

SQA’s Requirements for e-assessment

The criteria below should be used to support the assessment of SQA qualifications. They may be used by centres and providers of e-assessment systems to ensure that their systems meet SQA’s requirements, and also as a reference point for SQA’s External Verifiers. The criteria have been adapted from the UK Qualifications Regulators’ publication, [Regulatory Principles for e-Assessment](http://www.sqa.org.uk/files_ccc/RegulatoryPrinciplesforE-assessment.pdf). These principles are designed to ensure e-assessment is based on effective and robust educational methodologies, supported with valid and reliable infrastructure and systems.

SQA also provides criteria relating [SQA’s requirements for e-portfolios](https://secure.sqa.org.uk/sqa/files_ccc/SQA_requirements_for_e-portfolios-web_version_v6.1.docx), adapted from the Regulatory Authorities’ publication [E-assessment: guide to effective practice](http://www.sqa.org.uk/sqa/files_ccc/guide_to_best_practice.pdf).

When e-assessment is provided or facilitated via the SQA e-assessment system, [SOLAR](http://www.sqa.org.uk/sqa/8165.5671.html), the responsibility for assessment and quality assurance rests with SQA. This is because SOLAR assessments are prior-verified, and mostly automatically marked. We also liaise with our technology providers to ensure that the e-assessment system continues to meet the necessary quality standards.

Where e-assessment for SQA qualifications is delivered using centres’ own e-assessment systems, centres are responsible for ensuring that their systems meet the necessary quality standards. For e-testing systems, including those within VLEs, this means responsibility for ensuring that the systems meet standards in terms of how assessments are developed, checked, scheduled and delivered to learners and how results are managed, internally quality assured and reported.

If you would like to submit comments on the e-assessment criteria please send them to christine.wood@sqa.org.uk

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| **SQA Requirements for e-Assessment** | |
| 1.Validity and reliability of e-assessment  Assessment delivered and maintained by electronic means should be fit for purpose and produce a valid and reliable measure of a candidate’s skills, knowledge, understanding and/or competence. The choice of assessment method should be independent of the technology on which it may be based. | |
|  | **Comment** |
| 1.1 E-assessment should support the assessment methodology & test only the knowledge and skills needed to achieve the qualification. |  |
| 1.2 E-assessment systems must reflect relevant procedures in existing codes and criteria. |  |
| 2. Security  Security of e-assessment systems should be reviewed & maintained to ensure authentic test outcomes and protection from corruptive influences. Procedures must be in place to assure security of hardware and software and integrity of test data. | |
|  | **Comment** |
| 2.1. Security arrangements for e-assessments and assessment data must comply, where relevant, with current legislation and industry standards. |  |
| 2.2. E-assessment systems must 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. |  |
| 2.3. E-testing and e-portfolio systems must include adequate protection, such as software and/or firewalls, which will protect against viruses and hacking, and monitor and block attempts to corrupt the assessment process. |  |
| 2.4. In the development/procurement of an  e-assessment system the following areas should be addressed:  - 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. Due consideration should be given to the physical security of e-assessment hardware, such as the server. |  |
| 2.7. There should be 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. E-portfolio systems used must include 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 delivery/window. |  |
| 2.10. Procedures must be in place to 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. |  |
| 2.11. Where there are partnership arrangements with any other provider, service level agreements, licence or franchise arrangements must be in place and these must make clear where the responsibility for aspects of security lies. |  |
| 2.12. Results and scores that are automatically calculated and generated by e-testing systems must be delivered accurately and securely to the candidate. |  |

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| 3. Data integrity – input/output  Systems should 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. | |
|  | **Comment** |
| 3.1. There must be sufficient capacity to hold all necessary data and systems must operate successfully. Effective testing of system capacity should have taken place. |  |
| 3.2. Systems must be put in place to monitor, review and correct any errors that occur to data input or output and to measure the accuracy of what is generated. |  |
| 3.3. There must be secure and robust data storage, archiving and retrieval arrangements in place including effective and secure interfaces between centres, service providers and SQA. |  |
| 3.4. Ideally systems should have the ability to exchange data with SQA registration and entry systems, centres’ management information systems and other e-assessment systems, and must do so securely. |  |
| 3.5. The accuracy and security of results that are automatically calculated and generated by  e-assessment systems must be ensured through thorough system testing and regular review. |  |
| 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. | |
|  | **Comment** |
| 4.1 E-assessment systems must be sufficiently robust to support high-stakes assessment. |  |
| 4.2. Procedures must be in place designed to ensure that any services provided by network suppliers meet SQA’s principles for security and data integrity, as well as 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 should 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. Suitable support facilities must be in place and there must be a comprehensive contingency plan should any part of the system fail. | |
|  | **Comment** |
| 5.1. Before full implementation, a comprehensive period of testing should be 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. Any lessons learnt should be incorporated into the system. |  |
| 5.2. Procedures must be in place to undertake regular system testing and reviews once the  e-assessment system is in operation, to ensure continued reliability. |  |
| 5.3. Clear guidance should have been provided 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. The use of minimum IT requirements should not be allowed to affect the candidate interface. |  |
| 5.4. Clear guidance should have been provided on the range of applications an e-assessment system will support, including, as far as is practicable, applications that users may wish to use in order to fulfil the requirements of the assessment, such as e-portfolios. |  |
| 5.5. Any software that is developed specifically for the purposes of an e-assessment system should be compatible with a sufficient range of platforms and applications to ensure that it is viable. |  |
| 5.6. Clear arrangements should be in place between centres and service providers to supply effective technical support for users. All system users should be provided with clear guidance on the degree of additional system support that is available. |  |

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| 6. Access to e-assessment  Policies and procedures should be in place to ensure that disabled learners are not treated less favourably than non-disabled learners when implementing e-assessment. This must include disabilities as defined by the Equality Act (2010) and subsequent regulations and guidelines. | |
|  | **Comment** |
| 6.1. In product development, due consideration should be given early on to the ways in which disabled learners manage their disabilities. This must be included in business planning, product specification, choice of product, implementation and impact assessment.  Additional reasonable adjustments in line with the Equality Act 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. The needs or requirements of disabled learners need to be considered early on in the development of the e-assessment system, for example by considering font size and text layout in line with recognized guidelines or by making  e-assessment systems compatible with the main types of voice-activated software. |  |

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| 7. Avoidance of barriers to new technology for learners  Action should be taken to ensure the use of technology does not create barriers for learners - user-friendly interfaces should be provided and familiarisation and/or training sessions appropriate to the mode of delivery should be available. Provision must be made for learners with particular assessment requirements. | |
|  | **Comment** |
| 7.1. The use of technology, for the benefit all learners, should be facilitated by providing a user-friendly interface 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. Opportunities should be provided for all users to familiarize 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 should be designed to be easy to use and easy to navigate. |  |
| 8. Business continuity / disaster recovery  There must be suitable measures in place to ensure the effective management of business continuity, to address business interruption and the need for disaster recovery for e-assessment services and systems, in the event of a system’s failure. This should be underpinned by measures to identify potential risks to those services and systems so that they can be managed to minimise disruption. | |
|  | **Comment** |
| 8.1. Risk management procedures must be implemented 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. |  |
| 8.2. Service level agreements, with service providers for e-assessment systems, should 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. Procedures must be put in place to anticipate interruptions to the operation of e-assessment systems, and minimise the time needed for recovery, while ensuring secure system back-ups are maintained, including the facility to enable off-site access. |  |
| 8.4. A disaster recovery programme must be in place which sets out how the operation of  e-assessment systems and services will restart after a significant disruption. |  |
| 8.5. 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 SQA’s defined priorities and within identified timescales, after the disaster has occurred. |  |
| 8.6. There must be comprehensive strategies for back-up and contingency scenarios in the light of a system failure at the centre. |  |
| 9. Automatically generated on-demand tests  There must be 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. | |
|  | **Comment** |
| 9.1. Where electronic assessment item banks are used to automatically generate on-demand tests for groups of candidates, they must ensure, through 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, steps must be taken to 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. |  |

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| 9.3. Where electronic assessment item or question banks are used, each item that contributes to tests must be consistent and comparable with others over time and for each test session. |  |
| 9.4. Where delivery of test items or questions is randomised, there should be policies and procedures in place, for example pre-testing of items, to analyse the possible impact of the randomisation on candidates’ performance and ensure that question order does not bias results. |  |
| 9.5. Automatically generated on-demand tests must be appropriately designed to allow for equal choice for disabled learners. |  |
| 10. Test conditions and environment  Policies and procedures must be in place to ensure that controls on test conditions are managed in relation to on-demand testing, invigilation, secure test environments and health and safety. | |
|  | **Comment** |
| 10.1. Controls on test conditions must be managed 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. The management of invigilated test environments should be considered 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 invigilators. |  |
| 10.3. Policies should be 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 test locations.3 |  |
| 10.4. Any requirements on candidates, in terms of the management of the test environment and conditions, should be compatible with health and safety obligations of the centre. |  |

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| 11. System familiarisation for assessors and system administrators  Suitable support should be provided for system users, such as familiarisation sessions and guidance for assessors and moderators. | |
|  | **Comment** |
| 11.1. Examiners, assessors, verifiers and system administrators should be provided with familiarisation sessions or facilities to ensure that they have sufficient knowledge and understanding of the testing software. Clear guidance must be available on the correct support contacts available for all elements of the system. |  |
| 11.2. Clear guidance should be provided on judgments and decision making for assessors when dealing with different media of work, for example digital film, photos or mobile phone technology. |  |
| 12. Adaptive testing  In addition to regulatory principles 1–11, any adaptive testing provided must produce robust assessment that reliably identifies the appropriate level of each learner and is comparable across different modes of delivery, where this is required. | |
|  | **Comment** |
| 12.1. Adaptive e-testing 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. |  |