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An Introduction to Computer-Based Assessment

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Dear Editor,

With the emergence and progress of the information and communication technology, computer-based assessment (CBA) is considered as an efficient, innovative, and evolutionary assessment method in educational environments to evaluate students' performance compared with conventional paper-based one. Electronic exam is performed by means of an electronic system (computer) and enables the students to access the questions through a computer. One of the main advantages of CBA is the practical improvement of assessment exams, which is not possible in conventional assessment systems (paper-based assessment).

Educational assessment is a fundamental aspect of a teaching and learning process. The purpose of this assessment, as a systematic process, is to collect, analyze, interpret, and evaluate relevant information about students' progress and make judgments in order to achieve the educational objectives. There are many different assessment methods with remarkable influence on the students' performance.

Over the decades, the traditional paper-based assessments (PBAs) are accepted and implemented to achieve the educational objectives in many universities in the world. However, it can sometimes be hard to strategically achieve the real objective of the assessment in view by PBAs. Studies show that the conventional methods of assessment cover the elementary levels of learning (the level of knowledge) (1) and are answer-based and memory-dependent, while in a standard assessment, it is necessary to assess the cognitive and metacognitive levels of students; and the students need to be involved in deeper levels of learning such as analysis, reflective thinking, intuitive thinking, critical thinking, and creativity. Therefore, it is essential to implement new and modern methods instead of conventional ones to assess students' performance.

Today, with the rapid advancement of the information and communication technologies (ICTs) and computer systems, it is better to allow the integration and application of these facilities throughout the educational process that can be taken as an evolution of assessment in the education process. Computer-based assessment recognized as an electronic assessment (e-assessment) or electronic exam (e-exam) is an electronic system that uses ICT technology (1) and allows the students to access the questions of their exams via a computer and provides a chance to assess the students' learning.

The great benefits of the CBAs are as follows: It can be used to conduct various types of questions and improve the quality of questions; it can be presented in various forms such as multiple-choice questions, yes/no questions, true/false questions, short-answer questions, text documents, and multimedia formats such as audio, image, video clips, or in the form of complex simulations.

Some advantages of CBAs, commonly for test questions, include automatic and immediate scoring and feedback, elimination of scoring errors by teachers, test security, reduction of the costs and time (2), transparency of scores, use of computer facilities for calculations, protection of natural resources by removing paper consumption, analysis of the difficulty level of questions, analysis of student performance, etc.

Also, this method provides the ability to use some questions that are not applicable in conventional assessment methods (paper-based assessment). For instance, one of the advantages of this kind of exams is the possibility of using coloured pictures in questions; colour and high-quality pictures play effective roles in the process of answering. One of the challenges that the conventional exams face is the high costs of using colour pictures; on the other hand, black and white pictures do not have an ideal quality and negatively affect the students' answers. This fact imposes some limitations on PBAs when using pictures. Moreover, the possibility of using video or simulation facilitates the process of explaining and demonstrating a question in a real and proper way; although a long text could explain the subject effectively in a conventional exam, it cannot demonstrate the reality precisely as it is.

CBA method also encourages the students to learn their lessons more actively and seriously. In this approach, the assessment exceeds the book-based state and explicit concepts, and hidden curriculum is considered as well.

On the other hand, CBA is still a new phenomenon to assess the students' performance in the university all over the world; therefore, there are some drawbacks to integrate and use this technology in the education systems; for instance, costs associated with providing and equipping the e-exam centers with adequate infrastructural facilities make it difficult to perform a successful CBA administration (these current initiatives) in the education systems (3). Some of the students with poor ICTs knowledge and skill may face a range of problems with the new technology in the examination and need some technical assistance and training. The weak attitudes of some teachers regarding CBAs are also a critical challenge. Technical failures and challenges in case of technology are not unexpected, but it is important to be ready and arrange a back-up procedure and an alternative method for examination in times of emergency. The discussed challenges should be considered by the planners and proctors in order to ideally manage the exams in such a way to maintain this method privileges.

While the application of the PBAs is currently common in educational institutes throughout the world, some universities introduce CBAs as an innovative and essential tool to assess their students' performance. It is quite obvious that in near future, educational environments are moving toward a new digital world. Hence, e-assessment methods need to be supported and invested in the universities and the conventional PBAs should be replaced with CBAs, especially for the new generation of students raised in the modern technology era that are familiar with computer knowledge and skills.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Footnotes

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