PRESERVICE SCIENCE TEACHERS' PERFORMANCE EXPECTANCY OF E-ASSESSMENT IN COLLEGES OF EDUCATION

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Abstract

E-examination has been seen as an alternative to the unmanageable population of pre-service science teachers. This study was conducted to investigate the pre-service science teacher's perception of e-examination for examining science related courses. To this end it examined the potentials for using pre-service science teacher's feedback in the validation of assessment. A convenient sample of 120 pre-service sciences teachers from four cohorts in the school of science was selected from the college of education. Descriptive research of the survey type was used. Questionnaires which were tested for reliability using Cronbach alpha which stood at 0.910 were used as data collection instruments. Descriptive statistics of the frequency count and percentages were used to answer the four research questions raised. The major findings from the analysis revealed that high percentage of pre-service science teachers perceives e-examination to be necessity in the production of outstanding science teachers from tertiary institutions. Based on these results, it is recommended that the government should adopt the use of e-examination for evaluation in tertiary institutions in Nigeria and lectures should involve more technologies
Keywords: performance expectancy, *e-assessment, Colleges of Education, Science Teachers.*

Introduction

With the new wave of using technology in higher education, e-exams have become a part of the institutions course evaluation methods. E-examinations offers a variety of educational opportunities such as: allowing students to become more active, helping students with different learning styles and needs and offering them more access to e-database for exam preparations. (Yadav,Dhananjai and Ananya, 2018). E-assessment has a significant influence in the learning cycle. E-examinations, commonly known as electronic assessments [e-exams], are getting progressively executed in advanced education establishments in Nigeria. However, e-exam turned out to be so helpful during the lock down brought about by the infection Coronavirus. An e-test is an extraordinary method of leading tests and other significant tests with assistance of the web. An e-test needs a gadget fit for getting to the web like a PC or a cell phone.

E-examination is conducting a test online to measure the knowledge of the participants on a given topic. The first use of any e-exam for the award of a degree was in November 2009 at the University of Tasmania. Much of the learning in technological educational courses are best accepted via instruments and e-techniques and is preferred to be used to enhance the traditional test. Although traditional assessment required time and more administration efforts for grading and administer the exam it is still important for learning in the cognitive domain by helping students during their learning process. So, it is not argued in this paper to replace the traditional way of giving exams but enhancing it by integrating the e-exam if needed and if it is of any value to help in improving the educational process. (Yadav,Dhananjai and Ananya,2018) in the year 2019 the colleges in Nigeria utilized conventional technique (a mix

of exposition and reasonable examination)mostly to assess students information. Implementation of e-assessments were presented yet didn't produce its results appropriately not until the year 2020 due to the Covid.

Generally, advantages of e-exams over traditional paper and pencil testing have been shown in a few relative works. Along these lines, e-exam isn't only an elective strategy for conveying examinations, it addresses a significant subjective shift away from conventional technique, for example, paper-based tests. Researchers have performed large scale reviews of studies examining differences in performance of e-exam and paper-based version of exam, it has little if any effect on exam performance (Ajadi, Adewale, & Inegbedion, (2010)). On the other hand, pre-service teachers perceptive of e-exams have been several mixed reactions. Some of the teachers believe that e-exams will aid the performance of the students while some believe it has no effect on their performances. Others envisage or anticipated problems with the computer assisted assessment than paper-based assessment (Ajadi, Adewale, & Inegbedion, (2010).

Science and technology are something vital in our public this day there is even no uncertainty that science and technology have genuinely assisted we all with our everyday errands. This is proof in the lesser time that it takes us to do our jobs with the assistance of different items created because of technology.

It is important to note that science and technology are closely associated. There is no way that anyone can separate these two because to develop or invent a product, you need the scientific studies related to product as well as the tools provided by technology. Thus, science and technology are truly closed linked and important for the overall progress of our society.

Furthermore, science has a definitive objective of investigating and understanding the occasions in nature by acquiring information through extreme experimentation. With the quantity of things to find, numerous parts of science had been made so that each will want to zero in on a certain something. Consolidating all the logical investigation made by analysts under each part of science gives us extra information about the activities of the universe and everything in it. Science offers us the responses that have sidestepped our predecessors in the past just as answers for the issues our public is confronting at present. Logical investigations additionally help our chiefs settle on the appropriate choices about various emergency or issues. There is no rejecting that science is significant for the general advancement of our public.

The motivation behind why technology is truly significant in the present society is a result of the progressions and advantages brought by technology to humanity as the years progressed. There is a gigantic measure of advancements made when contrasting nineteenth century from the 21st century or even last month to now. Improvements brought by technology had been constantly pilling up and we, people, have profited significantly from these. One illustration of the benefit brought by both science and technology to humanity is the different correspondence choice accessible these days. Previously, individuals needed to depend on letters that consume most of the prior day they arrive at their objective to tell others what you need them to know. Be that as it may, presently, with texting or messages, individuals can undoubtedly communicate something specific and the beneficiary will get it inside a couple of moments or even at times, seconds. Science and technology had helped we all speak with one another without any problem. This is helpful to the public since now; sharing information about various things is a lot simpler. There is no uncertainty that both science and technology are essential to us. The blend of the two assists us with carrying on with our day by day lives simpler and as a result, partakes in our lives more. Without technology, we would not have TV, PC, telephones, and different things. Without science, we would scarcely know anything about our planet, country or even our neighborhood.

Statement of the problem

The colleges have carried out the utilization of e-assessment to test student's knowledge, the benefits of utilizing on the web assessment for instructive appraisal from a worldwide perspective have been perceived and these incorporates lower authoritative cost, time saving and less interest upon instructors among educators. One of the serious issues in taking paper-based test is that the number of students builds each time however the number of educators dealing with their evaluation doesn't increase. Thus, numerous instructors have a very sizable number of students to survey. The number of students increased drastically, and the conventional examination method became time consuming in terms of the examination time for evaluation and assessment. The effect of this is that the teacher is easily worn out, thereby

reducing his or her efficiency and sometimes producing inaccurate student's results. E-tests are faster, and the PC being a machine evaluates quicker than the educator and here and there produces precise outcomes than the teacher. Hence the utilization of PC has been an appealing suggestion for some colleges. In any case, science essentially requests show of effectively gained abilities by the students during assessment this breaking point to incredible degree the utilization of e-assessment in evaluating science students so, note that while surveying science students we can't make use of e-assessment alone since it utilizes numerous decision questions as it were.

Literature Review

Information and Communication Technology (ICT) is a generic term to cover notably computer and internet facilities. It is the use of computing and telecommunication media to provide rapid and easy electronic storage processing and transferring of information (Lee, Kozar, & Larsen, 2003). Liaw (2002) further stressed that ICT is instruction resource that encompasses a wide range of technologies including telephones, fax machines, televisions, video, radio, audio recorders, CD players, CD ROMs, personal organizers, programmable and remote operated toys, computers as well as other technologies that can enhance the process of finding, exploring, analyzing, documenting exchanging and presenting instruction-based information. ICT is a combination of micro electronics, computer hardware, and software, telecommunications that enable the processing and storage of huge amounts of information and its rapid dissemination through computer networks.

ICT can be viewed as computer-based tools used by people to work with the information and communication processing needs of an organization. It encompasses the computer hardware and software, the network, and several other devices (video, audio, photography camera and lots more), that convert information (text), images, sound, motion, and so on into common digital form. It is an eclectic application of computing, communication, telecommunication, and satellite technology, (Yusuf, 2005). ICT may be regarded as the combination of informatics technology, specifically communication technology. Informatics refers to the science dealing with the design, realization, evaluation, use and maintenance of information processing system, including hardware, software, organizational and human aspect, and the industrial, commercial, governmental, and political implications of these, (UNESCO, 2008).

ICT are technologies that facilitate communication and the processing and transmission of information by electronic means. This definition encompasses the full range of ICTs from radio and televisions (fixed and mobile), computers and the internet, (Vannatta & Fordham, 2004)[50]. It is the technologies people use to share, distribute, and gather information and to communicate through computers and computer network (UNESCO, 2008). ICTs are complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecom, television and radio broadcasting, hardware and software, computer services and electronic media. Njoku (2006) viewed ICTs as the use of electronic equipment (specially the computer) to process, store and disseminate information to, and over a wide audience.

ICTs involved the use of wide range of electronic devices like the computer, the internet, audio tape, television set, electronic mail, telnet, digital calculator, V-Sat, wireless audio-roliography and so on (UNESCO, 2008). ICTs represent a cluster of associated technologies defined by their functional usage in information access and communication, of which one embodiment is the internet. The internet is a worldwide network of computers, but sociologically it is also important to consider it as a network of people using computers that make vast amounts of information available (Olakulehin, 2007).

ICT serve as a means for the development of knowledge for lecturers. Through ICT, we can shift the emphasis from a content centered learning to a student centered one – valuing the personality of the learner, their own learning pace, resources, and limits. At the same time, learners develop computer using skills through the proposed exercises and tasks and the main advantage is that the teaching process emphasizes expanding skills, attitudes, personality, and not only cognitive perspectives (UNESCO, 2008).

ICTs represents a potentially equalizing strategy for developing countries as the new communications technologies promise to reduce the sense of isolation, offering developing countries widening the range of opportunities to populations in rural areas which have inadequate schools, women facing social or cultural barriers that limit their access to educational institutions, socially disadvantaged groups that include marginalized minorities, and students with disabilities. ICT facilitates access to resource persons such as mentors, experts, researchers, professionals, and peers worldwide (Zhang, 2007).

Yusuf, (2005) described the scope of ICT in a broad sense, said it has capabilities for delivery, management, and support of effective teaching and learning that ease the challenges associated with the geographically dispersed

audiences, helps students to collect and make use of complex data, supports different and process-oriented forms of communication and writing, enlarges the scope and timeliness of information resources available in the classroom and serves as a change agent that speeds up various other changes in the content, methods, and overall quality of lecturing and learning.

ICT mediated learning has become an integral component of the education and training systems (UNESCO, 2008). More so, with the rise of information and communication technologies era, new competencies have become vital. Digital literacy, the ability to use ICT, is among the most important. ICT was destined to change the face of learning. And to be fair, it has (UNESCO, 2008). In Nigeria, the National Policy for Information Technology (2001) defined ICT as any equipment that is used in the acquisition, storage, manipulation, management, control, display, switching and transformation of information. It can also be conceptualized as communication in whatever forms they are used, assessed, relayed, and transmitted to send and receive information. The application and utilization of these devices converts information, texts, messages, sounds, and motions to digital form (Onwumere, 2006).

Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT attempts to explain usage intention, as well as subsequent usage behavior. The theory suggests that four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions are direct determinants of usage intention and behavior. In addition, gender, age, experience, and voluntariness of use will mediate the impact of the four constructs on usage intention and usage behavior (Venkatesh, 2003). The comprehensiveness, suitability, validity, reliability, and accuracy of the model have been demonstrated in different contexts (Adeyanju, 2015).

Performance expectancy can be defined as the extent to which lecturers believes that readiness to use ICT for research will help him/her improve job performance. The following five constructs, taken from the eight models, capture the concept of performance expectancy: perceived usefulness (TAM/TAM2 and C-TAMTAB), extrinsic motivation (MM), job-fit (MPCU), relative advantage (IDT), and outcome expectations (SCT) (Venkatesh, 2003). In addition, it has been demonstrated that performance expectancy is the strongest predictor of usage intention of IT (Venkatesh, 2003). Adapting performance expectancy to readiness to use ICT for research suggests that lecturers think using ICT for research are beneficial if that they can improve which will improve productivity and help them perform tasks quickly and flexibly, or access services effectively.

Effort expectancy is defined as the degree of ease lecturers feels with respect to the readiness to use ICT for research (Venkatesh, 2003). The three constructs that relate to effort expectancy are perceived ease of use (TAM/TAM2), complexity (MPCU), and ease of use (IDT) (Venkatesh, 2003).

Social influence is defined as the extent to which lecturers perceives that significant other believe he or she should be ready to use ICT for research (Venkatesh, 2003). Three constructs capture the concept of social influence, namely, subjective norm (TRA, TAM2, TPB and C-TAM-TPB), social factors (MPCU), and image (IDT) (Venkatesh, 2003).

Facilitating condition can be defined as the degree to which lecturers believes that an organizational and technical infrastructure exists to support their readiness to use ICT for research. This definition captures concepts embodied by three different constructs: perceived behavioral control, facilitating conditions, and compatibility (Venkatesh, 2003).

Research Questions

1. How do pre-service science teachers perceive the performance expectancy of e-examination for science related courses in the college of education?
2. How do pre-service science teachers perceive the effort expectancy of e-examination for science related courses in the college of education?
3. How do pre-service science teachers perceive the social influence of e-examination for science related courses in the college of education?
4. How do pre-service science teachers perceive the facilitating condition of e-examination for science related courses in the college of education?

Methodology

This study adopted descriptive research method. A purposive sampling technique was adopted. College of Education, Lanlate was purposively selected for the study. Random sampling technique was used to select pre-service science teachers from the school of sciences in the college of education. Questionnaire titled perception of pre-service science teachers on E-examination on science related courses was used to collect data. The instrument was divided into two

sections. The first section contained the biographical aspect of the teachers, such as name of school, department, Cohort, sex, and year of study while section B obtained the pre-service science teacher's opinion on E-examination in four likert scale format. The data collected in this study were analysed using percentage, frequency and mean.

Results

Table 1.
Demographic Data by Gender and Course

Gender	**Frequency**	**%**
Male	48	40.0
Female	72	60.0
Total	120	100.0
Cohort	**Frequency**	**%**
Biology	45	37.5
Integrated Science	31	25.8
Chemistry	24	20.0
Physics	20	16.7
Total	120	100.0

Table 1 above shows that a total number of 48 (40.0%) male pre-service science teachers and 72 (60.0%) female pre-service science teachers participated in this study. The least number of respondents 20 (16.7%) was gotten from the Physics while the highest 45 (37.5%) was gotten from Biology. Integrated Science with a few 31 (25.8%) respondents and Chemistry with a total number of 24 (20.0%).

Research Questions

Research Question 1: How do pre-service science teachers perceive the performance expectancy of e-examination for science related courses in the college of education?

Table 2:
Pre-Service Science Teachers' Perceptions on the Performance Expectancy of E-Examination for Science Related Courses

Performance Expectancy	**SA (%)**	**A (%)**	**D (%)**	**SD (%)**	**Remark**
1. I find e-examination for science related courses useful	46.7	40.8	11.7	0.8	Accepted
2. Using e-examination provided by my institution increase pre-service science teachers' productivity in the knowledge of the use of technology.	44.2	46.7	6.7	2.5	Accepted
3. Using e-examination provided by my institution increases pre-service science teachers' chances of getting good grade.	17.5	64.2	16.7	1.7	Accepted
4. The use of e-examination for science related courses allows me to have access to more information on how to upgrade my course technically.	40.8	45.8	11.7	1.7	Accepted
5. Using e-examination will increase my learning in science and technology	48.3	40.8	9.2	1.7	Accepted

From Table 2 above, a total of 87.5% of the respondents agreed that they find e-examination for science related courses useful; 90.8% of the respondents opined that using e-examination increase pre-service science teachers' productivity in the knowledge of the use of technology; 81.7% of the respondents agreed that using e-examination increases their

chances of getting good grades; 86.7% of the respondents agreed that the use of e-examination for science related courses allows them to have access to more information on how to upgrade my course technically and 89.2% of the respondents agreed that using e-examination will increase their learning in science and technology.

Research Question 2: How do pre-service science teachers perceive the effort expectancy of e-examination for science related courses in the college of education?

Table 3

Pre-Service Science Teachers' Perceptions on the Effort Expectancy of E-Examination for Science Related Courses

Effort Expectancy	SA (%)	A (%)	D (%)	SD (%)	Remark
1. My interaction with e-examination provided in my institution is clear and understandable.	45.0	40.8	11.7	2.5	Accepted
2. It is easy for me to become skilful at using the computers provided by my institution.	22.5	65.8	10.0	1.7	Accepted
3. I find it easy to use the computers provided by my institution for e-assessments.	40.8	43.3	11.7	4.2	Accepted
4. Learning to operate computers provided by my institution is going to be easy for me	41.7	48.3	9.2	0.8	Accepted

From Table 3 above, a total of 85.8% of the respondents agreed that interaction with e-examination is clear and understandable; 88.3% of the respondents are of the perception that it is easy for pre-service science teachers to become skilful at using the computers provided by the institution.; 84.2% of the respondents agreed that they find it easy to use the computers provided by the institution for e-assessments and 90.0% of the respondents are of the opinion that learning to operate computers provided by the institution is going to be easy for them.

Research Question 3: How do pre-service science teachers perceive the social influence of e-examination for science related courses in the college of education?

Table 4:

Pre-Service Science Teachers' Perceptions on the Social Influence of E-Examination for Science Related Courses

Social Influence	SA (%)	A (%)	D (%)	SD (%)	Remark
1. Professors in my institution have been helpful in the use of computer for e-examination.	15.8	60.0	18.3	5.8	Accepted
2. People who are important to me think I should use the computer provided by my institution for e-examinations.	33.3	50.0	15.0	1.7	Accepted
3. In general, my institution supports the use of e-examination.	40.0	53.3	6.7	1.7	Accepted

From Table 4 above, a total of 75.8% of the respondents are of the perception that professors have been helpful in the use of computer for e-examination; 83.3% of the respondents together with important people around them think that they should use the computer provided by the institution for e-examinations and 93.3% of the respondents are of the opinion that the institution supports the use of e-examination.

Research Question 4: How do pre-service science teachers perceive the facilitating condition of e-examination for science related courses in the college of education?

Table 5

Pre-Service Science Teachers' Perceptions on the Facilitating Condition of E-Examination for Science Related Courses

Facilitating Condition	SA (%)	A (%)	D (%)	SD (%)	Remark
1. I have the resources necessary to use the computer for e-examination	22.5	58.3	17.5	1.7	Accepted
2. A specific person is available for assistance with the computer usage.	33.3	51.7	14.2	0.8	Accepted
3. I have necessary knowledge needed to use the computer for e-examination.	45.8	47.5	6.7	0.0	Accepted

From Table 5 above, 80.8% of the respondents opined that they have the resources necessary to use the computer for e-examination; 85.0% of the respondents agree that a specific person is available for assistance with the computer usage and 93.3% of the respondents are of the opinion that they have the necessary knowledge needed to use the computer for e-examination.

Discussion

The result of the study signifies that the use of e-examination has a very high-performance expectancy for science related courses. This reinforces the studies of researchers like Riddle (2018) and Olafare (2014) who from their studies confirmed that higher performance in evaluation can be achieved through e-examination. More so, these results attest to the deduction that the efforts involved in the use of e-examination in science related courses to be insignificant. This result corroborates the results from researchers conducted by Farzin (2017), Olafare (2014) and Hamsatu, Yusufu, & Mohammed (2016) (2013). From perceptions of the respondents, it is evident that the use of e-examination for science related courses has a great social influence on students. This finding supports the results of researchers like Adebayo & Abdulhamid (2017), Uddin, Ahmar & Alraja (2016) and Adewale, Ajadi, & Inegbedion (2010) in their studies exploring the perceptions of students to the use of e-examination in educational institutions. These perceptions ascertain the fact that both pre-service science teachers and the school have a perfect facilitating condition for the conduction of e-examinations for science related courses. This result strongly supports those of Ibrahim, Ba'aba, Ismail & Dawud (2021), Shraim (2019) and Hamsatu, Yusufu, & Mohammed (2016) whose studies were mainly focused on the facilitating conditions necessary to conduct e-examinations.

Conclusion

The major finding in this research is that the use of e-examination is vital to the production of outstanding graduates in the science field. Therefore, the major recommendation in this study is for the government to enforce the use of e-examination in the evaluation of undergraduates of all levels in all tertiary institutions in Nigeria.

Recommendation

It is also recommended that professors and lecturers should make use of various multimedia while lecturing the students before their exams as well as give them assignments that can be solve using electronic means only. This is to make the students abreast themselves with computers and other electronic devices before exam so that they wouldn't fail due to ignorance. This recommendation goes especially to the 100 level students who may likely not be acquainted with the use of computers.

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