

An Authentic E-assessment Task

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ABSTRACT

Assessment is integral to ensuring whether an academic programme has achieved its learning outcomes, as well as an essential means of providing the crucial evidence necessary for seeking and maintaining accreditation from authorities. A major element of any e-learning strategy, is e-assessment. In this digital era, academics should be encouraged to envisage various forms of e-assessment and then build and evaluate them using student feedback. A combination of information technologies together with e-learning strategies can enhance the learning and teaching process by supporting traditional, authentic, and alternative assessment practices. Benefits of e-assessments may be convenience and flexibility to learn anytime and anywhere. However, practitioners need to assess whether those benefits contribute to student learning, that students should not be disadvantaged by any e-assessment procedure and these assessments should be valid and reliable. This paper reports the findings of whether authentic e-assessments enhance student learning in comparison to the traditional assessment methods. Using a descriptive research method, this study investigated the perceptions of a group of students that were exposed to both an authentic e-assessment and the traditional closed-book assessment methods. Data were solicited from participants using a questionnaire survey instrument. A comparison of student perceptions between the different forms of assessments revealed that they are very keen on authentic e-assessments as it relates to situations experienced in the real-world. These assessments also measure the students' ability to apply the knowledge or skills, but more importantly, that it is used as a vehicle for student learning.

CCS Concepts

•Human-centered computing→Web-based interaction

Keywords

Open-book, Open-web Examination; Online-assessment; Constructivism; Closed-book Examination; Authentic E-assessment

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1. INTRODUCTION

Employers require the higher-order thinking skills described in Blooms Taxonomy of Cognitive Objectives [1] however, graduates these days lack the essential knowledge, skills and abilities required in the workplace[2]. Assessments designed to incorporate the higher-order thinking skills should be able to close the gap that, according to Paulson [3] exists between the types of jobs available and the skills that graduates possess.

According to Heijne-Penninga, Kuks [4], knowledge can be divided into core knowledge and backup knowledge. The former is the knowledge that students must know without reference to the material, and the latter is the knowledge that students need to understand and apply concerning material if necessary. Core knowledge can be assessed using closed-book assessments whereas backup knowledge can be assessed using open-book assessments. Educational researchers have found that students learn what is going to be assessed and not necessarily what is taught therefore it can be advocated that assessment drives learning[5]. It is therefore imperative that assessment methods be more authentic in order to improve student learning despite assessment of learning outcomes being a challenging and complex issue.

Recently, the application of information and communications technology has gained wider acceptance in administering and creating assessments. According to the Scottish Qualifications Authority [6] there are many debates over how assessment should be designed and administered, leading invariably to issues of curriculum design and policy. Student learning can be assessed through formative and summative assessments. The latter is more heavily weighted and can include taking an examination or submitting a project or any other means of evaluating student learning at the end of a module. Traditionally, summative assessments have taken the form of closed-book or open-book examinations.

Traditionally, higher education institutions have used various forms of invigilated assessment methods, however the students of today are from the digital age that engages very well with technology. Considering that technology enables educators to reframe schooling in order to meet the needs of the 21st-century learner, assessment methods must be enhanced by harnessing the power of technology. Academics have to keep pace with the new demands on assessments and changing frameworks as there has been a remarkable change in educational technology.

This study aims to assess whether an integrated, authentic and innovative e-assessment, that demonstrates theoretical knowledge and practical, real-world relevance, encourages student learning. Furthermore, this study establishes whether an open-book open-web e-assessment is more effective as opposed to the traditional closed-book assessment methods.

2. LITERATURE REVIEW

2.1 Forms of Assessment in Higher Education

Assessment within a higher education context takes the form of formative, summative, integrated and diagnostic assessments [7]. South African Qualifications Authority [7] outlines formative assessment to include a “variety of ongoing formal and informal assessment procedures that focuses on teaching and learning activities on improving learner attainment.” Furthermore, summative assessment “is conducted at the end of sections of learning or programmes, to evaluate learning related to the qualification that has already taken place, and the extent to which this learning has been successful”. Integrated assessment on the other hand means “assessment which involves a holistic set of assessment tasks required for a particular qualification and may consist of a written assessment of theory together with a practical demonstration of competence in order to evaluate a learner’s conceptual understanding of something through the approach taken in applying it practically”. Diagnostic assessment means “assessment conducted before teaching or training starts, to identify learners’ strengths and weaknesses, in order to use the associated information to create suitable learning environments.” [7]

2.2 Authentic Assessment

When graduates go out into the workplace, they are not asked to complete multiple-choice tests, a short answer quiz or any of the other traditional types of tests. Instead, they are given some form of performance review on their job. Authentic assessments are realistic assessments that role-play the work situation and allow access to books and the web. Boud and Falchikov [8] define authentic assessments as a form of assessment that is closely aligned with the activities that take place in real work settings. This definition is supported by Mueller [9] who defines authentic assessment as a “form of assessment in which students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills”.

Due to authentic assessments involving real-world tasks, they are likely to be more exciting and motivating for students, thus providing specific usable information about what students have succeeded in learning [10]. Authenticity is a fundamental characteristic of good assessment practice, and students usually value it highly [11].

Academics must make the conceptual shift from the traditional modes of assessment and transcend the testing paradigm by assessing with embedded, integrated and authentic assessments that are necessary to meet the needs of the 21st-century learner [12].

2.3 Open-book VS Closed-book Assessments

Closed-book assessments have been used for centuries however studies have shown that they are not useful for assessing students in situations that they will experience in the real world, they encourage recall type learning, without understanding the same and reproducing it, cheating is common, and they can be costly [13]. Open-book assessments are ideal for teaching programs that aim at developing the skills of critical and creative thinking and have two main reasons that underlay their use. Firstly to represent the professional setting as professionals do not rely on memory but rather on the job experience and secondly to assess students at a deeper cognitive level which would encourage deeper learning strategies when students prepare for the examination as this would

now be done more constructively since the need for the recall is limited. [14].

2.3.1 Open-book Assessments

A common misconception is that open-book assessments are simple assessments that require little or no preparation before embarking on it. Memorising information may not necessarily be required, but application-based knowledge is a necessity for this form of assessment. Critical thinking, creativity, analytical skills and application is vital in ensuring that the assessment outcomes are met and are relevant. These higher-order thinking skills are reaffirmed by the University of Newcastle in Australia where the central premise for open-book exams is that teachers can devise questions that require students to answer in more critical and analytical ways thus encouraging high-order thinking skills in their students [15]. The open-book assessment makes sense when one looks forward to the workplace setting, where an employee will not be given a task while not being permitted to complete it by accessing the internet. The employer expects the employee to have the fundamental knowledge for their chosen career, however further expects the employee to be able to use that knowledge to construct a solution, much like an open-book assessment [16]. According to Green, Ferrante [17], open-book exams would be a closer representation to what graduates would encounter “on the job” including for example being a pilot, program manager, or an accountant.

2.3.2 Closed-book Assessments

The interpretation of a closed-book assessment is an assessment form whereby students enter an examination venue with nothing (no textbooks, notes or any other material that would assist them), besides depending on their memory to complete the examination. This is one of the traditional forms of assessments that are still being used by many in the education and other relevant sectors today. One may question whether it is a useful mode of assessment and whether we are enhancing student performance and learning, especially considering the learners of the 21st century. Are we preparing students for the world of work in terms of deeper thinking, creativity and innovation? The answer to these questions may be met with mixed emotions as resistance to change may be encountered.

2.3.3 Open-book Open-web Assessments

Students of today are from a generation that enjoys using technology, which is stimulating and interactive. The open-book, open-web format is a very innovative way of conducting an online exam that allows students to take an examination at any location within a specified timeframe. Considering the online nature of the exam and the fact that students take the exam at their location, a regular invigilated open-book or closed-book examination paper would not be suitable. Instead, an authentic assessment kind of task requiring access to books and the web fits the bill well. The open-book, open-web approach fosters an understanding of learning processes in terms of practical problem-solving in real-world situations, as opposed to a display of inert knowledge which the learner has little chance of being able to apply, and learners are presented with unstructured problems that require the application of relevant skills and knowledge [18].

Being presented with an unstructured problem provides opportunities for a student to approach the assessment with realistic thoughts on resolving the problem and not merely regurgitating textbook theories. The integration of information and communication technologies with assessments makes this form of assessing rather distinctive as the world is becoming more digitised

each day. The open-book open- web approach is a form of electronic assessment that uses technology to generate, manage and deliver assessments and also to provide feedback to students. The use of open-book open-web assessments may generate original capabilities or skills to approach the problem as creative juices flow. Due to the nature of the assessment, flexibility is permissible, learner engagement can be improved, and overall open-mindedness is assured in terms of adapting new and enhanced digital skills.

2.4 The Authentic E-assessment Process

The student can be provided with the following in an open-book open-web examination:

2.4.1 The Context

This section of the exam is a scenario created to include a strong human dimension with lead characters, animation, images and hyperlinks to give it a real-life look. This sets the tone of the situation or problem at hand and provides any relevant information that a student may require regarding the framework of the situation or problem. A student must understand the circumstances that form the problem setting, in order for an appropriate response to the problem. Using an unclear context to a problem, may lead to misunderstanding and confusion and may defeat the purpose of the assessment form. The notion of the context section is to be simple, understandable and clear in terms of determining its exact meaning.

2.4.2 The Task

The task section of the examination places the learner in the role of a decision-maker, who can be an advisor, a researcher, business analyst, a consultant, etcetera whereby the learner is required to produce a report providing a recommended solution(s) to a particular problem. This section is equally important as the context section considering that it progresses into a more detailed segment of the problem. The task basically demystifies the problem, and it should be effortlessly comprehensible by all students.

2.4.3 The Guide

The guide to the task, which is the final component of the assessment is where the learner is provided with hints regarding theories and concepts that are most relevant to the task at hand. It may include tools and approaches that help direct the student before commencement of the assessment. An examiner must place him or herself in the position of a student assuming reciprocal roles and consideration when designing the guide to the assessment.

2.4.4 Time Allocation

Students are given a 72-hour window period which is usually the weekend (Friday 12 noon to Monday 12 noon) of the last week of the course to download the open-book open-web examination question paper. Once they have downloaded the question, they need to submit their answer within 24 hours. Students now assume the role of expert advisor, manager, decision-maker or consultant during the assessment of which he/she would draw on knowledge from experience. Understanding the learning process in terms of a real-life situation will equip learners with the ability to enter the world of work more confidently.

2.5 Information and Communications Technology in Education

The development of education can be mapped on a similar continuum as the World Wide Web from transmissive (1.0), social (2.0) to semantic (3.0) [19]. Education 1.0 locates a school in a building and is based on devices such as books and chalkboard. Education 2.0 combines elements of Education 1.0 with social media tools. Education 3.0 is delivered through Autonomous

Learning Software via smart devices. Thus, shift in education has altered the role of the teacher in the classroom. There's a shift from synchronous to asynchronous teaching, learning and assessment whereby the modes have shifted from face to face to blended or fully online.

There is a common belief that information and communications technology (ICT) in education can empower both the educator and learner, shift the teaching and learning paradigm from being teacher-centered to learner-centered, resulting in increased improvement in teaching methods and also student learning by developing their higher order thinking skills including analysis and evaluation amongst others [20]. ICTs include various digital tools that are used to enhance teaching, learning and assessment as well as support the traditional methods.

There is no doubt that assessments play a substantial role in education today and with innovations in the digital sector evolving at such a rapid pace, there is undeniably no deceleration when it comes to digitally enhanced assessments being conducted. This, in turn, creates more unique and authentic forms of evaluating. Commonwealth of Learning and KSOU [21] reiterates these sentiments of the key role that technology has to play in both the effective and efficient assessment of learning; providing educationalists with various innovative tools that they can use in the classroom; and the use of the technology in assessment involves: "the use of digital devices to assist in the construction, delivery, storage or reporting of student assessment tasks, responses, grades or feedback". The use of ICT to record student responses, to capture material produced and to convey feedback will grow as the use of virtual learning environments grows [22]. Educators' daily activities involving assessments can be simplified by using information communication technologies, for example, storage of information and by assuming the assessing role, including responses to students. Additional time can be spent on other relevant areas to support teaching and learning [23].

Technology is a tool, and like any other tool will be of benefit if it adds value to teaching, learning and assessment.

2.6 Constructivist Learning Theory

Constructivism is a modern learning theory whereby there is an emphasis on the learner-directed discovery of knowledge that begins with the learner's reasoning, which creates a mental lens that shapes their understanding of the external environment. Constructivism refers to the idea that learners construct knowledge for themselves where each learner individually (and socially) constructs meaning as he or she learns. Such an approach engages students, which, in turn, induces deeper learning and constructivists have suggested that learners be placed in situations that emulate the workplace and allowed to create their own solutions with limited support from the teacher. John Bigg's approach[24]: "in constructive alignment, we start with the outcomes we intend students to learn, and align teaching and assessment to those outcomes". Learning must be placed in a rich context, reflective of real-world context, for this constructive process to happen and transfer to environments beyond the school or training classroom. Learning through cognitive apprenticeship, mirroring the collaboration of real-world problem solving, and using the tools available in problem-solving situations, are key [25]. The development of constructivist approaches to learning theories involves the rise of new attitudes, practices and techniques within education (Payne, 2012). Constructivism applied in education today shifts the onus of learning onto the learner. It enables the learner to be an active participant, with knowledge construction

and extracting meaning from their own experiences. So in this sense, it makes the teaching and learning experience student-centred, allowing the student to focus on his/her learning abilities. Open book examinations align better with the constructivist philosophy and constructive alignment principles that are becoming the dominant mode in higher education pedagogy and regulation [26].

3. METHODOLOGY

A quantitative approach was adopted in order to answer the research question of this study. Qualitative data was also collected to supplement the quantitative findings.

The target population for this study were the thirty-one students registered for the module Management Accounting and Finance, a postgraduate course. These participants had undergone a formative assessment in the form of an open-book open-web examination as well as a closed-book assessment, making them ideal participants as they had the first-hand experience of these two forms of assessments.

This research used primary data from questionnaires that were administered with the thirty-one participants. The response rate for the study was eighty-one percent as only twenty-five participants had submitted their responses to the survey.

This study did a comparative investigation on both closed-book invigilated exams and open-book open-web exams using the Likert scale scoring system. There were eleven questions that were repeated on both types of assessment methods that focused on the period allowed, the location, the pedagogy, the quality of learning outcomes achieved, the relevance of the exam, the chances of cheating and the pre-exam preparation time. Qualitative data was elicited by asking respondents to further comment on each question on the Likert scale. The questions were repeated for both the closed-book and the open-book, open-web examination instruments conduct a gap analysis of the average scores in order to establish the relative prominence of each dimension. A 5-point Likert scale scoring system was used to record the data for each examination instrument and thereafter the results compared to provide a gap analysis. The scoring used was: strongly agree=5, agree=4, neutral=3, disagree=2, strongly disagree=1. Data were then analysed using MS Excel.

Table 1. A gap analysis of the invigilated closed book examination and the open-book, open-web examination

Statements	Open-book, open-web	Closed book	Gap
The time period allowed to take the examination was sufficient (3-4hours for closed book / 24 hours for open-book, open-web)	4.32	3.28	1.04
Suitability of exam period (Monday – Friday for closed book / weekend for open-book, open-web)	3.72	2.72	1.00
Physical location (examination venue for closed book / any location for open-book, open-web)	4.15	2.24	1.91

Statements	Open-book, open-web	Closed book	Gap
The examination was aligned with the pedagogy employed during the course	3.76	3.40	0.36
The examination achieved learning outcomes of a high standard	3.47	2.52	0.96
The examination was intellectually challenging	4.52	2.96	1.56
The examination format suited various learning styles (auditory; visual; reading/writing; kinesthetic; multimodal)	4.04	3.36	0.68
The format of the examination was relevant to the world of work and education	4.20	3.48	0.72
Content of the examination was engaging	3.84	2.56	1.28
Structure of the examination enabled cheating	2.64	2.72	-0.08
Requires a lot of preparation time	2.36	4.20	-1.84

4. RESULTS

The results of the study revealed that the open-book, open-web approach is superior to the traditional invigilated closed book approach on the majority of the statements, except the cheating factor, whereby the results reflected more or less similar scores between the two types of exams (-0.08 gap) as indicated in table 1. Qualitative responses from the participants with regards to the statement on cheating suggested that no system is perfect. Some of the comments included: *cheating is minimized with the open-book, open-web examination as it is designed as a case study; plagiarism, fabrication and cheating are more easily detected with the open-book, open-web exam as it is an e-assessment; the lecturer would notice if the style of the answer submitted by the students were consistent with that of previous material submitted throughout the course; students can ask a third party to their online assessment if it is not an invigilated assessment.*

The physical location (+1.91 gap) was seen as the most important factor in favour of the open-book open-web approach's superiority over invigilated closed book examinations, as students felt that a flexible location allows them to more easily manage their exam schedule to fit with family and work commitments. One of the respondents indicated that "completing the examination in the comfort of their own space, being their home or workplace, does reduce stress levels associated with traditional examination venues, and also improves their chances of better exam performance."

The engaging content of the exam (+1.28) and the fact that it was intellectually challenging (+1.56) also came up as important indicators of the open-book, open-web approach's superiority in the gap analysis. Some respondents indicated that the use of real-world case studies used provide them with opportunities to engage with current issues in a particular field, making their learning

clearly relevant to real-world situations and supporting critical thinking.

It was also noted that internet access enriches the quality of learning and submission of the examination.

5. CONCLUSIONS

Students will learn what they want, where they want and when they want. Academics have to engage these students to become active learners that are motivated, self-disciplined and who learn through discovery by being more creative in terms of their teaching, learning and assessment practices. The internet has not only opened up new avenues for these practices, but has also replaced many traditional forms of teaching, learning and assessment.

This study explored the benefits, challenges and methodology of an authentic e-assessment conducted in an online course. A comparison was made of student perceptions of an authentic e-assessment and the traditional closed book assessment. The results of the study revealed that the open-book, open-web approach is superior to the traditional invigilated closed book approach. Students of today are from a generation that enjoys using technology which is stimulating and interactive. Academics should be utilizing assessment methods that are integrated, authentic, and innovative, demonstrating theoretical knowledge and practical relevance, underpinned by learning theories and pedagogy. The open-book, open-web examination format is an example of one such assessment method that allows students to take examinations at any location within a specified timeframe, thereby permitting flexibility and encouraging originality. The open-book, open-web approach is a very innovative way of conducting an online exam and requires an authentic assessment kind of task to be set, that requires access to books, articles, newspaper references, the internet and any other relevant source. Traditional methods of assessment are still commonly practiced, and academics are resistant to changing as this would involve transitioning from one state to another and quite often, it is the uncertainty of the transitional period instead of the change itself that forms the basis for fear and opposition [27]. Grey and Ferrell [27] further state that some of the crucial stages in implementing change to assessment and feedback practice are: “open up dialogue about feedback and assessment, realise that acceptance is not the same as action and recognise that the process of transition to a new state can generate more resistance than the end goal”. Transitioning from the traditional practices to the innovative and enhanced method of assessing is necessary as transformation is inevitable.

The results of this study revealed a positive outcome in support of the open-book open-web approach where majority of the statements were favourable towards this innovative examination format as opposed to the invigilated closed-book format. Since there is roughly an equal scope for cheating with both approaches, then it would make sense to utilize the assessment method that maximizes student learning, namely the open-book open-web format.

Deeper learning, exposure to realistic situations, interactivity and creativity are some of the elements of authentic assessments that must be embraced to provide students with a more realistic approach to problem-solving. A commitment to an authentic assessment is the buy-in that is required from academics, where real-world problems are allowed to take centre stage, and technology can be harnessed to engage the student. Assessments are crucial in the education sector in its entirety, and assessment endorsements to a student lead to a more encouraging learning experience. Integrating information communication technologies

with an assessment create a unique experience for students and potential dual benefits are anticipated in the real working world.

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