E-assessment guidelines for the VET sector: Case study 3

Canberra Institute of Technology - Driving assessment using a virtual classroom

6 June 2011
Acknowledgement

This report was produced for the Australian Flexible Learning Framework and National Quality Council by Rob Stowell (Learning Australia Pty Ltd) and Reece Lamshed (Binary Blue).

The case study is based on interviews with:

- William Nauenburg, Centre Director, Centre for Information and Communication Technology, Canberra Institute of Technology.
- Penny Educational Manager of Flex:ED, Canberra Institute of Technology.

Thanks to William and Penny for their support in developing this case study.
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Summary

Institute
Canberra Institute of Technology

Qualification
Project Architecture 1 (Degree) / Requirements Analysis (Certificate IV)

Cohort
Project Architecture is conducted online in a partnership with the Academy of Interactive Entertainment AIE, involving seven learners.

E-assessment technology
Wimba - Virtual classroom
Moodle - Learning Management System, including Forum and Quiz functions
Equella – Learning content repository
Banner - Student Management System

Description
- The Learning Management System is used to provide the online learner resources; communicate with them (announcements, email, calendar) and provide assessment feedback and record / communicate results. It also retains the learner assessment evidence, and unofficial records.
- The Virtual Classroom is used as a tutorial session, where learners discuss issues.
- A Forum is used to encourage discussion on issues and topics between class sessions and facilitate collaboration between learners. They are assessed on their contribution and participation.
- The Quiz is used as a formative tool for assessment.
- Banner is the Student Management System, which is the official record and generates transcripts and certification.

Case study highlights
This case study provides a clear example of the seamless utilisation of a number of technologies in the assessment process.

The virtual classroom is becoming more popular in e-learning contexts, particularly for distance learning, and the case study shows how this is used to drive the assessment process.

The case study demonstrates how the utilisation of a Learning Management System can be used to provide an integrated package of learning and assessment materials for learners and an individualised feedback mechanism throughout the learning / assessment process.

The Forum is used as an assessment tool and the case study shows how these can be used effectively as collaborative assessment.

The ‘quiz’ in this case study is used in a highly innovative manner; to drive research rather than to test knowledge per se, highlighting how they can be conducted effectively within a rigorous assessment framework.
The case study context is a training partnership arrangement, which could be used as off-shore delivery model.
2. Case study details

William Nauenburg in his office at Canberra Institute of TAFE (CIT)\(^1\) at 10.50 am on Wednesday, opens the virtual classroom, Wimba\(^2\) and puts on his head set with microphone. He’s 10 minutes early for the session and loads his pre-prepared PowerPoint presentation into the system. He then waits until seven off-campus learners join the weekly session.

The learners all live in Canberra. Three days a week, they attend a games training provider, AIE\(^3\), where they do their practical skills training in games design and development. In this session they will be doing the ‘theory’ component of the course. The course, Project Architecture 1, runs for a semester.\(^4\) William matches the theory each week in UML\(^5\) in his virtual classroom sessions with the practical sessions the learners undertake at AIE.

Next week the learners will complete their final assessment; an examination. They come to the Institute campus for this three-hour exam. So today, William dedicates the two-hour virtual classroom session to summarising the key elements of the course, and preparing his learners for their final examination.

Wimba is the centrepiece of William’s delivery and assessment model. Wimba Classroom\(^6\) was developed about ten years ago as a live, virtual learning environment that includes audio, video, application sharing and content display used for formal, scheduled instruction and meetings.

All the learners have now joined the session: he can ‘see’ them arrive in the participant’s panel on the Wimba interface.\(^6\) Today, the attendance is good: all seven learners have joined. William reports on average over the semester, there has been about six learners attend every week.

William sets the Wimba record mode to record the session. After the session is complete, William will stop the recording and access a link to the recorded session. He will then link the session back to the online learning system, Moodle.\(^7\)

This means learners can replay the session, in its entirety or just review parts of it. On a week when all learners can’t attend, the absent learner can review what they missed in class. The recording is in either .mp3 (audio only) or .mp4 (video, slide presentation, etc).\(^8\)

The digital space William and his learners work in is called CIT eLearn.

eLearn is a system that seamlessly integrates three key systems:

- the learning management system, Moodle
- the virtual learning environment, Wimba
- the content learning repository, Equella.

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1. [http://cit.edu.au](http://cit.edu.au) See also case study documents, page 10, Figure 1.
2. www.wimba.com
3. AIE – Academy of Interactive Entertainment. [www.aie.edu.au](http://www.aie.edu.au)
4. This subject is part of the degree course, *Bachelor of Games and Virtual Worlds (Programming)*.
5. UML - Unified Modeling Language (UML) is a standardized general-purpose modeling language in the field of object-oriented software engineering.
6. See case study documents, page 11, figure 3.
7. See case study documents, pages 12 and 14, figures 5 and 10.
8. Interoperable file formats.
A benefit of the CIT eLearn system is that for both staff and learners, there is a single login to the three systems. The single sign-on occurs when the student logs into the Moodle, which is called CIT eLearn. The practitioner can choose to include Wimba in their course if they want to deliver training and assessment using a virtual learning environment /online classroom.

Learners login to their eLearn space (Moodle) to view all their course learning and assessment materials. When a learner enrols, Banner, the Student Management System, assigns them a password and an instance of the Moodle course that they have enrolled into. This means that all the learner contact details are seamlessly transferred across all three systems, so when, for example, learners submit an assignment (using Moodle), William receives an email to alert him. Similarly, when William marks or corrects work, the learner receives an email.

Moodle is an Open Source learning management system. Moodle was adopted by CIT two years ago to replace WebCT (which was taken over by Blackboard in 2006), and rolled out in 2010. The licence with an old version of WebCT was coming to an end, so the Institute conducted a comprehensive trial of different learning management systems, and opted for Moodle.

CIT had used WebCT as its learning management system for ten years, and on switching systems, the institute had to assist trainers to transfer the course material stored in WebCT to Moodle. Most data came across (PDF and Word documents, quizzes), except for html pages created in WebCT, and it was not in the correct order. For William, this re-processing task was positive because it meant that he and his colleagues had an opportunity to revisit, reassess and reconstruct the material, which was improved as a consequence: consistency in appearance and also the content was more consistent and engaging.

Later versions of Moodle are SCORM compliant, which means learning objects in SCORM formats can be used with Moodle. This means that in the future, if CIT were to change learning management systems, the content could be transferrable across platforms.

Both the developers of Moodle and Wimba have contended with the accessibility standards. However, there are a number of accessibility issues that are dealt with by the individual practitioner. Therefore, the level to which the assessments are ‘accessible’ or WCAG 2.0 compliant is dependent on the knowledge of the practitioner. An example of this is the provision of text alternatives for media. While the link to the recorded Wimba session is without a text alternative, strictly speaking, it doesn’t meet accessibility requirements, if a learner had disability issues and couldn’t access the recording, William would provide one-to-one support to provide an educational experience of similar value. The transcription of recorded content into a text alternative would be cost prohibitive and a less costly form of modification of content is much more appropriate while still meeting the spirit of the accessibility guidelines in this case.

William opens his microphone, and outlines the session aims to the participants.

He looks forward to the time, possibly next year, when he will use video rather than just audio, so he can see the learners rather than just hear them. This will mean that

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9 See case study documents, page 11, figure 4.
10 http://moodle.com.au
11 http://docs.moodle.org/en/SCORM_module
learners will need robust broadband connections, and if they don’t have this at work or home, they will be able to access Wimba from one of the CIT or AIE campus facilities\textsuperscript{13}. For the moment, he has two learners who are on dial-up connections. Despite this, they can participate fully in the session; see and hear what’s going on, write messages in the chat facility, but they generally don’t use the audio as this tends to drop out.

The learners are adept at using Wimba. Being games development learners, they are highly digitally literate, mostly school leavers, and it did not take them long to understand how the system worked. There are a number of support manuals available on the eLearn site, but in the first session at the beginning of the semester, William took them through all the features, using Wimba itself to do this.

William reminds learners that the examination next week is worth 25\% of their total mark. The three-hour examination will be conducted entirely on computer, but under supervision. The learners will download the exam paper from Moodle, and write their responses using MS Word. The learners also use a drawing tool called StarUML\textsuperscript{14} with which they develop flowcharts of programming solutions, and these are inserted into the Word document.

Previously, the exam was entirely paper-based, and was typically difficult to manage, with learner’s poor handwriting, hand drawn flow charts and other bits and pieces of work. Now it’s intact, in one single digital document, and therefore is much easier to assess.

The exam is the final assessment. During the semester, the learners complete two other written assignments – one a scenario that they need to analyse; the other, a research paper. Both are written at home and submitted electronically via the Moodle dropbox.

In the first virtual classroom session in week one, the learners access a downloadable student guide\textsuperscript{15} that provides a complete outline of all the assessment tasks they will need to complete during the course.

All the assessable items, including assignments and examination, are assessed by William electronically. After the learner uploads their assessment in Moodle, William is able to download that assessment. He then assesses the learner work. He uses the ‘track changes’ feature of MS Word to record his comments, feedback and assessment judgments. He then converts the document to a PDF (locking in the track changes and comments). When this is done, he uploads the document back into Moodle and the learner is notified by email that their assessment result has been recorded\textsuperscript{16}.

William enters the marks and assessment comments into the Moodle grade book. This is an ‘unofficial’ recording system, as he will also need to transfer those results into the institute Student Management System. However, a benefit of this process is that every assessment task has a lodgement area where he provides feedback and the grade.\textsuperscript{17} Learners then access Moodle to view their mark and the feedback on their assignments. All this information is stored and accessed in the same online space.

\textsuperscript{13} The intention is to conduct distance learning in Sydney and Melbourne.
\textsuperscript{14} \url{http://smartuml.sourceforge.net}
\textsuperscript{15} See case study documents, page 10, figure 2.
\textsuperscript{16} See case study documents, page 13 figure 7.
\textsuperscript{17} See case study documents, page 13, figure 8.
William has finished discussing the examination. Learners ask questions about the course using the message board, or the audio function to verbalise their questions. He now opens the Wimba ‘breakout rooms’. Wimba allocates two groups of two learners to two rooms, and one group of three learners to the third, and William gives each group a topic to discuss.

The discussion in the breakout rooms is not recordable, but William ‘drops in’ to any of the rooms and listens to and participates in any of the conversations. The learners enjoy this part of the session. The discussion is more open and freewheeling, and they also, despite being with each other all day at AIE working on computers, they now have the opportunity to share their ideas and opinions. After thirty minutes, they return to the main room, and report back to the group and a general discussion ensues.

William does not assess the learner’s discussion in Wimba, but is considering making attendance in the sessions compulsory in the future, and participation and contribution assessable items. However, if he decides to go down this path, he realises there are significant practical and auditing issues to consider.

The session is now over. Before the learners leave William reminds them of the next topic for the Moodle Forum: ‘The UML is sometimes unkindly called ‘Unwanted, Unneeded Modelling Language.’ How would you justify this argument?’

The Forum is open for a week; it is compulsory, assessable and worth 10%. The course outline provides rules on acceptable postings. William can come in at any time to see that they have done the research, and posted meaningful analysis and argument. At the end of the week, he makes his assessments of their work.

William is confident that the learners will do well in their final examination. He has noticed a significant improvement in results since he added in a series of self-assessment quizzes into Moodle in the companion VET course, Requirements Analysis. He intends to adopt this process in the degree course.

The ‘quiz tool’ in Moodle is robust, it enables multiple choice, short answer, calculated, description essay, matching, true/false. It also provides a number of parameters, for example open it after a certain time, allow a set number of attempts, close it at a certain time, review responses and then allow the learner to move on. Assessment items can be hidden until the assessor wants to publish them. Moodle also provides information on exactly what item a learner has viewed and when.

William uses the ‘quiz tool’ to prompt learners to conduct research. The quiz questions are framed in such a way that the readings he provides don’t give the answers. This requires the learners to conduct their own research, and write a short essay on their findings. The learners must ‘pass’ 4 of the 6 quizzes. The individual quiz questions are ‘partitioned’ so that the learner cannot move on to another quiz question in Moodle unless they have completed the preceding question.

When William’s team first ran the Requirements Analysis course without the quiz ‘partitions’, they had an ‘unflattering success rate’ in the final examination of 45%. With the introduction of the quizzes, this improved to a 55-65% pass rate.

The degree course that William is teaching is a companion to the VET course, Requirements Analysis. He borrows the course content and assessments from this
course, and lifts it to a higher standard to meet the requirements of the degree course. This has meant not having to create everything from scratch and load these materials into Moodle.

At this time, William spends about an hour each week working in Moodle, whereas if it were a new course, this would most likely take two or three hours/week. It takes him about three hours to prepare the PowerPoint presentation.

For William, one benefit of Moodle is that a trainer can build content into the course gradually, rather than having to do it all before the course starts. He can constantly add and revise materials. When the content is in Moodle, it can still be managed and modified easily. When the next learner cohort is ready to enrol into the course, William simply ‘zips’ the course, and restores it to make a new course. He could also add multiple groups to the same course.

William can choose to load his learning and assessment materials into the content learning repository, Equella. Rather than uploading materials directly into his course, this system is a way of storing learning objects for the whole Institute. For example, it enables a trainer to store reusable learning objects and assessment items, and use them in any course that they are conducting. This includes the assessment documentation (eg observation checklist, guidelines), as well as the assessment task or activity. Equella is fully standards compliant.

CIT Flex:Ed provides extensive training across the Institute for staff, and William was involved in this.

At a primary level, there’s a ‘Getting started with e-learning’ course. This is a quick two-hour course that shows practitioners around Moodle, Wimba and Equella. Every practitioner who wants to use the systems has to attend this course first. At the next level, there is ‘Developing digital literacy’, a ten week project-based course, three hours/week in which the participant builds a course using the technologies. This course also includes other software such as Audacity, ARED and photo editing tool, IrfanView. Flex:Ed also conducts a weekly training session where they offer different tools.

When a practitioner wants to use the system (eg Wimba) for the first time with learners, Flex:Ed offers one-to-one support in helping the trainer and learners through the system. There is a specific site dedicated to resources supporting eLearn, containing ‘how to guides’ and training schedules. Finally, CIT provides a 24/7 help service for both learners and staff.

Six hundred (out of 800 staff) have now completed the ‘Getting started with e-learning’ course. Consequently, there’s been a 44% increase in system usage over the previous e-learning system.

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22 CIT trainers have now loaded 82,000 learning objects into the system. These objects are accessible to all CIT staff.
23 However, it is necessary for the practitioner to create standards compliant documents and provide metadata that meets Vetadata guidelines. www.thelearningedge.com.au/products.php?id=40
25 http://audacity.sourceforge.net
27 http://www.irfanview.com
Given that all the learners live in Canberra, Project Architecture 1 could have been provided face-to-face. But is it the intention of the Centre for Information and Communication Technology to deliver this course in Sydney and Melbourne where the main games industry is based, that is, distance delivery. So the modelling of this course, driven by Wimba, is effectively a trial for its expansion in 2012.

Once the semester is complete, and all assessable items have been marked, William will transpose the results into the Student Management System, Banner. It keeps a record of all the learner’s competencies and where they are at any stage of their training.29

William says that it has been a deliberate strategy to keep Moodle separate to Banner. As a Student Management System, Banner, is the official repository of the learner’s grade, generating transcripts and certificates. Course reference numbers in Banner links the two data systems, so an auditor can follow the assessment path and locate the evidence stored in Moodle. Learners log in to Bannerweb to access their results and transcripts.

For security reasons, all systems (including Equella) are hosted internally by CIT. This meant significant technical issues to resolve, such as institutional firewalls.

According to Penny Neuendorf30, learners have not had problems accessing the systems; some even access Wimba using their mobile phones or on buses using their laptop wireless system. There have been fewer problems than predicted.

William has experienced some break up and audio drop out when using Wimba, but for him, it’s worth it, because without something like Wimba, there is a tendency to get ‘learner disconnect’. Flexible learning enables the advanced learner to work at their own pace, thus allowing him to concentrate on those learners needing more support. The model he has adopted is based on real teaching and assessment experience; it’s very different to providing a set of resources online, and having no one to attend to the learners.

Three colleagues working in the team with William have developed the assessment materials over a number of years. There is a regular industry validation process where examples of what they’ve done are shared with an industry reference group for endorsement. William has been teaching various incarnations of the VET course for the past eight years, and the whole course was revamped about four years ago.

William has other plans for Wimba next year. One idea is to have the learners use it as a collaboration tool, where learners work together on their plans for a project, and these are assessed. It could also be set up so that William records learners undertaking a practical assessment task using the Wimba webcam feature, and he assesses them doing this.

CIT has committed a significant amount of funds and resources to setting up their eLearn system, and in training the staff to use it. The costs are confidential. They have not at this stage conducted a cost effectiveness analysis, because the implementation results are not expected for a year or two.

29 CIT has a policy for academic appeal on assessment. ‘You have the right to appeal against decisions on your assessment. It is best to first discuss any issues with your teacher. Most issues can be successfully resolved at this level. If no resolution is achieved then make an appointment with the Education Manager or Centre Director.’

30 Educational Manager of Flex:ED. Her role is to manage 10 staff who provide support to students and staff to get online, create online learning and assessment objects, provide help desk (phone and email).
Case study assessment documents

Figure 1: CIT and surrounding districts

Project Architecture 1

Centre for Information and Communication Technology

<table>
<thead>
<tr>
<th>Subject Name:</th>
<th>Project Architecture 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Number:</td>
<td>INFT569</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>INFT565 Development Life Cycles (Unless taken as a Bridging Subject)</td>
</tr>
<tr>
<td>eLearn:</td>
<td><a href="http://online.cit.act.edu.au">http://online.cit.act.edu.au</a></td>
</tr>
<tr>
<td>Subject Teacher / Coordinator:</td>
<td>William Nauenburg</td>
</tr>
</tbody>
</table>

Figure 2: Sample of the Project Architecture 1 study guide.
Figure 3: Wimba interface (PowerPoint Presentation) centre screen.

Figure 4: Activities access in Moodle to recorded Wimba sessions and session blocks with session classrooms.
Figure 5: Recorded Wimba sessions accessed from eLearn (Moodle).

Figure 6: Forums in eLearn space (Moodle).
Figure 7: Showing where the practitioner accesses the learner’s take home assignments.

Figure 8: Showing the feedback from practitioner uses to make comments and grade the assignments.
Figure 9: Quiz questions

Figure 10: Replay Wimba session.
### 4. Guidelines checklist

<table>
<thead>
<tr>
<th>Group</th>
<th>Theme</th>
<th>Guideline</th>
<th>Case study approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure provision</td>
<td>1.1 Web based functionality</td>
<td>E-assessment providers must meet minimum web based functionality requirements to support e-assessment</td>
<td>Those interviewed in the case study didn’t indicate any issues meeting these standards.</td>
</tr>
<tr>
<td></td>
<td>1.2 Desktop functionality</td>
<td>E-assessment providers must meet minimum desktop functionality requirements to support e-assessment</td>
<td>Those interviewed in the case study didn’t indicate any issues meeting these standards.</td>
</tr>
<tr>
<td>Technical guidelines</td>
<td>2.1 Accessibility</td>
<td>E-assessment providers must confirm that e-assessment resources and materials are accessible to people with disabilities.</td>
<td>Accessibility of developed content wasn’t explicitly identified. However, there is support for learners if required.</td>
</tr>
<tr>
<td></td>
<td>2.2 Portability</td>
<td>E-assessment materials must be transportable between different repositories and learning management systems.</td>
<td>If required, there is the facility to move most e-assessment materials across repositories and LMS.</td>
</tr>
<tr>
<td></td>
<td>2.3 Desk top content formats</td>
<td>E-assessment materials must meet the standard for desk top content formats.</td>
<td>Those interviewed in the case study didn’t indicate any issues meeting these standards.</td>
</tr>
<tr>
<td></td>
<td>2.4 Mobile content formats</td>
<td>E-assessment materials must meet the standards for mobile content formats.</td>
<td>Not relevant for this case study.</td>
</tr>
<tr>
<td></td>
<td>2.5 Metadata</td>
<td>To support discovery and re-</td>
<td>Vetadata standards are used in <em>Equella</em>, the</td>
</tr>
<tr>
<td>E-assessment development and maintenance</td>
<td>3.1 Benchmarks</td>
<td>E-assessment resources and materials must meet the requirements of the relevant Training Package or accredited course.</td>
<td>The practitioner team work together to ensure the requirements are met.</td>
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<td></td>
<td>3.2 Assessment principles</td>
<td>E-assessment resources and materials must provide for valid, reliable, fair and flexible assessment</td>
<td>The practitioner team work together to ensure the requirements are met.</td>
</tr>
<tr>
<td></td>
<td>3.3 Personalisation</td>
<td>E-assessment resources and materials must provide for personalisation of assessment.</td>
<td>E-assessment is highly personalised with individualised feedback to each learner at many points in the process.</td>
</tr>
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<td></td>
<td>3.4 Validation</td>
<td>E-assessment resources and materials must be systematically validated.</td>
<td>The practitioner team work together and with industry to ensure the requirements are met.</td>
</tr>
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<td></td>
<td>3.5 Workplace and regulatory requirements</td>
<td>E-assessment resources and materials must address workplace and regulatory requirements</td>
<td>The practitioner team work together to ensure the requirements are met.</td>
</tr>
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<td></td>
<td>3.6 Candidate authentication and security</td>
<td>E-assessment resources and materials must provide for candidate authentication and the security of both the assessment process and assessment data.</td>
<td>Familiarisation with learner voice in audio (and video). Examination is supervised.</td>
</tr>
<tr>
<td>E-assessment practices</td>
<td>E-assessment context</td>
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<tr>
<td><strong>3.7 Maintenance</strong></td>
<td><strong>5.1 E-assessment support services</strong></td>
<td><strong>5.2 E-assessment deployment strategy</strong></td>
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<tr>
<td>E-assessment resources and materials must be maintained.</td>
<td>E-assessment providers must have appropriate support services for assessors and candidates.</td>
<td>E-assessment providers should have an e-assessment</td>
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<tr>
<td>The practitioner team work together to ensure the requirements are met.</td>
<td>Systematic training is provided, as well as provision of manuals and 24/7 help service.</td>
<td>Systems are provided institute wide, and seamlessly integrated. Facilities provided to</td>
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<tr>
<td><strong>4.1 Collaboration</strong></td>
<td><strong>5.2 E-assessment deployment strategy</strong></td>
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<tr>
<td>E-assessment must be developed in consultation with industry and other stakeholders.</td>
<td>E-assessment providers should have an e-assessment</td>
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<td>Formal industry committee to validate technologies and e-assessment processes.</td>
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<td><strong>4.2 Evidence collection</strong></td>
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<td>E-assessment involves collecting quality evidence for use in assessment decision making.</td>
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<td>The practitioner team work together to ensure the requirements are met.</td>
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<td><strong>4.3 Feedback</strong></td>
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<td>E-assessment feedback must identify candidate strengths, areas for improvement and ways in which performance may be improved.</td>
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<tr>
<td>Practitioner feedback to each learner is provided at many points in the process.</td>
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<td><strong>4.4 Assessment judgements</strong></td>
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<td>E-assessment involves assessors in evaluating evidence and making assessment judgments.</td>
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<tr>
<td>The practitioner team work together to ensure the requirements are met.</td>
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<td><strong>4.5 Recording and reporting e-assessment outcomes</strong></td>
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<td>E-assessment outcomes must be accurately recorded, reported and stored.</td>
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<tr>
<td>The practitioner team work together to ensure the requirements are met.</td>
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<tr>
<td><strong>4.6 Complaints and appeals</strong></td>
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<tr>
<td>E-assessment processes must provide for complaints and appeals from candidates.</td>
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<tr>
<td>This is addressed in Institute policy and practice.</td>
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<tr>
<td>deployment strategy.</td>
<td>learners without appropriate technology access.</td>
<td></td>
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</tbody>
</table>
For more information:

**Benchmarking and Research business activity**

Phone: (08) 8463 6509  
Email: melanie.worrall@sa.gov.au  
Website: flexiblelearning.net.au/research

**Australian Flexible Learning Framework**

Phone: (07) 3307 4700  
Email: enquiries@flexiblelearning.net.au  
Website: flexiblelearning.net.au