Learning-oriented assessment: a technology-based case study

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This paper focuses on reconfiguring assessment processes so that they support a learning function, in addition to the more traditional measurement function. In the first half of the paper we discuss a framework for ‘learning-oriented assessment’ derived from a project carried out in Hong Kong. We conceptualize learning-oriented assessment as containing three key components: assessment tasks as learning tasks; student involvement in assessment; and explicitly forward-looking feedback. The second half of the paper presents an action research case in which the first author implemented some of the principles of learning-oriented assessment within a module in a teacher education context. The module, focusing on multimedia and web authoring, was taught through blended learning with an emphasis on peer learning and project-based learning. A particular feature was the interplay between students’ learning experiences and the module assessments.

Introduction

The context for this paper is that of teacher education. The authors, as teacher educators, are involved in assessing teachers who in turn will be assessing their school learners. Our orientation towards assessment is that it should support appropriate student learning in addition to the more traditional measurement function. We also believe that it is necessary for teacher educators to model progressive assessment practices so that trainee teachers can themselves experience their impact. In other words, teachers in training need to undergo some form of engagement with alternative approaches to assessment. Clearly, for a learning-focused approach to assessment to be implemented successfully in schools, teachers need much more support than initial engagement through teacher education, but we feel that experimenting with alternative approaches to assessment with our trainee teachers is a useful starting point to raise their awareness of assessment as a learning process.

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The aim of this paper is to emphasize the learning potential of assessment through proposing a conceptual framework of learning-oriented assessment and then indicating how the framework can be implemented in practice via an illustrative case. The remainder of the paper is organized as follows. First, we introduce the assessment scene in Hong Kong with respect to both schools and higher education to set a contextual backdrop for the paper. Secondly, we describe a framework used in a project carried out in the Hong Kong Institute of Education. Then in a discussion of a specific teaching case, we examine how aspects of the framework were implemented in a module on multimedia and web authoring.

**Assessment context in Hong Kong**

Assessment in Hong Kong has generally been characterized as examination-oriented (Biggs, 1998; Pong & Chow, 2002). Whilst this form of summative assessment plays a useful role in selecting and certifying students, there are also potentially negative impacts of norm-referenced, competitive examinations (Morrison & Tang, 2002). Attempts to introduce more diversified forms of assessment have shown that, in the school sector, assessment is the curriculum component that seems most difficult to reform (Morris et al., 2000a). The current Hong Kong school reform agenda promotes ‘assessment for learning’ as part of wide-ranging reforms designed, amongst other things, to reduce testing and promote generic skills such as problem-solving and collaboration (Curriculum Development Council, 2001). In an analysis of the early implementation of assessment for learning in Hong Kong, Carless (2005) argues that a barrier to such reforms is presented when teachers’ existing beliefs are not congruent with those assessment elements being promoted. For such reforms to take root, clearly a large amount of teacher developmental work and associated support is needed. As Morris et al. (2000b) argue, assessment change in Hong Kong requires:

> ... opportunities for exploring alternatives which will require that teacher educators educate student teachers about the important role of assessment, and provide them with ample opportunities and practice of forms of assessment that integrate formative assessment into teaching and learning strategies. (p. 215)

This sentiment underpins our attempts to introduce a learning-oriented approach to assessment with our teacher education students.

Turning to the higher education sector in Hong Kong, there has been little large-scale research into assessment practices. Watkins (1998) carried out a survey of assessment practices in the universities and concluded that assessment largely failed to develop higher order outcomes. His respondents believed that a barrier to enhancing learning was a student orientation towards assessment which valued rote learning and the accumulation of marks rather than deep understanding. During the last decade or so, a number of scholars have reported attempts at making assessment a more productive learning experience for their students. Many of these reported practices have focused on how alternative assessment techniques can enhance student
Learning-oriented assessment

As part of processes to develop further the learning aspects of assessment, an initiative entitled the Learning-Oriented Assessment Project (LOAP) was launched in the Hong Kong Institute of Education, the main provider of pre-service and in-service teacher education in Hong Kong. The fundamental aim of this three-year staff development project was to identify, promote and disseminate good practices in ‘learning-oriented assessment’—this term being viewed as preferable to alternative terminologies (formative assessment, assessment for learning) for reasons articulated in more detail elsewhere (Carless, in press). Most crucially, we see learning-oriented assessment as being applicable to both formative and summative assessments when the components of our framework outlined below are present (Joughin, 2005).

Learning-oriented assessment is about putting learning at the centre of assessment and reconfiguring assessment design so that the learning function is emphasized. Our conceptualization of learning-oriented assessment includes three core components, as illustrated in Figure 1.

We now elaborate on each component in turn. Firstly, assessment tasks need to promote the desired learning outcomes and learning dispositions, something which examinations or one-off end of module assignments often fail to do adequately. Additionally, there should be constructive alignment of objectives, content and assessment (Biggs, 1999). ‘Alignment is evident when the articulation among learning objectives, content, instructional design, instructor expertise, technological affordances, and assessment strategies is as clear as possible’ (Reeves, 2000, p. 106). A further feature

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**Figure 1. Components of learning-oriented assessment**

- Assessment tasks as learning tasks
- Student involvement in assessment processes
- Forward-looking feedback
is that tasks should require distribution of student time and effort throughout a
module, not just short bursts of energy towards the end (Gibbs & Simpson, 2004).
As Macdonald (2004) suggests, ‘the design of assessment is critical in determining
the direction of student effort’ (p. 218). Other characteristics of ‘assessment tasks as
learning tasks’ include: a relationship between assessment tasks and real-world tasks;
cooperative rather than competitive tasks, for example, through group work or
project-based learning; and some degree of student choice in assessment tasks so as
to facilitate student motivation and engagement.

Turning to the second component of our framework, assessment needs to involve
students actively so that the assessment process can be more transparent to them.
Students need to be aware of the goals of learning and what constitutes quality
achievement of the goals. As part of this awareness-raising, we view it as axiomatic
that students should be engaged in activities that encourage reflection, peer feedback
and self-evaluation. Such processes enable students to better understand the nature
of assessment and the essence of good performance. In his seminal paper, Sadler
(1989) suggests that:

… the indispensable conditions for improvement are that the student comes to hold a
concept of quality roughly similar to that held by the teacher, and is able to monitor
continuously the quality of what is being produced during the act of production itself.
(p. 121)

Student involvement, through peer and self-assessment processes gauged against
assessment criteria, is one of the means by which students begin to understand the
notion of quality (Falchikov, 2005).

The third component of our framework holds that for assessment to promote
learning, students need to receive appropriate feedback which they can use to ‘feed
forward’ into future work. This conception is similar to the role of feedback in
formative assessment, whilst seeking to minimize some of the limitations of existing
feedback processes. Our view of feedback is that it should be less final and judge-
mental (Boud, 1995), more interactive and forward-looking (Carless, 2002), timely
and with a potential to be acted upon (Gibbs & Simpson, 2004). In particular, we
are anxious to minimize a common phenomenon in higher education, occurring
when students receive most of their feedback after a module is completed and when
there is minimal possibility of it being acted upon. In view of our emphasis on
feedback being timely and acted upon, priority is afforded to peer support and
verbal comments from tutors, both of which enable feedback to be communicated
speedily (although commentary may not be as rich or detailed as slower forms of
feedback).

In sum, the three elements of this framework seem to manifest a predominantly
formative orientation, most obviously the feedback element. We see, however, a
particular strength of learning-oriented assessment is that it can be applied to either
formative or summative assessments as long as a central focus is on enhancing student
learning. In the discussion of the case which follows, we show how learning-oriented
assessment can be put into practice and integrated with formal module assessments.
Case study: multimedia and web authoring

A core strategy used in LOAP was action research by which teams focused on exploring their own learning-oriented assessment practices (see Mok et al., in press). Action research processes have been seen to be a particularly suitable strategy for exploring the renewal of assessment practices both in higher education (see Swann & Ecclestone, 1999) and in schools (see Torrance & Pryor, 2001). The discussion below relates to action research falling within the general umbrella of technology-enhanced assessment (see also Keppell et al., 2006).

The first author was involved in the teaching of the same module on multimedia and web authoring to two cohorts of students. The first class comprised 20 second-year full-time teacher education students and the second class involved 25 similar first-year students. This was a three-credit point module with each credit point equating to 36 hours of total student effort. The students’ previous learning experiences were mainly with didactic approaches to teaching and learning as opposed to approaches that were more learner-centred and in the past the class was taught over 30 hours of face-to-face classes (i.e., ten classes of three hours each). In this case, however, a combination of online learning and face-to-face teaching was utilized. Use was made of synchronous discussion fora (i.e., students accessed the forum at the same time from a remote access computer) and asynchronous discussion fora (i.e., students accessed the forum over a one-week period). Most classes were taught in a computer lab which allowed the use of face-to-face group activities, the Blackboard Learning Management System, online group activities and project work.

The module focused on learning about multimedia and how to develop a web site for educational purposes. Multimedia was defined as multiple forms of media blended seamlessly into a web site. These media consist of graphics, photographs, animations, audio and video. The module was designed to provide participants with a broad exposure to design, development and evaluation of multimedia technology and web technology. Design refers to creating a conceptual plan for the web site. Development refers to the strategies and procedures used to capture and edit media and utilize authoring software to develop a web site. Evaluation focused on learning skills to recognize and judge the quality of a web site. There was also an emphasis on integrating multimedia into a web site so that students could use the resources in their teaching practice in schools. The module was taught using blended learning (i.e., a combination of face-to-face learning with online learning) and emphasized peer learning and project-based learning. An explicit attempt was made at constructive alignment between module objectives, content and assessments. The objectives of the module included:

- Understanding the importance of planning and design for educational web sites.
- Acquiring a knowledge of instructional design principles for multimedia and web-based applications.
- Being able to manipulate different media elements in multimedia applications.
- Being able to critically evaluate the issues related to the use of multimedia and Internet applications in an educational environment.
Developing subject knowledge on teaching multimedia and web authoring in secondary school.

There were four formal assessment items within the module which counted towards the overall module grade. We firstly summarize the four tasks and then discuss them in more detail in the remainder of this section. The assignments were: online discussion (weighting 15%); reflective journal (15%); group project (40%); and an examination (30%). The online discussion component of assessment (15%) asked students to complete four key readings about multimedia and web authoring and participate in related online discussions. For the reflective journal (15%), students wrote four entries and submitted a one-page summary to the lecturer. These first two assignments were completed in the first half of the module, so that students could achieve some marks counting towards their final grade and receive formal written feedback on their progress. The group project (40%) was a major focus of the module. Students created an educational web site and included a rationale, needs analysis, a concept map and educational resources for students. The web site also needed to contain graphics, video, audio and an animation. The end of module exam (30%) focused on ten questions which were key topics within the module. Students could choose any three questions to prepare and then complete in a designated exam session.

Our discussion of the module and its assignments indicates how features of our framework of learning-oriented assessment were implemented. The rationale for having four assessment tasks was to distribute student effort evenly throughout the module. The interplay between teaching of the module and assignment preparation also helped to facilitate the provision of feedback and support students in managing assessment workload. The first assignment task involved students in analysing four key readings, posting a one-paragraph summary of one of the articles within an online discussion forum and then responding insightfully to two other student postings about each reading. The strength of learning management systems is that they provide communication tools to foster and enhance peer learning by providing easy access to the opinions of other students.

Secondly, students needed to complete four short reflective journal entries in the first half of module and post these in their private area within the Blackboard Learning Management System. For this second assignment, students submitted a summary of these four journal entries. This learning task provided an opportunity for students to reflect on their understanding of the module during its early stages. Only the individual student and the lecturer had access to this journal. A number of questions were provided to guide their thinking in the writing of the journal. For example, How can I apply this module to my teaching? What is the value of web-based teaching? The lecturer synthesized and summarized key points of the journals and discussed these generic issues at the beginning of each face-to-face class. By discussing these issues the lecturer sought to provide timely and forward-looking feedback which students could act on to improve their learning and their grades.

The third assignment required students to work in groups of three to five students on a small-scale project to develop an educational web site for secondary schools
using principles of project-based learning. Project-based learning focuses on a meaningful activity in which realistic, relevant learning occurs through participation in a challenging and motivating project. It also emphasizes situated learning and apprenticeship learning by dealing with real-world issues. Open-ended generative tasks are advocated in which there is not a prescribed approach or solution and the learners generate their own questions, plans and goals. Collaborative decision-making and problem-solving is necessary as teams work on projects in which they discuss, consult, collaborate and solve problems to create a product. Project-based learning also changes the role of the teacher to a cognitive coach who models, guides and encourages independence in goal-setting and decision-making (Howard, 2002). Although peer learning can be both informal and formal, the teaching of the module explicitly emphasized formal peer learning. Formal peer learning occurs when group work or group projects are explicitly scheduled into courses. It was also hoped that informal peer learning would occur as students discussed lectures, assignments and projects outside the formal class time.

Three to five students per group (in subject areas including music, business, physical education, art and home economics) created a web site focused on an area that they could use for their own teaching in secondary schools. The web site needed to include a rationale for its focus, a needs analysis, a concept map (macro design of web site) and educational resources for students. It also needed to contain between five and ten graphics, three videos (30 seconds to two minutes in length), two audio segments and one animation. All media components needed to be original materials created by the students. The project needed to be submitted on a CD-ROM as part of their formal assessment. A rubric was provided to allow students to understand the evaluation of the project. Throughout the module, students were guided in how to complete a needs analysis, concept map, video, audio and photographic production and web authoring. The students had to apply their knowledge and skills in the design and development of their educational web site. The lecturer acted as mentor throughout the process and frequently provided verbal feedback to the students. For example, one week before the submission of the group project each team presented their draft project to the class. This task was undertaken in order to provide feedback that allowed students to refine and fine-tune their web site before the final submission. Although this feedback was purely verbal and not particularly detailed, we believe an important advantage is that it comes before a mark is awarded and so students have motivation to act on it. The comments also attempted to guide the students using Sadler’s (1989) notion of developing a student conception of quality comparable to that of the teacher.

The fourth and final assessment item (not discussed in detail) was an examination. To alleviate pressure on the students, ten questions were provided to the students two weeks before the exam. The students were given the task of researching any three questions and writing about them in the designated exam session. By allowing the students to prepare answers in this way, we considered the task to be more authentic than traditional exams and facilitated the student achievement of best performance.
Although there is extensive discussion in the literature about peer grading of individual contributions to group projects (e.g. Sivan, 2000; Johnston & Miles, 2004), the approach in the teaching of this module focused instead on peer feedback processes. This approach emphasized peer learning as opposed to grading within the development of the group project. In particular, group projects expose students to other points of view, teamwork skills, communication, leadership skills, planning and time management (Johnston & Miles, 2004). In addition, because ‘there is a microclimate of trust which already exists or can be established’ (Anderson & Boud, 1996, p. 17) within the group setting, no individual grading within the group project was utilized in an attempt to enhance the peer learning component of the module as opposed to the potentially competitive nature of the individual contribution to the group project.

**Evaluation**

There were five components (reflective journals, online discussions, group projects, questionnaires and student evaluation of teaching survey) of the module that provided evaluation data to the teacher. The reflective journals and online discussion provided a means for the teacher to gauge student understanding of the concepts. These tasks required students to conceptualize, synthesize and articulate their ideas by writing their personal journal and also by communicating with other students in the discussion forum. Critical enquiry, reflection, articulation of knowledge and managing how to learn were the hallmarks of the tasks. A student reflected as follows:

> During the process of doing the project, students have to exchange ideas with other group members and students have to find all the project materials and make analysis for it. It helps students to improve communication skills and have deeper thinking for everything. Thus, it is highly recommended introducing it in school. I will become a teacher very soon. It is important to set a good example to my students. (Student A, reflective journal about project-based learning)

> In this module, we can learn context through project-based learning. I study with some classmates, and no longer study by myself. I learn how to discuss with others so as to improve my communication skills. That influences my learning attitude, as I think learning is a very personal thing, but now, after reading some articles and attending the module, I know the importance of having group work and projects. (Student B, reflective journal about project-based learning)

The group project was the major assessment task and the module readings provided background for the design and development while each of the ten classes was devoted to aspects of the project. Students completed a needs assessment and concept map which showed the macro-structure of the web site. Feedback from the lecturer was provided to assist in the design of their project. Students were also provided with practical experience in filming and editing video, recording and editing audio and web authoring.

A 24-item questionnaire was administered with students during the final class in order to determine their perceptions about peer learning and project-based learning. The response scale comprises a 5-point Likert scale with categories ‘SA = strongly
agree’, ‘A = agree’, ‘N = neutral’, ‘D = disagree’ and ‘SD = strongly disagree’. Table 1 and 2 summarize the results of selected items from this questionnaire chosen for their relevance to our discussion.

The student responses to peer learning appear to be generally positive. In particular, 85% of students believed that working in groups was beneficial to their learning (Q1), 82.5% of students suggested that working with other students assisted them to reflect on their own learning (Q2), and 27.5% of students were unsure whether they received feedback from other students (Q5); the issue of what students perceive as ‘feedback’ requires further investigation. Twenty per cent of students are unsure if they can learn a lot from their peers (Q6).

Project-based learning, a component of our framework of assessment tasks as learning tasks, was a central aspect of the module and a number of questions focused on students’ perceptions of the project process. Only 57.5% suggested that they liked to complete group-based projects, with 22.5% of students suggesting that they do not like group-based projects (Q8). This may reflect that some group co-operation and outcomes were more successful than others. Interestingly 85% of students felt that they would use project-based learning as a teaching method in their future teaching (Q17). This positive response suggests that even some students who responded negatively to Question 8 could see the potential of project-based learning. This provides tentative encouragement for one of the concepts with which we began the paper, namely that teacher educators should model the kind of practices that they wish their trainees to adopt.

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<th>Table 1. Frequency distribution of peer learning items</th>
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<tr>
<td>Peer learning (40 students)</td>
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<td>Q1. Working with others in a group was beneficial to my own learning</td>
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<tr>
<td>Q2. Working with others allowed me to reflect on my own learning</td>
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<td>Q5. I obtained feedback from other students</td>
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<td>Q6. I think I can learn a lot from my peers</td>
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<tr>
<th>Table 2. Frequency distribution of project-based learning items</th>
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<td>Project-based learning (40 students)</td>
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<tr>
<td>Q8. I like to complete group-based projects</td>
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<td>Q10. I think that my individual contribution to the project should be graded</td>
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<tr>
<td>Q16. I think that it would be acceptable for me to grade other members of the group on their contribution to the group project</td>
</tr>
<tr>
<td>Q17. Project-based learning is a teaching method that I would use in my future teaching</td>
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In terms of whether or not their individual contribution to the group project should be graded, there were some interesting perceptions. Thirty-five per cent of students were unsure about this question while 57.5% suggested that their individual contribution to the project should be graded (Q10). Seventy-two point five per cent of students felt that it would be acceptable to grade other members of their group in relation to their contribution to the group project (Q16). Our own position (see also Liu & Carless, in press) is that we believe it more worthwhile to emphasize the learning potential of peer feedback processes rather than whether peer grading is involved or not. We viewed the peer learning processes as being one of the positive elements of the module. Because we sometimes learn best when we need to explain things to others, peer learning has enormous potential. The use of peer feedback and peer learning may also assist in reinforcing the teaching of teacher education students as they can practise their ability to explain, present and discuss with peers and hence improve their communication skills in the process of undertaking project-based learning.

Q1: I understood the assessment requirements early in the module.
Q2: I received useful feedback on my learning.
Q3: The organization of the module encouraged me to make good use of the resources inside and outside the Institute to learn.
Q4: Through this module I have become a more independent learner.
Q5: The teaching of this module was effective.

The evaluation of the module by the students (Table 3) indicated that they understood the assessment requirements early in the module (88%), whilst (73%) felt that they had received useful feedback. The remaining students may have felt that they did not receive particularly useful feedback, may view teacher feedback as the only valid form of feedback, discounting peer feedback, or may think of feedback as being individual formal written comments rather than verbal advice within teaching sessions. A useful comparison is with findings from Gibbs et al. (2003) that showed tutors viewed oral comments as feedback, whilst students did not recognize this form of feedback as much as written comments.

Multiple assessment strategies were utilized in the module in an attempt to cater to the individual differences of the students. The students were first-year and second-year students who may have struggled with some aspects of the module because they

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<th>Strongly disagree</th>
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<th>Agree</th>
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<th>N</th>
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<tbody>
<tr>
<td>Q1</td>
<td>0.0%</td>
<td>12.5%</td>
<td>81.3%</td>
<td>6.3%</td>
<td>16</td>
</tr>
<tr>
<td>Q2</td>
<td>0.0%</td>
<td>26.7%</td>
<td>66.7%</td>
<td>6.7%</td>
<td>15</td>
</tr>
<tr>
<td>Q3</td>
<td>0.0%</td>
<td>25.0%</td>
<td>56.3%</td>
<td>18.8%</td>
<td>16</td>
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<tr>
<td>Q4</td>
<td>6.3%</td>
<td>18.8%</td>
<td>75.0%</td>
<td>0.0%</td>
<td>16</td>
</tr>
<tr>
<td>Q5</td>
<td>6.3%</td>
<td>12.5%</td>
<td>81.3%</td>
<td>0.0%</td>
<td>16</td>
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differed from their previous learning and assessment practices. Although on reflection the assessment load for the module was too heavy, much class time was spent engaging with these tasks so as to integrate teaching, learning and assessment. Perceptions from the student evaluation of teaching survey of the module also suggested that they felt that the workload for the module was quite heavy. One of the challenges for our implementation in this module of the notion of assessment tasks as learning tasks was that it accentuated the workload burden. Although a series of short assessment tasks, integrated with in-class activities, can lead to productive learning experiences, a pragmatic student may prefer a more traditional one-off end of module assignment which involves less time and effort. Future teaching of the module will attempt to balance the educational ideals of learning-oriented assessment with a reduced workload for students.

**Conclusion**

This paper has investigated the potential of learning-oriented assessment by examining its application in a module on multimedia and web authoring. A series of assessment tasks fulfilled both learning and measurement functions through the implementation of the framework of learning-oriented assessment introduced in the early part of the paper. *Assessment tasks were designed as learning tasks* through reflective journals, online discussion and group projects. *Students were involved in the assessment processes* through a developing awareness of the characteristics of a quality web site, collaborating in groups and providing feedback to other classmates in the discussion forum. The approach of the lecturer throughout the module was to provide *forward-looking feedback* using timely advice and support so as to encourage a quality design of a web site for students’ future secondary school teaching.

It would be naive however, to believe that learning-oriented assessment is not without its challenges. It requires tutors and learners to buy into the approach. For the former, it may run counter to the dominant measurement approaches to assessment, although, as we have tried to show, learning-oriented assessment does not preclude summative forms of assessment. In fact, as boundaries between formative and summative assessment are often blurred, we have some misgivings about the usefulness of formative–summative distinctions which can lead to stereotypical assumptions, oversimplifications or misconceptions.

Learning-oriented assessment may also require adjustments from students in terms of their study habits and the pacing of their work. In the case discussed here, there was a tension between positive elements in the learning process and the negative elements of heavy assessment workload. We do feel however, that modifying assessment to highlight more powerfully its learning function brings potential benefits to both tutors and students in terms of increased satisfaction, enhanced learning and ultimately higher grades for students.

For learning-oriented assessment to take hold at more than a modest individual level, pressure and support at the departmental and institutional level needs to occur. As Knight (2006) argues, ‘For learning-oriented practices to fulfil their promise, attention has to be given to the learning environment as a whole’ (p. 448). An analysis
of change in learning-oriented assessment practices across wider groups or faculties is perhaps a suitable subject for a future paper.

Note

1. Various terms for peer processes are used in the paper. Peer assessment is used as a generic term to indicate peer involvement in grading or feedback. Peer learning is defined as 'students learning from and with each other in both formal and informal ways' (Anderson & Boud, 1996, p. 16). Peer feedback is defined as a communication process through which learners discuss their work in relation to performance and standards. Peer grading refers to students awarding grades to each other.

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