

Using ICT to measure knowledge, understanding and skills

For some years, e-learning has provided organisations and individuals with the tools to use technology for the support of learning and training. There is now a wealth of experience in class rooms, the workplace and at home enabling individuals to learn at their own pace on computers. Assessment on computer is but the flip side of the e-learning coin. It has become more sophisticated by providing systems to measure the performance of individuals as part of the delivery of the learning.

It is timely then to review what is meant by e-Assessment, what it offers and recognise that it is more than just computerised quizzes comprising multiple choice questions,. Modern e-assessment is more about providing challenging and imaginative assessments of knowledge, skills, attitudes and competencies. It is part of a growing trend to move qualifications and learning from paper to the computer. Electronic assessment is the use of computers to set, deliver and often mark tests of a student's skills, understanding and knowledge of a subject. Its impact on learning is growing rapidly through diagnostic or formative tests within managed learning environments. This includes recruitment and employee development to the delivery of assessment for vocational and professional qualifications.

Automatic assessment provides a set of tools and techniques to measure learning, identify educational and training needs and build on strengths through accurate and timely feedback. From the schoolroom and lecture theatre, to the workplace and the offices of education management and policy makers - all will be radically affected by e-Assessment. The impact on employers, employees and those seeking employment, on the learners, on those who deliver learning and those who set policy and strategy will be profound.

There are two elements of e-Assessment: e-Testing to measure skills and knowledge by questions and assignments presented on the computer, and e-portfolios to record performance and achievement usually in the workplace but also in project and coursework.

Within e-Testing the first category of use is Formative (or Continuing) Assessments, within the context of a programme of study enabling the trainer or teacher to monitor regularly how well parts of a course have been understood, to plan or to motivate. A second use is self-assessment or diagnostic testing. It provides a low risk, non-threatening method by which learners (with or without the tutor) can measure their own achievements or identify gaps in knowledge, at their own pace. The final category is Summative, where the assessment is presented as the culmination of a programme of study, typically in the award of a qualification. A large research project, the PASS-IT Programme (www.pass-it.org.uk), concluded that with the appropriate software and question design, tests on computer were equivalent to their paper counterparts. This has led directly to the Scottish Qualifications Authority offering part of their qualifications in Higher Mathematics and Intermediate Computing online in each of the last three years.

The systems allow assessments to be delivered frequently and often at any proctored secure location, maybe even on demand. A significant volume of marks and outcomes can be collected and automatically stored on management information

systems. As importantly, they can be rapidly fed back to the Learner or student. The variety of assessment methods and the range of knowledge, skills and understanding assessed can be greatly increased whilst the heavy burden of marking may be reduced.

With more versatility than the printed page, the power of information technology to include multimedia within the questions can also be used. This reinforces the all ready well-observed phenomenon that students respond very well to assessments presented through the computer and find them much more rewarding than the paper equivalent. The systems can collect and store large volumes of data about how each item is answered. This data can then be analysed and presented in many formats and reports to help refine the questions and present feedback to the learner and teacher alike.

Whilst most current examples of successful e-Assessment are as stand-alone events, it is when e-Assessment is incorporated within a recognised learning programme that its greatest benefits of flexibility, motivation and analysis are best realised. Such is the experience of thousands of pupils within the Scottish educational system through the SCHOLAR Programme (scholar.hw.ac.uk) where Higher and Advanced Higher qualifications can be studied online in Mathematics, Chemistry, Physics, Biology, Computing, Business and French.

The most common delivery system is the pure web based system using a standard web-browser. It is easy to set up though, at times, prone to the problems of using the web, in terms of security, delay and lost lines. A more robust, and typical method is to use the web to deliver a secure copy of the test, which is then presented to the candidate via local software, isolated from the vagaries of the web. The influence of the web can be further reduced by publishing the test on to a disk that is then activated locally.

It is necessary to consider the implications of security, confidentiality and authentication of the candidate either taking the test or submitting the work. There are significant implications for educational institutions and work based tracking of achievement though these issues are being addressed in a number of ways. The Accountancy profession has taken some of its qualifications onto the computer giving its trainees both formative and summative tests.

The challenge for e-Assessment professionals, students and employers will be to realise the full potential of the technology to deliver innovative assessments that are motivational, raise commitment and improve the educative experience for the learner. Computers are good at running tests and recording achievement, for many reasons. They are consistent and able to repeat the same task endlessly and impartially, and perform multi-tasking. They generally provide a rewarding experience for the candidate, far removed from the normal reaction to a 'written' test. They offer versatility and flexibility, providing new and varied ways of presenting information. They are adept at analysing and reviewing data, and they can hold great volumes of tests, responses and information valuable to both teacher and learner.

Over the last twenty years there has been considerable growth of e-Assessment from small disparate, shoots of activity to a wide range of computerised assessments, a profession has also begun to emerge. The annual London based e-Assessment

Question conference (www.e-assessment-question.co.uk) has provided over the last 6 years for a profession that is concerned with the design, delivery and quality of these e-Assessments. Moreover, the newly-formed professional body that is the e-Assessment Association is now becoming established to support professionals in this burgeoning field.

The embryonic e-Assessment Association (www.eaa.irtesting.net/) has three major goals for its community: to provide professional support for workers in this field of expertise, to work collaboratively with members and national organisations to create and communicate the positive contribution that technologies can make to assessment methods and produce a statement of good practice for commercial vendors of e-assessment. To this end eAA is working with the Institute of Educational Assessors at their conference next April, is preparing a series of meetings around the UK next May and June to investigate the challenges over the next decade and work with a leading awarding body to set up an e-journal in both e-learning and e-assessment.