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E-Examination and Academic Performance of Biology Students in Akwa Ibom State College of Education, Afaha Nsit - Nigeria

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Abstract
This study investigated the effect of e-examination on Biology students' academic performance in Akwa Ibom State College of Education, AfahaNsit. A quasi-experimental research design was adopted to study a sample size of 165 out of 408 first Year Biology (NCE 1) students in the 2015/2016 academic session. Two research questions and two null hypotheses guided the study. While two research instruments namely: Computer Appreciation Test (CAT) and Biology Performance Test (BIOPET) were used for data collection. Whereas Mean was used in answering the research questions, the t-test statistical technique was used to test the hypotheses at .05 level of significance. Major findings revealed that there was a significant effect of writing examination electronically on students' academic performance; and that no statistical difference existed between male and female students' performance who wrote exams electronically. Subsequent upon these findings, it is recommended amongst others that students of the Institution should be introduced to the electronic mode of writing examinations through series of tutorials and hands-on experience in order to create more familiarization as the electronic mode of exam writing is gradually coming to stay in Nigerian tertiary education system.

Key Words: electronic, e-examination, examination administration

Introduction

One of the rationales for introducing computer science into the curriculum of Nigerian education at all levels is to ensure that every Nigerian citizen meets up with the rapid

integration of information and communication technologies that are increasingly applied in the teaching and learning setting. Examination as a critical aspect of an educational system has been carried out in various formats. Basically, they could either be conducted orally or in written form.

In the current situation, the whole process of conducting examinations and processing results takes a vast amount of time and at each stage involves manual handling of data and examination papers. As observed by Bienieki, Stando, and Stollinski (2009), moving exam papers from one place to another could result in exposing the papers to risks (such as snatching), damage, or even loss. Moreover, the fact that exams are checked by human beings only may cause errors in results. However, technological developments are speedily transferring traditional approaches of assessments into computer environments, in order to reduce the flaws of traditional mode and automatically grade students.

E-examination and e-assessment are sometimes interchangeably used. However, it should be noted that the former is sub-subsumed in the later. Whereas e-assessment is broadly-based, covering a range of activities in which digital technologies are used for any assessment-related activity, e-examination is just an aspect of it; simply defined by Ayo, Akinyemi, Adebiyi, and Ekong (2007) as a system that involves the conduct of examination, with the use of information technologies especially computers, through the web or the Intranet. e-examination reduces a large proportion of workload on examination, training, grading, and reviewing, thus making it possible for institutions who adopt it to release exam results for recording in time (Iwuchukwu, 2007).

The origin of e-examination would naturally be traced to the deployment of the potentials of the Internet and Intranet. As schools around the world establish connections to the Internet; and teachers and students gain proficiency with navigating through the vast quantity of readily available information (Rout and Patnaik, 2011), the educational potentials of the World Wide Web (www) became understood. One of the potentials of the web is the ability to conduct examination through electronic means.

Research reports of Rout and Patnaik (2011) and Bauer, Degenhardt, Gilch, Kleimann, and Wannemacher (2008) have indicated that one of the reasons for adoption of e-examination was the delay in the release of examination results experienced with the traditional paper-pen mode of writing exam, thus resulting in the failure to graduate undergraduates as at when due. Other factors that contributed to the adoption of e-examination were failure to conduct more than one examination in a year and the growing increase in the number of candidates writing placement (aptitude) tests as a criterion for Universities' admission. Summarily, Awosiyan (2010) asserted that e-examination was introduced to address a series of abnormalities encouraged in the manual conduct of examinations.

A typical e-examination exhibits the following features:

i. The examinations are defined as computer files, ideally in some standardized format.
ii. At the time of examination, the students are assigned to individual computers.
iii. Students answer the examination questions using the computer.
iv. The questions are reviewed before publishing them to the server.
v. Control functions for the examination and examination setting such as supervising using a role-based security structure, are normally carried.
vi. Reporting and retrieval feature such as giving students instant exam and assessment feedback.
vii. Organizational functions and workflow management such as the administration of software licenses, interfaces for data import, examination participants, etc.

However, these features do not apply in all software systems. Different examination tools offer different profiles and features, have different technical and system requirements, and are characterized by different options of integration into existing information technology (IT) hardware and software infrastructures.

The basic types of e-examination are:

i. e-based test: These are tests/examinations administered through a local server connected in the Local Area Network (LAN).
ii. Online tests: This is the use of IT to administer tests through the Internet.
iii. Computerized adaptive tests: These are online, interactive tests that adapt to the examinee's ability level by selecting the next item to be presented, on the basis of performance on preceding items.

Some of the benefits of e-examination are:

i. creating an opportunity for students to access their results immediately.
ii. reducing the rate of examination malpractices.
iii. removing human errors involved in the process of examination.
iv. eradicating the compilation and physical movement of examination scripts.
v. It is cost-effective. For instance, if an examination is to be taken by a very large number of students, the cost of running the exam per student would be arbitrarily small.
vi. e-examination has the advantage of being available at any time of the year.
vii. The use of e-exam (like Universities' aptitude tests) contributes to allowing for better matching of students' capabilities on the one hand and study requirements on the other.
viii. Problems of legibility of handwriting do not apply in the context of e-examination.

In writing an examination electronically, the candidate logon to take the examination, by entering his particulars for identification, which is authenticated by the system to ascertain the candidate's legibility. Any candidate that is eligible is automatically disallowed from taking the exam. The moment a candidate's eligibility is verified;

questions are generated and displayed for such a candidate. Only one multiple-choice question is presented at a time. Choices of answers to the questions are identified as A, B, C, or D. The incorrect answer presented as a choice in a multiple-choice is known as distracter while the correct answer is called verstractar (Bienieki, Stando, and Stollinski, 2009). Candidates must indicate their answer choice by either typing the letter into the response box or by clicking in the option using the mouse. Candidates can as well change their answers as many times as they wish during the time limit of the exam.

To move to the next question, the candidate just has to click on the forward arrow (>) in the lower right-hand portion of the screen or select the "NEXT" key. This action moves the candidate forward through the examination, question by question. Should the candidate wish to review any question(s), he/she can reverse the action hitherto described above. With this flexibility, candidates can leave a question unanswered and return later to do so, provided that is done within the time limit of the exam. The exam continues in that manner until the candidates finish not later than the stipulated time for the examination. At the end of the exam, the candidate submits his/her work by clicking on the "SUBMIT" button. The system, which had hitherto being programmed, automatically computes the result and displays it for the student to see, who thereafter prints the result and quits the examination hall.

The adoption of e-examination is based on Roger's (1995) Diffusion Theory also known as the Diffusion of Innovation (DoI) theory; a theory concerning the spread of innovation, ideas, technology through culture or cultures. The theory is concerned with the manner in which a new technological idea, artifact, or technique or new use of an old one migrates from creation to use. According to Rogers (1995), the stages through which technological innovation passes are:

i. Knowledge: At this stage, exposure is done to the existence of the innovation and the individual is made to learn about the innovation
ii. Persuasion: This is the stage where favourable attitudes are formed, and the individual becomes actively interested in seeking information about the innovation.
iii. Decision: At this stage, the individual or society weighs the advantages of the innovation and decides whether or not to accept it.
iv. Implementation: This is the stage where the innovation is put to use after deciding to adopt.
v. Confirmation: At this final stage, the individual reinforces himself based on the positive outcomes from the use of the innovation. Also at this point, it is finally decided whether or not to continue using the innovation.

Going through the five stipulated stages of adopting an innovation, Rogers theory of diffusion becomes relevant in this study in the sense that the adoption of e-examination in Nigerian educational system actually started in the Open Universities and has been diffusing into some conventional Universities with the advent of screening (aptitude) test for admission. Critically assessing the stages (knowledge, persuasion, decision,

implementation, and confirmation), the use of e-examination had equally passed through the stages before being adopted.

Moreover, the qualities of an e-examination (highlighted above) that influence whether or not an innovation should be accepted also lend credence to the relevance of this theory to this study. The observable, relative benefits of e-examination, its interactivity, compatibility, and simplicity of use are all theoretical basis for adopting e-examination in our educational system.

Many studies have been conducted to evaluate the methods of examination administration and a variety of findings have been arrived at. For instance, Millsap (2000) compared computer-based testing versus traditional paper and pencil testing in the University of North Texas and found no significant effect on achievement when the test items in the two modes were identical.

Ward (1994) found achievement differences between the two modes of test administration (computerized and traditional paper and pencil) but attributed the differences to gender.

That of Ayo, Akinyemi, Adebiyi, and Ekong (2007) evaluated the prospects of e-examination implementation in Nigeria. The researchers concluded that the e-examination system has the potentials to eliminate some of the problems that are faced with the traditional methods of examination, such as impersonation; also that the system is easy to use. They, however, noted that much is still desired if the system is to be adopted on a national scale, particularly in terms of infrastructure and manpower development.

It is also worthy of note to recall that Joint Admission and Matriculation Board (JAMB) had proposed that from 2015 the Unified Tertiary and Matriculation Examination (UTME), an entrance examination for admission into the nation's tertiary institutions, shall all be written electronically without giving room for the option of Paper-Pencil Test (PPT). This information is substantiated as the board's head of public relations, Mr. Fabian Benjamin, made the disclosure in a telephone interview in Lagos (JAMB Online, 2013).

Moreover, the present problems associated with the conduct of UTME have been that of inadequate examination halls/rooms to check and control candidates effectively during the examination; impersonation in the exam hall; mercenaries hired by registered candidates to write exams for them; bribing exam officials and supervisors/invigilators; and conspiracy and collaboration of security agents and officials of the exams to compromise the integrity of the exam (Ayo, Akinyemi, Adebiyi and Ekong, 2007). All of these could contribute to candidates' performance in UTME not being reliable; and hence the glaring needs to go online in the conduct of UTME examination, where all these malpractices could be curtailed at least to the barest minimum.

In recent years, students of tertiary institutions in Nigeria do almost all their academic work on computers — either through their hand-held mobile devices or with their personal computers (PC) or use a cybercafé — but at the end of the semester, they are examined by handwritten essays. This misalignment of assessment practice to the learning environment can be addressed by requiring students to write their exams on a computer in order to keep pace with the modern trend in educational settings.

However, the reviewed literature related to this study could not conclusively state whether administering examination electronically through the Internet using the computer or traditionally using the paper and pencil mode affected students' achievement. Their outcomes were inconclusive and contradictory as some studies found no difference in achievement in the two modes while some did. Moreover, it was discovered that the effect of demographic variables such as candidates' gender on performance when the two modes were used, were not studied. These provide the rationale for continuous researches to be conducted in this area.

Statement of the Problem

In an educational institution, a student's performance is adjudged by his/her scores or grades either in the internal or external examination or both. A teacher training institution such as Akwa Ibom State College of Education (AKSCOE), AfahaNsit, is established to produce marketable, sound and high performing graduates to teach in the nation's (Nigeria) primary schools where Nigeria Certificate in Education (NCE) is the minimum qualification (FGN, 2004). Unfortunately, Etim and Udo (2010) reported that the performance of Biology students in the College has been a deviation. The cause(s) of this deviation remains an issue of concern to every educational stakeholder. As would-be teachers, Biology student-teachers are supposed to be highly knowledgeable because one cannot give out what he/she does not have.

Experience has shown that many at times some student-teachers are not confident in themselves during examinations. Such students are found indulging in one form of examination malpractice or the other. If in the process, they are caught and "disarmed", they become stagnated, having nothing reasonable of their own to put down on paper, thus impeding their performance. This study was therefore set out to find out if the mode of examination administration (e-examination) has any effect on Biology students' performance in AKSCOE, AfahaNsit.

Purpose of the Study

The general purpose of this study was to determine whether the conduct of examinations electronically affected Biology students' performance in the College. Specifically, the study sought to:

i. compare the performance of Biology students in the College who write examinations electronically and those who wrote the same exams in the traditional paper and pencil mode; and
ii. determine the influence of gender on the performance of Biology students who wrote examination electronically.

Research Questions

1. What is the effect of writing examinations electronically on the performance of Biology students of College of Education, AfahaNsit?
2. How does gender influence performance of Biology students of College of Education,
   AfahaNsit, who write examination electronically?

Hypotheses

These hypotheses guided the study:

i. There is no significant difference in performance between Biology students who write examinations administered electronically (e-exam) and those who write identical exams administered in the traditional paper and pencil mode.
ii. Biology male students who write e-exam do not significantly differ in performance from their female counterparts who write the same exam in the same mode.

Methodology

Aquasi-experimental research design was used for the study. The design was deemed appropriate since the study required the introduction of a treatment (e-examination) on the dependent variable (students' performance) in order to observe its effect if any.

The study was carried out in the Department of Biology, College of Education, AfahaNsit, Akwa Ibom State, one of the States in the South-South geographical zones of Nigeria. The choice of the area is based on the fact that it is one of the higher institutions in the country; and in the nearest future, the adoption of pure e-examinations would first be fully implemented in the country's tertiary institutions. Thus, a pilot study to ascertain its effect on performance is necessary.

A total of 408 first-year students (NCE I) in the Department of Biology in the 2015/2016 academic session constituted the study population. A sample size of 165, representing approximately 40% of the total population was used for the study, using a purposive sampling technique. Purposive sampling technique was advocated in order to use students who only had a prerequisite fair knowledge of the use of computers so that the intervening variable of computer knowledge could be put under control. This was ascertained by giving them a Computer Appreciation Test (CAT) to select the sample for the study.

Moreover, the choice for NCE I students was justified because it is believed that majority of these ones were fresh from their secondary schools, whom in their time Computer Science was not one of the core subjects at Senior Secondary Certificate Examination (SSCE); and as such would not have had broadened knowledge and skills on the use of the computer, particularly as it has to do with its use in writing examinations.

Instrumentation
Two different tests developed by the researchers captioned "Computer Appreciation Test (CAT) and "Biology Performance Test (BIOPET)" were instruments used for data collection. Whereas CAT was used to ensure that participants were equivalent in their computer knowledge level, BIOPET was designed to measure students' performance after the introduction of the treatment.

The questions in CAT were developed by selecting some test questions on "Computer Appreciation" online. The choice of selecting questions from "Computer Appreciation" is justified by the fact that the College has a compulsory general course, called "Computer Appreciation" for all first-year students. This course covers the fundamental concepts and use of the computer system.

In a similar manner, items that constituted BIOPET were based on two Biology topics the students had learned in their Senior Secondary two and three (SS2/SS3). These were Transport and Digestive Systems in Man. In addition, the choice of the topics was to offer the students opportunity of gaining advanced knowledge in the course, Vertebrate Anatomy — BIO 222.

Both CAT and BIOPET were 20-itemmed multiple-choice questions each. Whereas CAT had 3-options lettered A-C, BIOPET had 4-options lettered A-D. The options in both had only one of them as the correct answer and each question carried 5 marks, making a total of 100 for each of the tests.

Instrument Validation and Reliability
The two instruments were validated by presenting the items therein to two senior lecturers in the College, each from the Departments of Computer Science and Biology. This was to ensure that the items actually measured what they were purported to measure. After due considerations of the items, where irrelevant items were expunged and other corrections effected, the instruments were then recommended by the validators for data collection.

With reliability coefficients of .72 and .76 for CAT and BIOPET, respectively, both instruments were considered reliable. This followed the scores obtained from a test-re-test administration to 30 non-participant students in the study, and subjecting the same to Kuder-Richardson 21 (K-R 21) formula.

Development of a lesson package for the Biology concepts was based on Dick and Carey's (1996) model of instructional design, also known as the Systems Approach Model. The model views instruction as an entire system, focusing on the interrelationship between context, content, learning, and instruction. According to the authors, components such as instructor, learners, materials, instructional activities, delivery system, and learning/performance environments interact with each other and work together to bring the desired learning outcomes.

In line with the model briefly described above, the lesson package, which was presented through Microsoft PowerPoint accompanied with audio narration, instructional activities, students' interactions, formative/summative evaluation, was designed for the teaching of the concepts.

Administration of Instrument

After due consultations were made to find out when the students could be free from lectures, CAT was administered in a normal test-taking environment during one of their free periods. After scoring, 165 students who scored between 60 and 65% (the mean score being 63%) were on a separate day taken to the Educational Technology laboratory of the College, where PowerPoint facilities were available, for the delivery of the lesson. Each concept was taught for two hours, on two separate days, allowing for interactions amongst the students; students-lecturer; and students-instructional media, in order to enhance learning as proposed by Dick and Carey's model of instructional design.

Though the emphasis of the study was to ascertain the impact of the mode of examination administration on students' performance, it was necessary to subject the students to a uniform learning situation, as a way of controlling the intervening variable of teaching strategy on the performance of students.

After the lesson on the second day, the students were informed of the test and thereafter randomly assigned into experimental and control groups of 82 and 83, respectively. Those in the experimental group (group A) wrote the exam electronically while those in the control group (group B) wrote the same exam in the traditional paper and pen mode, writing the letter that corresponded with the choice of their answer on a separate answer booklet. The duration of the exam was one hour.

Students in group A were adequately informed about the procedures for the examination before commencement. The questions had earlier been programmed into a centralized computer (the server) that had been connected to about 43 other computers (the nodes) in the laboratory, through a Local Area Network (LAN) service. The students were administered the exam in two batches since the computers were not up to 82 (sample size for group A). Questions were programmed in such a way that students received one question and its option at a time on the screen. In addition, the item order of the questions varied per candidate. Candidates clicked on the letter of their choice of the correct answer and then clicked on "NEXT" to prompt the display of the next question. They could also review and change previously answered questions by navigating through, backward, clicking "PREVIOUS". A time frame of one hour was also set for them, after which the candidates' screen would go blank. Any candidate who finished before time was advised to click on "SUBMIT".

On completion, students in the first batch were confined in a lecture room away from where the second batch students were. This was to avoid interaction among the students in order to avoid exam leakage. Scores from the two groups of students

(groups A and B) were collated and analyzed using independent t-test statistical tools, at a significant level of 0.05.

Results

Research Question I

What is the effect of writing examinations electronically on the performance of Biology students of College of Education, AfahaNsit?

Table I: Mean and Standard Deviation of Biology Students' Performance on electronic and manual examinations.

Variables	N	$\overline{X}$	SD
Experimental Group	82	47.50	12.86
Control Group	83	53.19	11.86

Data in table I show that the mean score of Biology students who wrote examination manually (53.19) is greater than the Mean score of those who wrote the same examination electronically (47.50). The inference is that students are more comfortable and familiar with the pen and paper mode of writing exams than the electronic mode.

Research Question II

How does gender influence the performance of Biology students of College of Education, AfahaNsit, who write examinations electronically?

Table 2: Mean and Standard Deviation of Biology students' performance who write the exam electronically based on gender

Variables	N	$\overline{X}$	SD
Male	30	49.17	4.85
Female	52	45.67	9.37

Data in table 2 show that male students who wrote Biology examinations electronically have a higher mean score of 49.17 than their female counterparts with a mean score of 45.67. This implies that there is a possibility of male students being more confident in the use of electronic devices in writing examination than their female counterparts.

Hypothesis 1

There is no significant difference in performance between Biology students who write examinations administered electronically (e-exam) and those who write identical examinations administered in the traditional paper and pencil mode.

Table 3: t-test analysis of students' performance in electronic and manually written examination.

Variables	N	$\overline{X}$	SD	t-cal	t-crit	Decision
Experimental Group	82	47.50	12.86			
				3.25	1.96	*Significant
Control Group	83	53.19	11.86			

N=165; df=163; p<.05

Data in table 3 indicate that t-cal (3.25) is greater than the t-crit (1.96) at df, 163, and at .05 level of significance. This implies that there is a significant difference in performance between Biology students who write examination administered electronically (experimental group) and those who write identical examination administered in the traditional paper and pencil mode (control group), in favour of those in the control group. Hence, the first null hypothesis of no difference is rejected.

Hypothesis 2

Biology male students who write e-exam do not significantly differ in performance from their female counterparts who write the same exam in the same mode.

Table 4: t-test analysis of students' performance in the electronic examination based on gender

Variables	N	$\overline{X}$	SD	t-cal	t-crit	Decision
Male	30	49.17	4.85			
				1.64	1.98	**NS
Female	52	45.67	9.37			

N=82; df=78; p<.05

Data in table 4 indicate that t-cal (1.64) is lesser than the t-crit (1.98) at df, 78, and at .05 level of significance. This implies that Biology male students who write e-exam do not significantly differ in performance from their female counterparts who write the same exam in the same mode. Hence, the second null hypothesis is upheld.

Discussion

Results presented in tables 1 and 3 indicated that writing examination electronically did not have any positive effect on the performance of Biology students of the College of Education, AfahaNsit. The reason might be that the students are more comfortable and familiar with the pen and paper mode of writing examinations than the electronic mode. Moreover, it might be as a result of the students not being exposed to thorough drilling and were not allowed hands-on experience for a reasonable amount of time before implementation. The results conform with the assertion of Bauer, Degenhardt, Gilch, Kleimann, and Wannermacher (2008) that the switch from paper-based to computer- examination environments is still in its early stages that need substantial

reorganizational processes at Colleges and Universities. The authors are of the opinion that the administrative staff, information technology support staff, lecturers, and examiners, as well as students, have to adapt to and familiarize themselves with new examination practices. In addition, Fluck, Pullen & Harper (2009) pointed out that prior exposure to e-exam has a strong influence on future preferences towards e-exams and therefore it is important that the first exposure should be a positive one if adoption is to occur smoothly. In a similar study conducted by Hillier (2014) on the topic "The very idea of e-exams: Students' pre-conceptions", the author concluded that students expressed their fear of the unknown manifest in the risk of technical failures; hence, this might have made them develop a kind of phobia to the computer gadgets, resulting in their low level of performance.

The finding, however, disagrees with the finding of Clariana and Wallace (2002), who after conducting a study on "Paper-based versus computer-based assessment: Key factors associated with the test mode effect", found that students in the computer-based group out-performed those in the paper-based test group.

Whereas data presented in Table 2 indicated the male students to out-perform females with a mean difference of 4.5, the data on table 4 showed no difference in performance between male and female students who wrote e-examination after subjecting their Mean scores and Standard Deviations to t-test analysis. These inconsistencies in the findings of gender influence can be attributed to several factors, thus demanding for further research in this area. The finding arrived at as presented in table 2 could be attributed to differences in familiarity with computer devices for academic activities, amongst boys and girls at this level of education. This finding conforms to previous researches (Gregory, 1997; Jackson and Ervin, 2001) that there is male dominance in the area of electronic learning and examinations. Conversely to the above, the present study disagrees with the findings of Erdogan, Bayam, and Deniz (2008), who after conducting a research on "Factors that influence academic achievement and attitudes in web-based education", with 127 e-MBA students of Bilgi University, found that female students' academic achievement was higher than that of the male students.

However, table 4 indicated that male students who wrote e-exam do not significantly differ in performance from their female counterparts who wrote the same exam in the same mode. This finding is in line with another finding of Erdogan, Bayam, and Deniz (2008), which revealed that students' web-based education achievement compared in terms of gender showed no statistically significant difference ($t=1.139$, $p>0.05$). These findings are parallel to previous research results. Paris (2004) investigated students' cognitive, affective, and behavioural attitudes towards web-based education in terms of gender, significant relationships were not detected. Similarly, Huang (2002) studied factors affecting learners' attitudes towards web-based education and found that students' web-based education attitudes did not differ in relation to gender.

Conclusion

This study, having investigated what impact examination modes would have on students' performance, concludes based on its research findings that, the academic performance of Akwa Ibom State College of Education, AfahaNsit, students, specifically the ones in Biology Department, is not influenced by introducing an electronic mode of examination. Moreover, the gender of the students does not have any impact on their scores when subjected to the electronic mode of examination. It is the opinion of the researchers that the non-familiarization of the students with the electronic examination environment has a lot of bearing to this research conclusion. Therefore, introducing the electronic mode of examination in the College as a strategy of improving performance, without providing enough tutorial and long-term drilling on its utilization might be an effort in futility. However, since most similar previous researches encountered in the course of this study revealed improved performance, it is pertinent to work towards adopting e-examination in the College for the same goal.

Recommendations

Based on the findings of this study and also taking cognizance of the fact that e-examination is gradually coming to stay in our Nigerian tertiary institutions, of which Akwa Ibom State College of Education cannot afford to be left behind, the following are hereby recommended:

1. Planners and system designers should endeavour to design e-examination software in such a way that it is flexible and easy for use even for first-timers.

2. Lecturers of Colleges of Education and other conventional tertiary institutions in Akwa Ibom State should enroll in Information and Communication Technology programmes and training that will expose them to the necessary skills needed to structure their examinations online.

3. The management of the College should make frantic efforts to digitalizing her library resources and putting other relevant equipment/facilities in place needed for online examinations as well as making them accessible. This will spur the lecturers and students up, thereby creating ample opportunities for hands-on experience in the use of computers for examinations.

4. Lecturers should from time to time give students assignments and tests online and request submission via same medium. This will gradually reduce whatever phobia a student would have had regarding the use of electronics in writing examinations.

5. The electronic examination should form part of the orientation program for new students in the College every year; after which they can read e-exam guidelines, which should form a part of the contents in the students' Hand Book.

6. The Academic Affairs Division of the Colleges should strategize and conduct a routine workshop for fresh students on the e-examination. This would assist students to grab the basic principles and practice of writing online examinations and thus become acquainted with it.

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