Advantages and Challenges of Using e-Assessment

Nuha Alruwais, Gary Wills, and Mike Wald

***Abstract*—Information and communication technology (ICT) has been involved in different sectors. ICT has an impact to improve learning environment and process. With the increasing number of students and the limitation of placement, a new innovation in learning is required. Thus, E-learning and E-assessment have been introduced, to offer online courses and electronic assessment. E-assessment enables the students live in remote areas to have the test in their homes, and helps the teacher to correct the exam and release the marks in short time. This paper explains the meaning of E-assessment from different opinions and illustrates the cycle of E-assessment process. Moreover, this paper discusses the advantages and obstacles of using E-assessment in learning for different domains: student, teacher, institution, and in education aims.**

***Index Terms*—E-assessment, e-exam, electronic exam, online exam, online assessment.**

I. Introduction

ICT (Information and Communication Technology) has been an assistance tool in education for a long time. The use of technology in assessment began in the 1920s', when Sidney L. Presses designed a machines for automatic testing [1]. Moreover, at the same time the schools started to use standardized assessment, and automatic scoring technology, which helped to make a large-scale testing convenient and cost-effective [2].

A massive change in many sectors, especially in education, occurred when the World Wide Web was introduced in the 1990's [3]. From that time onwards, many companies introduced their own E-assessment system. In England, Wales and Northern Ireland principles and guidance for E-assessment were introduced by JISC (Joint Information System Committee) to clarify the different qualifications regulators in United Kingdom [4].

In 2009 IMS Global Learning Consortium produced IMS Question and Test interoperability Specification [5]. In 2009 Cisco, Intel and Microsoft produced Transforming Education: Assessing and Teaching 21st Century Skills [6].

II. E-Assessment

Since e-learning and e-assessment have been introduced the learning process has developed. E-assessment has enhanced the measurement of learner outcomes and made it possible for them to obtain immediate and direct feedback [7]. It is essential to create a system to assess students, which take into account the educational goals and help students to develop their skills which will be a useful for the society for long-term [8].

E-assessment can have different forms such as, automatic administrative procedures, digitizing paper-based systems and online testing that includes multiple choice tests and assessment of problem solving skills [8]. Sitthisak et al. [9] indicated that, E-assessment includes supporting the assessment by using a computer for example: with web-based assessment tools.

However, Reju and Adesina [10] clarify that E-assessment comprises the end-to-end electronic assessment procedures. This is confirmed by PingSoft [11], in their explanation that the design of the system includes a complete examination process comprising the proposition, composing papers, signing up, examining, batching, statistics and analysis. Moreover, JISC [4] defined E-assessment as the end-to-end electronic assessment process, that ICT (Information Communication Technology) is used for the whole assessment processes from the presentation of questions to the saving of the leaners responses.

Most of the studies agree that E-assessment is an electronic assessment, in which all the assessment procedures from the start to the end of assessment should be carried out electronically. This means that the design, test implementation, recording the response and providing the feedback are all completed using ICT.

Whitelock *et al.* [12] clarify how E-assessment can work by providing cycles of the process (Fig. 1). They claim that this framework enables educationalists to address the barriers and the cultural debate surrounding E-assessment strategies. They point out that motivation is the main point that drives the application, thus, it is the first step in the cycle. They emphasize that motivation is a crucial stage in assessment. The next stage is, the design of the assessment, and then the creation phase. After that, the students commence the test and when they have finished the outcomes are delivered. Later, the data is processed and the feedback is gained. Next, there is evaluation of the outcomes and a review of the feedback. After this last step, the cycle moves back to the design and creation steps; thus, the testing, data retrieval or evaluation outcomes, depending on the outcomes and feedback to enhance the assessment and feedback in order to meet the aims of course and reach the desired outcomes.

III. The Advantages of Usinf e-Assessment

Universities adopted e-assessment, in order to obtain develop, accurate and faster method to assess students, rather than traditional measure (paper-test). This section presents the advantages of using e-assessment in different domain: student, teacher, institution, and in education aims.

A. Student

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Students prefer E-assessment, because they can have more control, friendly interfaces and test as games and simulations, which resemble learning environment and recreational activities [8]. It is, also, fast and easy to use [13], [14]. E-assessment provides immediate feedback comparing with paper test, which helps to improve the learning level [7], [8], [15], [16]. According to study in Glamorgan University and Leeds Metropolitan University E-assessment can improve the student performance [7]. Since, it increases the students motivation to enhance their performance (study in University of Winchester) [17]. Furthermore, It helps the students in remote area to learn and assess in their locations and it can take it any time, which provide flexibility for students to have the exams [8], [16], [18] .

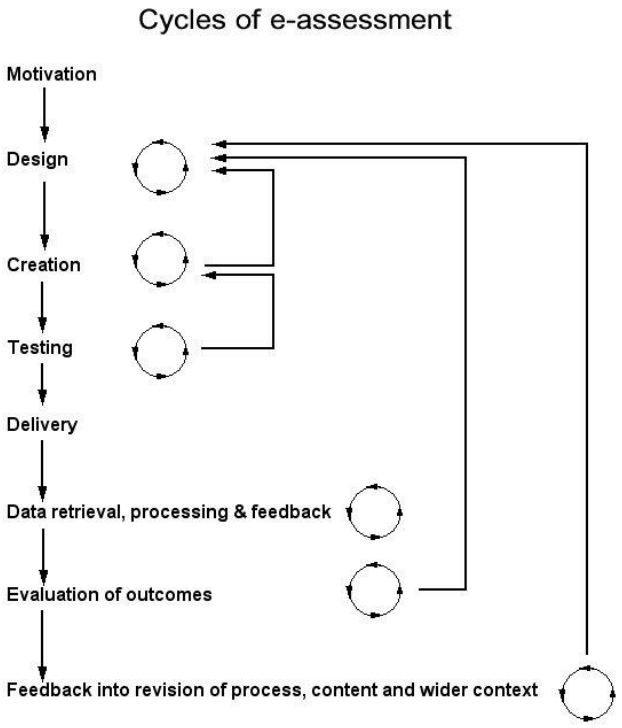

Fig. 1. Whitelock *et al.* 2006.

Regarding the students opinion about E-assessment, one of the study conducted using a survey that 88.4% of student prefer E-assessment [19]. Also, Llamas-Nistal *et al*. [3] study found that 43 of students out of 52 choose online evaluation rather than traditional evaluation. Moreover, a survey in Jorden University (JU) and Zayed University (ZU) conducted that 59% from JU and 50% from ZU preferred online exams, while 21% from JU and 43% from ZU liked traditional exams [20]. The Sorensen [21] study indicated that student feel that e-assessment play a role in higher education and it adds a value to their learning. In the University of New South Wales a survey conducted that 92% of the students approved that E-assessment helped their learning [7].

B. Teacher

The paper test consumes time from teacher to correct each paper, but using E-assessment will save the teacher time [7], [8], [14], [15], [19], [21], [22], for example, in Leeds Metropolitan University research they found that E-assessment saved up to £3000 per cohort in staff time. Also, E-assessment helps the teacher to improve the quality of feedback for the students [8], [16]. E-assessment enable the teacher to track the students' performance and make analysis across many assessment [23]. The direct feedback from E-assessment allows the teacher to find the misconceptions, which are not clear for the students and solve it out before the final exam [23]. Using E-assessment can reduce the teachers' burden to assess large student number [24].

C. Institution

Increasing the number of students, which increase the demand of fast and accurate method for assessment [8], [16]. Also, university need a timely results to arrange for places for appropriate qualified applicants, this can accrue easily using E-assessment [8]. Moreover, using E-assessment decrease the cost for institution to assess student, as the time is reduced [7], [8], [15], [16], [19], [21], [22]. Furthermore, E-assessment has its own set of security, which providing the questions and unable the student to copy the questions, also, it includes checking identification and password verification to ensure the identity of student [13], [15]. it assists to reduce student cheating by providing different question in different order [13].

D. Educational Aims

E-assessment supports educational goals, by supporting high-order thinking skills such as critiquing, reflection on cognitive processes and facilitate group work projects [8]. Also, it support the new educational goals, that focused on problem solving using mathematics, science and supported by information technology, for instant understanding and presenting the problem, especially in mathematical and scientific literacy [8]. E-assessment has the ability to sort question which cannot create it using the paper test for example software simulation, it helps to represent the information in simple and fast way [8], [13]. Moreover, it provides more accurate results than paper test, by adaptive testing, which change the difficulty of the test depend on the user response, by increasing the difficulty if he/she response correctly and decrease the difficulty if he/she chose the wrong answer [8].

IV. E-Assessment Challenges

Implementation of E-assessment in higher education could face some challenges. Different studies have investigated about these challenges and suggested solutions:

- Inexperienced student with computer or with the online assessment process [16], [19]. Students need a training at the beginning to be familiar with E-assessment [16].
- Accessibility of computer and internet [15], [16]. As solution for this problem, the universities should provide a labs with fully equipment and internet access for those student.
- Poor technical infrastructure development, especially in poor countries for instant Nigeria [16]. The government should provide fully equipment to set up and run E-assessment system.
- Ridgway *et al.* [8] discussed the difficulty in scoring and

correcting questions with student open response such as explain things. He illustrated some solutions. The success one is comparing the correlation between computer and human judges, and the correlation between the scores of two human judges. Moreover, the computer will be appropriate for questions that well defined answers such as short answer question [8]. Mitchell et al. [25] provided an example in Dundee Medical School, where the responses of exams in the school are well defined for each questions in the exams, using computer correlation. They found that Human scoring time significantly decreased and staff reported that questions quality type improved and rewrite question that can determine student misconceptions [25].

- Assessing group project is a difficult job. It needs a monitor of the communication skills, evaluate the group work, assess each member and the whole group, and provide a feedback. It is hard to use computer in this task. However, SPARK (Self Peer Assessment Resource Kit) is an academic open source project that designed to support the evaluation of effective group work, which has been used in many universities in different contexts [8].
- Some teachers unfamiliar with technology, or most of them use E-assessment for first time. Therefore, teachers need a training to be confident for using E-assessment system [8], [26].

V. Conclusion

This paper points to the benefits and obstacles of using E-assessment in learning from different domains: student, teacher, institution and educational aims. The main advantages of using E-assessment are: providing direct and immediate feedback for student, improving student performance, reducing the time and effort of the teacher, decreasing the cost for the institution, and encouraging high-order thinking, which is one of the educational aims. E-assessment faced some challenges such as: poor technical infrastructure and unfamiliar student with computer.

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