exam serves as a flexible assessment method					
5.	E-exam improves the quality of the teaching-learning process					
6.	E-exam enables educational institutions to save cost					
7.	E-exam makes me feel less stressed than paper-based exam.					
8.	E-exam enables me to show a better academic achievement.					
9.	E-exam is an effective method for assessing one's skills					
10.	E-exam is an effective method for assessing one's amount of knowledge					

3. Mathematics students' satisfaction towards E-assessment.

   Note:SA(Strongly   Agree);   A(Agree);   U(Undecided);   D(Disagree);
   SD(Strongly Disagree)

S/No	Items	SA	A	U	D	SD
1.	Online questions are clear and appropriate to the course and its evaluation method.					
2.	Sufficient guidance was provided to female students prior to the online exam.					
3.	Online exams are times for you and your opinion to betaken.					
4.	Time set for the online test is sufficient					
5.	College takes into account the needs and desires of students when scheduling examinations online.					
6.	Equal opportunity and fairness of the electronic tests encourage female students.					
7.	The online test is characterized by diversity in the difficulty of the questions and taking into account individual differences.					
8.	Method for assigning grades to test questions is appropriate.					
9.	Exam questions cover all parts of the course content.					
10.	In general, you are satisfied with the experience of electronic exam.					

APPENDIX B

1. Reliability result for Students' Perception

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.899	.0.750	10

2. Reliability result for Students' Attitude

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.915	.810	10

3. Reliability result for Students' Satisfaction

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.899	.740	10

APPENDIX C
ANALYSIS OUTPUTS

Hypothesis one

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
Perception	Equal variances assumed	.023	.880	-.068	378	.945	-.030	.433	-.882	.823	
	Equal variances not assumed			-.069	323.506	.945	-.030	.433	-.881	.821	

Hypothesis two

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
Attitude	Equal variances assumed	.000	.989	.011	378	.991	.005	.460	-.899	.909	
	Equal variances not assumed			.011	325.016	.991	.005	.458	-.897	.907	

Hypothesis three

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Satisfaction	Equal variances assumed	7.116	.008	-4.946	378	.000	-2.355	.476	-3.291	-1.419
	Equal variances not assumed			-4.851	299.658	.000	-2.355	.485	-3.310	-1.399

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
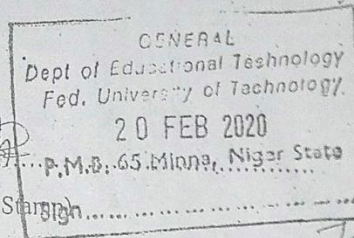DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology.
2 0 FEB 2020
P.M.B. 65 Minna, Niger State

Dr ALABI Thomas Omotoyo

Head of Department (Signature, Date & Official Stamp)

Student's Surname.......JAMES...................... Other Names....JOHN.

Registration Number.......................... Programme........................

Title of the Instrument.......................................

ATTESTATION SECTION

Summary of the Remark on the Instrument......The Instrument is well Sructured and Clear for the level of Student being assess.

I hereby attest that the above named student brought his instrument for validation

Name of Attester....Engr. Elisah Joseph

Designation....Lecturer

Name and Address of Institution....Ibrahim Badamasi Babangida University Lapai

Phone Number....08139965263............E- Mail...J.elisah @ ibbu.edu.ng

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for.... Good

2. Clarity and simplicity for the level of the language used... The Instrument is clear for the level of student being asses

3. Suability for the level of the targeted audience .... Good

4. The extent in which the items cover the topic it meant to cover... Well Covered

5. The structuring of the Questionnaire... Well Structured

6. Others (grammatical errors, spelling errors and other ... None

7. General overview of the Instrument... The Instrument is well Structured

Suggestions for improving the quality of the Instrument

3. ....
4. ....
5. ....

Name of Validator... Engr. Elisah Joseph

Area of Specialization... Lecturer (E-exam analyst)

Name of Institution... IBB University Lapai ...Designation........

Signature......JE........ Date. 19/04/2001

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
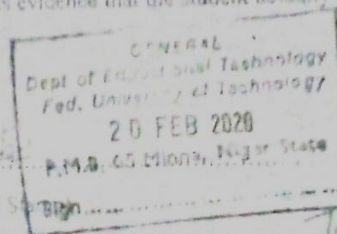SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument.

Thanks for your anticipated assistance.

GENERAL
Dept of Educational Technology
Fed. University of Technology
2 0 FEB 2020
P.M.B. 65 Minna, Niger State

KALASI Thomas Onalya Otha

Head of Department (Signature, Date & Official Stamp).....

Student's Surname...... James ...... Other Names.... John

Registration Number .... Programme......................

Title of the Instrument......................

ATTESTATION SECTION

Summary of the Remark on the Instrument......................

....

....

I agree/attest that the above named student brought his instrument for validation

Name Abafar..... MUSA MUHAMMED

Designation...... LECTURER 1

Name and Address of Institution..... NIGER STATE COLLEGE OF EDUCATION

Phone Number ..Ø fØ 66 35 11 ..... E-Mail

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for... It is Probable for the purpose of it's design.
2. Clarity and simplicity for the level of the language used... It is Suitable for the level
3. Suitability for the level of the targeted audience. Very suitable for the targeted audience.
4. The extent in which the items cover the topic it meant to cover. The content validity is also satisfactory.
5. The structuring of the Questionnaire... Well structured Questionnaire.
6. Others (grammatical errors, spelling errors and others... None for now.
7. General overview of the Instrument... The instrument is valid for use.

Suggestions for improving the quality of the Instrument
1. The items on the questionnaire should be more
2. of objective questions that can objectively be
3. answered not too subjective.
4. ....
5. ....

Name of Validator... Mu13 Mohammed
Area of Specialization... Counselling Psychology
Name of Institution... C. O. E Minna ...... Designation. Lecturer 1
.... Date. 22/6/21
Signature........

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY
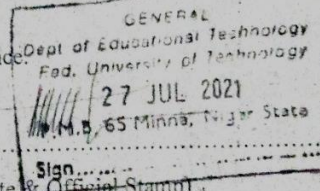
Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument

Thanks for your anticipated assistance.

Dr. C.S. Tukura

GENERAL
Dept of Educational Technology
Fed. University of Technology
27 JUL 2021
P.M.B. 65 Minna, Niger State
Sign......

....

Head of Department (Signature, Date & Official Stamp)

Student's Surname.. Other Names.................

Registration Number.. Programme.................................

Title of the Instrument...

ATTESTATION SECTION

Summary of the Remark on the Instrument.....Satisfactory...

....

....

I hereby attest that the above named student brought his instrument for validation

Name of Attester....MRS USMAN ZALIHA NDATSY........................

Designation.......LECURER II........................

Name and Address of Institution....NIGER STATE COLLEGE OF EDUCATION MINNA

Phone Number.....08123185852.........E-Mail. Usman.zalihaco6@ya....
com

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for...... The Instrument is in line with the purpose it was designed for.

2. Clarity and simplicity for the level of the language used.... The researcher used simple and clear language for the instrument.

3. Suability for the level of the targeted audience ..... the Instrument was suitable for the audience.

4. The extent in which the items cover the topic it meant to cover..... The Instrument covered the expected content that is required

5. The structuring of the Questionnaire...... the OK

6. Others (grammatical errors, spelling errors and others.... there are minor grammatical errors, spelling mistakes in the Instrument

7. General overview of the Instrument... Generally the Instrument has covered the expected content (Topic of the Research

Suggestions for improving the quality of the Instrument

1. ...... Effect the corrections pointed out ......

2. ......

3. ......

4. ......

5. ......

Name of Validator... Mrs Usman Zainab Odatsy

Area of Specialization... Educational Technology mixed.

Name of Institution... College of Education .....Designation... Lecture - 1

Signature... [signature] .....Date... 6/6/2021

Thank You

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
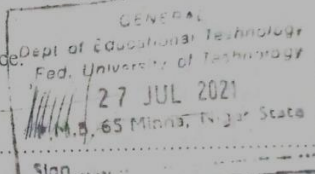### DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. She/he is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument.

Thanks for your anticipated assistance.

```
GENERAL
Dept of Educational Technology
Fed. University of Technology
27 JUL 2021
P.M.B. 65 Minna, Niger State
Sign.....
```

By...... S. Tukura ....

Head of Department (Signature, Date & Official Stamp).

Student's Surname......James...... Other Names....John......

Registration Number....MTech/SSTE/FT/2018/8167.... Programme....Educational Technology......

Title of the Instrument.......................................

ATTESTATION SECTION

Summary of the Remark on the Instrument......Satisfactory.......

I hereby attest that the above named student brought his instrument for validation

Name of Attester....Dr Umar Kadiri Gbnba.......

Designation....Principal Lecture.......

Name and Address of Institution....Niger state college 7 relug ming......

Phone Number....8068141978.... E-Mail....hofla exang gntcan......

Please comment on the following

1. Appropriateness of the instrument for the purpose it's design for... The instrument is in line with the purpose it made for.

2. Clarity and simplicity for the level of the language used... The language used they the reachor is to the level of their standard.

3. Suability for the level of the targeted audience ... The target audience are correct allery based on the simplicity of the hat...

4. The extent in which the items cover the topic it meant to cover... the items has a wider coverage to the topic which is OK.

5. The structuring of the Questionnaire... The questionaire is sd ordorly in such a way that it talks to the subject matter.

6. Others (grammatical errors, spelling errors and others... The gramatical errors are limited and berg corrected.

7. General overview of the Instrument. the instrument is in line with the topic of research.

Suggestions for improving the quality of the Instrument

1. Make each instrument indipendent on its own.
2. Breakdown the Language vocabulary for easy compelins
3. Improve on the quality of the photocopy of production
4. ....
5. ....

Name of Validator... Dr Umanu Kadma Gmba

Area of Specialization. Educatmal Technology PHD

Name of Institution. College of Educafo Designation. principal lectrur

Signature...... Date. Sept-7-2021

Thank You

Appendix E

Population Distribution of students in Federal University of   Technology,   Minna across the nine schools

S/N	Schools	Population
1	School of Agriculture and Agricultural Technology	2975
2	School of Electrical Engineering and Technology	1810
3	School of Environmental Technology	3804
4	School of Information and Communication Technology	1096
5	School of Life Sciences	2205
6	School of Physical Sciences	4293
7	School of Science and Technology Education	1791
8	School of Infrastructure, Process Engineering and Technology	3036
9	School of Entrepreneurship and Management Technology	499
	Total	**21,509**

Source: Information Technology Service (ITS) FUT, Minna (2021)

Population Distribution of students in Industrial Technology Education

No 6 Loveday Avenue,

Patrick Yakowa estate,

Narayi high cost, Kaduna

Kaduna State.

The HOD
Department of Industrial Technology Education,
Federal University of Technology, Minna.

Through:

The Examination Officer,
Department of Industrial Technology Education,
Federal University of Technology, Minna.

Dear Sir,

REQUEST FOR THE TOTAL POPULATION OF MALE AND FEMALE 100, 200, 300, 400 AND 500 LEVEL STUDENTS IN THE DEPARTMENT OF EDUCATIONAL TECHNOLOGY

I James, John a postgraduate student in the Federal University of Technology (FUT) Minna with the matriculation number M.Tech/SSTE/FT/2018/8167 hereby apply to request of the total population of male and female 100, 200, 300, 400 and 500 level students in the department of Industrial Technology Education to enable me carryout my research work. I am presently caring out a research on "students' attitude, perception and satisfaction in the modes of examination in Universities Niger State". On this note, I will need the total population students in 100, 200,300, 400 and 500 level in the department of Industrial Technology Education. I thereby write to apply for the total population of male and female 100, 200, 300, 400 and 500 level students in the department of department of Industrial Technology Education.

Thanks in anticipation.

Re-Population of ITE students 2019/2020 Session

	Male	Female	Total
1 100 level	112	10	122
2 200 level	150	14	164
3 300 level	189	14	203
4 400 level	172	15	187
5 500 level	97	9	106
TOTAL	720	62	782

James John

6/10/2021

M.Tech/SSTE/FT/2018/8167

08166952533

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF SCIENCE EDUCATION

EXAMINATION OFFICE

TOTAL NUMBER OF STUDENTS IN THE DEPARTMENT

LEVEL/OPTION	BIOLOGY	CHEMISTRY	MATHEMATICS	TOTAL
100	39	7	6	52
200	48	43	30	121
300	46	59	48	153
400	19	24	14	57
500	35	20	35	90
TOTAL	187	153	133	473

EXAMINATION OFFICER'S NAME: Ahmad Ibn Shuaeeb

SIGNATURE & DATE 07/10/2021.

07 OCT 2021

Population Distribution of students in Educational Technology

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF EDUCATIONAL TECHNOLOGY

Level	Male	Female	Total
100	46	12	58
200	47	23	70
300	89	38	127
400	97	48	145
500	60	38	98
Total	339	159	498

DR. I. I. Kuta

Appendix F
Population Distribution of students in IBBU Lapai across the six faculties

IBRAHIMBADAMASIBABANGIDA
UNIVERSITY, LAPAI
Directorate of Information & Communication Technology

Head of Department
Department of Educational Technology
School of Science and Technology Education
Federal University of Technology
Minna. Niger State.

Re-James John (M.Tech/SSTE/FT/8167)

Reference to your request dated 27/7/2021to assist the bearer of his needs in his postgraduate (MTech) pursuit. Directorate of Information and Communication Technology (DICT), IBB University, Lapai hereby furnish him with 2019/2020 academic session students' data of the University according to faculties as shown below:

S/No	Faculty	Students
1.	Faculty of Management Studies (FMS)	4, 034
2.	Faculty of Agriculture	594
3.	Faculty of Languages and Communication	1, 217
4.	Faculty of Natural Science (FNS)	3, 584
5.	Faculty of Applied Technology (FAT)	777
6.	Faculty of Education and Art	3, 964
	Total	14, 170

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Abdullahi Aliyu Enagi
Deputy Director

For ICT related issues kindly mail us at complains.ict@ibbu.edu.ng