futurelab

REPORT 10 UPDATE:

E-assessment – an update on research, policy and practice

A report for Futurelab
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CONTENTS:

This update relates to Futurelab's Literature Review of E-assessment, published in 2004[1]. It covers the areas of:

• research projects and reviews

• policy changes and developments

• market place and practitioner developments.

Although the update makes reference to a large number of e-assessment products, pilots and developments, it is not a product review. It does not provide a comprehensive list of materials and products available, nor does it offer any view regarding the quality, cost or benefits of products referenced.

RESEARCH PROJECTS AND REVIEWS

1 RESEARCH PROJECTS AND REVIEWS

This section provides an overview of major e-assessment research and development projects since the publication by Futurelab of the original literature review. The review of these projects and activities covers three aspects of e-assessment:

- uptake of e-portfolios
- classroom assessment, and the increasing use of handheld and personal technologies
- the transformation of (some) examinations and assessments, using technology.

E-PORTFOLIOS

In 2005 the UK government published its strategy for technology in education, 'Harnessing Technology'[2]. This document expresses an aim for:

"...online personalised support for learners, parents, and practitioners, giving secure access to personal records, online resources, tracking and assessment that works across all sectors, communities, and relevant public and private organisations."

'Harnessing Technology' includes a commitment for this aim to be delivered by December 2008. In turn, Becta's plan for the delivery of the government's e-strategy[3] includes a commitment to deliver the following outcomes:

- "learners can support their learning through a personalised online learning space"

- "[to] use technology in assessment to enable learning and improve learning outcomes and progression"
- "learners have access to their own e-portfolio to support their personalised learning and enable seamless transition between institutions and learning providers and throughout life."

In addition, the delivery plan sets out the steps that Becta needs to take to build a "dynamic, vibrant and responsive technology for learning market". These market conditions apply to the supply of e-portfolio systems, as well as to other products and services in the supply chain.

In developing this policy, in 2006 Becta and the DfES commissioned two reviews of e-portfolios[4]. These identified the fact that e-portfolio development to date has largely been led by technologists. From a technological and design perspective, it is clear that there are few barriers to the development of e-portfolios. Instead, the need now is to understand better the educational value and benefits of e-portfolios to learners and their institutions. In addition, adoption of e-portfolios must be managed as a significant implementation, bringing many of the same issues as other implementations. This includes issues such as: senior management sponsorship, funding, training and user buy-in to the claimed benefits. In order to understand better how to achieve this step-change in the adoption of e-portfolios, Becta commissioned the University of Nottingham to collect evidence of the impact of e-portfolios on learning[5]. The study has focused on eight current UK e-portfolio projects and is due to report later in 2007.

The adoption of e-portfolios has been remarkably rapid in some sectors. In Wales e-portfolios are already an important aspect of education and training policy. In 2004, the Minister for Education and Lifelong Learning announced a national entitlement for all Welsh citizens to access an e-portfolio. Winning a BAFTA 2006 Interactive Award, Careers Wales provides learners from age 14 to adult and professional learners with an online space where they can accumulate evidence of learning and achievements[6]. They can reflect on progress made and think about next learning steps. They can reflect their interests and aspirations in their online space. The software supports learners in producing a CV, preparing for an interview or writing an application letter.

The Learning and Skills Council has developed an approach known as Recognising and Recording Progress and Achievement in non-accredited learning (RARPA)[7]. The approach is designed to increase the relevance of learning offered by learning providers and trainers. According to NIACE's report on RARPA, learners involved in early pilots stated that their self-confidence and attitude to learning were improved as a result.

CLASSROOM ASSESSMENT

Potentially, the most radical changes brought about by e-assessment could occur in the classroom and the lecture hall. A significant driver for change currently is the availability of personal, handheld devices. There are already revealing examples showing how this technology can revolutionise pedagogy.

- The University of Strathclyde's Department of Mechanical Engineering has had noteworthy success in introducing electronic voting technology to the lecture hall[8]. Short bursts of instruction are followed by focused questions designed to assess comprehension and understanding. All students, not just the most vocal, discuss and respond to all set questions. Lecturers can see immediately where misunderstandings are occurring, and they can pace instruction accordingly. Not surprisingly, students' interest and motivation have also been positively influenced by this engaging approach to formative assessment.

- The Re-engineering Assessment Practices (REAP)[9] initiative in Scotland is piloting approaches to assessment involving tutors, peers and self-assessment. This work covers the University of Strathclyde, Glasgow Caledonian University and the University of Glasgow. It is designed to place the learner at the heart of learning, encouraging self-reflection. It will develop new models of assessment, linked to a drive to support learning for the 21st century.

- In Wolverhampton Local Authority in England, David Whyley's Learn2Go project has experimented with the use of handheld devices in primary and secondary schools over the past two years[10]. Already this project has demonstrated significant improvements in children's self-assessment, motivation and engagement with the curriculum, including in reading and mathematics. The work is now also claiming evidence that these broad gains translate into improvements in children's scores on more traditional tests.

RESEARCH PROJECTS AND REVIEWS

At the 2006 Computer Assisted Assessment (CAA)[11] conference in Loughborough, Andrew Boyle delivered a prize-winning paper entitled 'An evaluation of the formative functions of a large-scale on-screen assessment'[12]. The report differentiated between the potential for on-screen tests to perform a useful formative function, and the reality of these assessment tools which have not yet lived up to their potential.

TRANSFORMATION OF ASSESSMENT

This section outlines progress in using technology to achieve transformational change in assessment tools and assessment domains.

Project e-scape

Project e-scape – led by Richard Kimbell at TERU (Technology Education Research Unit at Goldsmiths College), and by TAG Learning – is now entering its fourth year. The project has focused on the subject of Design and Technology at GCSE and has been highly successful. The purpose has been to design a short, classroom-administered assessment which assesses students' ability to create, prototype, evaluate and communicate a solution to a design challenge. In the e-scape project:

• students work individually, but within a group context, to build their design solution

• each student has a PDA, with functionality enabling them to video, photograph, write documents, sketch ideas and record voice messages

• at specified points in the assessment, students exchange ideas and respond to the ideas of others in the group

• at the end of the assessment, students' portfolios are loaded to a secure website, through which human markers score the work.

TERU has recently published a landmark report on Phase 2 of e-scape[13]. This report describes the 2006 pilot in which over 250 students completed multimedia e-portfolios, submitted these to TERU, which then trained a team of markers to mark the e-portfolios on screen. The assessment efficacy and the robustness of the technology have proven highly satisfactory. Students work well with the technology and rate the assessment process positively in respect of its validity.

The e-scape assessment has also required application of an innovative approach to marking. Working with Alastair Pollitt, TERU has applied a Thurstone's graded pairs approach. Human markers rank order students' work, working through a series of paired portfolios. For each pairing, the markers record which of the two pieces of work is better. Based on the positive evaluation findings of this approach, QCA has encouraged further development and Edexcel is actively looking to apply the e-scape approach. The e-scape project will shortly commence its third phase of development, now under the management of Becta.

Key Stage 3 ICT test project

This is one of the largest scale and most expensive e-assessment developments in the world. The original vision for the tests

involved the creation of an entire virtual world, with students responding to sophisticated problems within the virtual world. The vision was for tests that would operate in a virtual environment akin to Second Life. For this vision to work, the project needed to deliver successful innovation on several fronts, for example:

- developing the virtual world
- developing a successful test form within the virtual world, including a test that could reliably measure students' use of their ICT skills
- developing a new psychometric model
- training all secondary schools in the technical and educational adoption of the tests
- redesigning teaching of ICT.

The experience of developing the ICT tests has been that the full range of planned innovation has not been delivered. In particular, the tests have adopted more traditional approaches to test design, and teachers generally have not been persuaded that the tests reflect improved practice in ICT teaching.

However, the project is one of the most evaluated e-assessment projects and is an excellent source of information for other organisations considering the development of innovative forms of e-assessment. This includes:

- work by Andrew Boyle, including that referred to above
- annual evaluation reports[14], focusing on operational and implementation issues
- an investigation of how the tests award National Curriculum test levels[15]

- an investigation of the use of a bespoke desktop environment within the virtual world of the tests[16]. Ken Dyson concluded that the approach is "pedagogically sound" and "assures the need to transfer learning from specific software normally used by the student to the one used for testing". Dyson's report also covers the technical, legal and IT reasons for the use of a bespoke desktop environment.

OTHER RESEARCH

Partnership for 21st Century Skills

In the USA in 2005, Margaret Honey led a world-wide investigation into the use of 21st century assessments[17]. Her report includes a survey of educational assessments that support 21st century learning. It highlights "promising assessments" including England's Key Stage 3 ICT tests. It also describes current activities and efforts to develop 21st century learning assessments, predicated on the Partnership's description of a 21st century curriculum[18]. It investigated the existence and quality of assessments in key areas of 21st century learning, including:

- global awareness, concluding that "no measures currently exist that address students' understanding of global and international issues"
- civic engagement, concluding that this was "one of the most established" areas for the provision of assessments for students in the USA
- financial, economic and business literacy; ETS (Educational Testing Service) is currently developing an

RESEARCH PROJECTS AND REVIEWS

assessment for use in Year 12, use of which will be mandatory under the USA's No Child Left Behind legislation

- Learning skills, concluding that a range of newer assessments are currently under development in the USA

- ICT literacy, concluding that – although in many major countries educators are agreed that ICT represents a core and essential skills set for learning – it is only in the UK that substantial progress has been made in developing a school-based assessment of ICT.

Psychometric and measurement issues

In 2005 ETS published the findings of a significant, large-scale comparison of paper-based and computer-delivered assessments[19]. The empirical data was collected in 2001, involving over 2,500 Year 8 students who completed either mathematics or writing assessments. The traditional, paper-based tests were migrated to screen format, with little or no amendment made for the purpose of screen delivery. In respect of mathematics, the study found no significant differences in performance, comparing paper to screen delivery, except for those students reporting at least one parent with a degree. These students performed better on paper. In respect of writing, the study also found no significant differences, except for students from urban fringe/large town locations. Again these students performed better on paper than on screen. The report also described the technical, logistical and local support implications of instigating a large-scale computer-delivered assessment.

JISC

In 2006 the Joint Information Systems Committee (JISC) published, jointly with QCA, a glossary of e-assessment terms[20]. This followed extensive industry-wide consultation and was designed to enable the e-assessment profession to converge on common usage of key terms and concepts. JISC's Roadmap for e-Assessment was also researched and published in 2006, by the Open University[21]. This report was based on research conducted with e-assessment experts. It developed a vision for 2014, arguing that "a pedagogically driven model for e-assessment" is needed. The report argued that "students will take more control of their own learning and become more reflective. On-demand testing will assist students to realise their own potential and e-portfolios can help them to present themselves and their work in a more personalised manner." The report also contained detailed analysis of barriers to and opportunities for the development of e-assessment, focusing in particular on the role of institutional senior managers in leading innovation.

Most recently, in 2007, JISC published 'Effective Practice with e-Assessment', written by Denise Whitelock with contributions from Martyn Road and Martin Ripley[22]. This publication concludes that e-assessment is "much more than just an alternative way of doing what we already do". Through evidence and case studies, the report provides examples of e-assessment widening the range of skills and knowledge being assessed, providing unprecedented diagnostic information, and supporting personalisation.

Market survey

In 2005 and 2006 Thompson Prometric commissioned two reviews of e-assessment issues involving all UK awarding bodies[23]. These reviews achieved very high levels of participation from awarding bodies. They revealed that the majority of awarding bodies are actively pursuing e-assessment, although often without senior executive or strategic involvement. The studies also made clear the remarkable agreement between awarding bodies regarding the benefits of e-assessment, which were seen as including learner choice, flexibility and on-demand assessment. There was also agreement between most awarding bodies regarding the major issues – a perceived concern about the issues of authentication, security, cost and technical reliability.

Implementation and uptake

Scotland's Pass-It project[24] is one of the best medium term reviews of the benefits and issues associated with implementing e-assessment in educational settings. Pass-It brought together a wide range of individuals and organisations to design, build and share e-assessments, designed for both formative and summative purposes. The research project ran until January 2005, and now provides resources for practitioners, learners and researchers alike. For example, Pass-It is one of very few projects to have investigated the potential for automated marking of short-response answers in certain areas, or to have compared different styles of question in assessing the same learning outcome.

POLICY UPDATES

2 POLICY UPDATES

In the UK since 2004, the QCA has continued to make clear its visionary hopes for e-assessment. In 2005 Ken Boston, QCA's Chief Executive, spoke [25] optimistically of a forthcoming transformation of assessment in which technology was presented as a catalyst for change:

"Technology for assessment and reporting is the third of three potentially transformative but still incomplete major reforms."

His speech continued by setting out the agenda if technology-led assessment is to fulfil its potential. He described the following three challenges:

- reforming assessment (ie placing more emphasis on assessment for learning, in the classroom, and less emphasis on external examinations)

- improving the robustness of organisations that supply assessments (ie ensuring that awarding bodies make the change)

- leading debate regarding standards and comparability with paper-based ancestors of e-assessments (ie making sure that transformation is not thwarted by media hype about erosion of standards and dumbing down).

Whilst acknowledging the risks and difficult choices for suppliers and adopters of e-assessment, Ken Boston's speech concluded with an enthusiastic call for technology to be used to transform assessment and learning:

"There is much less risk, and immensely greater gain, in pursuing strategies based on transformational onscreen testing; transformational question items and tasks; total learning portfolio management; process-based marking; and life-long learner access to systemic and personal data. There is no political downside in evaluating skills and knowledge not possible with existing pencil and paper tests, nor in establishing a new time series of performance targets against which to report them."

That conclusion has been translated into QCA's subsequent policy developments and e-assessment activity.

QCA has published two regulatory reviews of issues relating to the use of technology in assessment. The first study focused on issues relating to e-plagiarism [26] and led QCA to establish an advisory team in this area. Some commentators have seen a link between the e-plagiarism study and the subsequent advice from QCA that will lead to significant curtailments in the use of coursework. QCA's second review related to the use of technology to cheat in examination halls. Entitled 'Digital technologies and dishonesty in examinations and tests' [27], the report recommends that QCA should:

- publish advice for schools, colleges and suppliers

- design and implement better policing arrangements

- consider ways of preventing use of digital devices in examinations and tests.

This continues to reflect a dilemma for the regulators in England, Wales and Northern Ireland. At the same time as wanting to demonstrate regulatory control and instil the public with confidence in examination

systems, the regulatory bodies have wanted to bring about transformation. So, while QCA has been urged to consider banning digital devices, projects (like e-scape – see previous section) have been demonstrating the huge improvements to assessment that those very same devices can bring.

QCA and the DfES have completed a review of the Key Stage 3 ICT tests, through which QCA advised that the future focus of the Key Stage 3 ICT tests should change from end of Key Stage statutory testing to an ongoing diagnostic assessment. Accepting QCA's advice, Ministers have signalled a shift in the direction of travel for assessment. However, there are significant obstacles for QCA to overcome if it is to establish the Key Stage 3 ICT tests as when ready, optional, diagnostic assessments. First, teachers have not welcomed the innovative approach to assessment reflected in the ICT tests. They have shown an increasing appetite for DiDA and ECDL qualifications, commencing in Year 9, and in this environment it is by no means clear that teachers will want to use the QCA test if it continues to be designed to drive change in ICT pedagogy and learning. Second, QCA and RM are likely to find it technically difficult (and expensive) to successfully redesign the Key Stage 3 ICT test environment. A consequence, therefore, could be that the Key Stage 3 ICT assessments become a small and insignificant island rather than being a pathfinder or trail-blazer.

QCA, together with Northern Ireland's CEA and the Welsh Assembly, has now published a framework for the regulation of e-assessment[28]. This relates to regulatory activity and is therefore designed to ensure that candidates experiencing e-assessment find that experience to be valid, reliable and robust. QCA proposes to regulate through the publication of best practice in the following areas:

- validity and reliability
- security
- data integrity
- operation of e-assessment
- integrity of systems
- access
- avoidance of barriers
- business continuity
- automatic generation of on-demand tests
- test conditions and environment
- system familiarisation for assessors and administrators
- adaptive testing
- use of e-portfolios.

NATIONAL LEADERSHIP OF E-ASSESSMENT

Following QCA's decision in 2005 to disband its e-strategy unit, a number of observers have commented on the potential lack of leadership in e-assessment at a strategic level. Developments at the DfES have also led that organisation to adopt a less proactive role: in March 2005 the DfES published its e-strategy under the title, 'Harnessing Technology'[29] and subsequently established a Technology Directorate, only to disband it in 2006. The consequence of these developments is that the national policy lead for delivery of the government's e-strategy for education became a core element of Becta's remit. Becta has now published a Delivery Plan for 'Harnessing Technology'[30]. This document contains

POLICY UPDATES

some references to e-assessment, including the need to plot current activity, to plan a future policy-led vision and to communicate that vision. However, as matters stand in early 2007, the potential for e-assessment to transform learning – and for paper-based assessment to act as a major barrier to change – is not well reflected in the highest levels of policy leadership.

Becta's new remit includes responsibility to lead and coordinate e-assessment, alongside the government's e-strategy for education. The time is right for Becta, given this remit, to take stock of developments in e-assessment. E-assessment has a significant role to play as a catalyst for educational change, and the modernisation of assessment is a fundamental pre-requisite for core government policies (see below). As set out in this paper, e-assessment is developing rapidly. However, it is not clear that e-assessment is playing its full role in acting as a catalyst for change, and it should now be for Becta to take stock of developments, determining whether strategic interventions are needed.

At the present time, some of the government's flagship education reforms include significant opportunity for assessment reform generally and for e-assessment in particular. Four core elements of government policy are directed to achieving change:

- the Every Child Matters reforms
- curriculum remodelling, including: QCA's review of the Key Stage 3 curriculum, the government's 14-19 reforms, and the introduction of specialised diplomas

- the 'personalisation' of the curriculum[31]
- the Building Schools of the Future (BSF) programme[32].

There is significant potential within these reforms for technology-led transformation of assessment. First, the 14-19 reforms are designed in part to provide learners with greater flexibility and control over their learning and assessment. This should lead to wider adoption of e-portfolio tools. As learning becomes increasingly fluid over time and place, so assessment systems will have to provide learners with greater flexibility. Local authorities, required to provide a 'local prospectus' setting out the range of learning opportunities for 14-19 year-olds, will provide e-portfolio systems to support learners. Already in 2006, in Wolverhampton learning opportunities have been widened for all learners by designating Wednesdays as the day on which they can attend other schools or colleges. A network of software maps out learning opportunities and timetables. An excellent e-portfolio product - called 'my i-plan' - helps the learner map progress and keep track of achievements[33].

Second, the DfES' 14-19 reform programme has also carried forward Sir Mike Tomlinson's recommendation that a new assessment, in the form of an extended essay/project, should be introduced. The currently agreed assessment framework, covering qualifications at level 3, states that "the evidence for assessment for any part of the project, including its outcome, can be presented in any appropriate format. For example, written text, noted, slides, CD-Roms, videos/DVDs of performances and activities, audio tape, photographs and

artefacts." This extended essay/project is on track for first teaching from September 2008[34].

Third, QCA is currently field testing proposals for the introduction of a new national framework for qualifications. This new framework, now called the Qualifications and Credit Framework, aims to provide a simple and effective structure enabling learners to build up a record of achievements (and credit) over time and with different awarding bodies. To enable this, qualifications will be broken down through a national framework of units. Learners will record credit by unit, and will be able to accumulate the credit needed for a qualification over time. A national IT solution will be required, enabling learners to access their record of qualifications and unit credits. Learners will also be able to 'cash-in' their unit credits with designated awarding bodies[35].

The new Specialised Diplomas, the first of which will be piloted from September 2008, reflect a commitment to 21st century learning which is timely, relevant, flexible in its provision, as well as being supportive of the mobile and adult learner. The diplomas are unitised qualifications, and are designed to ensure that assessment and learning reflect best 21st century practice[36].

NORTHERN IRELAND, WALES AND SCOTLAND

Experience in Northern Ireland, Wales and Scotland is of governments providing resources and building local capacity. In Northern Ireland, for example, ALTA systems[37] has developed an adaptive assessment tool which includes:

- adaptive assessment offering fine-grained profile feedback

- formative assessment enabling teachers to feed information back to students in ways that enable the student to improve their own performance

- frequent (short) assessments that help all students to enhance their learning, and help teachers adjust their teaching and learning practice to provide the most benefit to both high and low achievers.

The ALTA adaptive engine is one of the most successful in the UK, and has been installed by Cambridge Assessment and Harcourt in their Achieve assessment product[38]. The Achieve assessment system consists of a bank of objective, onscreen, adaptive tests. These provide reports on strengths and weaknesses and link students to curriculum resources based on their assessment profile. The ALTA engine is also undergoing trials in schools in Scotland.

The Welsh Assembly has appointed NFER to develop and pilot Year 5 skills profiles and assessments in developing communication and thinking skills. Interestingly, the Department for Education and Lifelong Learning (DELLS) in Wales has opted to create a bank of assessment materials for teachers to use, but not to make great use of technology in the design or delivery of those assessments.

In Scotland, the longevity of e-assessment and e-learning in education policy-making has resulted in an impressive range of initiatives and projects, including the University of Strathclyde's electronic voting technology discussed earlier, and the

POLICY UPDATES

e-assessment work of the Scottish Qualifications Authority. This includes Pass-IT[39] (which investigated how e-assessments might enhance flexibility, improve attainment and support teaching and learning) and guidelines on e-assessment for schools[40]. For the first time, there has been use of e-assessment in high-stakes external examinations including in Higher Mathematics, Biotechnology Intermediate 2 and other Higher assessments. The Scottish OnLine Assessment Resources project is developing summative online assessments for a range of Units within Higher National (HN) qualifications. SQA is developing, through the Common Interests Group, three linked on-screen assessment tools (Initial Screening, Diagnostic and Recognising Achievement) for Communication, Numeracy and IT. Finally, SQA is investigating the use of wikis and blogs to assess the Intermediate 2 PBNC Health and Safety in Care Settings[41]. The SCHOLAR programme[42], developed within Heriot-Watt University, is designed to provide students with an online virtual college. The declared aims include an attempt to help students as they progress between school, college and university. The website provides course material, guidance, and online assessment materials. These latter materials are designed to give the learner access to diagnostic assessments and exam preparation aids.

MARKET-PLACE AND PRACTITIONER DEVELOPMENTS

3 MARKET-PLACE AND PRACTITIONER DEVELOPMENTS

This section provides information about developments in the supply of e-assessments and about developments in classroom practice.

THE E-ASSESSMENT ASSOCIATION

One of the most significant developments has been the creation of a UK-wide professional association for e-assessment, the eAssessment Association (eAA). Chaired by Cliff Beevers, Emeritus Professor of Mathematics at Heriot-Watt University, the group was launched in March 2007, with involvement from industry, users and practitioners.

The eAA has a significant role to play in encouraging the assessment community to make use of technology to improve assessment for learners. Uniquely it spans all phases of education; it covers the four countries of the UK; and it will play the campaigning role currently needed to help link policy making with the potential of e-assessment.

The eAA has set itself three goals:

1 Provide members with professional support.

2 Provide a vision and national leadership of e-assessment.

3 Publish a statement of good practice for commercial vendors.

The eAA will be linked to the Institute of Examiners and Assessors. More information about the eAssessment Association can be found on its website, www.e-assessmentassociation.com.

THE BETT AWARD FOR E-ASSESSMENT

In 2005 Becta launched a new BETT award, for e-assessment. The award was introduced in order to encourage industry suppliers to identify excellent products. The criteria for the award are also designed to lead expectations of what constitutes best practice. The criteria cover:

• impact on teaching and learning
• validity
• reliability
• engagement and motivational impact
• facilitating innovative use
• demonstrating sound design principles
• cost effectiveness.

In addition, the judging panel are asked to consider user references and citations.

The following five products were shortlisted for the 2007 BETT award for e-assessment. In January 2007, Becta announced the winner to be MAPS eQualifications, produced by TAG Learning.

MARKET-PLACE AND PRACTITIONER DEVELOPMENTS

Product	Company	Description of product
MAPS eQualifications	TAG Learning	This product enables teachers and tutors to manage students' portfolios and coursework. The product supports KS3 ICT tasks, DiDA, CLAIT, GCSE and iMedia. The major features of MAPS include: providing teachers with an IT system to develop and assign tasks to students, monitor students' progress in completing those assessments, communicate and message with the students about their work, and to keep track of completed and graded work.
Activote	Promethean	Activote is one of two student response systems on the shortlist. The system, and others like it, enables teachers to engage all children in the classroom in responding to quizzes, surveys and assessments. Such systems have been shown to engage and motivate students, as well as providing teachers with instantaneous assessments of students' understanding.
Digivey Suite	Diatouch	Digivey Suite provides touch-screen survey tools for classroom use.
InCAS	CEM Centre	InCAS (Interactive Computerised Assessment System) provides a personalised diagnostic and adaptive reading assessment. It includes word recognition and other reading assessments, covering Years 1-6. It generates age-equivalent reading scores.
Turning Point vPad 2006	Turning Technologies/ Steljes Ltd	Turning Point is one of two student response systems on the Becta shortlist. The software supports a range of types of quizzes, questionnaires and assessments. Teachers use the system to present a series of questions to a whole class or group of students, who use voting devices to respond.

AWARDING BODY DEVELOPMENTS

Of all the awarding bodies actively pursuing e-assessment, City & Guilds has long been a notable leader. City & Guilds has made e-assessment and technology a major thrust of its corporate strategy.

For City & Guilds, this has been an expensive (but rewarding) four-year investment. In 2006 it administered over 750,000 tests on screen. The strategy has been commercially successful – City & Guilds has grown from a £35m company to a £100m company. Its GOLA (Global Online

Assessment) system has proven successful; it successfully delivered the benefits of on-screen assessment, such as when-ready testing and immediate notification of results for candidates. The philosophy of the system has been to get the right assessment to the right people, in the right place, at the right time – for employers, this has meant short wait-times for resists. Most of the uptake of e-assessment has come in three business sectors: IT, electrical trades and hairdressing.

As well as delivering tests on screen, City & Guilds is at the forefront in the use of e-portfolios. Its approach is one of flexibility – provided an e-portfolio can be audited by a verifier, City & Guilds does not impose requirements on the selection of e-portfolio systems by centres. However, it has also sought to accelerate the adoption of e-portfolios by kite-marking three e-portfolio products. This approach is intended to provide centres with greater reassurance in their e-portfolio systems purchases[43].

City & Guilds had found that the marketplace was generally not well informed about the existence of e-portfolios. Despite this, City & Guilds has seen real benefits delivered through e-portfolios, including transparency and quality. City & Guilds reports that candidates complete their e-portfolios faster than paper-based portfolios. E-portfolios also give learners greater visibility of progress and next steps. Quality of contact with the assessor improves, with more regular and better informed contact.

Other awarding bodies are rapidly following the City & Guilds lead. The uptake of DiDA confounded all expectations and delighted Edexcel[44]. CCEA's AS qualification in Moving Image Arts[45] became one of the first to be based on 20th and 21st century uses of technology – both in terms of syllabus design and assessment content. How could the study of moving images be assessed if not through the use, in part, of video? In 2006 AQA completed its first trial of computer-delivered assessment at GCSE. The significance of this step is twofold. First, it represents a major awarding body introducing e-assessment into high-stakes examinations. Second, the approach taken by AQA was to create a closed-response computer-delivered test by selecting suitable materials from the historical paper-based tests. The national media were sceptical of the educational value of multi-choice testing – a point which AQA refuted[46]. In summer 2006, the AQA pilot was reviewed by The Times, which quoted Jonathan Osborne, Professor of Science Education at King's College London. He said: "How is this going to assess pupils' ability to express themselves in scientific language, a major aspect of science?" The Times article expressed strong doubt regarding the educational value of this approach to testing, a view shared by many educators in the UK.

Finally, World Class Tests, designed to provide mathematics and problem solving assessments for students aged 9-14, have continued to set expectations in terms of the possibilities for the design of on-screen assessment. The materials are now made available commercially through nferNelson, and include a significant range of classroom learning resources as well as test material. Uptake of the materials in China and Hong Kong continues to accelerate, in contrast to the UK.

GLOSSARY

Wherever possible, the following definitions have been taken from the e-assessment Glossary of Terms produced by QCA and JISC jointly[47].

Becta UK government agency appointed to lead the national drive to improve learning through technology. It does this by working with industry to ensure the right technology is in place. It also supports the education workforce to make the best use of technology to improve learning

DiDA Diploma in Digital Applications, a suite of three paperless qualifications from Edexcel that focuses on the practical application of technology. The suite includes the Award (AiDA), which is equivalent to one GCSE, the Certificate (CiDA), and the full Diploma (DiDA), equivalent to four GCSEs

Diagnostic assessment (information) refers to non-accredited assessment used to identify a learner's strengths and weaknesses with a view to providing an appropriate learning programme

E-assessment refers to the end-to-end electronic assessment processes where ICT is used for the presentation of assessment activity and the recording of responses. This includes the end-to-end assessment process from the perspective of learners, tutors, learning establishments, awarding bodies and regulators, and the general public

ECDL European Computer Driving Licence, a computer skills qualification (known as the ICDL outside Europe)

Electronic voting technology refers to devices used by individual students in a learning situation to respond to questions, prompts or ideas. The technology is used to gather responses from students and, usually, to display the range of responses to the teacher and/or students

E-portfolio an electronically-based portfolio, ie a file store and information management system which is modelled on the working method used for paper portfolios

ETS Educational Testing Service (based in the USA), provides a range of assessment, testing and related products and services worldwide

JISC Joint Information Systems Committee, manages research and development programmes in the use of ICT in teaching, learning and research to build knowledge; develop services, infrastructure or applications; and provide guidance and leadership. JISC operates in relation to further and higher education

Learning and Skills Council a body established by the UK government, with responsibility for planning and funding high quality education and training for everyone in England other than those in universities

Higher National Assessments qualifications offered to school students in Scotland preparing for education at university or college

NIACE National Institute of Adult Continuing Education (covering England and Wales), a non-governmental organisation working to promote adult learning

No Child Left Behind legislation passed in the USA in 2001 designed to ensure that all children receive a high quality education so that no child is left behind

On-demand testing refers to assessments and testing where there is a high degree of flexibility in the date and time of the assessments. This is to suit the student and their learning programme. This contrasts with many traditional assessment which are provided on a fixed date and time

Specialised Diplomas new qualifications, to be introduced from 2008, to recognise achievement at ages 14-19. They will combine practical skill development with theoretical and technical understanding and knowledge

Handheld devices/handheld learning refers to the use of mobile technologies and mobility to support learning, often with the aim of enabling transformational improvements in teaching and learning

PDAs personal desktop assistants, a category of handheld technology used in schools and some colleges

Second Life a 3D virtual world which opened to the public in 2003 and now has over 5 million members - see www.secondlife.com

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4 The Becta and DfES reviews were carried out by 3Square and Martin Ripley, respectively. Both of these reports are to be published by Becta shortly.

5 Becta has recently commissioned a study looking at the impact of e-portfolios on learning. The work will be carried out by Learning Services Research Institute at the University of Nottingham.

Project 1
This e-portfolio project in a large primary school in Nottinghamshire runs from Foundation Stage to Year 6. The early stages concentrate on recording progress and assessment, changing to become a 'work and evidence' folder for later stages.

Project 2
This project is run across some 80 schools in Berkshire. Schools have access to the same learning platform, with e-portfolio functionality. Not all schools use the e-portfolio functionality, and of those that do, some have provided innovative practice, some have taken a lower key approach.

Project 3
This project is based in the East Midlands. Last academic year, 900 learners used the e-ILP including those with visual impairment and dyslexia, for which the Accessibility Learner Information Profile standard was used.

Project 4
This university-based project in Oxfordshire has small cohorts of learners and aimed to adapt, implement and trial an Open Source Portfolio in a range of post-compulsory educational contexts, integrating a web services interface.

Project 5
This series of projects looks at the use of e-portfolios to support a 'staged process' which establishes a way of recognising and recording progress and achievement on non-accredited provision.

Project 6
This Scottish project looked at the impact of e-portfolios on supporting junior doctors during placement years.

Project 7
This West Midlands-based regional pilot has proved successful in tracking learners across the flexible and increasingly mobile 14-19 phase.

Project 8
This Midlands-based project implemented the use of e-portfolios in two schools and three Further Education colleges looking at four areas.

6 www.careerswales.com/progressfile

7 www.niace.org.uk/Projects/RARPA

8 www.jisc.ac.uk/uploaded_documents/strathclyde.doc

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Phase 1 final report: www.esnips.com/doc/b2a90a93-ba06-4759-bfae-81983326dbc2/e-scape-phase-1-(final-report) e-scape
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This publication is available to download from the Futurelab website –
www.futurelab.org.uk/litreviews

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Futurelab is passionate about transforming the way people learn. Tapping into the huge potential offered by digital and other technologies, we are developing innovative learning resources and practices that support new approaches to education for the 21st century.

Working in partnership with industry, policy and practice, Futurelab:
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• provides the space for experimentation and the exchange of ideas between the creative, technology and education sectors.

A not-for-profit organisation, Futurelab is committed to sharing the lessons learnt from our research and development in order to inform positive change to educational policy and practice.

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