



Unlocking the New possibilities of Assessment and Feedback in a Digital World

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ABSTRACT

This research paper focuses on specific technological innovations emerging from the digital revolution. Progressions in technology strongly stimulate our lives, counting the field of education. The present paper has shown ways to enhance assessment and feedback, by various tools that leverage various types of technological evolutions that include cybernetic, human-computer interface and digital experience, Automated learning and synthetic intelligence, adaptive assessment, online proctoring, game based assessment, e-portfolios, online discussions and collaborative tools, online quizzes and tests, digital badges and micro credentials systems, screencasting, web-based peer assessment platforms, etc. has caused the evolution of a range of “e-learning” software’s that are being utilised in enriching learning experience. These technological innovations have also provided opportunities of standardised assessments for the new generation. With new technological advancement the entire assessment and feedback process has been transformed as these practices have become engaging, adaptable, innovative and easily accessible through both synchronous and asynchronous mode. This digital revolution has empowered



teachers and children to achieve their goals through greater engagement.

Introduction

Assessment in education is a powerful tool that influences learning outcomes and achievement of both teachers and students. Feedback acts as a backbone for any type of assessment and stimulates future engagement with the teaching learning process. With new technological advancement the entire assessment and feedback process has been transformed as these practices have become engaging, adaptable, innovative and easily accessible through both synchronous and asynchronous mode. It has not only empowered teachers by streamlining the workload but also has the potential to empower children to evaluate their performance and achieve their goals through greater student engagement. Rapid evolution of technology like cybernetic, interface for digital users and digital experience, Automated learning and synthetic intelligence and this has caused the evolution of a range of “e-learning” software’s that are being utilised in enriching learning experience., this technological advancement has also provided opportunities of standardised assessments for the new generation. Furthermore, using technology for simulated environments makes it possible to evaluate knowledge and abilities in contexts which are more similar to "real life" applications of those abilities. Assessment is a data collecting process about learners in order to help appropriate decision-making about their achievement and growth (Cooper & Coweive, 2010; Gullickson, 2003). “Assessment is the collection of relevant information that may be relied on for making decisions” (Fenton, 1996).

Nicole and Macfarlane-Dick (2004) stated that “Feedback is used to encourage teacher and peer dialogue around learning; help clarify good performance; provide opportunities to close the gap between current and desired performance; deliver high quality information to students about their learning; and also provide information that teachers can use to help shape their teaching.” Educational Institutions are finally shifting from the conservative (teacher-led pattern) to a more personalised (about learner-centric) model of teaching. With hybrid learning mode now educational institutions are forced to invest in e-learning platforms and shift education towards online mode (Infosys Limited,2023). With modern technologies, schools will be able to conceptualise digital resources for educators, learners, and administrative staff to regularly update their mode of assessments and feedback.

“Assessment, in the teaching–learning process, is a device used by educators and learners during their instruction to offer the required feedback to change on-going teaching and learning to help pupils achieve specific goals (Robinowitz, 2010).” Assessment, as put by (Popham, 2008) is a planned process in which



educators use data on learners' progress to change their continuing educational techniques or learners use it to modify their existing learning approaches. "Assessment seeks to enhance education and remove the distance between pupils' present learning situations and their desired educational aims (Popham, 2008; Robinowitz, 2010 & Heritage, 2012)." Feedback is considered to encompass all communication from an educator to a student following appraisal of a student response. (Sadler, 2010). Shute (2008) defined "Feedback is information communicated to the learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning." The issues that come with this new kind of assessment are unique. For instance, if we compare the classic standardized exams based on a straightforward set of discrete questions or short tasks, they are excessively expensive and very difficult to create.

Objectives of the study

- To study the concept of assessment and feedback in educational settings.
- To find out how digital innovations facilitate, promote the assessment and feedback.

Methodology of the study

This conceptual paper defines the new possibilities of assessment and feedback in to digital world. This paper analyses and discusses the new innovations of digital world an assessment and feedback strategies which are directly related to learning outcomes. This research paper uses ResearchGate, google scholar, academic database, research generals, text books and educational blogs to study the latest digital innovations.

Digital technologies which are used for assessment and feedback are discussed as follows:

Adaptive Assessment: Adaptive assessment is artificial intelligence and machine based online assessment tests. They are specifically made for each student based on their previous performance in the assessment. These assessments allow administration of the test based on the estimated level or ability of the student. The test begins with a medium level of difficulty and level of difficulty is either decreased or increased based on the responses of the student and the assessment is stopped when a certain level of knowledge is gained.

Online Proctoring: Proctoring in an educational setting means during examinations keeping an eye on the student to make online examination a fair process. Online proctoring comprises two components namely online assessment platform and a proctoring software. Online proctored assessments are online timed assessments where every activity of a student is monitored, data is recorded and sent to external



proctoring service for review. Foster and Layman (2013), stated that “Online proctoring refers to proctors monitoring an exam over the internet through a webcam or other hardware devices.”

The two main types of proctoring exams are-

Proctoring Record and Review: Every learner’s computer activities, webcam videos, and audios are recorded by software and go halves with the online proctoring service via the cloud and the data is then evaluated.

Proctoring Online: The teacher/invigilators observe the students in real time during the assessment. They have remote access to the student’s computer programmes and can also see and hear them via webcams, permitting them to spot signs which show test fraud.

E-Portfolio – It is a digital collection of evidence and artifacts that represents the knowledge, skills, and accomplishments of an individual or group (Lorenzo & Ittelson, 2005). E-portfolio is a comprehensive detailed document which includes student academic record, accomplishments, goals. They provide a clear view of what actually happens inside the four walls of the classroom. It helps students to reflect on their learning outcomes and receive holistic feedback on their learning. Mahara is one such web based electronic platform that allows easy creation of portfolios that can be shared with specific students or groups of students and engage in discussions. E-portfolios utilized in speaking courses as a tool for assessment have been studied by Yastibas (2015). The results of the study demonstrated that e-portfolio assessment enhanced learners’ capabilities to evaluate themselves as it allowed learners to keep track of their teaching learning progress. Moreover, it allowed them to assume concern for their education and monitor its development (Yastibas, 2015). The students became more inspired, self-assured, and concerned in their studies as a result (Heshmat, et al., 2021; Yastibas, 2015). In addition, study also demonstrated that e-portfolio assessment enhanced active participation as it gave students command over designing of their e-portfolios, what materials were selected, and how they were presented.

Clemson University (n.d.) categorizes portfolios into three main classification-

- **Showcase portfolio:** Call attention to accomplishment of the learners
- **Learning portfolio:** Justify the teaching learning process with a spotlight on feedback
- **Assessment portfolio:** Used to evaluate students’ capability on subject matter

E-portfolios are treasured, adaptable tools that have several advantages in education and career. It allows pupils to imitate their performance, obtain feedback, and formulate their finest work and display it in front



of teachers or educators. With the right scheduling and forethought, institutions can provide a stage that allows students to build an e-portfolio over the duration of entire course or degree so that they can significantly improve their knowledge and leave school with practical skills to support them to create expressive work and achieve their dreams.

Game Based Assessment- A recently developed type of standardized games-based tests for education has been made possible because of recent developments in digital technology, as long as educational institutions use assessments that are capable of measuring more complex abilities than previous standardized tests. Game-based assessments have the ability to raise testing standards and extend evaluation to access higher order skills. These types of assessments will probably be used in addition to traditional exams, which have benefits of their own. This viewpoint is demonstrated by three game-based examinations that incorporate a variety of cutting-edge technology. These game-based evaluations allow for the better measurement of some parts of learners' cognitive capacities, particularly in more conventional subjects like science and mathematics, as well as the assessment of a wide range of talents (such as creativeness, working together, cooperation, critical thinking capacities).

Virtual reality (VR) and augmented reality (AR) simulation games are significantly being developed, evolved and adopted for various teaching-learning and training purposes (Kaplan et al., 2021). In the domain of engineering, games (desktop, VR and AR) can be utilised to present difficult-to-imagine concepts and knowledge, molecular activities and also helps to design/perform unsafe or expensive environments/ experiments that would have been very difficult/impossible to access/present in the classroom (Fracaro et al., 2021). Games are probably going to be more appealing to educators as a teaching tool because of these technological elements. With better technological advancements and better internet services available, the use of augmented and virtual reality for education is expected to rise even in future.

Gamification is becoming more and more popular in the sphere of education because it has a significant impact on student learning (Goksun & Gursoy, 2019). Gamification is an instructional technique that can be applied to raise student interest and participation in the process of learning, motivate and inspire students, speed up learning, and encourage them to learn new material (Gokson & Gursoy, 2019; Lopez & Tucker, 2019). However, a number of game-based standardized tests have already been effectively created and will probably comprise a portion of the evaluation methods used on tomorrow's students.



Assessment Analytics- Personalized learning experiences and areas where students require support are recognized by instructors with the use of assessment analytics. Academicians can better anticipate their students' academic performance by using predictive analytics to act before it's too late to improve the learning outcomes for those they teach. Identifying the unique strengths, weaknesses, and learning patterns of every learner is made simple with the use of the data that is presently available. Educators can tailor their lesson according to the student's needs in order to enhance their academic performance (Vijay, 2023). The benefits of assessment analytics in teaching learning processes work in dual ways. It helps academic institutions with refining organizational processes as well as magnifying the learner's journey, in and out of the classroom. "The measurement, collection, analysis and reporting of data learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" is how the Society for Learning Analytics Research (SOLAR) defines learning analytics. Several researchers (Price, et al., 2010; Carless et al., 2011) have developed treatments with novel evaluation tasks to offer feedback. By encouraging the use of data to guide decisions that bridge any gaps between actual and reference levels, learning analytics approaches help to advance student learning.

Screen casting- The usage of screencasts and their potential to alter the way language learners have access to feedback on written assignments. As stated by Payne (2022) screencast feedback aims to establish rapport, inquire, offer advice, inspire, and enhance students' future work. It acts as a clear call to action for purposefully created digital feedback procedures and tools that go beyond the use of technology for grade justification, remedial corrections, and domineered telling, and instead focus on developing tools that will empower both educators and learners alike.

Online Discussions and Collaborative Tools: These are the platforms that allow collaborative assessment, where learners engross in online discussions, group projects, and peer review activities. Online tools can support learners to gain additional prospects for in-depth collaboration and association with their peers, guides and study subjects that enhance their critical thinking skills. With the use of digital tools, students can "teach and learn" at any time and from any location, engage in written communication, and learn at their own rate. In addition, because discussions are "invisible" online, these tools help those that are afraid of being embarrassed online (Hussin et al., 2019).

Learning Management Systems (LMS): Platforms for learning management systems (LMSs), such as Moodle or Canvas, frequently have tools for managing tests, monitoring student progress, and giving feedback. The usage of LMS in education is causing the traditional teaching and learning process to rapidly lose its value. Using learning management systems in the classroom, mentors can keep an eye on



a learner's progress about program completion, knowledge breaches, engagement and involvement level, and time to finish the course. Another amazing LMS feature that institutions of learning can use is reporting. These comprehensive evaluations can assist educational institutions to figure out if courses are appropriate for their present demands and whether any changes must be made (Neendoor, 2023). With the help of the reliable assessment tools that LMSs offer, we may simply analyse our students prior to, during, and after a course without interfering with the overall teaching learning process. The best learning management systems on the market can effortlessly combine assessment and instruction into a single online platform and let students to rate their own efforts as well. Learning management systems (LMSs) and other platforms have been developed in the past to support online learning (Ouadoud et al., 2017). Because information and communication technologies have been employed so often in the teaching and learning process, the use of LMSs has expanded in the modern era (Reiser & Dempsey, 2012). It provides a number of resources (e.g., chat, discussion forum, and Wikipedia) which provides interaction opportunities to teachers and learners.

Artificial Intelligence

The use of AI and machine learning algorithms to analyse and score assessments, as well as identify patterns in student performance. The ethical issues surrounding AI in evaluation are also covered in this field. Exam and assignment grading can be done faster and more precisely with the help of AI-Assisted Grading and AI algorithms. Teachers save time and are guaranteed impartiality and reliability in grading. AI technology can accommodate a variety of learning methods, as well as prepare lessons, assess prior performance, and make modifications in response to student outcomes. AI can assist in pointing pupils in the proper direction for making use of various resources and other material that is available. A huge amount of teachers' time is wasted in grading assignments and tests, AI can easily do grading and this saved time can be utilised to plan effective teaching learning instructions (Burton, 2023). Automated Essay Scoring that uses natural language processing and machine learning to evaluate and score written essays or responses.

Online Quizzes and Tests: These are Web-based platforms and software that enable mentors to generate and direct quizzes and tests. These testing software's often provide instant feedback and automatic grading. Testing and quizzing online will often provide the user with results instantly. This is good for learners because they will get immediate feedback about what they did wrong , what they need to focus on. There are certain applications that provide interactive quizzes like Kahoot, Moodle, Quizlet, Flexiquiz, Fyrexbox and Hot Potato.



Kahoot-One of the most interactive assessment tools. Kahoot is a game-based app for teachers to ask students questions in an interactive way. Questions on kahoot can be played online, in groups, or assigned as a quiz.

Features-

- Free access to resources are available for premade Kahoots
- Results are shared immediately after a Kahoot is completed which provides feedback to both student and teacher
- To make assessments engaging teachers can add photos, videos, and diagrams

Moodle- It is an open source and secure system that provides support to teachers. Teachers can build engaging, interactive assessments with a variety of cooperative and collaborative activities and tools such as forums, blogs, wikis, chat, assignments, quizzes, and with a feature of personalized feedback.

Quizlet- It is a web based application that facilitates students learning through engaging tools and games. It provides students with the opportunity to attempt practice tests and expert feedback which help them to assess their progress and reach their goals. It tracks the student process, adapts to their needs and provides students with challenges based on their responses.

Flexiquiz- This platform helps to make customized quizzes with a variety of question formats, specific settings and it can be made engaging by adding images, animation, booster points. It provides instant feedback and total points are updated.

Fyrebox- It is an interactive interface where teachers can create a stunning quiz in a few seconds. It provides options of different templates where each template can be customized accordingly. This app offers teachers to create quizzes in more than 100 languages.

Hot Potato: It is an application used to set up different types of educational services for example guessing the missing word, matching one word with another word in a list, disordering the letters etc. Academics at the University of Bristol have free access to this assessment authoring tool, which is not open source.



It enables the development of interactive short-answer, crossword, jumbled-sentence, matching/ordering, gap-fill, and multiple-choice activities in addition to longer self-test quizzes.

Digital Badges and Micro credentials Systems: Technology platforms for presenting and managing digital badges or micro credentials that recognize specific skills or achievements. A Micro credential is a short, competency-based recognition that enables an instructor to document a student's mastery in a particular area. When micro credentials are digitally presented to students they are known as Digital Credentials. Digital Badges and Digital Certificates (collectively referred to as "Digital Credentials") are shareable electronic documentation of this learning. Like Digital Badges, these Digital Certificates enable the students to share the certificates of learning on various platforms such as LinkedIn, Facebook, and with the help of email signature blocks. Worldwide universities and colleges are testing a variety of digital badging programs (Ellis et al., 2016). These initiatives for digital badging range from the creation of a new system of micro-credentials to replace traditional degree programs to the integration of digital badges into already-existing structures, such as certificates and minors. The development of a new system of micro-credentials to replace traditional degree programs is one of the goals for digital badging. Second is the inclusion of digital badges into already-existing structures, including certificates and minors. Using the Credly badging platform, Illinois State University introduced digital badges in 2015; in its first year, more than 7,400 badges were awarded to honour students (Fain, 2016). Digital badges, according to Streater (2018), could represent the next "great leap forward" in learning, assessment, and professional growth. For this reason, IBM introduced a digital badge program in 2015 in an attempt to encourage pupil engagement. Comparing the six weeks prior to the digital badge experiment, enrolments rose by 129%, retention by 226%, and course completion by 694% in a matter of weeks. After following up with the students who finished the courses and received the digital badges, IBM found that employee engagement was higher and that sales were growing, as well as that the organization's skills had improved. This demonstrates how even something as basic as a digital badge may boost completion and retention rates while improving post-completion results. Microsoft recently changed the focus of its certification program to focus on certain professions like web developer, consultant, and administrator rather than specific technologies and applications like the Microsoft Office Suite or Azure Cloud Server (Aucoin, 2019). Microsoft found that the focus of digital badging should be on the skills and competencies needed for certain professions, rather than on passing a test related to a particular product.



A digital badge consists of 3 components

Signifier: It is the visual component of the badge that represents the badge. It includes a unique name, a description of the badge and it can also give instructions on how to receive the badges.

Completion logic: this component includes the obligation to receive a badge.

It includes Trigger: indicate what an individual must do to attain the badge

- Pre-requirement: the requirement that must be satisfied before activating the trigger.
- Conditions to obtain the badge.
- Multiplier: the number of times the individual has to meet the requirement to obtain the badge.

Reward: It specifies what the user will get after getting the badge. Digital badge contains metadata that contains a clickable hyperlink to access more information. This information contains when the badge was awarded, name of the issuer, and other relevant data (Chukowry et al., 2021). Micro-credentials have undergone evolution since they were first developed. Initially, they were merely digital badges that were first established in online discussion forums and other social media platforms as a way to differentiate average users from advanced users (Wu et al., 2015). However, their purpose has migrated beyond demonstrating differences among users into a method of demonstrating skills and abilities, thus becoming micro-credentials. This evolution of micro-credentialing now provides learners with the ability to engage in a performance-based assessment that is a less expensive and a faster method of acquiring skills than a traditional degree (Fong et al., 2016; Wu et al., 2015).

Web Based Peer Assessment Platforms:

These are online systems that ease peer assessment, where learners assess the work of their peers. The use of web-based peer assessment has exponentially amplified in the last couple of decades due to its benefits for academic institutions. Among these benefits, it is usually argued that web-based peer assessment lessens mentors' load by automatically managing peer assessment data (e.g., ratings, feedback) (Bouzidi & Jaillet, 2009), helps in conducting formative assessment (Sondergaard & Mulder, 2012).

A widely quoted definition of Peer Assessment is 'an arrangement for learners to consider and specify the level, value or quality of a product or performance of other equal-status learners' (O'Donnell & Topping, 1998). Keith James Toppings (2023) used similar terms (synonyms) are in the literature (e.g. peer grading/marking – giving a score to a peer product/performance; peer feedback – peers giving elaborated feedback, peer evaluation more usually in workplaces regarding skill and knowledge, or peer review more usually in academia regarding assessment of written papers).



Use of digital Technology for Special need Students

Technology has provided us with the facility to make a classroom which provides opportunity for individual learning events, allowing teachers to provide greater flexibility and differentiation in teaching learning and in assessment. Teachers can utilize technology so that he/she can provide diverse learning and assessment opportunities and techniques that involve, educate, and support special education students with innumerable strategies intended to satisfy the needs and demands of individual learners. No longer are students stuck in assessment techniques that are suitable to only a particular group of students and they need not have to try to keep a pace they can't keep up with. (Diluksar,2018).

Technology offers a variety of assistive technology that offer students with support and immediate feedback about their work. Some of them are mentioned below-

1.Kurzweil 3000

It is a software designed for students who suffer with literacy and dyslexia. It provide following features-

- Support for languages and dialect
- Talking spell checker
- Tools for test taking, essay writing, note-taking.

2. Ginger

It offers various features that help students with dyslexia and other learning disorders with writing in tests.

It is designed for speakers of languages other than English.

- It determines any error or misspelling
- The software reads out what they have written
- Practice sessions are provided based on past mistakes of students

3. Screen Readers-

These softwares are known for text to speech applications, these evaluate the words, phrases, sentences and text passage and convert them to digital speech. They also analyse phonetic structure , detect the errors and reconstruct them. (Guha, 2017)

4. MangoMon

This software offers interactive learning material and tailored education plans that provide students with individualized attention catering to their needs and abilities. In addition, it provides valuable information to the parents and educators about their student's ability and allows them to have regular updates regarding their progress.



5.Read 180-

This software has been created for children having difficulty in reading. It creates a unique learning module for every child , giving them certain objectives to achieve fluency and help them to track and assess their progress as they continue to learn through the learning module.

Findings

This research paper has explored the various technological tools which have provided an opportunity for educational stakeholders to enhance the assessment and feedback strategies in the educational system. Various research studies as highlighted in this paper have shown increased enrollment engagement and retention of students in various courses due to better teacher and learner interactions. The technological innovations have reduced the efforts of teachers but have improved the teaching learning outcomes. Learners have been empowered to direct their learning by self assessment, self evaluation and receive immediate holistic and unbiased feedback. Furthermore, with the use of technology simulated environments are created which makes it possible to evaluate knowledge and abilities in contexts which are more similar to "real life" applications of those abilities and produce skilled students who can prosper in career and life as well.

Future Perspectives

With the significant utilization of technologies in assessment, there increases the potential of adopting pedagogical techniques which were previously ignored or criticised, because of sophistications like handling a huge quantity of information(learning analytics, developing interactive, organized, systematic feedback, and creating automated feedback mechanisms. Although technologies have always served these purposes, they are now especially well-known in the context of "emerging technologies," which Veletsianos (2010) defines as the tools, inventions, and advancements used in the teaching learning process to support a range of educational goals. In education, these techniques can stimulate learners' learning, recognise at-risk learners, and personalize learning experiences. Creating a data universe makes handling data easier for academic institutions, it facilitates scrutinizing students' data easily and becomes a world-class organization. By using modern techniques of assessment and feedback we can predict future events or trends. Technological advances have played a crucial role in promoting efficiency and inclusivity in the large field of education. Here are some ways through which educational Institutions can unlock new possibilities with modern technology.

- Utilizing online instruction and evaluation will cut down on paper use and promote environmental sustainability



- The traditional methods of assessment are very structured and limited but with the technological integration in assessment and feedback, a child's 360 degree holistic evaluation can be done and comprehensive feedback will be provided.
- With the growing complexity of our global landscape, it will necessitate the use of more adaptive, holistic and innovative assessment techniques in education that will help to produce lifelong and more skilled learners.
- With the fusion of technology and assessment, the traditional structured and standardized assessments will completely take a setback as technology will provide more fair and equitable evaluation opportunities to students belonging to diverse backgrounds, where no learner will be marginalized based on his preferred method of learning, instead they will be assessed based on their understanding.
- The fusion of technology in assessment will not only assess students but also cultivate numerous skills in them. Technological literacy will increase among students as well as teachers, which will broaden their exposure to information, improve their learning, and make them capable of employability in the rapidly evolving world of technology.

With increasing integration of technology into education the education system is undergoing significant changes that will enhance development of various cognitive skills among students which will help them in their personal and professional world. But these significant achievements will only be possible if the educational stakeholders are equipped with basic technological skills to use various softwares, applications to make personalized and need-based assessments for students. Technology also offers various other challenges like, requirement of manpower for training of stakeholders, funding for technological facilities, dealing with large amounts of data, concerns for data privacy and lack of personalized touch in feedback. Keeping in mind these challenges and difficulties educational institutions and government can collaborate with edtech companies to improve educational experiences and learning and minimize challenges. With the spirit of embracing and bringing changes, educational leaders need to collaborate to achieve the milestone of Education for All.

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