

Characteristics and Forms of the Electronic Assessment of the Knowledge

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Abstract: *The report discusses the main functions and components of the students' assessment process. The basic structure, the possibilities and advantages of e-assessment system are discussed in this paper. It also describes the advantages of the Computer-Assisted Assessment Mode. System requirements for e-Assessment are examined as well.*

Key words: *Learning, The functions of the assessment, Computer Systems and Technologies, Model, Computer-Based tests, Question banks, E-test system*

INTRODUCTION

Learning, as well as other human activities, cannot be confined within defined boundaries. Moreover, a learning environment has to support trust building and rich forms of communication between teachers and learners as well as between learners. In order to be powerful, the environment must be inspiring and accelerate curiosity for the learning task. We believe Semantic Web technologies form a basis for realizing a multitude of fascinating e-learning visions. But without the proper meta-data semantics, the visions will not be implementable.

Recent research on Web-based educational systems attempts to meet the fast growing needs and expectations of the education community with regard to e-learning efficiency, flexibility, and adaptation by employing ontologies and Semantic Web standards and paradigms. These advanced technologies aim at providing more intelligent access to and management of Web information and semantically richer modelling of the applications and their users. Within the educational field, this motivates efforts to achieve semantically rich, well-structured, standardized and verified learning content.

Assessment is an important component of teaching and learning processes.

E-assessment is becoming widely used because it has many advantages over traditional (paper-based) assessment.

The report discusses the main functions and components of the students' e-assessment process. It also describes the advantages of the Computer-Assisted Assessment Mode as a combination between the classical assessment modes and modern e-learning assessment technologies.

□ THE FUNCTIONS OF THE ASSESSMENT

The functions of the assessment summarize (fig.1.) are:

- ✓ *Evaluation (feedback)* - to measure the results of the learning process;
- ✓ *Diagnostic* – to detect individual educational problems;
- ✓ *Forming* – to direct and manage the learning process;
- ✓ *Motivation* - to stimulate and to motivate;
- ✓ *Perfection* – to improve the students' knowledge;
- ✓ *Providing* – to collect data and to process statistical evaluation.

The Evaluation function (feedback) - measures the learning process and is one of the most important. The computer has several inherent capabilities which are suitable for difficult problems solving and can help for assisted assessment. The development of the WWW provide wide access to the resources that are available to teacher staff in order to produce and maintain an on-line assessment [7].

The Computer-Based Assessment (CBA) complements classical system resources and provides more complete statistical information. It serves to adjust and change both the educational content, and technology training.

The computer assisted assessment mode (CAA) combines classical assessment

modes - teacher assessment (testing "face-to-face") and a paper-pencil mode with CBA, which achieves maximum realization of the functions of assessment.

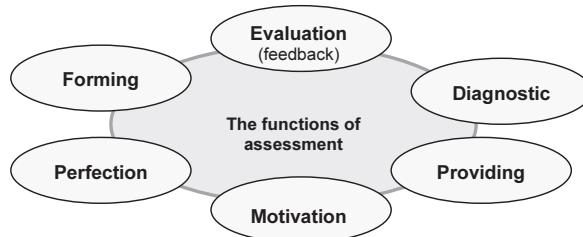


Figure 1. The functions of assessment

The assessment system must be constructed in accordance with the requirements, functions and purposes of assessment tests.

□ THE ADVANTAGES OF E-ASSESSMENT

E-assessment is becoming widely used. It has many advantages over traditional (paper-based) assessment. The advantages include [1], [6], [8]:

- ✓ **Richer assessment experience** – questions can be made clearer and more detailed through the use of text, sound and video which can aid motivation. For example, e-Portfolios allow the use of digital video, animations, presentations etc to be submitted electronically for assessment – impossible in a 'paper world'!
- ✓ **Increased flexibility** – assessment can be provided at a greater range of locations. This means assessment on-demand can become completely achievable. This allows learners to formally demonstrate their understanding at a time and place that is convenient for them. For example, e-Tests can be taken (under test conditions) in a range of locations as diverse as the community hall through to a formal e-Testing centre.
- ✓ **Instant feedback** – results are often available within minutes of taking an e-Test, as well as diagnostic information on a learner's performance, highlighting areas that can be improved upon.
- ✓ **Reduce the administration burden** – fewer paper forms to complete, no posting of test papers, no printing and posting candid.
- ✓ **Greater storage efficiency** - tens thousands of answer scripts can be stored on a server compared to the physical space required for paper scripts.
- ✓ **Enhanced question styles** which incorporate interactivity and multimedia.

There are also **disadvantages**. E-assessment systems are expensive to establish and not suitable for every type of assessment (such as extended response questions). The main expense is not technical; it is the cost of producing high quality assessment items - although this cost is identical when using paper-based assessment.

The best examples follow a Formative Assessment structure and are called "Online Formative Assessment". This involves making an initial formative assessment by sifting out the incorrect answers. The author/teacher will then explain what the student should have done with each question. It will then give the student at least one practice at each slight variation of sifted out questions. This is the formative learning stage.

□ THE LIFE CYCLE OF VERIFICATION TESTS

The **life cycle of verification tests** development has three phases – preparatory, Operating, Phase evaluation.

The **Preparatory** phase includes: Target; Design of questions, answers and practical tasks; Determination of weights odds - determining the severity of the problem and to

which part of the material relates; Design Test; Determination of structural variations for different types of tests - linear (conventional), adaptive (in difficulty), interactive (against the wishes of the test); Write instructions for students.

The **Operating** phase includes: Administration of various types of tests - optional version control; Providing a test - dynamic or static, with the possibility to derive the correct answer, visualization of information relating to the material of the wrong question; Navigation.

The **Phase evaluation** includes: Scoring, evaluation and analysis of results; Assessing the quality of knowledge; Extract the necessary data for statistics (for the management of educational process).

□ THE CHARACTERISTICS AND COMPONENTS OF COMPUTER-BASED TESTS OF KNOWLEDGE

The characteristics of Computer-Based tests are:

- ✓ Interactively;
- ✓ Multimedia items;
- ✓ New opportunities to answer:
 - Show and hit (point and click),
 - Download and run (drag and drop),
 - Development (performance - based);
- ✓ Independence of space and time;
- ✓ A one-man-testing: an opportunity to respond immediately retesting;
- ✓ Self-control of students;
- ✓ Need for feedback;
- ✓ On line Resources;
- ✓ Accessibility to information on the Internet - to increase achievement;
- ✓ Security - issues disconnect;
- ✓ Lower price.

It is necessary to develop a system which:

1. Permits the rapid production of a variety of question types;
2. Is flexible enough for staff (teachers) to author and maintain question banks and retain some measure of ownership of the material;
3. Provides (the course of events) a courseware management system to maintain a range of assignments and classes with associated marking and grading schemes, accordingly difficulty and syllabus.

The components of such systems include: the computer database; the reasoning engine and the user interface.

Computer-Based Assessment may be a stand-alone system or a part of a virtual learning environment, possibly accessed via the World Wide Web.

Question banks are the basis in constructing assignments. Using the same question from banks for source material, we can design assignments that range from low stakes self-study sessions to homework sessions to high stakes, proctored tests requiring student login and proctor validation. Each question or task contains the following elements, which are carried out in test selection, evaluation and analysis of results: school discipline code; code modules from the educational content; the content of the question or task; code of difficulty - 1,2,3; code for other criteria for evaluation.

Question styles available. Computer-Based Assessment (CBA) permits a large variety of question types that can either be static or dynamic. These include: Numeric, Formula, Click-on-image, Sketch, Multiple Choice, Choose all that apply, Yes / No, Fill-in-the-Blank questions. All the above are graded automatically, in addition free response type questions, which may be graded using key phrases, are also available [4].

□ THE REPOSITORY OF THE RESULTS FROM ASSESSMENT STORES

The repository of the results from assessment stores (Fig. 2) includes e-tests, E-portfolio and Another type of theoretical and practical examinations

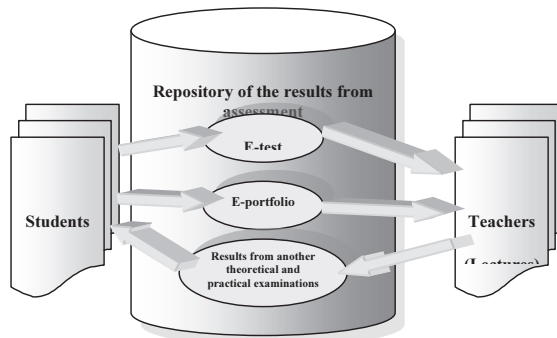


Figure 2. The repository of results from the assessment stores

Just like traditional testing, e-Test is a method of assessing learners' ability to meet the required standards. The difference is that e-Tests are extracted from a computer, rather than pen and paper.

In the electronic portfolio (e-Portfolio) [8] the learners could upload and submit except all other information for themselves, also their work – term papers, solved problems and other tasks assigned by teachers. Unlike traditional paper based methods, e-Portfolios provide much richer and varied ways of recording and presenting proofs about their knowledge and skills. Learners can submit a range of file formats including word processed documents, spreadsheets, images, video and sound files. Then the content of an e-Portfolio can be shared with others.

Another kind of examinations that teacher provides could be practical and oral excises, projects, etc.

All that is needed to work with the system for electronic verification and assessment is PC or laptop with Internet access or LAN, where the server of the system is located. No specialist software or hardware is necessary because everything you need may be accessed via the network. Everything is access on the network via a user account, i.e. after registration and granted access to the system for electronic verification and assessment.

□ E-TEST SYSTEM

An e-assessment system designed to focus on more sophisticated forms of knowledge requires some sort of interactive activity and a system for inviting students to reason or solve problems around that activity [5].

The structure of the E-test system for e-assessment is presented in Fig.2.

The types of questions can be very different:

- ✓ **Direct** - they offer the respondent to express his own position.
- ✓ **Indirect** - to the respondent is given an opportunity to express agreement or disagreement with the position of other people.
- ✓ **Questions filters** – They are called so because it is possible to select the respondents according to given indicator. For example - gender, age, profession, etc.
- ✓ **True - false statement** - suggest two mutually exclusive response options (type 'yes-no').
- ✓ **Question-menu** - requires answers when the respondent can choose a combination of variants of answers.

- ✓ **Questions - rocks** – those questions which answer is putting in order something in preliminary determined scale.
- ✓ **The Table issues** - suggest as a response to fill table.
- ✓ **Open questions** - do not contain any version of the response, a respondent answers his opinion in certain place in the questionnaire.
- ✓ **Half-questions** – part of the variants of the answers are preliminary suggested, but the student may write something additional.

There are some special rules for formulation of questions and answers, compliance with which ensures maximum reliability of the answers of the respondents [5].

The most important principles of questions are:

- ✓ Questions and answers must not contain suggestion that one way or another direct to some answers or make them more desirable or more prestigious.
- ✓ Creating artificial opportunity some of the answer to be given more frequently than others;
- ✓ Question and all answers must be formulated in an equivalent manner so that various responses to have the same conceptual value;
- ✓ The answers should form a unified scale and relate to one and a same sign;

In education a well constructed survey can be a tool for feedback, which can significantly enhance quality of education. In this case there must be adequate and rapid response as a result of the aggregated answers of students in order to change their approach and training institutional.

CONCLUSION

Our modern life at the beginning of the 21st century is strongly influenced by effects such as rapidly changing and developing information, technology-enhanced communication and information access, and new forms of production and services in a globalized world. This situation requires individuals to adapt their skills and competencies. Consequently, educational objectives and societal expectations have changed significantly in recent years. Modern learning settings have to consider learning community aspects as well as learner-centred, knowledge-centred and assessment-centred aspects.

The formative e-assessment is understood as the use of ICT (Information and Communication Technologies) to support the iterative process of gathering and analyzing information about process of learning by teachers as well as by learners for evaluating the results in relation to prior achievement and attainment of intended, as well as unintended learning outcomes.

The system for e-assessment comprises two components: an assessment engine and an item bank. An assessment engine consists of hardware and software required for creation delivery of test. Most e-testing engines run on standard hardware so the key characteristic is the software's functionality [5].

There is a wide range of software packages for e-testing. E-assessment system that provides analysis and statistics include many specific software modules.

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The paper is reviewed.