Using Mobile Phones for Educational Assessment

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INTRODUCTION

Educational assessment is defined as collecting information about the content and depth of student knowledge to help teachers, administrators, policy makers, and the public presumably for the purpose of enhancing future outcomes (Pellegrino, 2002). Mobile assessment (m-assessment) stands for assessing learners via mobile devices. For the purpose of this study, m-assessment refers to assessing learners via mobile phones, i.e., tools that have calling and texting functions. Mobile phone applications (applications or apps) stand for small software programs that can be installed to smart phones to enhance capabilities of smart phones. Computerized Adaptive Testing (or computer adaptive tests) is using computers in administering tests to tailor the test to the examinee's trait or ability level (Chang & Ying, 2007).

OVERVIEW

M-assessment is rooted in incorporating technology into educational assessment. The National Research Council (2001) stated that technological advances had enormous potential for advancing the science, design, and use of educational assessment, especially in classroom assessment context. It was suggested that influence of technology would spread beyond classroom tests and high stakes tests were seemed as influenced. For example, Bennett (1999) claimed that test design, item generation, task presentation, scoring, and testing purpose and location for high stakes testing would be influenced. Incorporating technology into educational assessment started with implementing computer-based assessments, then mobile devices such as Personal Digital Assistants (PDA) and iPads and iPods were used. Almost all affordances of these little computers were collected and in one single piece of equipment: mobile phones. Educational assessment also benefited from mobile phones.

The earliest studies on m-assessment were published in mid-2000s. Although m-assessment is an emerging topic, its emergence attracted the attention of scholars around the world. To start with, Dr. McGuire at Anglia Polytechnic University, United Kingdom is one of the first scholars published in m-assessment. McGuire (2005) utilized mobile phones to collect student feedback via automated mobile phone calls. Dr. Virvou and Dr. Alepis at University of Piraeus, Greece are also among the first scholars published in m-assessment. Virvou and Alepis (2005) assessed students' writing performance and provide feedback with mobile phones. Dr. Susono and Dr. Shimomura (2006) at Mie University, Japan are also among the pioneers who made use of mobile phones for presenting in class survey questions in Quick Response (QR, i.e., visual square code) format. Following years, m-assessment studies focused on delivering computer adaptive tests via mobile phones with Dr. Triantafillou, Dr. Georgiadou, and Dr. Economides at University of Macedonia, Greece publishing the first studies on delivering computer adaptive tests via mobile devices in 2008 (Triantafillou, Georgiadou, & Economides, 2008a & 2008b).

As one of the earliest studies, McGuire (2005) benefited from the calling function of mobile phones by presenting some questions to students

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via automated calls. Automated call system was developed to use outside of classroom for self and peer assessment, as well as collecting student data easily and reducing teacher workload. Automated calls reached out students who were working on their end of year project and asked them questions about their progress. McGuire interviewed 25 students benefited from m-assessment and their teachers to learn about their experiences with the system. Students narrated that using m-assessment increased their motivation, facilitated self-directed learning, and improved student-teacher relationships. Consistent with students' experiences, teachers also observed that students' motivation and self-esteem increased, students took responsibility for their learning and became independent learners, and the system improved teacher-student relationships.

In the same year, Virvou and Alepis (2005) developed and evaluated an authoring tool by developing a specific application capable of automatically scoring student responses (see Williamson, Mislevy, & Bejar, 2006 for automated scoring). This application could be used both inside and outside classroom for self-assessment. Virvou and Alepis intended to support instruction, increase student-teacher interaction, and reducing cost and time for assessment. Ten instructors and 50 students at high school and college level were interviewed. Both instructors and students found using m-assessment useful for their courses. Students especially appreciated the user friendliness of the authoring tool and found it helpful for keeping track of their progress and preparing for the course.

A year later, Susono and Shimomura (2006) prepared a survey in a QR format enabling students easily access survey questions via the World Wide Web. Students could read the survey questions using their mobile phones, answer questions, and write some comments. Meanwhile, teachers could see students' answers and comment immediately after students sent their responses and provide feedback to students. Susono and Shumomura introduced this m-assessment practice to a class of students and reported some concerns about the delivery.

Through 2008 – 2009, scholars from Greece, Taiwan, Spain and Netherlands published m-assessment studies regarding computer adaptive tests. Computer adaptive tests were extensions of Computer Based Testing ([CBT], see Mills, Potenza, Fremer, & Ward, 2002), which could be possible with advancement in measurement theories (see Hambleton, Swaminathan, & Roger, 1991, for Item Response Theory [IRT]). In computer adaptive tests, the examinee's responses are automatically scored after posing a number of items and new items were given to the examinee depending on the calculated score. Therefore, computer adaptive tests have two main advantages: precision and efficiency. First, computer adaptive tests can provide more precise results than other modes of assessment since the tests are tailored to the examinee's ability level. Second, computer adaptive tests can be more efficient than other modes of tests as they usually require less time to measure a participant's ability and for scoring.

Starting from 2008, Triantafillou et al. (2008a) published the first mobile computer adaptive testing study. Triantafillou and colleagues aimed to administer tests efficiently and make computer adaptive testing accessible from anywhere, specifically both inside and outside classroom with the help of m-assessment. The evaluation of the system was done through review of 12 students who tried out the system by taking a generic test. Time required finishing the generic test was recorded and compared with time needed to take the test in paper-pencil form. Participants also responded to a seven-item questionnaire about their experiences. Results indicated that less time required gathering information about test takers' ability by m-assessment because the test was adaptive. The authors noted that students who took the test on mobile phones found it to be interesting and attractive, user-friendly, with a clear and straightforward interface.