Qualifications and Curriculum Authority

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Regulatory principles for e-assessment

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Contents

Introduction

The increasing use of technology for the development, delivery, administration and reporting of assessment – whether for end-to-end e-assessment solutions or for combined electronic and manual systems – means that regulatory issues also need to be carefully considered.

This document sets out the regulatory principles that address developments in e-assessment activity, where it is felt that regulation is needed to take account of the specific nature of this mode of delivery. These principles represent a new approach to regulatory intervention, intended to ensure flexibility and encourage innovation. They must be used in conjunction with the regulations and best practice set out in:

- *The statutory regulation of external qualifications in England, Wales and Northern Ireland (2004)*
- *GCSE, GCE, GNVQ and AEA code of practice (April 2007)*
- *NVQ code of practice (2006)*
- *Awarding body criteria (SQA 2007)*
- *National curriculum assessments code of practice (2006)*
- *National curriculum assessments regulatory framework (2006)*
- *Regulatory monitoring and reporting guidance (2007)*
- *SQA guidelines for e-assessment for schools (2005)*
- *SQA guidelines on on-line assessment in further education (2003)*
- *A guide to effective practice in e-assessment (2006),* which offers practical support and information to people involved in the management and delivery of e-assessment.

The above publications were produced by the Qualifications and Curriculum Authority (QCA), in England; the Department for Education, Lifelong Learning and Skills, (DELLS), in Wales; the Council for Curriculum, Examinations and Assessment (CCEA), in Northern Ireland; and the Scottish Qualifications Authority (SQA), in Scotland.

Awarding bodies are expected to comply with these regulatory principles wherever technology assists or facilitates in the assessment process and within the context outlined in this document.

Regulation of e-assessment systems will be incorporated into the monitoring and self-assessment processes. Awarding bodies will be required to address any issues arising from these activities.

A glossary of terms used in this document, compiled in collaboration with JISC (Joint Informations and Systems Committee), can be accessed from the QCA website (www.qca.org.uk/6886.html) or the JISC website (www.jisc.ac.uk/assessment.html).

A list of current legislation, industry standards and best practice is provided at the end of this document. Awarding bodies should consider the requirements and implications of these when developing their e-assessment systems.

The regulators' aims and objectives for e-assessment

The regulators aim to:

- modernise further the qualification system through the use of technology, in order to provide the flexibility to create innovative forms of assessment and to extend the ways in which learners can demonstrate their achievements
- ensure that sector qualification strategies encourage the development and take-up of innovative forms of e-assessment
- ensure that its e-assessment strategy and operations are robust and develop confidence in the e-assessment process for users
- guide operations, developments and innovative practice in e-assessment in a consistent way through principles of regulation and in the context of other relevant quality standards in the ICT domain
- identify and address the parameters for success and areas of risk for innovative e-assessment strategy, and keep the scope for regulation under constant review
- ensure that the integrity, reliability and validity of e-assessment are upheld, and – insofar as is consistent with integrity, reliability and validity – facilitate and support innovative assessment practice
- ensure that regulation of e-assessment is based on the following common principles:
  - proportionality
  - accountability
  - consistency
  - transparency
  - targeted.

Scope of e-assessment and regulation

E-assessment, for the purposes of regulation, is defined as the use of electronic systems for the development, operation and delivery of accredited qualification assessment or the collection of performance evidence, which contributes to the awarding of a unit or an accredited qualification.

In addition, the implications of using electronic means for the generation, delivery and administration of assessment or calculation of results are included in the scope of what is regulated. This includes where minimal use of technology still raises issues for regulation, for example transfer of data from optical mark reader (OMR) forms and scanning of scripts, but does not include standard awarding body administration systems or candidate databases.

The regulators will examine the extent to which the regulation of e-assessment is needed, through consideration both at a micro level, for example through outcomes based monitoring of awarding bodies' e-assessment systems and processes, and at a macro level, for example by conducting research into the e-assessment market.

Examples of e-assessment

The term ‘e-assessment’ denotes any type of assessment that has an electronic component and incorporates one or more of e-testing, e-portfolios and e-marking. The following examples of e-assessment illustrate the potential scope and the range of its different uses. This list is not intended to be exhaustive.

- Assessments that are distributed, completed, marked automatically and administered electronically using local intranets/networks and individual workstations.
- Assessments that are distributed, completed, marked automatically and administered electronically using the internet.
- Assessments – comprising a combination of automatic marking and manual marking that are delivered in either of the two ways described above.
- Electronic test delivery, with all marking completed manually on screen or on paper.
- A range of multimedia formats for submitting assessment.
- Electronic scanning of completed assessments for marking.
- Tests downloaded from the internet by the centre.
- Delivery of assessments` and submission of completed assessments by secure email.
- E-portfolios to store and manage candidates’ evidence electronically
- Assessments that are automatically marked and react adaptively to student performance.

Regulatory principles

Awarding bodies must carefully consider the following regulatory principles for e-assessment in terms of how they, together with their technology provider(s), can ensure effective and robust educational methodologies, together with valid and reliable infrastructure and system capabilities, supported by awarding bodies' requirements on service providers and centres.

1. Validity and reliability of e-assessment

Awarding bodies must ensure that assessment delivered and maintained by electronic means is fit for purpose and produces a valid and reliable measure of a candidate's skills, knowledge, understanding and/or competence. The choice of assessment method must be independent of the technology on which it may be based.

1.1. Awarding bodies must ensure that e-assessment is fit for purpose and does not compromise the assessment methodology and the integrity of what is being assessed. Assessment should test only the knowledge and skills needed to achieve the qualification.

1.2. E-assessment systems must maintain the integrity and validity of the assessment process by reflecting the relevant procedures outlined in existing codes and criteria.

2. Security

Awarding bodies must maintain and review the security of e-assessment systems to ensure authentic test outcomes and protection against corruptive influences[1]. Procedures must be in place to assure the security of hardware and software and the integrity of test data.

2.1. The security arrangements for e-assessments and the assessment data must comply, where relevant, with current legislation and industry standards (see Appendix 1 for a list of current relevant legislation and standards).

2.2. Awarding bodies must ensure that e-assessment systems have safeguards in place designed to ensure the security of all aspects of e-assessment and the e-assessment process, including plagiarism, copying and any interference with test outcomes.

[1] For example, a candidate, malicious person or programme changes information on the server, makes uses of electronic resources not specified in the test or helps another candidate.

2.3. E-testing and e-portfolio systems must include adequate protection, such as software and/or firewalls, that will protect against viruses and hacking, and monitor and block attempts to corrupt the assessment process.

2.4. Awarding bodies must ensure that, through their technology provider, the following areas are addressed in the development of an e-assessment system:

- developing appropriate authentication processes
- differentiating users on the basis of permissions and rights of access
- protecting system areas so that only correctly authenticated users are able to access certain parts of the system.

2.5. E-assessment systems must have the functionality to provide accurate audit trails and reports of system use and activity.

2.6. Awarding bodies must give due consideration to the physical security of e-assessment hardware, such as the server.

2.7. Awarding bodies must require their centres to have policies and procedures in place to protect the security of the hardware and software used to deliver e-testing and the network in which it operates.

2.8. Awarding bodies and their centres must ensure that e-portfolio providers have included features that protect the security of the hardware and software used to hold candidates evidence and assessment outcomes.

2.9. E-tests must be developed within secure environments to prevent possible security breaches before the test window.

2.10. Awarding bodies must have procedures in place that will protect the integrity of test data before and after the assessment is taken and while it is being transmitted to and from the test centre, for example through encryption or authentication of e-signatures, in line with industry standards (see Appendix 1 for a list of current relevant legislation and standards).

2.11. Where awarding bodies have entered into partnership arrangements with any other provider, they must have in place service level agreements, licence or franchise arrangements that make clear where the responsibility for aspects of security lies.

2.12. Awarding bodies must ensure that results and scores that are automatically calculated and generated by e-testing systems are delivered accurately and securely to the candidate.

3. Data integrity – input/output

Awarding bodies must be confident that systems have been thoroughly tested to ensure that they have sufficient capacity to store, retrieve, generate and share all necessary data, including the ability to exchange data securely with other internal and external systems, as required, without endangering the integrity of the data.

3.1. Awarding bodies must be confident that there is sufficient capacity to hold all necessary data and that systems operate successfully. Awarding bodies must ensure that effective testing of system capacity has taken place.

3.2. Awarding bodies must put in place systems to monitor, review and correct any errors that occur to data input or output and to measure the accuracy of what is generated. This must be incorporated into the awarding bodies' quality assurance procedures.

3.3. Awarding bodies must have secure and robust data storage, archiving and retrieval arrangements in place including effective and secure interfaces with centres and service providers.

3.4. Awarding bodies must ensure that systems that have the ability to exchange data with awarding body registration and entry systems, centres' management information systems and other e-assessment systems, do so securely.

3.5. Awarding bodies must ensure, by thorough system testing and regular review that results which are automatically calculated and generated by e-assessment systems are accurate and secure.

4. Operation of e-assessment systems

E-assessment systems must be stable and work reliably to generate valid and reliable assessments and/or results. They must be demonstrably consistent with relevant recognised standards of good practice and be easy to navigate.

4.1. Awarding bodies must ensure that e-assessment systems are sufficiently robust to support high-stakes assessment.

4.2. Awarding bodies must have procedures in place designed to ensure that any services provided by network suppliers meet the regulatory authorities' principles for security and data integrity as well as relevant industry standards and best practice (see Appendix 1 for a list of relevant industry standards and best practice).

4.3. E-assessment systems must include functionality to generate key information, for example statistics on results and system error reports and data that will demonstrate regulatory compliance.

5. Integrity of e-assessment systems

Systems must allow for flexibility in the light of technological development. System testing must be thorough, and be reviewed at regular intervals once the system is operational. Awarding bodies must ensure that suitable support facilities are in place for centres and that there is a comprehensive contingency plan should any part of the system fail.

5.1. Before full implementation, awarding bodies must ensure that a comprehensive period of testing is undertaken, taking into account the system's functionality and capacity for all levels of user as well as for a potential high level of concurrent users. ~~A~~ny lessons learnt must be incorporated into the system.

5.2. Awarding bodies must have procedures in place to undertake regular system testing and reviews once the e-assessment system is in operation to ensure continued reliability.

5.3. Awarding bodies must provide centres with clear guidance on the minimum requirements for IT infrastructure and the subsequent quality of operating levels that can be expected, for example the effect of different connection speeds or administrative functionality. Awarding bodies must not permit the use of minimum IT requirements to affect the candidate interface.

5.4. Awarding bodies must make clear what applications their e-assessment systems will support and, as far as is practicable, that they support the range of applications that users may wish to use in order to fulfil the requirements of the assessment, for example in the case of e-portfolios.

5.5. Awarding bodies must ensure that any software that is developed specifically for the purposes of an e-assessment system is compatible with a sufficient range of platforms and applications to ensure that it is viable.

5.6. Clear arrangements must be in place between awarding bodies and their service providers to supply effective technical support for centres and any other user. Awarding bodies must supply all system users with clear guidance on the degree of additional system support that is available.

6. Access to e-assessment

Awarding bodies must have policies and procedures in place to ensure that disabled learners are not treated less favourably than non-disabled learners when implementing e-assessment. This should include learners with physical/sensory disabilities and learning disabilities or difficulties as defined in the Disability Discrimination Act (DDA) 1995 and subsequent regulations and guidelines.

6.1. Awarding bodies must give due consideration early on in product development to the ways in which disabled learners manage their disabilities. This must be included in business planning, product specification and choice of product, implementation and impact assessment. Additional reasonable adjustments in line with the DDA should also be made for disabled learners who are eligible for adjustments in examinations. It should not be assumed that all people with the same disability will have the same requirements, or that all disabled people need to be offered all access adjustments.

6.2. Awarding bodies must begin to consider the needs or requirements of disabled learners early on in the development of the e-assessment system, for example by considering font size and text layout in line with recognised guidelines or by making e-assessment systems compatible with the main types of voice-activated software (see Appendix 1 for details of relevant guidelines).

7. Avoidance of barriers to new technology for learners

Awarding bodies must ensure that the use of technology does not create barriers for learners by providing user-friendly interfaces for centres and learners and by enabling familiarisation and/or training sessions appropriate to the mode of delivery. Provision must be made available for learners with particular assessment requirements.

7.1. Awarding bodies must open up the use of technology for the benefit of all learners by providing a user-friendly interface for centres and learners and by allowing users, where appropriate, to engage in e-assessment activities from a variety of locations This should be supported by clear guidance and details of available support facilities.

7.2. Awarding bodies must provide opportunities for all users to familiarise themselves with the mode of delivery, for example through preparatory exercises or familiarisation sessions appropriate to the mode of delivery, to ensure that the use of technology does not inhibit candidates' performance.

7.3. E-assessment systems must be designed to be easy to use and navigate.

8. Business continuity/disaster recovery

Awarding bodies must have suitable measures in place to ensure the effective management of business continuity to address business interruption and the need for disaster recovery for their e-assessment services and systems, in the event of a system's failure. This management should be underpinned by measures to identify potential risks to those services and systems so that they can be managed to minimise disruption.

8.1. Awarding bodies must implement risk management procedures to provide early identification of risks to the operation of e-assessment systems and enable action to be taken to minimise the impact of those risks, in line with recognised standards of good practice (see Appendix 1 for a list of relevant standards of good practice).

8.2. Awarding bodies' service level agreements with service providers for their e-assessment systems must consider substantial interoperability with other systems and service providers, as far as is practicable, to enable adaptability in the contracting of services and to help manage risks and dependencies in the event of a system's failure.

8.3. Awarding bodies must put in place procedures to anticipate interruptions to the operation of their e-assessment systems and minimise the time needed for their recovery, while ensuring secure system back-ups are maintained, including the facility to enable off-site access.

8.4. Awarding bodies must put in place a disaster recovery programme that sets out how the operation of their e-assessment system and services will restart after a significant disruption.

8.5. Awarding bodies' disaster recovery programmes should determine how access to alternative, convenient, fully equipped services and facilities will be provided. This must include how service will be re-started in line with an awarding body's defined priorities and within identified timescales, after the disaster has occurred.

8.6. Awarding bodies must ensure that their centres have comprehensive strategies for back-up and contingency scenarios in the light of a system failure at the centre.

9. Automatically generated on-demand tests

Awarding bodies must ensure that there is a sufficient volume of assessment items or questions to provide consistently secure, robust, balanced and unique on-demand tests, appropriate to the form of assessment.

9.1. Where awarding bodies use electronic assessment item banks to automatically generate on-demand tests they must ensure, by thorough testing, that there are sufficient assessment items to provide consistently robust, balanced and unique test papers for the assessment/test windows to be accommodated.

9.2. Where electronic assessment item banks are used to automatically generate individual on-demand tests, awarding bodies must make sure that the security of assessment items is not compromised by the level of use by ensuring that there are sufficient items available to accommodate the test window and candidate capacity.

9.3. Where electronic assessment item or question banks are used, awarding bodies must ensure that each item that contributes to tests is consistent and comparable with others over time for each session.

9.4. Where delivery of test items or questions is randomised, awarding bodies must have policies and procedures in place to analyse the possible impact of the randomisation on candidates' performance and to ensure that question order does not bias results, for example by pre-testing.

9.5. Automatically generated on-demand tests must be appropriately designed to allow for equal choice for disabled learners.

10. Test conditions and environment

Awarding bodies must have policies and procedures in place to ensure that centres manage the controls on test conditions in relation to on-demand testing, invigilation, secure test environments and health and safety.

10.1. Awarding bodies must ensure that centres manage the controls on test conditions in relation to the extent to which on-demand testing is available to ensure that the security of the assessment is not compromised by the level of candidate use.

10.2. Awarding bodies must consider the management of centres' invigilated test environments in terms of any additional requirements specific to the use of technology for testing, and any new skills set or support that could potentially be required by centre invigilators.

10.3. Awarding bodies must ensure that their centres have policies in place that address the need to manage the secure test environment in relation to the use of technology for assessment, for example in terms of network security and data integrity in their test locations.

10.4. Awarding bodies must ensure that any requirements on candidates in terms of the management of the test environment and conditions are compatible with health and safety obligations of a centre.

11. System familiarisation for assessors and system administrators

Awarding bodies must provide suitable support for system users, such as familiarisation sessions and guidance for assessors and moderators.

11.1. Awarding bodies must provide examiners, assessors, moderators and system administrators with familiarisation sessions or facilities to so that they have sufficient knowledge and understanding of the testing software. Centres must have clear guidance on the correct support contacts available for all elements of the system.

11.2. Awarding bodies must provide clear guidance on judgments and decision making for assessors dealing with different the media of work to be assessed, for example digital film, photos or mobile phone technology.

12. Adaptive testing

In addition to regulatory principles 1–11, awarding bodies must ensure that any adaptive testing that they provide produces robust assessment that reliably identifies the appropriate level of each learner and is comparable across different modes of delivery where this is required.

12.1. Systems must be thoroughly tested to address construct and content issues to ensure that the test will operate consistently and generate tests that are a valid and reliable measure of the attainment of each candidate.

12.2. Systems must be comparable across different modes of delivery, including alternative provision for the specific needs of particular groups of learners, for example to provide equality of access to assessment for disabled learners.

12.3. Systems must include functionality to monitor adaptive questions, including the ability to collect data on the degree of difficulty of each question, within and across assessment sessions, in order to inform future test sessions and development.

13. Use of e-portfolios for assessment

In addition to regulatory principles 1–11, e-portfolio systems should store and maintain performance evidence for access by all required parties securely, meet the evidence needs for a range of qualification types and enable learners to move their portfolios from one centre to another.

13.1. E-portfolio systems must have the capabilities to store and maintain a variety of forms of performance evidence or coursework for secure access by the learner, assessors, verifiers and moderators based on a robust authentication process.

13.2. As far as is practicable, awarding bodies must give due consideration to the need to support a degree of inter-operability in thee-portfolio systems that they develop or endorse to enable learners to move their portfolios from one centre to another.

13.3. Awarding bodies must consider the need for the e-portfolio systems that they develop or endorse to meet the evidence needs for a range of qualification types in order to provide consistency of service, appropriate to their awarding body.

Appendix 1: Current relevant legislation, industry standards and best practice guidance

Title	Definition
Data Protection Act	Governs the use of personal information by businesses and other organisations.
Disability Discrimination Act (DDA) 1995	Legislation that is in place to protect disabled people from discrimination and to promote equality of opportunity for disabled people.
ISO23988: International code of practice for the use of information technology (IT) in the delivery of assessments	Gives recommendations to awarding bodies, technology providers and centres on the use of IT to deliver assessments to candidates and to record and score their responses.
The electronic signatures regulations 2002 (SI2002 No. 318)	Regulations from HMSO that provide a framework for the definition and issue of electronic signatures.
RNIB good design guidelines	Provides guidelines for designing documents and websites to ensure that they are accessible to people who are visually impaired.
BS25999: Code of practice for business continuity management	Establishes the process, principles and terminology of business continuity management (BCM), and provides a basis for understanding, developing and implementing business continuity within an organisation.

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Qualifications and Curriculum Authority
83 Piccadilly
London
W1J 8QA
www.qca.org.uk