

Policy and New Products

Research Report 5



Using IT to Facilitate Personalisation and Internal Assessment for National Qualifications

1 Introduction

This report was produced by Christine Wood in October 2007.

As the Scottish curriculum develops a focus on personalised learning, assessment systems will also have to change to place the learner at the heart of the assessment process. Personalisation of learning means involving students in decisions on what, where and when they learn, and taking account of their preferred learning styles. Consequently, personalisation in assessment requires a move away from externally-assessed, end-of-course examinations for large groups of learners, and towards internal assessment and continuously monitoring the progress of individuals.

Two of the key initiatives, A Curriculum for Excellence (CfE)¹ and Assessment is for Learning (AifL)², aim to improve the learning and attainment of children and young people. CfE is designed to ensure students acquire confidence, skills and abilities that are relevant to the contemporary world. AifL aims to provide assessment opportunities and experiences that will help to improve students' performance. Both initiatives emphasise the importance of learners' participation in deciding how to improve their future learning and attainment. Both emphasise the importance of learners receiving feedback through formative assessment.

In 2006, in *Formative assessment and self-regulated learning: a model and seven principles of good feedback*, Nicol and MacFarlane-Dick identified principles of good feedback practice. It:

1. helps clarify what good performance is (goals, criteria, expected standards)
2. facilitates the development of reflection and self-assessment in learning
3. delivers high quality information to students about their learning
4. encourages dialogue with teachers and peers around learning
5. encourages positive motivational beliefs and self-esteem
6. provides opportunities to close the gap between current and desired performance
7. provides information to teachers that can be used to help shape the teaching

In a second paper, *Rethinking technology-supported assessment in terms of the seven principles of good feedback practice* (2006), Nicol and MacFarlane-Dick suggest that technology is most effective in assessment when it is used to support the provision of feedback and self-regulated learning.

In December 2006, a Department for Education and Skills (DfES) report was produced by a group that was established to develop a vision of what personalised teaching and learning might look like in 2020. The report³ said that personalisation of learning should be learner and knowledge-centred, and also

¹ The Curriculum Review Group, The Scottish Government, *Purposes and Principles for the Curriculum 3-18* (2004)

² Pamela Robertson and John Dakers, *Assessment is for Learning: Development Assessment Programme — Personal Learning Programme: 2002–2004 Evaluation Report* (2004)

³ Department for Education and Skills, *2020 Vision: Report of the Teaching and Learning in 2020 Review Group* (2006).

assessment-centred (both formative and summative assessment). A Becta conference to discuss this generated a paper⁴ which proposes that technology can support the personalisation of learning in several areas: the learning and teaching dynamic; assessment; the flexible curriculum; the learning environment; support networks; personalised content; and the responsive infrastructure. In relation to assessment, the Becta paper says that using technology can:

- ◆ enable learners' assessments and records of achievements to be available to them, their teachers and their parents when they want it and in the format that they want it
- ◆ enable more effective and efficient diagnostic and assessment tools that provide ongoing and instantaneous feedback — supporting the planning of more appropriately focused learning plans
- ◆ enable learners to be assessed at times and in ways that are appropriate to their own stages of development
- ◆ help learners to become more actively involved in designing and carrying out their own assessments
- ◆ help learners to reflect on how they and their peers are progressing through the use of good diagnostic and assessment tools

This report provides an overview of ICT-based assessment approaches and resources that could support personalisation in learning and assessment for qualifications. Some are already used in Scottish centres and by SQA.

⁴ Becta, *Personalising Learning: The Opportunities Offered by Technology* (internal paper, Version 0.9: 29 January 2007).

2 ICT-based assessment approaches

2.1 E-assessment or e-testing

To meet the requirements for personalised assessment, the approaches and tools used for assessment must be able to:

- ◆ ensure that feedback on learners' performance is available to both learners and their teachers, and support the links between formative and summative assessment
- ◆ enable learners to reflect on and develop their learning — at times and in places that are appropriate for them
- ◆ provide more effective ways to listen to learners, to allow them to participate in and shape their current and future learning and assessment
- ◆ recognise preferences in learning styles, as well as preferences for assessment in different environments
- ◆ reflect the skills students have learned, which today may have more to do with using online resources than taking written examinations

Most ICT-supported assessment approaches, for example using e-portfolios or social software, could be used to facilitate the dialogue between teacher and student and to provide students with the information and feedback they require. E-testing (sometimes called computer-assisted assessment or online assessment) is one approach that can contribute to this. At the same time it can offer candidates visually stimulating and flexible assessment opportunities, and can offer teachers reduced marking, greater standardisation in assessment, and a quicker turn-around in results.

Some e-assessments, such as where performance is objectively assessed, can be totally computer-marked. This can be extremely useful for establishing what the candidate knows and remembers across a wide domain of knowledge.

The additional benefit of this approach is that it can often also be used to randomise questions, or create multiple versions of the tests, which means that candidates can access e-tests for practice, or formative assessment, from home or elsewhere, before taking the summative test in school or college. Teachers can access the results of the practice tests to monitor progress, provide feedback and address areas of weak performance.

Some e-assessment systems will automatically provide feedback to candidates taking practice tests. The practice assessments can also be used as a teaching tool in a classroom situation, for example using a whiteboard, to allow candidates to discuss the questions and answers and reflect on their own progress.

There are a variety of question types and different ways of designing questions to enhance validity and make the questions stimulating for candidates. The Pass-IT

project created a range of question types which are currently used for formative and summative assessment for National Unit assessments in Higher Mathematics, and for practice and summative Unit assessments in Intermediate Computing.⁵

In situations where automatic marking alone will not suffice, e-assessment can still contribute to teaching professionals' assessment judgements. Computer-marking of short answer responses is relatively accurate, but where some questions need to be marked or mediated by teachers, the teacher could use the marking or mediation as an opportunity to provide feedback to candidates. Essay-marking software, which may also require some teacher mediation, could be used in a similar way.

Online tests can be designed to assess higher-order, as well as lower-order, skills by combining good question design with different technologies, such as adaptive assessment, high levels of interactivity, or simulation. Simulations in particular can add validity and provide assessment opportunities that might previously have been inaccessible (eg practical work in science). Variables in the simulations can sometimes be reset so they can be used as practice material or in formative assessment

Online social networking and chat facilities could also be used to assess critical thinking, problem-solving, evaluation and analysis — teaching professionals can initiate projects and discussions and then monitor each learner's participation and contributions. These resources offer an excellent way to maintain the dialogue between teacher and learner, as well as providing a vehicle for feedback.

Some of the pedagogic and quality assurance concerns schools may initially have about using e-assessment have already been considered in higher education, where e-assessment is widely used.

SQA currently offers internal e-assessment in a range of qualifications. As well as the National Unit assessments in Mathematics and Computing, there are Higher National Unit e-assessments (SOLAR⁶) in a wide range of subjects. SOLAR e-tests are also available (along with an SQA e-portfolio) for Skills for Work qualifications⁷ and for SQA's first online-only qualification, a National Unit in Internet Safety⁸. With the support of ESF funding, SQA is also developing a substantial bank of e-assessment items to support new National Certificates and National Progression Awards.

In external assessment, candidates at centres throughout Scotland have piloted online versions of the objective test section of the Biotechnology Intermediate 2 and Higher and Physics Intermediate 1 examinations. This has provided SQA and its centres with valuable experience to inform future plans for e-assessing exams.

⁵ <http://www.pass-it.org.uk>

⁶ <http://www.sqasolar.org.uk/mini/27322.html>

⁷ <http://www.sqa.org.uk/sqa/33645.1565.html>

⁸ <http://www.sqasolar.org.uk/mini/27622.1198.1318.html>

2.2 E-portfolios

E-portfolios are another form of e-assessment in which the technology can facilitate learner-centred assessment. By providing a method for learners to store, organise and submit assessment evidence, e-portfolios encourage candidates to take control of the process and accept responsibility for their own work. E-portfolios also make it easier for teachers to access candidates' work and provide feedback.

Where e-portfolios are used for assessment, they generally relate to a particular course of study, delivered over an identified period of time. Learners use these to:

- ◆ manage and submit work — digital evidence of competence, knowledge, skill
- ◆ present visual/audio work — video or sound clips, digital photographs or scanned images
- ◆ store information relating to prior or extra-curricular experiences
- ◆ support and demonstrate personal reflection on learning
- ◆ record attainment of qualifications

E-portfolios are ideal for retaining evidence of formative as well as summative assessment, and so have the potential to change the way coursework is conducted and assessed in future. A well-structured assessment e-portfolio could record the learner's progress in coursework as they move from formative to summative assessment and this, in turn, could contribute to the richness and authenticity of the candidate's evidence. The evidence could also be accessed remotely, by teaching professionals and SQA Verifiers, allowing quick and efficient quality assurance and bringing additional administrative benefits.

By making candidates responsible for gathering and submitting their assessment evidence, e-portfolios also support the aims of Curriculum for Excellence, encouraging individuals' confidence in using the skills considered relevant to the contemporary world, such as researching; writing and communication; critical thinking and use of ICT and digital media.

E-portfolios are not yet in widespread use, but there are examples of their being used in colleges in Scotland. SQA currently offers an e-portfolio, SQA Deskspace, for use with Skills for Work Courses⁹. It is also developing an overarching policy to encourage and support centres wishing to use e-portfolios.

2.3 Web 2.0 and social software

Web 2.0, the range of tools and services that collectively represent the second version of the world-wide web, can support a wide range of activities, including creating and uploading information, online publishing and broadcasting, and connecting or social networking. Web 2.0 resources are ideal for progressing the objectives of CfE and AifL. They encourage sharing information and collaborative working, support the use of skills relevant to the contemporary

⁹ <http://www.sqa.org.uk/sqa/33644.html>

world, stimulate candidates to take an active part in shaping their learning and assessment activities, and provide ideal vehicles for delivering feedback on their work.

Candidates in some schools and colleges are already creating their own content using tools such as online diaries (blogs) and pre-recorded audio broadcasts (podcasts). Other tools designed to support file-sharing include YouTube (video), Del.icio.us (bookmarking) and Flickr (photographs). Social bookmarking services allow candidates to bookmark websites, access these from any web-enabled device and share them with friends. Resources such as MySpace support networking activities, and online e-mail services can be used as personal portfolios.

The potential is there for candidates to use Web 2.0 resources to find, capture, describe, organise and share evidence for assessment purposes. SQA has published a separate paper considering the potential of Web 2.0 to support assessment¹⁰ and suggesting how learners could use Web 2.0 tools to produce and present evidence contributing to their assessments. Teaching professionals could also use the resources to access the candidate evidence and provide feedback.

Blogs or blogquests (challenges requiring learners to undertake online tasks) could be used to set projects and assignments. Teachers could post assignments, including group assignments, such as creating and maintaining a learner newsletter. Learners could use individual blogs as journals in which they undertake writing tasks and reflect on their learning. Blogs could also be used to record collaborative work, such as reporting on school trips.

Podcasts are also valuable tools. They can be used for subjects such as Modern Languages, to support development of students' speaking skills, provide listening assessments, and provide access to learning and assessment materials generally¹¹.

Another useful technology for assessment is online bookmarking. Learners are able to keep bookmarks or 'favourites' on a website, allowing them to be accessed from any computer and shared with others. Learners working on a project, eg a history-based research project, could be given bookmarks and asked to use these in their research and to evaluate the bookmarks, either individually or collaboratively. Evidence from such tasks could form part of the assessment requirements for an SQA qualification.

SQA has trialled the use of a wiki (an editable webpage) and blogs to assess group and collaborative working, using peer and self assessment, in the Intermediate 2 project-based National Course Health and Safety in Care Settings. The wiki was used to record the development of the project Practical Assignment, especially to see how each candidate contributed to the project and how the group interacted as a whole. Individual blogs were used to record each candidate's reflections on the process and outputs of the group project, and on their own and others' contributions to this. This type of software can operate even with

¹⁰ <http://www.sqa.org.uk/sqa/22941.html>

¹¹ <http://www.ltscotland.org.uk/sharingpractice/p/podcasting/introduction.asp?strReferringChannel=mfle>

geographically dispersed groups of learners. Evaluation of this trial demonstrated benefits for learners, teachers and markers. Consideration is now being given to how we can build on this initial work.

Each of these approaches could contribute to the full range and choice of assessment methods available. In Scotland, the facilities offered by Glow may provide learners with access to these types of resources. Learners will be able to take a more active part in their learning, by file-sharing, collaborating and networking. Glow will be able to support high levels of collaboration, within and between schools and colleges and farther afield, and will also offer authentication and security tools.

2.4 Mobile phone technology

A 2008 survey of 1,250 Scottish young people aged 11 to 17 suggests that more than half of Scotland's 11-year olds, and over 90% of secondary school age students, own a mobile phone. The survey also showed that young people prefer to text than talk, and on average each young person sends or receives 9.6 text messages per day.¹²

Young people today use mobiles for a range of purposes; to find information and answers to complex questions quickly, to network, and to create, organise, send and receive content. Mobiles could be used to enhance the personalisation of learning, and assessment, by focusing on the way these learners already use this technology. Their learning and assessment experiences should reflect the way they respond to, and manipulate, the masses of information they constantly receive, and focus on the communication, networking and information-handling skills they use on a daily basis.

In a Futurelab review of the role of mobiles in education, the authors point out that, as mobile technologies become more 'embedded, ubiquitous and networked', learning will move more and more out of the classroom and into the learners' environments. 'The challenge for educators and technology developers is to ensure that learning also becomes highly situated, personal, collaborative and long term: in other words, truly learner-centred learning'. *Literature Review in Mobile Technologies and Learning*, Futurelab, 2004.

Futurelab drew attention to the wide range of applications for mobile phone technology, and there is good potential for using these approaches in assessment for qualifications. Students using 3G phones could capture images, sounds and text, manipulate information into a variety of formats and share this with others. Speaking exercises could be recorded and compared and the files transferred to a computer via Bluetooth. Once on the computer, these can be edited into a podcast or for contributing to a radio show. Across all subjects, students could use this technology to conduct interviews with experts, record study notes, and access the recording when required. Also, as mobile phone cameras become more

¹² *The Mobile Life Youth Report 2006: The impact of the mobile phone on the lives of young people*

sophisticated, there will be opportunities to create digital stories, as well as simple films such as interviews, experiments and virtual tours¹³.

As with other new technologies used for assessment purposes, there will be quality assurance and security issues. However these must be weighed against the benefits of using technology that is relevant and motivating and can create learning and assessment based on students' real experience.

2.5 Games technology and education

A Futurelab report on computer games and education¹⁴ notes that both teachers and parents recognise that games can support development in a range of skills, including strategic thinking, communication and negotiating. The report concluded that, although there is a need for games developers to consider the needs of the education sector before games can take on a meaningful role in education, there is sufficient interest in the use of games in education to encourage further exploration in this area.

Some schools are already using computer games informally to help pupils improve attitudes related to perseverance and politeness and respect, as well as those skills demanded by the games, such as concentration, hand-eye coordination and confidence in using keyboards.

An initiative is underway to establish a rationale for games and learning in Scotland. Learning and Teaching Scotland has created the Consolarium, a new Scottish Centre for Games and Learning, which offers teachers hands-on access to educational games resources and explores the rationale for using these in educational contexts.

Meanwhile SQA is exploring computer games technology for use in the assessment of Skills for Work Courses¹⁵. This work, which is at an early stage, will be based initially on the Skills for Work Retailing and Skills for Work Health Sector qualifications.

2.6 Videoconferencing

Videoconferencing is now being used very effectively in learning and teaching and could be used more for assessment. With this interactive communication medium, a visual connection is provided for those working remotely from each other, such as groups of learners from different schools, or a teacher from one centre working with learners in another centre.

¹³ <http://www.Itscotland.org.uk/ictineducation/connected/articles/16/mobilemania/index.asp>

¹⁴ Laura Naismith, Peter Lonsdale, Giaserni Vavoula and Mike Sharples, *Literature Review in Games and Learning*. Futurelab Report 8 (2006).

¹⁵ <http://www.sqa.org.uk/sqa/33644.html>

Videoconferencing is used in learning and teaching in a range of different ways:

- ◆ reporting news/events
- ◆ demonstrating and answering questions on projects
- ◆ planning joint events/initiatives — and for collaboration
- ◆ running competitions/quizzes between schools and groups of candidates
- ◆ hosting guest presenters, with question-answer sessions
- ◆ delivering training in new skills and techniques
- ◆ hosting meetings/discussions
- ◆ supporting virtual field trips
- ◆ reporting on news or events, such as eclipses or sporting activities
- ◆ demonstrating, and answering questions on, outputs from projects
- ◆ planning joint events or initiatives, collaborating on them, and reviewing and evaluating outcomes
- ◆ running competitions and quizzes between schools and groups of candidates
- ◆ hosting guest presenters, and follow-on student question-answer sessions
- ◆ delivering training in new skills and techniques
- ◆ hosting meetings or discussions
- ◆ supporting virtual field trips, for example to zoos, museums or libraries

Many of these learning activities could be used for assessment, to provide evidence of candidates' individual work or contribution to group activities, and the process would also contribute to the authentication of candidates' work. This would be especially useful in the more remote areas of Scotland, where many schools are equipped with videoconferencing facilities.

3 Supporting teachers and quality assurance

3.1 Supporting teachers

Technology can also be used to support good practice in teaching and assessment. In e-testing, most questions and items are drawn from subject based item banks. Teachers who participate in the establishment and maintenance of item banks may benefit from the process of liaising with other teachers, and SQA appointees, as the items are created, moderated and added to the banks.

E-portfolios could be used to encourage teachers' understanding of standards in subjects. With the learner's permission, selected parts of an e-portfolio could be shared among teaching professionals, which would support the development of shared understanding on the nature of evidence (in a range of formats) and the standards of work required.

Videoconferencing could also be used to share learner work and promote understanding standards within specific subject areas. Teachers working in remote locations could form teaching teams and use the technology to plan lessons or mentor another teacher.

The SQA Understanding Standards Website¹⁶ (USW) has pioneered the use of web-based materials that allow teachers to benchmark their own assessment decisions against those made by SQA subject specialists. Teaching professionals can access marking principles and examples of candidate scripts and compare their own marking with that of SQA's examining teams.

The USW resources also include video clips of candidates' performance in subjects such as Drama and Core Skills, where assessment is by nature more subjective and has to take account of behaviours and attitudes associated with the learner's performance. This is proving to be a valuable approach for developing understanding of standards in these areas, and it is an approach which might work well for cross-curricular areas such as creativity and citizenship.

At present the USW contains material prepared by SQA, and focuses mainly on external assessment for National Qualifications; however it could be developed to allow teachers to post evidence from their own learners and to seek feedback from other teachers. The range of courses and types of assessments shown could also be extended.

This type of resource could be used to deliver assessment-related training to a wider audience of teaching professionals, both to build confidence in assessment decisions and to support understanding of national standards generally. Training delivered via a virtual learning environment (VLE), for example, would allow teachers to access materials at a time and place of their choosing, and also support the establishment of communities of practice for sharing good practice between

¹⁶ <http://www.understandingstandards.org.uk>

schools. SQA Academy¹⁷ online courses are an example of this type of resource. This type of technology could also (resources permitting) be used for students, to deliver feedback on their performance in formative tests and examinations and allow them to prepare better for summative assessment and further examinations.

3.2 Quality assurance

Most of the assessment technologies discussed here could also contribute to and enhance quality assurance. E-assessment, e-portfolios and Web 2.0 tools are real-life tools that allow learners to perform authentic activities, reflecting on their own experiences, which in turn leads to assessment opportunities with high validity. These resources also assist with authentication, as teachers who can access learners' contributions to e-mail and forum discussions, blogs and wikis, develop insight into the learner's level of knowledge and style of work. This should alert the teaching professional if the candidate submits work for assessment that is of a much higher level or different quality. Technologies are also available to allow remote oral questioning of learners, and this could be used to verify students' understanding and the authentication of their evidence.

ICT could also help us provide support to teachers through external verification. Web-based evidence, such as work from learners' e-portfolios or web pages, could be accessed remotely by SQA Verifiers. This should allow higher levels of verification as well as verification provided in a more flexible way. Most questions or items used in e-testing are drawn from item banks and, where these are prior-moderated, little or no external verification is required. Where verification is required, this can often be undertaken remotely. SQA is currently piloting e-verification for some qualifications with a view to making it part of our mainstream process.

Using ICT to record simulations, such as role-play for example, could allow external verification to be done remotely, or could facilitate double marking between teachers. It may also be possible to observe the simulation in real time remotely using videoconferencing, webcams or mobile recording devices.

Assessment specifications are changing in response to the need for personalisation in learning and assessment and to the ways in which technology can give rise to new types of evidence. Specifications are becoming more flexible in the way that they specify the nature, duration and conditions for assessment and the format and volume of evidence required. Evidence Requirements must support online as well as other forms of assessment and should encompass a wide range of digital products.

SQA has recently collaborated with Ofqual and several other UK awarding bodies to produce *E-assessment: Guide to Effective Practice*,¹⁸ which addresses both e-testing and e-portfolio delivery. This should be applicable to centres UK-wide.

¹⁷ <http://www.sqaacademy.com>

¹⁸ <http://www.sqa.org.uk/sqa/23369.html>

4 Conclusion

In the future, ICT-supported assessment could be used for qualifications to allow learners to participate more in their learning and assessment activities and to facilitate personalisation of assessment. It can facilitate the teacher-learner dialogue and the delivery of high quality feedback to support self-regulated learning. E-testing, e-portfolios and Web 2.0 tools can combine to provide the context for engaging, motivating and authentic formative and summative assessment. Teaching professionals can benefit from the technology, both for managing assessments and for networking with other teachers on assessment standards and judgements. Finally, both centres and SQA can benefit from the use of assessment technologies to enhance quality assurance.

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