Literature Review

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**e-AFFECT: assessment and feedback literature**

**Educational principles of assessment and feedback**

Much has been written on assessment and feedback, including three seminal papers which identify principles of good practice (Chickering and Gamson 1987; Gibbs and Simpson 2004 and Nicol and Macfarlane-Dick 2006). Nicol (2009) reviewed the literature on assessment and feedback and identified 12 outcomes of good assessment and feedback practice to support the transition from school to higher education. These are summarised in Table 1.

As part of its feedback amnesty, the National Union of Students (2008) stated that feedback should be:

1. For learning, not just of learning
2. A continuous process
3. Timely
4. Relate to clear criteria
5. Constructive
6. Legible and clear
7. Provided on exams
8. Include self and peer assessment
9. Accessible to all students
10. Flexible and suited to needs

Boud et al. (2010) proposed that assessment is most effective when:

1. It is used to engage students in learning that is productive
2. Feedback is used to actively improve student learning
3. Students and teachers become responsible partners in learning and assessment
4. Students are inducted into the assessment practices and cultures of higher education
5. Assessment for learning is placed at the centre of subject and programme design
6. Assessment for learning is a focus for staff and institutional development
7. Assessment provides inclusive and trustworthy representation of student achievement.

They argue that these propositions are not stand alone, but should be integral to curriculum design.

The JISC-funded ESCAPE project summarised the good assessment for learning as that which:

- Engages students with the assessment criteria
- Supports personalised learning
- Ensures feedback leads to improvement
- Focuses on student development
- Stimulates dialogue
- Considers student and staff effort

Despite the plethora of literature and the identification of best practice, the student perception of and engagement with assessment and, particularly feedback, as reflected through surveys such as the National Student Survey (NSS) continues to cause angst among academics and senior university management.
Table 1: Comparing views on assessment and feedback best practice

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<tr>
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<tbody>
<tr>
<td>1. Encourages contacts between students and faculty</td>
<td><strong>Influences of assessment on the volume, focus and quality of studying:</strong></td>
<td><strong>Good feedback practice:</strong></td>
<td><strong>Good assessment and feedback practice should:</strong></td>
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<td>2. Develops reciprocity and cooperation among students</td>
<td>Conditions:</td>
<td>1. Helps clarify what good performance is (goals, criteria, expected standards)</td>
<td>1. Help to clarify what good performance is ((goals, criteria, expected standards)</td>
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<td>3. Uses active learning techniques</td>
<td>1. Sufficient assessed tasks provided to capture sufficient study time</td>
<td>2. Facilitates the development of self-assessment (reflection) in learning</td>
<td>2. Encourage ‘time and effort’ on challenging learning tasks</td>
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<td>4. Gives prompt feedback</td>
<td>2. Students engage with the tasks, allocating appropriate time and effort to the most important parts of the course</td>
<td>3. Delivers high quality information to students about their learning</td>
<td>3. Deliver high quality feedback information that helps learners to self-correct</td>
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<td>5. Emphasises time on task</td>
<td>3. Students are engaged in productive and appropriative learning activities when tackling the task(s)</td>
<td>4. Encourages teacher and peer dialogue around learning</td>
<td>4. Provide opportunities to act on feedback (to close any gap between current and desired performance)</td>
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<td>6. Communicates high expectations</td>
<td><strong>The influence of feedback on learning:</strong></td>
<td>5. Encourages positive motivational beliefs and self-esteem</td>
<td>5. Ensure that summative assessment has a positive impact on learning</td>
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<tr>
<td>‘six powerful forces in education’</td>
<td>4. Sufficient feedback is provided, both often enough and in enough detail</td>
<td>7. Provides information to teachers that can be used to shape teaching (p205)</td>
<td>7. Facilitate the development of self-assessment and reflection in learning</td>
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<td>1. Activity</td>
<td>5. The feedback focuses on students’ performance, on their learning and on actions under their control, rather than on the</td>
<td>8. Give choice of topic, method, criteria, weighting or timing of assessments</td>
<td>8. Give choice of topic, method, criteria, weighting or timing of assessments</td>
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<tr>
<td>3. Cooperation</td>
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<td>10. Support the development of</td>
<td>10. Support the development of</td>
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students themselves and on their characteristics

6. The feedback is timely – it is received by the students while it still matters to them and in time for them to pay attention to further learning or receive further assistance

7. Feedback is appropriate to the purpose of the assignment and to its criteria for success

8. Feedback is appropriate, in relation to students’ understanding of what they are supposed to be doing – their conception of the task; conception of learning and knowledge; and their conception of the discourse of the discipline

9. Feedback is received and attended to

10. Feedback is acted upon by the student

11. Encourage positive motivational beliefs and self-esteem

12. Provide information to teachers that can be used to help shape their teaching (and subsequent assessment tasks)
Engaging students with assessment and feedback

In their recent paper Handley et al. (2011) argue that there needs to be a ‘shift towards student engagement [with feedback] ... as a counterweight to the attention traditionally given ... to the study of effectiveness [of feedback]’ (p544, emphasis in the original). They argue that a typical assignment feedback event ‘ignores the socio-cultural context which influences student engagement’ (p549) (Figure 1).

Figure 1

Handley et al. (2011) propose a conceptual framework for student engagement (Figure 1). Figure 2 builds in the contextual influences including how engagement with the assignment creates expectations on the part of the student. The diagram here builds on the Handley et al. (2011) version by adding the feedback loops from student outcome back to contextual influences, because the ‘outcomes influence the student’s readiness to engage and their active engagement with future feedback events’ (p550: figure 2). If students do engage with the feedback then this should influence how they interact with the next assignment and the expectations that they generate for this. Whilst Handley et al. (2011) argue that more work is needed on how students engage with feedback, it could be argued that if we are to address student engagement then we still need to consider the effectiveness of the feedback since this becomes part of the contextual influences for the student.
CONTEXTUALISATION

STUDENT OUTCOME

Tutor’s assignment brief

Student creates and submits the assignment – expectations generated about the future feedback – this influences readiness to engage

Assessor writes the assignment brief

Tutor’s feedback with the assessed assignment

Tutor assesses the assignment and gives formative feedback

Student engages actively with the feedback

After Handley et al. (2011)

**Figure 2**

In their paper on how to make written feedback useful, Rae and Cochrane (2008) identify three themes and propose a heuristic model of effective written feedback (Figure 3):

1. Learning from written assessment feedback
2. The process of receiving feedback
3. Making sense of feedback

**Figure 3:** A heuristic model of effective written assessment feedback (adapted from Rae and Cochrane 2008)
The gap between staff activities and student perceptions and follow up of feedback may be the result of a lack of what Orsmond and Merry (2011) refer to as ‘feedback alignment’. Their study identified the tutors’ intentions when providing feedback, how those intentions were manifested in the feedback provided, and how the students perceived and followed up on the intentions. They concluded that greater feedback alignment would be achieved with increased dialogue between staff and students – as a group and individually. They also posited a number of recommendations for tutors:

- Provide feedback in a variety of forms
- Draw attention to the students’ development as professionals – in this case biologists
- Utilise model answers and whole group feedback
- Encourage the value of self-assessment
- Consider requiring students to reflect on the feedback provided as part of a summative assessment
- Provide more guidance about future work and reading
- Discuss feedback intentions with students
- Be aware of the generic/general feedback provided by colleagues.

As a means of better engaging students with feedback and developing a sense of self-assessment, Sadler (2010a; 2010b) discusses the role of peer assessment within a formative setting. Students and the tutor come to a session with 300 words on a topic previously provided. These are without names. The ‘papers’ are passed around the group and students answer four questions:

- Does the piece answer the question set?
- How good is it – on a range of pretty awful to pretty good?
- Why do you say that using whatever criteria are appropriate? This gets the students used to applying criteria in their own words
- Write some advice – ca 50 words – about how the paper could be improved.

Every few weeks, only the tutor ‘essay’ would be used as a model answer to inculcate the concept of quality.

In an attempt to engage students with formative feedback before the final submission of work, Handley and Williams (2011) explored the use of annotated exemplars with a large module in the business school. The exemplars were hosted on the VLE which also provided the space for a discussion forum. They concluded that students found it useful to see structure and layout, although only 20% reported finding the feedback was useful as a means to improving the quality of their work. The students were unwilling to engage in online discussions of the exemplars, much preferring the classroom based dialogue.

Macdonald (2004-05) reports on an initiative to overcome being presented with the same errors in subsequent assignments from students unable to recognise what was required for a high grade. Students were asked to grade a short piece of writing based on a proforma provided by the lecturer. They also had to provide a short evaluation of their work if it was to be considered for a higher mark based on material that they had included but which was not on the proforma. The same format was
used later in the year to assess another piece of writing by the same students. After the initial attempt students were more comfortable with this form of self-assessment.

In an attempt to engage students in formative activities and to start dialogue around learning, Robinson and Udall (2004-05) redesigned the formative assessment strategy of a level 2 engineering course. This involved a number of interventions:

1. Intended learning outcomes were given for all in class activities.
2. Students were required to undertake preparatory activities, take part in the class activity and make a self-assessment as to the extent to which the intended learning outcomes had been met.
3. Students maintained a ‘progress record’ of 1 and 2.
4. Included in the progress record were questions for the tutor based on the outcomes the student considered were not met.

Robinson and Udall (2004-05) concluded that students found the statement of intended learning outcomes for activities important in identifying why things were being done. Equally the students had an understanding of their own progress prior to the summative assessment. Some students reported lower levels of anxiety and heightened motivation to study. Tutors reported increased and better dialogues about learning. Overall the pass rates were higher and all students achieved at least a bare pass.

Technology in assessment and feedback

Since Chickering and Gamson’s (1987) paper there has been a revolution in the use of technology in assessment and feedback in higher education. In the United Kingdom both the, then Department of Education, and higher Education Funding Council for England (HEFCE) have recognised that ‘a greater focus on technology will produce real benefits for all’ (Department of Education 2005:2), but that ‘focus should be on student learning rather than on developments in technology per se, enabling students to learn through, and be supported, by technology’ (HEFCE 2005:6).

In their paper Implementing the seven principles: technology as lever Chickering and Erhmann (1996) set out how technology could support Chickering and Gamson’s (1987) principles for good practice. They are particular to describe ‘some of the most cost-effective and appropriate ways to use computers, video and telecommunications technologies’. Clearly the introduction of mobile technologies such as smart phones, PDAs and tablets have further revolutionised the assessment and feedback landscape.

Hepplestone et al. (2011) reviewed the literature on the use of technology that might be used to encourage students to engage with the feedback they receive. They looked at the technology that supports:

- The publication of feedback
- The production of feedback
- Release of grades
- Computer-assisted assessment
- Peer assessment
Parkin et al. (2011) reported on a project at Sheffield Hallam University that **explored the potential of technology-enabled feedback to improve student learning**. Hepplestone et al. (2011) was the literature review for that project: *Technology, Feedback, Action!* The project examined how the following affected students’ engagement with the feedback (Table 1):

- Online publication of grades and feedback
- Adaptive release of grades – feedback provided electronically ahead of the release of the grade
- Linking feedback to the assessment criteria – using an electronic feedback tool – feedback grids

**Table 1**

<table>
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<tr>
<th>What</th>
<th>How students affected</th>
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<tr>
<td>Online publication</td>
<td>● Can be accessed when and where student wants</td>
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<td>● Students appreciated flexibility and convenience</td>
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<td>● Perceived permanence</td>
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<td></td>
<td>● Frequent back reference for future work</td>
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<td></td>
<td>● More likely to be stored ‘filed’ logically than a hard copy</td>
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<td></td>
<td>● When delivered via the VLE it is stored along with other module resources – learning hub</td>
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<td></td>
<td>● Face-to-face – good practice But students like to engage privately – emotional security</td>
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<td></td>
<td>● Perception of more timely receipt of feedback</td>
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<td>● Not the case when grades published online and hard copy feedback to be collected later</td>
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<td></td>
<td>● If grades published ahead of feedback then decline in engagement with feedback</td>
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<td></td>
<td>● Electronic feedback perceived to be more considered than hand written – legible – but some query if it is personal</td>
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<tr>
<td>Adaptive release of grades</td>
<td>● Feedback released before grade – student submits a reflection on the feedback – then grade released.</td>
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<td>● Recognition of the benefits of reflecting, but can lead to instrumentalist approach if not carefully applied</td>
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<td>● Reflection seen as an extra to the task</td>
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<td></td>
<td>● Uncertainty about reflection</td>
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<td></td>
<td>● Response to tutor commenting on the quality of their feedback?</td>
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<tr>
<td>Linking feedback to the assessment criteria</td>
<td>● ‘Help students make better use of assessment criteria as targets’ (p7)</td>
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<td></td>
<td>● Feedback grids – rubric grids – I’m not clear what is being discussed here – is it tick sheets or is it similar to Rust (2001) where the standards are also spelled out to the students</td>
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<tr>
<td></td>
<td>● Paper-based</td>
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<td></td>
<td>● Electronically generated using pre-populated comment banks – cf Denton’s electronic feedback tool - see Jones (2007) below</td>
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<tr>
<td></td>
<td>● SHU in-house tool: feedback Wizard (see Hepplestone and Mather 2007)</td>
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<tr>
<td></td>
<td>o Assignment specific feedback template</td>
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<td></td>
<td>o Matrix of assessment criteria and feedback comments</td>
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<td></td>
<td>o Other remarks specific to the student</td>
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<td></td>
<td>o Aim is to provide feedback in a consistent and equitable way</td>
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</table>
Students: better understanding of feedback when aligned to assessment criteria
- Able to identify strengths and weaknesses
- No issues with it being impersonal – even given the automatic population of some of the fields – in contrast to HEA project at QUB using Denton’s electronic feedback tool
- SHU can provide weighted mark against each criterion
- Transparency – but arithmetic see Jones (2007) below
- Needs assessment criteria to be provided with task for effectiveness (this is best practice anyway)
- Issue about how to provide this kind of feedback – grid makes easy reading but not against the work itself to see where the comments apply

Turney et al. (2009) demonstrated that when technology is embedded into the teaching of a module it can be beneficial for student outcomes, particularly in the percentage of students passing the module. They concluded that technology should be used alongside face-to-face teaching and not as a substitute. Of particular note, they identified the importance to students to be able to return and reuse the learning objects in the Virtual Learning Environment (VLE), and the reduction in staff time in marking using Computer Assisted Assessment and hence the possibility of quickly identifying misunderstandings.

Similarly, Cullen (2011) ‘embedded a technology centric assessment strategy’ to support 12 hours of contact time into a Masters level module in 2007-08, 2008-09 and 2009-10. The feedback for the formative assessment consisted of combinations of Track Changes in Microsoft Office documents, comments in an online discussion forum, the completion of written profomas in the VLE, video screen capture and audio feedback. In evaluating the experience he concluded that in time invested in providing feedback the audio feedback required less tutor time to produce. The student participants expressed a preference for audio and video-based feedback as opposed to written, although they could identify benefits for the combination of audio or video alongside the annotated documents. It was clear that some formats of feedback delivery suit some students over others. As with Turney et al. (2009) there was a concern about drop off in attendance or non-completion of the formative activities. Cullen (2011) concluded that there has to be a relationship between the online activities, face-to-face sessions and the summative assessment. Equally students need to understand the value and purpose of the formative tasks.

Previously, Jones (2007) reviewed the use of three e-marking tools at Queen’s University Belfast (Table 2). It was considered that the tools would commend themselves to academic staff if they could reduce what Kreig et al. (2004, p4) refer to as the ‘unproductive work’ associated with marking.

**Table 2**

<table>
<thead>
<tr>
<th>Software</th>
<th>Developed by</th>
<th>What it does</th>
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<tbody>
<tr>
<td>Electronic Feedback v13</td>
<td>Developed by Phil Denton, Liverpool John Moore’s University: open source</td>
<td>Uses MS Word and Excel to create feedback letters to</td>
</tr>
</tbody>
</table>
GradeMark | Part of TurnitinUK: license required | Allows the use of rubrics, comment banks, Marking online |
M²AGIC | Developed by Peter Nicholl University of Ulster: it was intended that this should be licensed | Used for the management and marking of group work, including self and peer assessment, Marking online |

Whilst the cost of software is an issue, other considerations were highlighted as part of this review:

- Staff confidence in the use of computers
- The need for staff time to be invested in setting up rubrics, comment banks etc before starting to mark: this has implications for time and efficiency
- Time to get used to using the software: again efficiencies may be gained over time with increasing familiarity
- Attaching marks to criteria (rubrics) – staff were generally happy using criteria, providing grade descriptors and comments against them, but they were less happy with what was seen as an arithmetic approach to the overall mark. This is an issue with criterion referenced assessment, rather than e-marking tools per se (Dunn et al., 2002; Sadler, 2005).

Use of GradeBook [sic] at Loughborough College (JISC 2010a) illustrated efficiencies in uploading and storing assessed work. They also reported that second markers see what first markers have done and this saves time: “An additional unexpected gain has been that feedback given by one marker is visible to a second marker, which has helped to standardise the amount and detail of feedback given to students by different tutors” (pp 3-4 in online case study).

Mobile technology can be used to overcome difficulties in access to assessment and learning. For example, students in placement settings (e.g., in the Health Service) are often unable to access computers. The Assessment and Learning in Practice Settings Centre for Excellence Teaching and Learning (JISC 2011a) developed a mobile learning platform and assessment suite. Continuous student access to their e-portfolio allowing reflection before submitting assessment was one of the benefits reported.

Nicol (2009) provides four examples from the Re-engineering Assessment Practices (REAP) project of how technology was used to support significant change in assessment in the first year (Table 3).

Table 3

<table>
<thead>
<tr>
<th>Subject</th>
<th>What was done</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Psychology, University of Strathclyde</td>
<td>Ca 550 students divided into 82 online discussion groups 3 week online learning tasks: Week 1 = ‘light’ written task –</td>
<td>Student evaluations indicated earlier engagement with the literature, the usefulness of reading the feedback based on</td>
</tr>
<tr>
<td>Course</td>
<td>Description</td>
<td>Benefits</td>
</tr>
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<td>-------------------------------------------------</td>
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<tr>
<td>Modern Languages, University of Strathclyde</td>
<td>Online diagnostic test and online survey of students re their backgrounds and expectations. Interactive lectures using Electronic Voting Systems (see below) to stimulate small group discussion and retesting. Formative online tests scheduled to support tutorials and interactive lectures provided information for subsequent sessions. Assessment: 1. Fortnightly online self-assessment tests 2. Fortnightly online guided listening tests 3. Online class tests under exam conditions 4. Online class-based oral comprehension tests under exam conditions 5. Two written tests There was some flexibility when 1 and 2 were taken and the number of attempts before the mark counted.</td>
<td>Students valued regular self-assessment and feedback and ability to measure progress. Over 90% reported that having to work regularly helped them to learn. Teaching time was saved and there was better quality time with the students. Improved progression rate from first to second year, reduced failure rate. Improved attendance at scheduled lectures and tutorials.</td>
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<tr>
<td>Biology, University of Glasgow</td>
<td>80 groups of eight students assigned to an online discussion board forum in the VLE for a group project. Postings were monitored by tutors. The project was organised into a series of ‘micro-tasks’ which were released through the VLE as time progressed.</td>
<td>Meeting deadlines for the mini-tasks improved over the life span of the group project. Tutors were able to identify problems as they emerged. Although there were fewer problems reported by students.</td>
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</table>
The completed tasks were posted to the online forum. Tasks included:
1. The marking criteria the group would use to apply peer marks
2. A statement indicating who would do what on the project
3. After receiving the group mark the group had to agree the individual marks based on the marking criteria and self-assessments. Marks had to be justified.
Feedback was given to the whole group via the whole class discussion board.

Computer Science
University of Auckland
Individually or in small groups students submitted a reflective essay following each two hour lab class to the class wiki. Students had to read and comment on a sample. When all comments posted one group reads all the papers and comments and then produces paper that describes the expected results and common mistakes/difficulties. A group mark is awarded.

Recording and sharing material creates an authentic task.
Immediate feedback is received via peers
Low risk environment created
Staff able to identify difficulties as they arise and adapt teaching/support as required
Struggling individuals can be identified

Sutton-Brady et al. (2009) describe an Australian study where the assessment information was provided as a podcast rather than in print, although students could access both formats via their VLE. The podcasts ‘discussed assessment tasks, guidelines for approaching the assessment tasks and assessment feedback’ (p222). Each was 10-20 minutes in length. Whilst students preferred the more traditional forms of study to listening to podcasts for the delivery of information, the study concluded that using them in a context-specific situation – to deliver information about the assessment tasks – was of use to students who could then refer to the podcast throughout the semester. Students in this study also intimated that they would have been interested in podcasts as a tool to prepare for lectures.

The study demonstrated that there were benefits to both staff and students from these short podcasts and that many of these were common to both:

- Mix of media
- Aids non-English speaking students
- Easy to use/develop – BUT time-consuming
- Use of emerging technology
- Saves consultation time
Student benefits:

- Highlights important information
- Personalises learning
- Extends learning
- Assists study process
- Listen at own pace
- Aids assessment preparation

Staff benefits:

- Increases student interest
- Reinforces learning

France and Wheeler (2007) report on the interim results of a project that used **podcasts to deliver feedback on assessments**. The feedback given to the students comprised generic feedback for the whole class and personalised feedback for the individual student. At the end of the podcast, students were invited to raise any queries or questions about the initial feedback – thus creating opportunities for dialogue. Podcasts were uploaded to the VLE. Initial student concerns that they would find it difficult to listen to feedback rather than reading it, were not realised. Indeed, the ‘podcast feedback was perceived as being harder-hitting, in form less easy to ignore; and the tone of voice of the feedback provided a clear context to the critical comments, that is unavailable in traditional written feedback’ (p 10). The students found:

- The quality of the feedback to be better
- There were no issues with legibility
- The podcast feedback identified specific areas for improvement
- The feedback gave them a ‘more accurate account of the quality of the assessed work’ (p 10).

Whilst this type of feedback was labour intensive for the staff, they did find it rewarding, although it is not clear how many students acted on the feedback provided.

Macgregor *et al.* (2011) present the findings of a study on the efficacy of ‘**audio feedback technology** to deliver voice emails’ (p 40) as part of **formative feedback and the influence on student learning**. The results support:

- View that audio feedback can be more efficient
- Provides quality or good formative feedback
- Better informs strategic policies with regard to assessment practices

Ekinsmyth (2010) reports on the experiences of staff and students in using **digital audio assessment feedback**. The students were very positive and particularly valued:

- The greater detail
- More personal nature
- Greater clarity
- Potential to feed-forward
Feelings conveyed by voice
Not having to decode illegible writing
More constructive

But there were some concerns about the separation from the script, sometimes the personal was upsetting/uncomfortable, the inability to answer back and that it does not replace written feedback.

Among the staff who took part in this project (many queried why there was a need to change the way feedback was given to students), the greatest potential that was identified was providing ‘students with individual, personal, explicit, and carefully considered feed-forward’ (p 76).

Judicious use of audio feedback is recommended at points in the curriculum where it will be useful to students. There needs to be a clear reason for using audio feedback as opposed to written – what is the intent?

Merry and Orsmond (2007a) conclude that audio feedback can help to fulfil some of the good practice of feedback in that it is detailed, timely and understandable by the students, particularly it does not have to be deciphered before understanding can take place. In addition to some general good practice feedback suggestions, they recommend that:

- The quality of the audio needs to be sufficiently high so that the tone of voice can be appreciated
- That written feedback is not needed to supplement the audio so long as it is clear where in the text the points being made apply
- Audio feedback should be presented in a personal manner
- The feedback provided should be in a measured fashion – not rushed
- The feedback should provide examples of how the work could be changed to improve it with reference to texts etc if appropriate.

In the Merry and Orsmond (2007b) study students reported that they listened to the feedback with a copy of their work in front of them. Interestingly, students identify written feedback as being for that piece of work only whilst audio feedback is transferrable! Equally, students liked the ability to play and replay the feedback – read and re-read feedback? On the other hand, staff reported giving more feedback using audio, particularly examples. This was reported as being time and space related.

Lunt and Curran (2010) describe the staff and student experiences of providing and receiving feedback produced using Audacity. In an attempt to address the question of efficiency of this medium in terms of staff time they measured how long it took staff to type, write out by hand and record a sample of feedback. The recording was significantly quicker at 40 seconds as opposed to three minutes for typing and four minutes for writing out by hand. On average one minute of speaking equates to six minutes of writing. The students who responded to the evaluation questionnaire were overwhelmingly in favour of receiving feedback in this way. They commented on how personal the feedback was: ‘...quite like sitting in John’s office and getting him to explain what I need to do’ (p764).
The dialogical nature of audio feedback and its accessibility from any location were two of the advantages that led to its adoption in a distance learning MSc in Occupational Psychology at the University of Leicester (JISC, 2010b). As part of the JISC funded DUCKLING project both group and individual feedback podcasts were produced and tutors reported efficiency gains particularly in producing dissertation feedback once the approach was mastered. It was also noted that students “appear to be more attentive to spoken feedback” (JISC 2010b, p 41).

As a means of overcoming the separation of audio feedback from the script, Kerr and McLaughlin (2008) trialled the use of Camtasia (by TechSmith) to both capture on screen written comments and overall audio feedback. In this trial the software was linked via a macro to MS Word. Feedback from students and staff was generally positive with the quality of the feedback being considered better and greater student engagement (McLaughlin 2009). Studies of audio, screencast and MS Word (Cullen, 2011) based delivery of feedback have referred to perceived staff efficiencies and increased student perception of quality. It is difficult, however, to measure this objectively. In all marking tasks familiarity and rehearsal will bring about time efficiencies (see Jones, 2007 above).

The JISC funded ASSET project (Crook et al., 2012) developed a Web 2.0 video feedback resource, designed to enhance the feedback experience of both students and staff. The study did not take account of how the resource, which was used to provide post assignment generic feedback, general study skills videos and pre-assessment introductory videos, affected student performance. Both staff and students were positive about the use of generic videos for this purpose and the tool the timeliness and ability to replay the video feedback provided were noted by students. The premise that the novelty of the video approach would challenge staff to think differently about feedback as well as deliver it differently and challenge students to process and utilise it differently as well as receive it differently, was borne out: 6/8 staff reported that it had changed their approach to giving feedback and 60% of students thought that it made them take more notice of feedback. Crook et al. (2012) reported that students commented that it as easier to understand and gain a sense of the lecturer’s reaction describing it as ‘extensive, informative … key points better emphasised’ (p391). Two recommendations to result from the pilot phase were Integration of the tool in the VLE and encouragement to students to comment on the feedback provided.

An emerging theme seems to be the idea of the novelty of the medium in which the feedback is provided to students. This is identified by Lunt and Curran (2010) in what they call the ‘potential halo effect’ (p765). Do students pay more attention to audio or screencast or video feedback because it is different? Is there a sense of ‘going on to autopilot’ when feedback is provide in written format which students simply skim to pick out what they want to see? It maybe that feedback provided in a variety of formats would be more effective.

Masikunis et al. (2009) describe how an Electronic Voting System (EVS) (Personal Response System – PRS) has been used in a large lecture class. In reviewing the literature they identify a number of advantages of using this technology in interactive lectures:

- Emphasis on developing cognitive (intellectual) skills
- Improves students’ attention and attainment
- Facilitates and encourages interaction
• Promotes constructivist learning (learning that is about personal understanding, interpretation and selection, active, constructive and reviewing or integrating)
• Stimulates interest and concentration
• Encourages active learning

PRS was introduced as part of an overhaul of the way large classes were taught which included in class small group tasks. The students used the PRS to respond to questions following the tasks. The use of the PRS provided information on whether learning was taking place. Other outcomes are that:

• Attendance improved
• Disruptive behaviour was reduced
• Lectures described as more interesting and motivating

How much of this can be put down to the use of PRS or the restructuring of the lectures is difficult to determine.

The use of PRS as a tool to promote learning is endorsed by Cullen and Maw (2011) as long as it is used in conjunction with appropriate pedagogical methods. The ability to include all students in formative activities means that staff can assess the whole class understanding rather than relying on the few students willing to volunteer an answer, and students are not challenged by being ‘picked on to answer’ or feeling unable to answer in case they ‘get it wrong’.

In contrast, Roe and Robinson (2010) used PRS for summative assessment of a large class. The motivation to use this form of test administration was, in part, to reduce pressure on staff time. The timing of the test was such that it preceded the fieldwork element of the course and it was hoped that the post-test feedback – a question by question run through of the results – would aid their understanding and retention of material and benefit discussion in the field. Roe and Robinson (2010) indicate that staff time is significantly reduced in marking, checking and collating the results.

Issues identified by staff and students include:

• Not being able to revisit questions
• Concerns that a response had not been registered
• Unfamiliarity with the system
• Having to answer the question within a specified time period

The benefits identified by the students include:

• Rapid turnaround of results
• Graphs of results to individual questions – staff would discuss the results and so formative feedback provided
• Easy to use technology

Unfortunately, Roe and Robinson (2010) do not indicate if students were better able to retain material for use in the field or apply it appropriately.
Indeed, it would appear that a majority of the literature in the area considers student experience of the use of PRS rather than its actual effects on their learning performance. In a review of 67 peer-reviewed papers published between 2000 to 2007, Kay and Le Sage (2009) found eight studies that reported improved learning performance with a further five studies specifically reporting a qualitative improvement in the learning. King and Robinson (2009) reported no correlation between PRS use and improvement in student grades or retention in Mathematics Education Centre, Loughborough University, despite student endorsement of the use of PRS as an appropriate teaching method for the subject, increased participation and engagement, and acknowledgement of increased feedback. The use of voting technology over a decade by Prof. Eric Mazur at Harvard (Crouch et al. 2007), however, shows that students’ understanding of underlying concepts increases (on standardised measures) when utilising his well-established Peer Instruction approach.

Wakefield and France (2010) report on the use of digital stories as an assessment type in a first year Geography module. Working in groups or individually, students build a digital story with the aid of storyboard, some planning, a digital camera and tripod and a video camera. The three minute digital story was created using Audacity or Windows Movie Maker (both free to download). The digital story was 30% of the assessment and the assessment criteria were: quality of content, content complements/enhances the report, quality of presentation, sound quality and creativity.

Before carrying out the activity, students expressed concerns about creating the digital story, rather than using the technology. After the exercise students reported enhanced learning, increased interest and greater motivation. As with any new type of assessment, it is important that the students have an opportunity to practice beforehand.

Reporting student perceptions of the incorporation of blogs into a third year computing course, Gallop (2007-08) concluded that learning can be enhanced. In particular, activities can be extended beyond the lecture room, there are increased opportunities for dialogue between students and students and staff, and opportunities are presented for students to reflect on their work. Importantly the students considered ‘that technologies used in this way help them to learn’ (p77). In 2006 and 2007 the School of Divinity of Edinburgh University used some form of blogging throughout the taught courses (Parvis et al. 2010). The conclusion of this experiment was that blogging works best with first year students. It helps them to gel quickly as a group and to respect each other’s work. The transition to University is eased, it provides a forum for student and staff contact and helps to maintain a record of tutorial activities, as well as helping with some basic IT skills. Parvis et al. (2010) suggest that if blogging is to be used in subsequent years then it requires a significant change in the activities that the students undertake. In this context it would be deeper engagement in the historical texts, or replacing a traditional essay with a well-developed blog. They caution, however, that if there is too much of this activity then the novelty wears off and there needs to be consistency across courses.

The University of Ulster (JISC, 2011b) has encouraged first year bioscience students to make video logs or “vlogs” of practicals which are shared in small groups in a closed video sharing site. The author is provided with guidance including reflective prompts to help them review their learning and pass this on to future students in the video. They then review, rate and comment upon each other’s videos. Students report a better understanding of the relevance of practical work including what to improve upon and tutors report they demonstrate enhanced reflection and understanding.
The Making Assessment Count Project from University of Westminster (JISC, 2010c) included development of a tool to support the process individual student reflection on assignment feedback. Surveys of student and tutor views of assessment and feedback suggested that students claimed to read and understand feedback but tutors perceived that students did not use it to improve their performance. The process of students completing an automated questionnaire on the feedback, receiving an instant report relating to their responses, and then reflecting in an online learning journal (a blog) was carried out in conjunction with personal academic tutorial sessions. Personal and subject tutors were able to view students’ reflections on the feedback online – allowing personal tutors to address the learner needs more effectively in the learning tutorials and helping subject tutors to see how their feedback was interpreted.

Protagonists of peer assessment of group work argue that it:

- makes the group work fairer
- gives students a sense of ownership and control
- encourages socialisation and integration within the class
- causes students to work harder
- enriches the overall learning experience. (Chan and Ridgeway, 2006)

These are easier to assess if:

- aspects of the group interworking are visible to the assessor
- a system (with elements of anonymity) is provided for students to give feedback on performance of other members of the group

Tutors can facilitate group work activity electronically by the use of wikis, discussion forums or shared electronic documents. Peer feedback can be supported by comment features in web2.0 tools as previously described (Parvis et al., 2010, JISC 2011b). Chan and Ridgeway (2006) reported that, however, whilst teaching students found blogs a useful tool for reflection on their learning and a useful channel for tutor comment and communication, for peer review and peer comment to occur they needed to be required as part of the learning process and even then they happened at a superficial level. They concluded that “collaborative learning is not a necessary consequence of the availability of collaborative tools” (Chan & Ridgeway 2006, p8). Halic et al. (2010) reported that although a majority of students taking part in an undergraduate programme felt that blogging increased their perceived learning only a quarter of them valued peer comments on their blog.

Van der Pol et al. (2008) examined the nature of peer feedback, its reception and use for revision of student outputs, as received and delivered by two distinct groups of students using three different online tools. The first group, 27 Health Care Education students used a tool called Virtual Learning Community to voluntarily comment on each other’s essays, reflection and internship reports. Comments appeared beneath each piece displayed on the screen rather than being anchored to any specific part of the document. Participants were not given any particular guidance as to how or when to structure or respond to feedback. Van der Pol et al. (2008) found that the more the feedback included recommendations the more frequently it was used to revise texts. Also the more important the feedback was perceived to be, the more it was used to inform amendments.
The second student group, from an Educational Science course, were randomly allocated to one of two online peer feedback tools in undertaking a small group educational resource design task. Each group was required to give peer feedback on a draft “concept version” of the design to one other group in the first stage of the assessment. Groups could then use the feedback in formulating their final output. Approximately half the groups were required to carry out their feedback activities in the discussion forum in Blackboard where the document and discussion were viewed separately and the other half in the Annotation system which allows document and discussion to be viewed together with comments pin pointed to specific pieces of text. In addition to positive relationships between specific recommendations and revision and perceived importance and revision, Van der Pol et al. (2008) also found a significant relationship between analysis and evaluation feedback functions and the revision of content. This may be attributable to the provision of assessment criteria and guidance for giving feedback in this task, helping students to provide analysis and evaluation which had more impact on their peer’s future action, but it may also be attributable to the different natures of the groups and their tasks. The first set of tasks was often reflective (as acknowledged by Van der Pol et al. (2008)), sometimes in a practice setting, involved a community of practitioners and participation in the peer feedback is voluntary. The second group were doing a more objective task which was outside of a real life educational setting and they were perhaps more of a class of learners than a professional group learning together. They were also required to give feedback as part of the task. Comparison of the use of the two different feedback tools by this class showed that whilst those using the Annotation system provided more feedback with suggestions for revision it was less evaluative than those using Blackboard. This suggests that different peer feedback tools may encourage students to produce feedback that differs in nature eg the tool that allowed anchoring of comments produced more suggestions for revision and the discussion tool promoted more evaluative feedback.

In addition, specialist peer marking and feedback tools eg WebPA from University of Loughborough and PeerMark from iParadigms have been developed, which help with online collection and collation of peer marks in a confidential, secure environment. The use and facilities of WebPA with a large first year cohort are outlined in a JISC case study example from Hull University (JISC, 2010d). Hull University advise that a face to face session should be used to introduce the students not only to the software but also the purpose of the peer assessment in the context of the task and the criteria to be used. They further advise that students should be encouraged to develop the criteria to increase their involvement in the exercise.

This review has already made reference to examples of formative (Turney et al., 2009) and diagnostic (Nicol, 2009) uses of computer assisted assessment (CAA) software which are beneficial in giving feedback to students and staff as the learning progresses. The power of such testing is illustrated in the JISC Case Study on embedding interactive computer marked assessments to promote independent learning from the Open University’s Centre for Open Learning of Mathematics, Science, Computing and Technology (COLMSCT) (JISC 2010e). The regular formative assessments, which form part of the Level 1 S104: Exploring Science module, are designed to involve non-traditional learners in supporting their development of independent learning strategies and build confidence. To this end, students answer free text short answer questions (responses up to 20 words in length) which relate to the course material. They receive immediate feedback which varies according to the answer given. Students see the question, their answer and the feedback which may include redirection to relevant aspects of the course material. Given than the Open University has
found that students are more likely to complete credit baring assessments, a small percentage of the final mark is allocated to each test. The mark the student receives for each question relates to the number of attempts at that question, for example those who get a question right first time get 100% but a reduction in percentage occurs for each subsequent attempt. Once a student has achieved the right answer a full explanation of the question is given, affirming the student’s reasoning. Answer matching for these free text questions is now carried out by the Open Mark software, which was tested against the Intelligent Assessment Technologies (IAT) and marking by hand in 2009 and found to be just as reliable. Tutors have the ability to review the free text answers given by the students and this can provide them with insight into their teaching.

The case study makes reference to the resources and expertise required to implement such a complex responsive model:

‘Producing interactive assessments with high-quality feedback is a time-consuming and complex process for which a sound business case must be made. To function well, questions must support a range of ability levels and play a confidence-building role while still communicating course expectations to learners. Subject and technical expertise need to be combined with question and feedback authoring skills and each question must be rigorously tested for impact, usability and accessibility if it is to be employed for summative purposes’ (JISC 2010e p37).

It is important then to consider the cost benefit analysis for developing resources of this scale and quality.

The potential to provide large scale summative online objective tests has challenged the Higher Education sector to deliver this in a quality fashion (JISC 2009). Warburton (2006) describes a rudimentary dual-path approach to CAA uptake contrasting pedagogically driven “slow burn” and productivity driven “quick win”. Table 4 below outlines the characteristics of the two:

Table 4

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<th>Characteristics</th>
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<tr>
<td><strong>Slow Burn</strong></td>
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<tr>
<td>● Initial use of small formative or diagnostic tests</td>
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<tr>
<td>● low stakes/ low risk</td>
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<tr>
<td>● Gradually expanding use of low stakes assessments</td>
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<tr>
<td>● experience of academic builds with support from learning and teaching staff and learning technologists</td>
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<tr>
<td>● Gradual formation of question banks</td>
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<tr>
<td>● Progression to summative assessment (sometimes)</td>
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<td>● More rapid uptake by colleagues</td>
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<tr>
<td><strong>Quick Win</strong></td>
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<tr>
<td>● Immediate jump to summative assessment</td>
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<tr>
<td>● Rapid investment in (untested) question banks</td>
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<tr>
<td>● High stakes/high risk</td>
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<td>● Lack of preparative activities (e.g. seeking advice)</td>
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<td>● No provision of practice tests for students</td>
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<td>● Failure to think process through</td>
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<td>● Colleagues discouraged from adoption where difficulties and failure occur</td>
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Uptake at the tutor level was acknowledged to be influenced by activities at the following levels: Pedagogical (learning and teaching support), Procedural (Learning Technologist, administrative and information systems support), Strategic (Institutional, SMT support and physical resourcing), Sectoral (funding and development of good practice models).

Walker (2012) further outlines the importance of policy in preventing barriers to CAA uptake in his reflection on the usefulness of such a policy at the University of Dundee. He states it should:

- be aligned to external standards,
- relate to relevant institutional processes,
- be inclusive,
- recognise risk,
- have iterative development in conjunction with stakeholder needs.

In conclusion he warns “implementation in the absence of policy serves only to heighten risk, jeopardise the long-term credibility of e-assessment within the institution and potentially result in inconsistent practice which may disadvantage students” (p5-6).

The JISC (2010f) case study of the development of a of summative assessment in some first and second year modules in the School of Health Sciences at the University of Southampton based on the QuestionMark Perception software over a 5 year period. This illustrates the “slow burn” approach described above (Warburton, 2006) and makes reference to good practice in terms of policy, procedures, CPD and question quality refinements. It also highlights pragmatic considerations which challenge institutions carrying out large scale high stakes e-testing, such as the availability of workstations, training of invigilators, failsafe mechanisms, and student authentication.

The e-Assessment Association in their paper on the future of e-Assessment to the CAA Conference 2010 (Beevers et al., 2010) discuss not only the pedagogical drivers for e-Assessment but also the need for the “authority for change” to be established. There is a sense in which this goes beyond institutional encouragement through good policy, robust procedure and comprehensive staff development towards acceptance of this type of testing within the individual subject disciplines and the sector as a whole.

Much of the literature on computer assisted assessment software reviewed above makes reference to learning benefits to students and cost and time savings in the marking and delivery of feedback in online tests. These should be carefully weighed, however, against the costs of assessment preparation by teachers and technicians, staff training required, investment in technology and administrative support. Relevance to learning outcomes, longevity of curriculum content and class size are all factors that should be considered carefully when planning this kind of investment to ensure efficiencies are truly achieved.

In their wider definition of technology supported assessment, the e-Assessment Association (Beevers et al., 2010) include the use of text matching software to illustrate inappropriate inclusion of the texts of other authors. Turnitin Originality Check is a text matching tool used by nearly 100% of UK universities. A range of examples of the formative use of this software to illustrate on an early piece of draft work where students are not paraphrasing adequately (resulting in coloured text matches with electronic sources) have been documented (JISC 2010e). These case studies promote these value of this software in bringing about self-reflection and identification with the concept of
plagiarism versus referencing and citation in what Jude Carroll has described as an “Ah ... you mean me” moment (Rowell et al., 2009).

The literature does, however, caution that the facilitator of the formative exercise should be skilled in getting the limitations of Turnitin and the implications of the extent of copying across to the students. For example, there can be confusion by both the staff and students on what the percentage match score in the report actually means (Cohen, 2010). Equally, Turnitin’s lack of access to a range of electronic journals can cause texts to appear blank when in fact many phrases they include are copied from sources not included in its databank. Students who have not learned from the illustrative use that they must completely stop the practice of borrowing text in their writing and cynically use access to Turnitin prior to submission to outsmart the tool will not be gaining positively from the experience. Kaner and Fielder (2008) suggest that by learning which journals do not cause a match to the formative report, students can restrict their text borrowing to these and thus outsmart the system. This criticism is valid to some extent but fails to take into account the following phenomenon which occurs with time. The work of students copying from journals inaccessible to Turnitin will be compared with those of others worldwide who may have done the same. Subsequently this kind of cheating will manifest as similarities with other students’ work. This is an important illustration of how the functioning of the system should be made fully transparent to the students. Some of these difficulties are reflected in the approach taken in the JISC (2010a) case study report on use of Turnitin in Sports Science at Loughborough College where the students do the formative exercise as part of induction but then do not see the originality report after that. Loughborough College state

‘students in the early stages of a degree course may find it difficult to interpret Turnitin reports accurately and personal tutors are considered the best judge of whether guidance, warning or disciplinary action is needed. Instead, tutors review their tutees’ Turnitin reports to check how well the principles of good academic practice that have been taught at induction and reinforced via the tutorial system are being applied’ (p2 of the online full case study)

The University of Glamorgan in its Change Academy project promoting assessment FOR learning (JISC, 2010g) created an assessment diary. This was part of their drive to map the frequency, extent and timing of assessments and take into account student and tutor workloads in the first year courses studied. The diary consists of a database of assessments (including deadline and feedback dates) for each module and a web-based menu driven interface accessible from the VLE to allow each student and lecturer to view their own “assessment calendar”. The student feedback they gathered in the project showed that it is more important for students to know when they will receive feedback and to be able to use that feedback to prepare for future assignments than to receive feedback within a specific time limit – the feedback date in the calendar therefore provides the students with important information.

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