

TAXONOMY for the DEVELOPMENT of an ASSESSMENT MODEL of LEARNERS in a HYBRID LEARNING ENVIRONMENT

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ABSTRACT

The field of education has been influenced by the rapid pace of advances in technology just as in other fields. Instructional and learning technologies have affected the way courses are designed, developed, delivered, and assessed. On the one hand, classroom or face-to-face instructional methods enhance interaction, immediate feedback, and controlled assessment. On the other online or web-based instruction has proved to enhance flexibility, enrollment growth, and student retention. To obtain the benefits of both methodologies, hybrid learning was introduced as a means of instruction and learning that combine the features, and consequently, the benefits of both classroom and online learning methods. As with all educational systems approaches, the effectiveness of a system is evaluated by its contribution to student learning. This means that assessment of student learning is always an important aspect to consider in the application of any instructional methodology. While the literature talks about classroom assessment and online assessment, very few research papers talked about assessment in a hybrid learning environment. Based on the literature related to assessment models used in both instructional methodologies, a model is presented for hybrid learning assessment. The model combines the features of assessment related to both classroom and online assessment models.

Taxonomy for the Development of an Assessment Model of Learners in a Hybrid Learning Environment

Introduction

Today's world is highly driven by technology. All organizations in various sectors: business, education, healthcare, banking and finance and others are influenced by the rapid pace of technological developments and innovations. The education sector, where student learning is a core aspect to take into consideration, is highly influenced by technology. In fact, technology made it necessary for certain transformations to take place for the benefits promised by technology to be realized (Garrison & Kanuka, 2004). This technology effect presented itself in various forms, ranging from using instructional technologies inside the classroom to running the whole course away from classroom boundaries, thus offering students with the chance of having access to higher education regardless of place, time and constraint. What one might wonder about at this point is the effectiveness of each of these two forms. While each of these two modes of instruction has its advantages and disadvantages, the need would be for a method that will combine the positive features of both, and would provide both the educational institution and the student with competitive and learning advantages respectively. This need is being satisfied with the emergence of a new wave of learning called "hybrid learning".

Hybrid learning which is also called blended learning is a blend of both: classroom or face-to-face learning and online learning (Garrison & Kanuka, 2004). While face-to-face-learning is referred to as synchronous, online learning is termed as asynchronous (Schullman & Randi, 1999, Garrison & Kanuka, 2004, and Howard et al, 2006). As it is commonly known, classroom instruction-learning takes place inside the classroom, where students gather in a physical place (the classroom), listen to lectures, hand in homework assignments, and take scheduled examinations. On the other hand, in on-line learning, students complete their assignments on the Internet, post their questions and/or their comments on a discussion forum or electronic board, and meet with their instructor and their peers in an internet chat room. In other words, they learn more by performing than by listening and have more frequent assessment feedback (Tuckman, 2002).

It was stated by many researchers that blended learning offers both students and universities with several advantages (for example, Picciano, 2006 and Ellis et al, 2006). As an example, blended learning can play an important role in enhancing the enrollment rate to universities and in providing means for more access to education (Picciano, 2006). Also, Singh emphasizes in his article that blended learning offers more choices to benefit educators and learners than either classroom based or web-based learning alone (Singh, 2003). According to him, blended learning can make use of the powerful Internet technology, and at the same time, provide the elements lacking in web-based instruction, such as engagement and social contact. Using Khan's Octagonal framework, Singh defines the major dimensions of blended learning, and concluded that blended learning offers more choices for instructors and learners, which makes it a preferred

instruction method for many organizations. The dimensions available in Khan's Octagonal framework include: pedagogical, technological, interface design, evaluation, management, resource support, ethical, and institutional dimensions (Singh, 2003).

Moreover, Picciano suggests that blended learning can improve student retention in higher education. He reveals the fact that research on blended learning is not yet developed, but hopes that a research interest in the impact of blended learning on enrollment, access, and retention gets established (Picciano, 2006). In addition, others believe that hybrid learning enables the presentation of material in a broader context and in an integrated manner (Atiken, 2006). Furthermore, research about the value of a hybrid format shows that hybrid learning is effective in teaching important concepts (Katz, 2008).

The major point is whatever the instruction method is, and whatever the learning content is, the student performance against a set of learning outcomes or course objectives should be assessed. In other words, student assessment should take place whether the learning environment is an online or a traditional classroom environment.

Statement of Problem and objective

Working in this rapidly developing world requires that university graduates have not only the needed knowledge, but also the appropriate skills to be effective and productive in the workplace (Bousalma et al, 2003). This means that instructional methods and assessment methods should take into consideration this important requirement.

The review of literature shows researchers have talked about assessments taking place in face-to-face and in on line learning environments. Also, several research papers have introduced hybrid learning models (such as Troha, 2002 and Martyn, 2003); however, no contribution was made regarding the establishment of a model related to hybrid learning assessment.

The objective of this paper is to present a model for hybrid learning assessment that will integrate the elements related to both face-to-face and online learning contexts. The model is intended to help faculty and educational institutions take into consideration all the factors that would lead to effective assessment strategies in a context that includes both classroom and online aspects.

What is Assessment?

In an attempt to unify theories of different and experimental psychology, Cronbach (1957) emphasized the importance of linking cognition and learning with the practice of assessment. According to him, such a link, when properly explained, will help explain educational psychology, which measures students' readiness for various types of teaching, and invents new methods of teaching that would be convenient for different types of readiness (Cronbach, 1956). What Cronbach said is important in 2 ways: (1) learning and instruction should be linked to assessment, and (2) assessment indicates the level of fitness between students' readiness and the teaching method used.

Coming back to assessment, it is a means used in academic institutions to measure the scholastic ability of students (Pelligrino et al, 1999). Since this instructional ability is affected by the instructional methodology or program, then a process-based performance model needs to be developed in order to understand and even enhance academic achievement (Pelligrino et al, 1999). In the 1980's through the early 1990's, assessment of students was guided by curricular frameworks. Later on, goals for assessing aspects like higher order thinking, problem solving, analysis, reasoning and others were set. Moreover, during the 1990's, research work emphasized the importance of improving learning outcomes by directly linking assessment to classroom practice (Pelligrino et al, 1999). Based on this, the design of the learning environment and the associated assessment practice used can determine to a huge extent the students' understanding and learning levels (Duschl and Gitomer, 1997).

It is important at this point to differentiate between the two assessments related to the two instructional methodologies highlighted in this study: the face-to-face methodology and the online methodology.

A- Face-to-face (classroom) Assessment

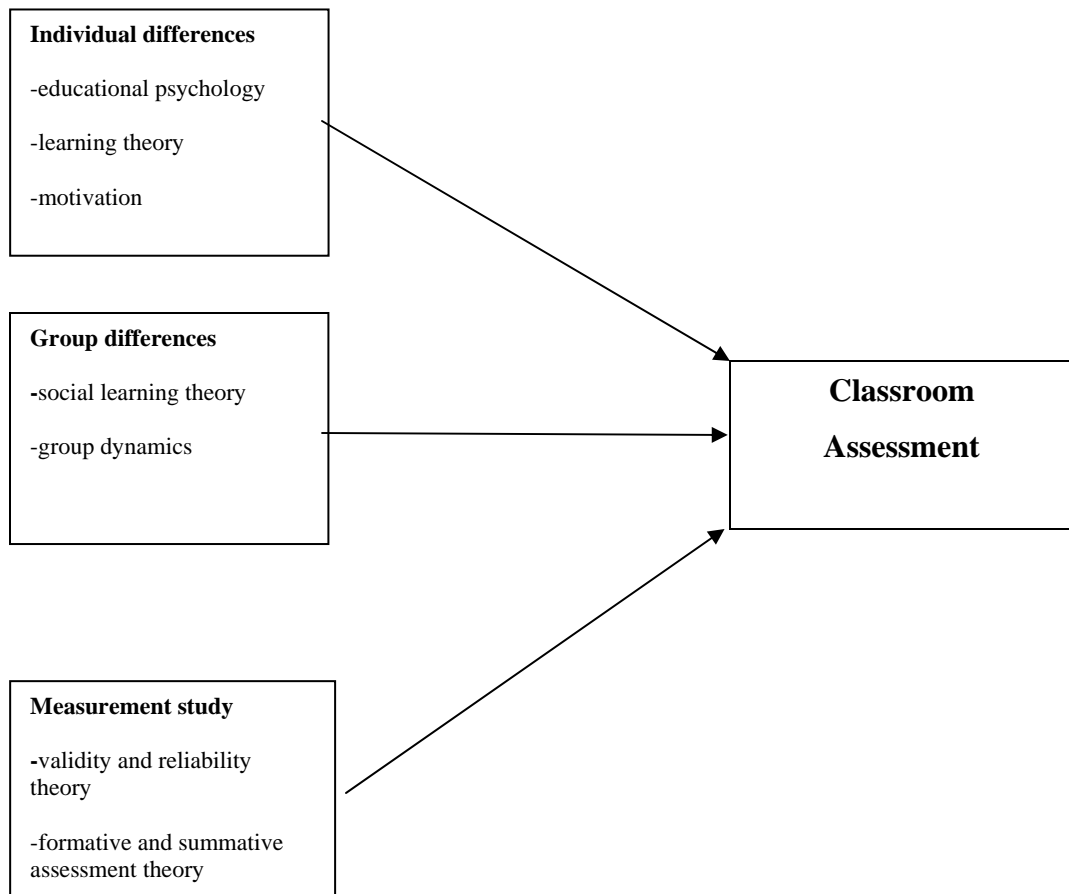
A lot of research work has reported that the purpose of assessment is to help students learn and that assessment constitutes a large part of education. In fact, theory relevant to studying classroom assessment roots back to the study of individuals (psychology), the study of groups (sociology), and the study of measurement principles (validity and reliability) (Brookhart, 2004). Of course, integrating these various theories together would allow for a richer understanding of the assessment process in a classroom environment. The model for classroom assessment as based on these various theories is clearly shown in Figure 1.

In face-to-face learning environments, assessment would include the following (Brookhart, 2004):

- oral questioning,
- class or individual discussions,
- informal observations,
- commenting or marking work,
- behavior and interaction,
- paper-pencil exercises, and tests
- Online Assessment

Since the learning environment and instructional context in the online instruction method are different, it is important to understand the instructional and assessment strategies that are most effective in the online learning environment. As in the classroom environment, using a variety of instructional methods to match with the various learning styles is extremely important. In addition to this, an interactive learning environment that supports group work should be promoted (Gaytan and McEwen, 2007). As for online assessment, strategies would include having a wide variety of clearly explained assignments on a regular basis and providing meaningful and timely feedback to students regarding the quality of their work.

Figure 1: Classroom Assessment Model



Effective assessment techniques in the online environment would include a combination of: (Gaytan and McEwen, 2007)

- projects,

- portfolios,
- self-assessments,
- peer evaluations, and
- weekly assignments with immediate feedback

The role of meaningful feedback cannot be overemphasized.

Student assessment in an online environment is influenced to a great extent by the theory of dependability (Weippl, 2007). Dependability theory includes as its major components four important elements: availability, reliability, integrity, and maintainability (Weippl, 2007). Referring to Avizienis's (2004) definitions, Weippl addressed these major issues related to dependability: (Weippl, 2007)

As for availability, it addresses the readiness of a system to provide correct services, especially critical-time tasks like exams.

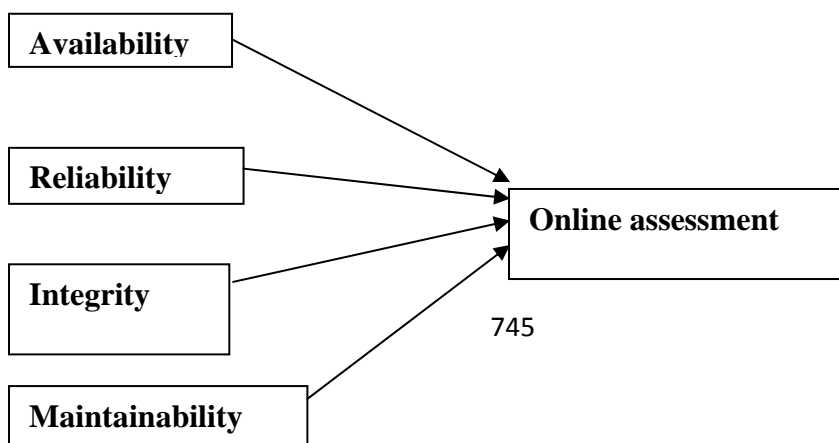
Reliability refers to the continuity of correct services. For example, in e-assessment, the process of question selection should reliably produce valid exams in all cases. Equally important is the reliability of the grading process.

Integrity in e-assessment includes both integrity of applications and integrity of data. Integrity of applications guarantees the protection of the secrecy of exam questions before the exam, and integrity of data ensures that the exam questions and the student answers are protected from unauthorized access. Equally important is ensuring the correctness of the identity of the sender at all times, which can be done by audit mechanisms and digital signatures, for example.

Finally, maintainability refers to the flexibility of the system in being modified, updated, or repaired. In this respect, modularity can facilitate such activities, allowing for the parts to be tested and upgraded to be worked on instead of working on the whole system.

The online assessment model is shown in figure 2.

Figure 2: Online Assessment Model



In fact, whether the discussion is about online or classroom assessment, the literature mentions two important forms of assessment in general. These are: formative and summative assessment (Harlen & James, 1997; Pelligrino et al, 1999; and Murtha et al, 2006). To start with, both formative and summative assessments are required by the national assessment policies to ensure that the learning process is being run effectively (Harlen and James, 1997). As for formative assessment, it refers to providing students with regular feedback on their progress, and as for summative assessment, it refers to making judgments of the student achievement of the course objectives (Philips & Lowe, 2003).

Blending Face-to-Face and Online Instructional Methods: A Comparative Advantage Approach

Based on the advantages and the disadvantages listed about face-to-face and online learning approaches, and depending on the fact that blended learning is a blend of both approaches, a comparative advantage framework was suggested to discuss the learning activities that are best run online and the others that are best performed face-to face. The results show in Table 1.

Table 1 Comparative Advantage: Face-to-face vs. Online learning tasks

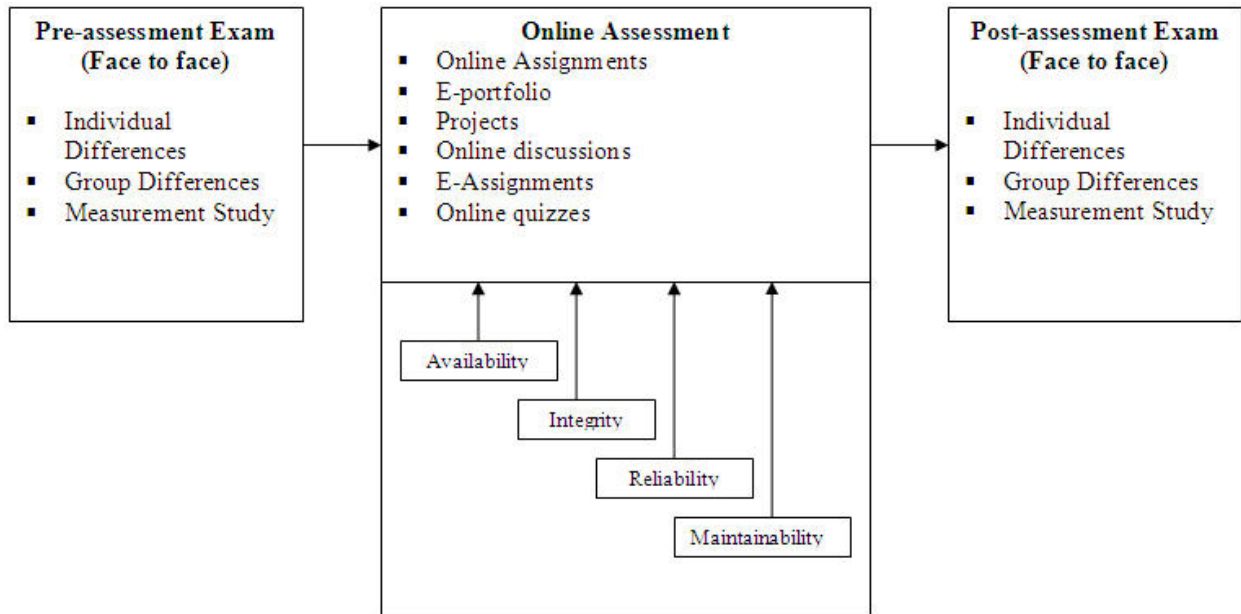
Comparative Advantage: F2F vs. Virtual		
Activity	F2F Only	Virtual Only
Lecture Monologue	Disadv	Advan
Two Person Discussion	Disadv	Advan
12 Person Discussion	Advan	Disadv
Simulation	Advan	Disadv
Course Mechanics	Disadv	Advan
Problem Solving	Advan	Disadv
Integration of Concepts	Advan	Disadv
Exercises w Branching	Disadv	Advan
Visualizations	Disadv	Advan
Repetitions	Disadv	Advan
Monitor student reading	Disadv	Advan
Testing	Advan	Disadv

Source: Smeaton, 2001

As could be noticed, none of the methods is a complete one by itself. This is why a blended learning approach would prove to be more useful than any of the learning models classroom or online alone.

Based on this and since the face to face approach is more advantageous to students' testing and assessment than the online approach, a model for an effective hybrid assessment is needed. Following is the proposed model for this study.

Hybrid Assessment Model



Conclusions and limitations of the Study

After conducting a review of literature related to online as well as face-to-face learning approaches and assessment models, a model for hybrid learning was developed and proposed. The model takes into consideration the major features available in each of the two learning and assessment models, and attempts to integrate the benefits of each in order to provide educational institutions as well as faculty and students with an effective means of assessment that blends the benefits of each type of assessment with the other. The model can be useful to students, faculty, and educational institutions in terms of efficiency and effectiveness measures.

The major limitation of this study is the narrowness of the literature review available. There is not adequate research on blended learning assessment strategies. This limitation could have been overcome by collecting field data and conducting interviews regarding hybrid learning assessment activities. Future research is needed to take such limitations into consideration and try to validate the model in a more practical way.

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