

Using Innovative Technologies as e-Assessment tool in Higher Educational Institutions

N. K. Thakre¹, P. Ramesh², Mamta Thakur³, S. Sumitra⁴

¹Assistant Professor, Department of Humanities, Yeshwantrao Chavan College of Engineering, Nagpur, India, thakrenkycce@gmail.com

²Assistant Professor, College of Agricultural Engineering, Professor Jayashankar Telangana State Agricultural University, Telangana, India, pagilla0103@gmail.com

³Assistant Professor, Department of Mathematics, Chaitanya Bharathi Institute of Technology, Gandipet, India, mamtathakur_maths@cbit.ac.in

⁴Assistant Professor, Department of Biotechnology, Chaitanya Bharathi Institute of Technology, Gandipet, India, ssumitra_biotech@cbit.ac.in

With the emerging world, the education system is also evolving. Though the digital revolution started long ago, it attained its peak only after the advanced technologies were made accessible for every learner. During the pandemic online mode of teaching and evaluation has made its impact on every student's learning styles. e-Assessment is a domain, which is multi-dimensional. The objective of this paper is to study how innovative technologies enhance e-Assessment process while evaluating students of higher engineering mathematics. Learning management systems, moodle etc, are providing various options to conduct online or offline assessments with ease. In order to study the varied approaches of evaluation among the students of higher educational institutes, an online survey was conducted. The quantitative approach was adopted to analyse the data. It was observed that in some cases E-Assessment was an effective tool of evaluation where as in some categories it contributed more when combined with traditional pen-paper assessment. It can be concluded that blended mode of assessment will impact more on the successful implementations of the learning strategies.

Keywords: e-Assessment, Innovative technologies, paper assessment, HEI.

1. Introduction

Online teaching and learning were introduced long ago to promote distant learners. During the lockdown situation, there was a drift from traditional to online mode.

Transition E-assessment, stands for electronic assessment many a times found in synonym with computer-based assessment, digital assessment or online assessment is basically the method where information and communication technology (ICT) is used in the assessment

(Electronic Assessment, 2020). Whitelock (2009) explained that e-assessment is a new approach that can transform the higher education. UNESCO (2020) also recommended the use of ICT in delivering traditional assessment formats more effectively and efficiently to measure the latest and soft nuances of modern competencies. Jordan (2011) has specified the importance of considering and evaluating students' perceptions of e-assessment in several domains like awareness, ability, security, validity, teaching–learning, etc.

“e-Assessment” is the use of digital technologies to create, dispense, evaluate and deliver feedback for formative, summative, diagnostic or self-assessment Kocdar’ (2018). Transition from Traditional to Online Teaching using Innovative Technologies Mamta Thakur (2021) discussed the need and process of transition including online tools to be needed. Osuji (2012) said e-assessment could be hypothesized as the use of ICTs to facilitate the entire assessment process, from the designing and delivering of assignments to marking, reporting, storing the results and/or making statistical analysis. Crisp (2011) used the term e-assessment to refer to all the assessment tasks conducted through a computer, a digital tool and/or the web. Advanced technologies enhanced and e-learning systems has put e-assessment on high demand Brink and Lautenbach, (2011). Geoffrey Crisp (2016) discussed how e-Assessment can enhance student learning outcomes.

Lot of work has been done in various aspects of e Assessment. The present paper discusses the different innovative technologies being used to conduct e-Assessment. Also, it emphasizes on the blended form of assessment where summative evaluation can be conducted through traditional mode and formative in e-Assessment medium.

2. Methodology

This pandemic has forced the educational fraternity to switch onto online mode. For teaching-learning activities, ample awareness was created among the learners and teachers, but lacks were observed in implementation of approaches of e-assessment.

A group of 120 students of first year Engineering from UG programs CSE and Bio tech were considered. Online classes were taken through various platforms like ZOOM, Google Meet, Teams etc. In the beginning, evaluation process was not at all easy, as teachers were also not completely trained for the needed purpose. Students also faced difficulties in attempting e - test . Later, proper training was provided to both the teachers and learners in accordance with the various e-assessment procedures.

As our institution has specially designed Learning Management System (LMS), it was quite easy for the teachers and the learners to conduct exams through online mode. The different types of e-Assessment are discussed.

- Types of e-Assessment with Examples

There are different types of e-Assessment, which are framed on internet usage, device available, and the pattern followed.

- (i) Online Assessment

Online assessments are online tests conducted for the evaluation purpose, measuring, and

documenting the academic readiness, learning progress, skill acquisition, or educational needs of the test takers. Earlier, paper print outs were used manually for assessments. Nowadays, evaluation can be done online by sharing a link with the users. The test taker needs a proper internet connection with the required speed to attend the online assessment. The computer or the device in which they attempt the test should have the essential configuration to run the test. The main advantages of these tests are the test taker can attend the test from anywhere, immediate feedback, and results.

Mostly online formative assessment is constructed by specific institutions to assess the learner's progress. Some assessments are time constrained that the learner has to attend the test at the particular time either in a particular place. Some tests are supervised and proctored with webcams and eye identifications. In some cases, supervisions are arranged manually. E.g., NET, MOOC, TOEFL

(ii) Offline Assessment

In this assessment, the learner attends the course or study the materials online, and the questions are prepared online later the students attend the test in an offline these such as a paper-based exam or any other offline mode. The answer scripts/sheets are evaluated by the instructor or machine; then they upload the results online. In remote areas, it is hard to administer online assessments due to no availability of internet connection. Nowadays, offline exams do not even require an internet connection to launch or submit the test.

Offline assessments are used for summative, formative, and diagnostic assessments. The test taker attends the test in the computer lab of the Institution in which a particular test software is installed and work without any internet connection. In such cases, the feedback and results are immediate since it is predesigned in the software. It needs a lot of preparation from the teacher and administrators for the first time to run the test. Either the teacher or the computer or any other electronic device evaluate the answer scripts.

Mostly the test taker has to come to one place to attend the exam. Sometimes it may be a performance-based assessment for which the learner has to develop or prepare the test content office and attend the viva. In such cases, the feedback and the results will be announced later because it takes time for the teacher to assess and give feedback to each student.

(iii) Computer Assisted Assessment

Computer Assisted Assessment is transferring assessment questions and activities to learners through computers. Here, computers are tools, which facilitate the assessment; they are not optional, which replace paper-based assessment. In this assessment, computers are used only as supplementary tools. It can be used whenever it is necessary. It can be used as partial requirement such as online assignment, online quiz, etc. It can be used for formative, summative, diagnostic, norm reference, and criterion referenced assessments. Objective and subjective questions can be assessed through CAA. It can be used for structured assessment such as assessment under supervision either by the personals or electronic such as webcam, biometric, etc. or non-structured assessments, which the students can attend the assessment whenever they come to the computer lab or by using any software or link from wherever they are. It can either be online or offline.

(iv) Computer-Based Assessment

Other names for Computer-Based Assessment are computer-based exam and computer-based Test. In this assessment, the learner uses the mouse and keyboard to select the answer and to select the next question. In this assessment, computers are the main source to test the learner, for example, computer exams and online exams for the fulfilment of the degree. There are two types of Computer-based assessment. They are: linear and adaptive.

- Types of tests used in e-assessment

While planning a test in LMS, teacher has wide range of options to choose. There are different types of question formats used in e-assessment. They are Multiple-choice questions, either / Or Questions, Short Answers, Essay type questions, File response questions, Quiz Bowl questions, ordering questions, Fill in the blanks, fill in multiple blanks, Hot spot questions, Jumbled Sentence, Drop-down, Matching, Drag and drop, Drag and drop markers question, Assignments, Listening Comprehension, and Proficiency Testing in e-assessment

1. Multiple-choice Questions

Multiple Choice questions are objective questions. MCQs, makes the learners choose one correct answer from several distracters to a question. Multiple-choice items can be used to access basic knowledge and complicated concepts. There are two different types in MCQs they are choosing the multiple answers and choose the right one which is commonly used. It used to be designed in such a way to click on the answer or select the answer. There are questions in which the learner has to select all the suitable answers from the given alternatives in some question the learner has to choose the only right answer.

The teacher has to construct the MCQ along with answers and distractors. Either the teacher or the technical assistant upload or type the questions in the required format. Then they upload the questions either online or in the software. They have to program to shuffle questions. If they fix the answer and score for each, the students will get the feedback and results immediately. It can be used for any assessment, such as formative, summative, diagnostic, norm reference, and criterion reference. It can be conducted a quiz in the classroom to make it more effective.

2. Either/or Questions

It is a type of objective question. In this type, the question is presented to the learners in the form of a statement, and the students are asked to answer from two- choices. The two choice answers may be True/false, yes/no, agree/ Disagree, and right / Wrong. These types of questions are effective in assessing cause-effect and misconceptions.

Mostly, it is helpful to measure a low level of learning. It encourages guessing as it makes use of two alternatives alone. It is easy to prepare. The subject experts construct it and upload by the technicians in the software/app or online.

3. Short Answers

Short Answer questions are like essay questions. In both the test- taker has to type the answer. Short answers are the questions that need short textual responses one words or short phrases, but it should match the expected answer. It can be used for both subjective and objective tests.

It helps to assess the basic level of knowledge of the student. It is easy to construct. Comparatively, with MCQ the students are free to express their view. It will give followed by the space to type the answer. Space, or the word limit set by the teacher, decide the limitation of words for the answer.

4. Essay type questions

In Essay questions, the learner has to type the answer in a text box, and the teacher has to evaluate these questions by themselves. The students are expected to type their answer in paragraphs. It helps to assess the writing skills and subject knowledge. Mostly these types of questions are subjective. The students are free to express their views with the restricted word limit. It is easy to construct by the teachers, but the teacher has to use rubrics to evaluate the essay types questions since it is subjective.

5. File Response Questions

In this type of question, the test-taker has to upload a file from the computer in which they take the test or mail or internet as a response to the question. Learners can prepare the content before the test and submit the file during the test as a response. It is very useful in case of large text and image designing. The teacher has to grade this type of questions manually. It is easy to construct. Higher order thinking skills can be assessed by using it. It takes time from students to prepare and teachers to evaluate. Rubrics will make the evaluation easier. The students and the teacher need a good internet connection for the students to upload the file and teachers to view the file.

6. Quiz Bowl Questions

The students had to choose the correct question for the given answer from the list of questions. It needs more work from the teachers. It is easy for the students to answer. It is like MCQ in which the students have to choose the question instead of the answer. The students are given with the statement followed by several questions.

7. Ordering Questions

In this type of questions, test-takers choose the right arrangement of a sequence of items. For example, it may be events from history, which the test-taker has to arrange it in chronological order, or a story, which they have to arrange. It may be given in two forms such as each event followed by numerical options from which the students have to chlick the position of the event to show its place and all the events followed by the numbers in space in which the students have to drag and drop the events in sequence.

It is hard to construct. The students should know the whole content; they can't skip any portions. It can be used to assess both simple and advanced skills.

8. Fill in the Blanks and Fill in Multiple Blanks

Fill in the Blank question may be in the form of statement, sentence, or passage with a blank space where the students type answer. It is an open-ended objective type question. It is used to assess the knowledge and understanding of the students. It is easy to construct and evaluate. To type an answer, either the students have to type the answer in the given space directly in the question or the space given below. It may be a one-word answer or a phrase.

Comparatively, with MCQs, it needs some time since the students have to type the answer. In this type of questions, there is a possibility for auto spellchecks. So, the teacher has to disable all those things before they conduct the test.

Small and big paragraphs with multiple blanks are used in Fill in Multiple Blanks questions. The students have to type a suitable answer in the given space.

9. Jumbled Sentence

List of words or phrases is given to the students in which they have to choose one to complete a sentence. The similar list of options appears for all the blanks, which include both the right answers and distractors.

10. Drop-down

Drop-down questions are similar to multiple-choice questions. The responses in the drop-down will be inside a box; the test-taker must click the box and should sort the answer. This type of responses is mostly found in online applications for examinations.

11. Matching

Matching questions have a slight variation from MCQs. In this type of question, there will be two-columns. The first one for test item or questions, and the second is for the corresponding responses. The test items will be on one left side of the page simultaneously; on the right side of the column; answers will be in a jumbled form.

12. Drag and Drop

Drag and drop is a method by which an image or an object can be dragged from one particular place and dropped in the desired location. The test-taker used to drag and drop the files from one folder to another in the computers. As a test item, it is used into reordering the puzzle cards, sequential ordering of numbers, dragging the picture of an animal near to their names.

13. Listening Comprehension

During this test, test-takers are made to listen to recordings of discussions, lectures, and speech of different personalities or to live ongoing discussions. Following each audio, a set of questions will be given from the audio. Based on the performance of the learner in the test, listening skills will be accessed.

• Online tools for e-Assessment

Educational technology has grown manifold during the pandemic time creating scope for innovative technologies .Online evaluation tools which are most frequently opted were Kahoot, Google forms, Hot Potato, Quizzes, and Google sheets also.

Slip test was conducted through e assessment mode using quiz option. Assignments were accepted from students where they have to upload a file of mentioned format. For summative exams students were asked to answer Essay questions in the online text box.

To draw conclusions based on their experience of e Assessment, a google form was created with certain questions such as

Questions	Yes	No
Were the necessary facilities provided to take the e –test	65%	35%
How easy is taking up e-assessment	78%	22%
How much genuine are the e – test results	67%	33%
Is e-assessment time saving	96%	04%
Can the test be taken remotely	98%	02%
Does it need to have basic computer skills to take the e-test	89%	11%
Was necessary training given to students before logging in to e–assessment	58%	42%
Do you prefer for only e assessments in future	71%	29%
Do u think pen n paper assessments still play an important role in assessment process	92%	8%
How about blending traditional and the e assessment method	94%	06%

Responses for these questions were collected and findings were mentioned as below. It was observed that students find assessment as the best alternative for exams during pandemic. Later the similar e assessment was conducted in college premises in labs with proper proctoring. Many agreed that test can be taken comfortably if proper internet facility is available along with good supporting device even from remote places also. As it is a well-known fact that digital education is here to stay in the future, e assessment cannot be confined to rare occasions. Many are in support of traditional mode of evaluation but are also enthusiastic towards the innovative e assessment methods as they are easily accessible

- **Pros &Cons of e-Assessment**

This mode of assessment increases students' motivation level as they get the feedback immediately when compared with paper tests. This mode encourages students to answer questions of higher order thinking levels. E-Assessment is a boon for all those distant learners who find it very difficult to move far off places to write exams. Since the learning and assessment both are according to learner's feasibility, it provides a platform which is cost effective. Now there are many innovative ways to control online cheating during evaluation. Thus, this method can play a vital role in implementation of active learning strategies. Beside these many advantages it still has grey areas. e-Assessment is possible only when proper internet facility is provided and the device to be used should be of upgraded version. There are instances where students couldn't write their exam because their device was not able to support the software. Even some exams demand good band width data to successfully complete the test. This will ponder financial burden on the learner. Lack of awareness about e- test also triggers panic among learners. Time management is also to be taken care while attempting online e assessment. There is always a concern about authenticity of online assessment.

3. Conclusion

After examining the responses and studying the advantages and difficulties of e -assessment, it can be concluded that this mode can be a good tool for evaluation but need to be more user friendly with proper proctoring. Blended mode of evaluation can contribute more for the proper assessment of the learning outcomes. Teachers or examiners should choose a particular method of e – Assessment based on the criteria to be evaluated. e –Assessment is going to be an integral part of assessment and evaluation process.

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