

# Computer Based Assessment: an Innovation to Language Assessment

Chen Zeng\*

School of Foreign Languages and Literature, Beijing Normal University at Zhuhai, Zhuhai 519087, Guangdong Province, China

**Abstract:** With the integration of technology and education, classroom teaching has experienced a substantial change. In order to improve the efficiency of assessment, computer has been adapted as a promising instrument in assessment area. This paper aims at evaluating the role that computer can play in language assessment.

**Keywords:** Computer based assessment; Paper-and-pencil test; Language assessment

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**\*Corresponding author:** Chen Zeng, 18390904756@163.com

## 1 Introduction

According to Nikou and Economides, computer based assessment (CBA) can be defined as testing that occurs utilizing a computer or mobile-based device<sup>[1]</sup>. CBA is a part of e-learning technologies, which can assign quizzes and tests to learners and evaluate learners on a computer instead of paper form. With the development of technology, computers exert promising influence in the area of language assessment .

## 2 The Development of CBA

Computerized testing systems were developed and studied in classroom environments starting in the 1970s, as computer has been used to create and administer assessments during the school year as a supplementary learning tool<sup>[2]</sup>. The use of computers for assessment purposes has grown considerably since the 1980s, with much research and development in computer-based testing<sup>[3]</sup>. In the following decades, the equivalence

of the same test presented in paper-and-pencil format and on computer has been one of the issues emerged in the computer based assessment literature as being key concerns of practitioners.

From the 1970s through the 1990s, CBA were used by various teachers and researchers to measure fairly simple declarative knowledge based on students' correct or incorrect responses to questions<sup>[4]</sup>. In the late 1990s, researchers began using computers to assess more complex cognitive skills like problem solving. These tests can now capture more details with the advanced development and implementation of technology. For example, educators can see where mistakes are being made and the sequence of problem-solving can be measured. CBA has segued from measuring simple knowledge into measuring more complex cognitive abilities<sup>[4]</sup>.

## 3 CBA for Summative Purpose

The computer-based testing model has become a more commonly implemented method for summative purposes, due to its efficiency, convenience, and cost effectiveness<sup>[5]</sup>. Summative assessment is usually administered after some major event, involving using assessment information for high-stakes or cumulative purposes, such as for grades, promotion and certification. Considering several advantages that CBA has comparatively to paper-and-pencil form, computer based assessment has been gradually replacing traditional paper-and-pencil tests.

### 3.1 Higher Efficiency and Quality

According to Bachman, one of the most promising and challenging areas of research and development in

language testing is that of computer adaptive testing, or the application of computers and related technology to the design, administration, and analysis of tests<sup>[6]</sup>. By using computer, large numbers of the assessment results can be marked quickly and accurately. Teachers can quickly get a clear picture of students' performance and grade the results easily. The administrator may also benefit in the analysis report of the test takers, especially in a large-scale assessment, which provides invaluable information for accreditation and curriculum purposes.

Computer based assessment provides the possibility of recording response latency and time on text or task, which opens up a whole new world of exploration of rates of reading, of word recognition, and so on which are not available, or only very crudely, in the case of paper-based tests<sup>[7]</sup>. With the use of computers, we can capture every detail of a learner's performance and progress through a test, including not only the results, but also answering sequence and any other clues. The functions of summative assessment, like discrimination between students, gauging student progression and quality assurance, can be fulfilled with CBA.

### 3.2 Contextualized Assessment

The objective of language assessment is not limited to testing students' language knowledge as language learning is a complex process. For language learners, learning to use language appropriately in different situations is one of the main issues, which makes higher requirement for language assessment. By using multimedia, CBA can present more contextualized, realistic and dynamic content or tasks.

Technology brings innovation in integrative assessment of listening, speaking, reading, writing, and translation. For example, context and media materials can be integrated into test. Students can be asked to fill in the blanks, to rank order a series of options, click on different "hot spot" areas of graphics or review various multimedia options. Providing a range of different types of assessment for students can also provide a more stimulating learning environment by introducing some variety as well as providing your students with the opportunity to develop a range of different skills<sup>[8]</sup>.

## 4 CBA for Formative Purpose

According to Bull and McKenna, CBA can offer a sort of bridge between summative and formative assessment<sup>[9]</sup>. Formative assessment is not a new program or complement to existing practices in

classroom. It is more like a new perspective to understand and hopefully reform what teachers are doing in classroom based on an alternative paradigm of assessment. Within this paradigm, assessment is believed to have formative potential (contributing to learning) and formative assessment is a process of trying to exploring the formative potential of assessment activity, either planned or unplanned, by tapping on each step of assessment cycle: elicitation of evidence, interpretation of it and use of assessment results<sup>[10]</sup>. Taking advantages of technology, CBA can enhance the functions of formative assessment, such as giving students feedback, guiding students' effort, helping staff direct their teaching effort, and encouraging students.

### 4.1 Effective Feedback

Hattie and Timperley conceptualized feedback as the information provided by agents like teachers, peers, and computer regarding aspects of one's performance or understanding<sup>[11]</sup>. Feedback is the basis of formative assessment and it is used to support learners' learning or understanding. One major advantage of using CBA is about the feedback provided. Teachers and students can get the immediate and structured feedback on the assessment results and performance. The time is greatly reduced with CBA. Using computerized testing could speed up the return of test results to teachers, thus enabling teachers to make more informed decisions about instruction.

Besides, instead of the time, CBA can provide more high-quality feedback. With the help of technology, CBA can capture many details of students' performance. For example, CBA has the option to record students' reaction and interaction with the instruments which helps to raise students' awareness of their own learning. It provides students with the opportunity to identify their strengths and weaknesses in a vivid and clear way.

The development of student-centred learning has been widely promoted with the intention of shifting prime responsibility for learning to students, while the role of teaching staff turns to the provision of opportunity for learning. CBA makes the feedback more personalized, standardized, and consistent, which benefits both instructors and students as computers can compile and categorize larger amounts of data from integrative language tests and provide personalized and consistent reports for learners. These materials are not only useful for teachers' instruction, but also provide valuable information for learners' self-assessment. However, the

merits of CBA is not limited to it. Students' responses and performance can be stored and presented in the software or website platform, enabling peers to make assessment in a more convenient way, thus facilitating active peer-assessment and reducing the time spent on assessments.

#### 4.2 Individualized Assessment

Computer based assessment also allows for highly individualized learning comparing to paper-and-pencil tests. In traditional assessments, items are usually presented in a preset sequential order. As a range of different types of computer based assessments are now available, it can be geared towards students of different abilities. One example is computer adaptive assessments, in which items are adapted or presented based on students' performance in previous tests. Although it is initially designed for summative purposes especially for credentialing examinations, such as college entrance examination or some placement and diagnostic tests, various scholar and instrument developers now claim that computer adaptive assessments can be used to support formative framework. Adaptive testing is an important way to facilitate individualized language testing. The computer presents individual candidates with items that are appropriate for their current level of ability (as estimated by their performance on previous items), raising or lowering the level of difficulty until a dependable estimate of their ability is achieved<sup>[12]</sup>. Therefore, it offers opportunities for not only efficient testing, but also presenting tests that are tailored to students' ability levels, which will not frustrate the test-takers.

Learning evidence is the basis for individualizing assessment. Comparing to paper-and-pencil form, CBA has the potential for collecting and storing a great variety of learning evidence, and also for providing more stimulating and interactive assessment processes to engage students more effectively in formative assessment. For example, portfolio is a promising and personalized tool in formative assessment. Electronic portfolio can not only collect the evidence, but also organize, analyze and present these materials efficiently from different perspectives. It encourages students to take responsibility for their own learning. Students can make preparation for the assessment and take self-paced learning which may help facilitate good learning attitudes and improve learning ability of students. Used appropriately, CBA can enrich the learning environment

for students by being used to promote reflection, which in turn can lead to longer-term deeper learning.

### 5 A Look into the Future

Computer based assessment provides a promising perspective for language assessment, both for summative purpose and formative purpose, considering several advantages it has. However, computer based assessment is not without limitations. For instance, adequate facilities and test-security must be in place, and there should be backup procedures in place in the event of technological failure. Therefore, there are still many things to be considered in the future research on CBA.

Douglas claims that language testing driven by technology, rather than technology being employed in the services of language testing, is likely to lead us down a road best not traveled<sup>[13]</sup>. Technology should not be an obstacle for testing design, which means that we should not limit the test items to the things that can be easily tested or delivered by computers. It is better to integrate computers into assessment and maximize the advantages of technology. The comparison between paper-and-pencil assessment and CBA has been focused in the area of language assessment, there is a need to focus on comparing and exploring different technologies, software or platforms. Given the rapid development, computer literacy, as an evolving concept, should also be a concern of test providers and test-takers.

### 6 Conclusion

Computer based assessment brings innovation to language assessment. Using technology to support assessment can provide a number of options that not always provided by paper-based methods. However, it does not equal to that all assessments should be computer based. The introduction of technology should always be motivated by how appropriately it can support, enhance and integrate learning and teaching.

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