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A Case Study on E-Examination in Universities of Odisha

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Abstract - This article discusses an E-examination guide lines and related technology keeping in view the needs of the Universities of Odisha. The weaknesses in E-examination pointed out by different researchers have been taken into account and a noble solution is proposed. The new system will allow E-examinations to be taken securely under the supervision of invigilators without specialist information technology skill.

Keywords - E-examination, ICT, computer based test, guidelines.

I. INTRODUCTION

The advent of web applications into the computing technology has brought about a significant revolution in our social life including the traditional system of education and examination. Many institutions are beginning to reevaluate their traditional methods and have considered providing pedagogical materials through the Internet. Web-based testing and assessment systems offer greater flexibility than the traditional approach because test could be offered at different times by students and in different locations. More importantly, questions could be shuffled having the same structure and level but different contents. Since the inception of the University, the conduct of examinations as well as the process of producing results has been fraught with various problems leading to inability to release results on time, inability of some students to get their results and several incomplete results. These problems have become embarrassing to the university. In one of the students' bid to complaint, a newspaper was used to air their view, and this was the comment, "other challenges they highlighted include delay in the release of examination results failure to graduate undergraduate students since inception and many others". It has to be stated however that these problems are not entirely the fault of the University as the students also contribute immensely to these problems. These factors range from the failure of the students to write the Tutor-Marked Assignments (TMA) (that is, Cumulative Assessment) and the University's result software is designed in such a way that a student without TMA score cannot have a result even if the student pass the examination very well; the use of mobile phone numbers in place of matriculation numbers, thus making the students' grades untraceable. It is the problems associated with

conventional method of writing examination that made the University to come up with the resolution of conducting the University's examination with the electronic model. This, is believed would put an end to the inability to release results, failure to conduct more than one examination in a year and other problems faced during the conduct of examinations. Before this decision was taken however, the Universities of Odisha has to grapple with serious issues including the preparedness of the students to face electronic examination. Basically, E-examination can be defined as a system that "involves the conduct of examinations through the web or the intranet" [1]. E-assessment in its broadest sense is the use of information technology for any assessment related activity. The origin of e-examination would naturally be traced to the further deployment of the potentials of the internet and the 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, the true educational potential of the World Wide Web can finally begin to be understood [2]. One of the potentials of the web is the ability to conduct examination through electronic means. E-Examination deployment removes series of anomalies being encountered in the manual tests. According to Researchers [3] the e-examination would remove all human errors recorded in manual examination and create opportunity for students to access their results immediately. If the examination is conducted through net, it would be difficult for students to carry out any form of examination malpractice. From the above, the advantages of e-examination are (i) Removal of human errors involved in the process of examination. (ii) The eradication of the compilation and physical movement

of examination scripts (iii) It would also eradicate examination malpractice from the part of the students. E-examination system involves the conduct of examinations through the web or the intranet and it reduces the large proportion of workload on examination, training, grading and reviewing. The set of questions often used in the e-examination system are multiple choice objective tests and quizzes that can be formally and easily evaluated online.

II. RELATED WORK

The role of Information and Communication Technology in supporting the curriculum has been extensively evaluated by some large, government sponsored projects. Authors [4] have found positive effects in almost all subjects, except the system simulation and mathematical modeling. Large scale studies [5] in USA found even good software had little learning benefit. Further, researcher [6] demonstrate computer use in support of a pre-existing curriculum is of contested effectiveness, and possibly inefficient. According to the researcher, database of learning management system includes much useful information which can be effectively used for the improvement of e-examining process [9]. In data mining methods many kinds of knowledge can be discovered [8] by the student. In this system, student's knowledge and abilities [9], would be improved for learning and examining process [8-9]. This trend has also led to so many research works [10] on e-examination as well as web-based studies focused the perception of the students that are all subjects of E-examination in globally. The Senate of the University had to grapple with serious issues including the preparedness of the students to face electronic examination for which the students' perception resolve to embark on the research. Digital Education Revolution [11] will provide a computer for every student to prepare online assessment in commonplace in many Australian universities. Online assessment is mostly used for quizzes, forums and digital assignment drop boxes. In many cases online assessment is conducted using an institutional learning management system (LMS). Byrnes and Ellis concluded this is largely superficial for both formative and summative purposes. In the following section, the detailed procedure for a good E-examination system is presented keeping in view the anomalies pointed out by the above mentioned researchers.

III. E-EXAMINATION

A. Formal vs Informal Education

Some students like to learn classroom which get them pleasure to sit there and have the teacher tell them what to learn, and when they get stuck, they are happy

that there is someone there to help them, and they enjoy the social environment. For many students, "education" is a synonym for "formal education", and if they tell them that their education consists of reading and learning by doing, they won't take seriously. One advantage of formal education, for those who like it, is the structured learning environment. The other advantage is that it comes with a system of qualifications. The students have to do assignments, projects and examinations and the results from these determine whether or not they "pass". If on the other hand, the students prefer to educate themselves informally, but students want something to show people that they have successfully educated themselves in a particular area, then they need some means of assessment which is disconnected from their choice of education process. Self-education requires access to learning resources. Traditionally, the two major sources of self-learning material were books and real-life experience. If the students wanted to include interaction with other people in their educational program then they would have to find other students interested in informally studying the same topic, and if they were lucky to find some expert willing to informally assist them in learning about the topic. Internet is a new ingredient modern technology to conduct the E-examination which is cheaper and improved version of the self-education resources. The self-education resources depending on the topic, enormous amounts of free written material are available on the Internet. If the topic is an activity which results in the creation of information, then the Internet can provide both the means to assist in the creation of information, via free and/or open software, and it provides an outlet by which the candidates can display the results of their endeavors to anyone who might be interested.

B. About the E-examination

Many established Universities in Odisha are choosing to convert their examinations from paper-and-pencil test programs to E-based test programs. In paper & pencil test, a question booklet and an Optical Mark Reader (OMR) based answer sheet are provided to the students for darkening the circle out of the four choices A, B, C and D. An E-examination is a quick and easy wide range of features. There is no need of configuration or installation of anything. It saves time in managing tests and getting result correctly. The first step in stream-lining the examination system is to be computerized everything. The examinations are defined as computer files (ideally in some standardized format). At the time of examination the students are used individual computer for appearing the examination. The students have entered the answer in the computer, later processed by computer, and finally distributed by computer. In this system the cost price is reduced to

minimum for creation, supervision and marking of the answers. An examination has to be created by someone who knows the subject, who puts the effort into constructing the questions and who is willing to make the effort required to keep the examination secure until the examination is given by the examinees. If an examination is one taken by a very large number of students, the cost of creating the examination per student can be arbitrarily small. Examination supervision is one human cost that remains proportional to the total number of examinations taken. It should be reasonably supervision by one supervisor if there is a maximum number of students have given examination. To minimize the costs of supervision there should be maintained a permanent examination environment and experience supervisor. This can be achieved if supervision can be cleanly separated from creation and marking. For example, if 10 examinations are taken across 10 students each in 10 Universities, that is only 1 student per examination per University. But if different examinations can be taken in the same examination centre, then that makes 10 students per University, with consequent economies of scale (and no requirement for the students to travel to different Universities to appear an examination). Examination marking is potentially also expensive, but this depends substantially on basis of answers are required. Some questions have objective criteria for correctness (for example multiple choice), then a computer program which feed in computer can able to marking it easily. Other questions have subjective criteria for what is a good answer, for example when you have to write an essay. One way to keep costs down is to maximize the proportion of objective answers, and there are plenty of computerized examination systems which already allow only multiple choice or other types of fixed answers. There is another way to reduce the cost of answers requiring subjective marking, which is to defer all such marking (and post the answers themselves instead of the marks). The major business opportunity for a streamlined computer-based examination system is for the provider of the supervision component of the examination process. The nature of the supervision service effectively determines the framework for the other processes, and also for the distribution of final results. The services provided will fall into four main categories. An examination result is only useful if it can be trusted. If a potential employer judges a potential employee on the basis of an examination result, the employer needs to trust the creation process, the supervision process and the marking process. Where these are separated from each other, the examination result must explicitly show the parties responsible for each component of the process, i.e. who created the examination, who supervised it and who marked it (or, if it was marked automatically, what algorithm was used to mark it). Anyone judging the

reliability of a result must take into account all identified responsible parties.

C. Types of E-examination Test:

There are three types of E-based test such as: (i) E-based test (ii) online test and (iii) computerized adaptive test

E-tests are administered through a local server connected in the Local Area Network. Online tests are administered through Internet. Computerized Adaptive Tests are administered through Internet. Institutions/organizations/ Universities may adapt different models of E-based examinations or Hybrid models that suit them. University of Odisha offers different types of papers such as: (i) Key English Test (KET) (ii) Preliminary English Test (PET) (iii) First Certificate in English (FCE) (iv) Certificate in Advanced English (CAE) (v) Business English Certificate (BEC), (vi) Preliminary level (vii) Business English Certificate (BEC) (viii) Vantage level (ix) Business English Certificate (BEC) (ix) Higher level Teaching Knowledge Test and Skills for Life. The authorities of University are regularly making new developments with online and E- testing of their examination centre to find out what is available in their area.

D. Methods of E- examination

A test that is administered on computer might be delivered through any of several methods. The most common delivery method for E-based test programs is linear, or fixed E-based test. This approach to test delivery is the method that is most similar to paper-and-pencil testing; a fixed set of items is administered to examinees, in a fixed order. A variation on the fixed E-based test method is the random E-based test method. The random E-based test method also administers a fixed set of items; however, in this method the order of the items is randomized, to provide a modest test security benefit. A very different approach to test delivery is offered in the adaptive E-based test method, also known as the computer adaptive test, or CAT approach. In a CAT, items are individually selected for the examinee, based on his or her performance on earlier items in the test. While an adaptive E-based test can result in a shorter test, it is more challenging to develop and can only be used by examination programs that have a large number of examinees.

E. Software listing: E- Examination

Examination Software is a Test Management Software, which offers a complete solution for E- Based Test (EBT) We can create our own unique Tests in any language and administer for the Test. Examination. Software keeps all the records of conducted

examinations, score reports and Student Answer Sheets. The different types of new software are as: GotCLIP, MP3 Speed, ProteMac Key Bag, NCache, ChordPulse, CDRoller, Remote Utilities, MP3 Cut, Auslogics Disk Defrag, Rank Tracker Enterprise, SEO PowerSuite Enterprise, SecurityCam, ThunderSoft Flash Slideshow, MSN Recorder Max etc. Except these there are some new top Softwares as: H-Dictionary, Entrance Examination, Computerized Examination, Cognitive Examination, On Line Examination, Cpt Examination, Examination Result According To... , Computerized Entrance Examination, College Examination System, Online Examination Asp net, Electronic Examination Project, Online Entrance Examination, Virtual Certificate Examination, Synopsis Of Online Examination..., Code Of Online Examination In Java, Online Examination Project Report, Class Diagram Of Online..., Quick Heal Total Security, English & Armenian Dictionary, , Excel Invoice Template, Quick Heal AntiVirus Plus 2009, SpeederXP, Full DVD Ripper Free, DVD Movie X player, Red Call Recorder, Full Video Converter, and Device Driver Backup

F. *E-examination Administration*

The Committee of Universities of Odisha has the overall responsibility for examination development and policies governing eligibility and administration of the examination. It is also responsible for contracting with a professional testing agency that is responsible for the establishment of test centers, administration of the examinations and exam security, as well as providing psychometric expertise. The Committee of Universities of Odisha has appointed the professional agency to assist in the development, administration, scoring and analysis of the E- examination which has given by the students. The professors of Universities are involved with the handling or scoring of any examination in any way. Examination Development Committee (EDC) of Universities have comprised of individuals whose knowledge and experience in exercise sciences, strength training and conditioning and personal training qualifying them as “content experts,” develops the examination questions. The committee develops also specifications from a job task analysis study that is completed every five years that defines the content areas to be covered, the number of questions on the examination and the abilities and skills measured by the examiner. E-examination of University is monitored constantly for content validity and updated for timeliness. It is designed to ensure a minimum level of competency among practitioners and creates a better awareness among the public of the nature and purpose of the profession. One focal point of the examination is to demonstrate that candidates possess appropriate knowledge of industry guidelines for the safe and effective strength training and conditioning of athletes.

Each examination undergoes quality control checks. A thorough item analysis is completed and is used as a part of the statistical review of the performance of the examiner. The review examination committee of University has verified the data, candidate comments and the scoring of the questions is appropriate or not. All candidate comments are reviewed for relevance and accuracy, but these comments are not taken as statements to argue or challenge the examiner (either at the time of the examination or afterward).

F.1. Registration policies for Universities: 7

The University of Odisha does not discriminate among candidates based on race, color, creed, gender, religion, national origin, disability or marital status. When a candidate requests special accommodations, the candidate must be submit the Request for Special Examination Accommodations Form provided at the end of this document at least 40 calendar days prior to the desired examination date. When scheduling the examination, candidates need to inform for special accommodations. Candidates with visual, sensory or physical disabilities that would prevent them from taking the examination under standard conditions may request special accommodations and arrangements. If the candidate does not provide the information within the specified time frame (at least 40 calendar days before the examination) or authorities of University has provided information is inadequate to assess special needs requirements, then candidates will be asked to provide additional information/documentation and given a deadline by which they need to respond. If the required information is not received by the specified deadline, then the authority of University will deny the request for accommodations. The authority of University will provide Telecommunication Devices for the Deaf (TDD) to assist deaf and hearing-impaired candidates. TDD calling is available E-examination testing centre in time. This TDD phone option is for individuals equipped with compatible TDD machinery.

F.2. Change of examination appointment

Candidates who do not schedule an examination appointment and take the examination within 100 days from the date their eligibility is confirmed will forfeit their entire registration fee. A completed registration and examination fee are required to reschedule for the examination.

F.3. Examination Refunds/Forfeiture

Candidates deemed ineligible for an examination will not receive a refund of their registration fee then he can contact the web site of the University to clarify his problems. If a candidate has any questions regarding eligibility, contact the authority of University before registering for an examination. Refunds are not granted

on cancelled E- based examination registrations but candidates willing to forfeit their entire registration fee. A candidate who arrives for the exam more than 10 minutes late for any reason forfeits the registration and all fees paid to take the examination. A completed registration and examination fee are required to reschedule for the examination.

F.4. Transfers of examination

Candidates can transfer their examination testing slots (dates and times) by depositing some rupees at the University account section. Candidates may transfer only one time and must transfer to a date within the original 100-day testing window. Candidates can't transfer from one certification examination to another.

F.5. Failure to Report

Candidates who fails to report for an examination, forfeits the registration and all fees paid to take the examination. A completed registration and examination fee are required to reschedule for the examination.

F.6. Inclement Weather, Power Failure or Emergency

In the event of inclement weather or unforeseen emergencies on the day of an examination, the authority of University will determine whether circumstances warrant the cancellation, and subsequent rescheduling of an examination. Candidates may contact or follow the web site to know the details of his E-examination. If power to an assessment center is interrupted temporarily during an administration, operator can restart the examination from where it left off so that candidates may continue the examination. Every attempt is made to administer the examination as scheduled; however, should an examination be cancelled at an assessment center, all scheduled candidates will receive information about rescheduling procedures.

F.7. On the Day of the Examination

On the day of examination appointment, report to the assessment center roll number, name, subject, time etc will be posted in the front of examination hall. A candidate who arrives more than 10 minutes after the scheduled testing time will not be admitted. To gain admission to the assessment center, a candidate needs to present two forms of valid identification with a current photograph and include the candidate's current name and signature. Acceptable forms of identification include a current.

IV. GUIDE LINES FOR E-EXAMINATION

A. Proof of Identity

On the examination date each candidate must bring his/her original identification document, such as identity card or library card and admit card for

verification purposes. The name and number of the identification document must be identical to the one indicated on the record enrolment form. That should be produced to officer before 15 minutes after the scheduled starting time of the E-examination. Whose identity cannot be verified will not be permitted to sit for the E-examination. Such a candidate will be graded absent. No examination-related information is allowed to be printed/written on and/or attached to the identification document. If, in the opinion of the Chief Invigilator/invigilator(s), a candidate's identity is in doubt, the Chief Invigilator/invigilator(s) will take photographs of this candidate and photocopy his/her identification document. The candidate whose identity is in doubt should offer all necessary assistance (e.g. by removing any glasses, hat or mask) to ensure that the photographs can reveal his/her full face. The photographs and copy/copies of the identification document will be retained for further investigation. The invigilator(s) is unable to clear its doubt about the true identity of the candidate taking the E-examination, but he has the sole discretion in invalidating his/her results of the E-examination. If he/she does not allow the Chief Invigilator/invigilator(s) to take photographs of him/her or photocopy his/her identification documents, he/she will be disqualified from the E-examination.

B. Security

The authority of University maintained examination administration and security standards that are designed to assure that all candidates are provided the same opportunity to demonstrate their abilities. The assessment center is continuously monitored by audio and video surveillance equipment for security purposes. The following security procedures are applied during the examination:

- (i) Exams are proprietary. Cameras, notes, tape recorders, Personal Digital Assistants (PDAs), pagers or cellular phones are not allowed in the testing room. Use of a cellular phone or other electronic devices is strictly prohibited and will result in dismissal from the examination and forfeiting the entire registration fee.
- (ii) Pencils will be provided during check-in. Candidates will be provided with scratch paper to use during the examination. If a second piece of scratch paper is needed, candidates may ask the test proctor for another piece of paper and turn in the one they used before. Candidates must sign and return the scratch paper to the supervisor at the completion of testing or they will not receive a score report.
- (iii) No guests, visitors or family members are allowed in the testing room or reception areas.

- (iv) No personal belongings are allowed in the assessment center. Only keys and wallets may be taken into the testing room. The testing center is not responsible for items left in the reception area.
- (v) Eating, drinking or smoking are not permitted in the assessment center.
- (vi) Candidates may take a break whenever they wish, but they are not allowed to take additional time to make up for time lost during breaks.

C. Discipline

Any candidate who does not have positive identification, who uses unauthorized aids, or who does not follow the testing procedures can be dismissed from the test center. Candidates must not give or receive assistance of any kind during the E- examination. Any cheating, attempt to cheat, assisting others to cheat, participating therein, or engaging in such improper conduct as listed below is a serious violation and other disciplinary action as may be deemed appropriate. Candidates have agreed in their applications for the examination to be bound by the rules and regulations governing the examinations. After being logged into the computer, a prompt will require the candidates to agree to the rules before proceeding to the examination itself. The candidate does not access the test questions before the examination or aiding someone else to do so. He does not use the calculator or other mechanical aid for E-examination. He should not access to or consulting notes or books during the E-examination. Talking or otherwise communicating with another candidate, disturbing other candidates ,consulting other persons outside the examination room, removing or attempting to remove test questions and/or responses (in any format) or notes about the examination from the testing area, taking unauthorized material from the test room, taking an examination for another candidate, arranging to have another person take an examination for the candidate, threatening or physically or verbally abusing a supervisor or proctor responsible for curbing or reporting improper conduct, disclosing the contents of an examination to any other person, presenting false information on an examination application, failing to follow other examination instructions, tampering with the operation of the computer or attempting to use it for any function other than taking the examination etc are obeyed by the candidate when he appeared the E-examination in the examination hall. The Examination Committee, or its designee, will investigate any irregularity or suspected violation of the rules involving the examination process, and a determination will be made regarding the matter. Where there is a determination to invoke a penalty, the candidate is advised by letter

D. Misconduct

Individuals who engage in any of the following conduct may be dismissed from the examination, their scores will not be reported and examination fees will not be refunded. Examples of misconduct are when a candidate:

- (i) Creates a disturbance or is abusive or otherwise uncooperative;
- (ii) Displays and/or uses electronic communications equipment such as pagers, cellular Phones, PDAs;
- (iii) Gives or receives help, or is suspected of doing so;
- (iv) Attempts to record examination questions or make notes;
- (v) Attempts to take the examination for someone else; or
- (vi) Is observed with notes, books or other aids.

E. Notice to the candidates:

The Personal Data Ordinance has been forced to help the candidates understand their obligations and rights in respect of the provision of their personal data to the University record. Candidates are required to keep their personal data once they have enrolled as candidates for an examination, and until such time as they have completed the examination. The personal data provided for the following purposes:

- (i) Administering the examination and marketing purposes.
- (ii) Delivering information about the examination.
- (iii) Maintaining candidate records.
- (iv) Distribution of examination results to candidates concerned.
- (v) Informing the candidate of any courses, examinations, products or services which the University believes may be interest to them.
- (vi) Research or statistical analysis.
- (vii) Promoting and providing services made available by the University.
- (viii) Any other related purposes.

F. Format for E-examination

Each examination is of two hours duration in which contains 50 questions (40 two-mark questions and 10 one-mark questions). Out of 90 marks 50% contains question types carrying one and two mark multiple choice objective questions, one and two-mark multiple response questions, and two-mark multiple response matching questions. The different subjects having

different codes such as: for physics the codes are F₁,F₂, F₃,.....,for chemistry the codes are C₁, C₂, C₃....etc so on.

G. Student instructions for appearing E-examination

Taking online examinations is a simple process. The basic skill of reading text on the computer screen and clicking on or typing the right answers is what is required to take examination. The steps to follow are outlined below:

1. Open the web-browser – (Internet explorer or Mozilla Firefoxetc....)
2. Log on to the Utkal University of Odisha website; www.utkl.edu.org.
3. Click on the E-examination link.
4. The candidate will be directed to a page where he will choose the following options:
 - i. Instructions on taking the Electronic Test.
 - ii. Log in to take an examination or practice test.
 - iii. Download student help.
5. Click on the “Log in to take an examination or practice test” link to take a practice test or to take an actual examination. Note that there will only be able to take an actual examination if it has been scheduled for him.
6. Enter his University roll number into the user login section.
7. Enter his University roll number as password (lower case only).
8. The System may ask him to verify his name and other details have been entered correctly. If so check through to see that the details are correct then click on OK.
9. He will be take to the system homepage. He should see all the courses and examinations which he has registered for as well as practice tests available. If he does not see the course, then he can consult the study centre administrator.

H. Preparation for the E-examination

In E- examinations there are 150 questions covering the breadth of the syllabus which is fairly short and able to deal with each question in a few minutes and then move onto the next question. It is sure that the candidate can attempt plenty of multiple-choice questions, and the wider range of objective question types if taking a E-examination, as part of his revision. This will help the candidate to attempt the style of question and dealing with subject areas very quickly. Both E-examination and

paper-based examination have the same weightings for different syllabus areas. Weightings for each area are intended to reflect the relative size and importance of the area.

I. Confidentiality

Information about candidates for testing and their examination results are considered as confidential will contain no information identifiable with any candidate, unless authorized by the candidate. The authority will take care with customer property and personal information while it is under his control. The authority will handle and protect customer property/information as is done with all University property. Only employees authorized by the Executive Director (or designee) will have access to customer files. The designated employees are responsible for maintaining the confidentiality of the information in those files. The authority will not discuss, disclose or release any information submitted for certification purposes to any third party without the certificate holder's or candidate's written consent. The examination candidate needs to make all inquiries pertaining to material submitted for certification examinations and/or information related to the examination administration. With the exception of verification of certification, written consent from the certificate holder or examination candidate is required prior to the release of any information from the individual's record. To complete and submit the “Authorization to Release Information Form,” please visit the Utkal University website www.utklunv.org to receive a faxed or mailed copy of this release form. The examination administration and examination security are designed to ensure that all candidates are provided the same opportunity to demonstrate their abilities and to prevent some candidates from gaining an unfair advantage over others due to testing irregularities or misconduct. The University Certification Committee reserves the right to withhold or cancel examination scores if, in its opinion, there is reason to question their validity or to investigate a violation of the testing regulations.

J. Expectation at the E-examination Center

After confirming the candidate's identification, the candidate will sign in and will be directed to a testing station. The candidate will receive on-screen instructions to enter his/her assigned ID number. The candidate's photograph will be taken and displayed throughout the exam session. This photograph will also print on the score reports. Prior to attempting the examination, the candidate will be given the opportunity to practice taking an examination on the computer. Note that this practice examination is to help the candidate become familiar with the computerized examination format. Also note that it is possible that the

practice examination questions will not relate to strength and conditioning. The time used for this practice session is NOT counted as part of the examination time or score. When the candidate is comfortable with the computer-testing process, he/she may quit the practice session and begin the timed examination. The practice session, instructions for taking the examination will be provided on-screen. Then the candidate will begin the actual timed examination. The computer monitors the time the candidate spends on the examination. The examination will stop when the testing time has expired. Candidates can click on the "Time" box in the lower right-hand corner of the screen or select the "Time" key to monitor the time. A digital clock indicates the time remaining for the candidate to complete the exam. The "Time" feature may be hidden during the examination. Only one examination question is presented at a time. The question number appears in the lower right-hand corner of the screen. Choices of answers to the examination questions are identified as A, B, C or D. Candidates must indicate the answer choice by either typing the letter into the response box in the lower left-hand corner of the computer screen, or by clicking in the option using the mouse. To change the answer, just enter a different option by pressing the A, B, C or D key or by clicking on the option using the mouse. Candidates can change their answer as many times as they wish during the exam time limit. To move to the next question, click on the forward arrow (>) in the lower right-hand portion of the screen or select the "NEXT" key. This action will move the candidate forward through the examination, question by question. Should the candidate wish to review any question(s), he/she can click the backward arrow (<) or use the left arrow key to move backward through the examination. Candidates may leave an examination question unanswered for return later in the testing session. Questions may also be bookmarked for later review by clicking in the blank square to the right of the "Time" button. Click on the hand icon or select the "NEXT" key to advance to the next unanswered or bookmarked question on the examination. To identify all unanswered and bookmarked questions, repeatedly click on the hand icon or press the "NEXT" key. When the exam is completed, the number of exam questions answered is reported. If not all questions have been answered and there is time remaining, return to the exam and answer those questions. Be sure to provide an answer for every question before ending the exam. Any blank answers will be scored as incorrect.

K. Benefits of E-examination versus paper-based examinations

E-examination has the advantage of being available at any time of the year and give instant results at the end of the examination. However, students who have not previously used or who lack confidence in using

computers may find that they are better off in completing the examination on paper. Students who have suitably prepared for their examination (including practicing for the exam on computer if relevant) should be equally likely to pass either format.

V. CONCLUSION

This E-examination case study has revealed important information about Information and Communication Technology innovation which has implications for universities of Odisha. There were no initial clear cut guidelines for students to appear the E-examination. The cohort was split fairly evenly between the two options. Further it could be undertaken in other parts of the country to validate this finding for similar cohorts, and to investigate preferences for older and younger (University aged) cohorts. Such a finding is very valuable to innovation engineers – it tells us that creating the first positive experience of E-examinations is a vital first step adoption. This describes the chicken and egg aspect of innovation, where adoption is related to perceived utility. There are an increasing number of computer mediated assessment products on and entering the market. Apart from proprietary interests of the suppliers, each of these generally restricts the demonstration of ability to a closed environment. One reason for supporting a change to E-examinations is the linkage between tertiary and secondary assessment methods. The methods used in one sector will be noticed and appropriately adopted in the other. Secondary sector assessments may be impeded from adopting computer mediated methods whilst tertiary systems rely heavily on high stakes written examinations. Our informal scrutiny of pre-service faculties in University substantiates this linkage, with few instances of E-examination assessments observed in classrooms. We speculate that the low rate of E-assessment in University could also be due to governance issues, lack of opportunity for teachers to perceive significant advantage or greater demands in institutions which are 'busy places'. This student cohort was ambivalent about the introduction of computer based examinations. To facilitate adoption of this innovation we make some recommendations.

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