Enhancing Higher Education, Theory and Scholarship

Proceedings of the

30th HERDSA Annual Conference

8-11 July 2007
Adelaide, Australia

HERDSA

The Higher Education Research and Development Society of Australasia, Inc.
2007 International Conference

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Collaborative peer review: a model for promoting reflective practice, improving quality of feedback and enhancing learning outcomes

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The potential benefits of engaging students in a process of peer learning and assessment are well documented. The benefits for students participating in peer learning activities involving self, peer and co-assessment are reported to include increased awareness of the quality of their work, increased self reflection on their learning and on their performance as peer evaluators, improved student learning outcomes and the development of life long learning skills. Collaborative peer review involving both students and teacher as peers can enhance the scholarship of teaching and learning by engaging teachers in a process of reflection on their own teaching, the quality of the feedback they provide students and the alignment of assessment and feedback with student learning objectives. This paper explores the potential of this approach for promoting the scholarship of learning and teaching, drawing on the experience of the authors applying this model within undergraduate courses at the University of South Australia.

Keywords: peer review, scholarship of learning and teaching, reflective practice, feedback and assessment

Introduction

The need for higher education institutions to review and transform assessment practices has become a major focus of attention over the last decade. There are many factors that have contributed to this trend including a greater emphasis on preparing students for lifelong learning and equipping them with the skills required to function effectively in future employment. These skills include the ability to analyse information, problem-solve, work in teams, communicate effectively and reflect critically on their professional practice (Dochy & McDowell, 1998; Sluijsmans, Dochy, & Moerkerke, 1998; Humphreys, Greenan, & McIlveen, 1997).

In the Australian context, James, McInnis and Devlin (2002) discuss several factors that have challenged conventional approaches to assessment in higher education including the need to be responsive to more flexible learning environments; the perceived threat of plagiarism from online sources; the need for more cost and time effective assessment techniques; the emergence of new technological possibilities for assessment and the need to cater for students from diverse backgrounds while still maintaining standards and accountability.

The problems with traditional approaches to assessment have been widely reported (Sluijsmans, Dochy, & Moerkerke, 1998; Falchikov, 2004; Boud & Falchikov, 2005, 2006). Based on an extensive review of the literature, Falchikov (2004) reported that traditional assessment is more likely to produce passive learners and reduce motivation, tends to be associated with surface approaches to learning, and has been found to be unreliable and biased. Sluijsmans, Dochy and Moerkerke (1998) also point out that the traditional view that assessment of student achievement as a summative activity carried out at the end of a process of learning is no longer widespread, and they suggest the need for an alternative model which changes the place and function of the assessor.

Holroyd (2000) reports on evidence demonstrating that such changes are taking place. In summarising some of the more recent changes, Holyrod identifies the following dimensions:

    a) increasing emphasis on the learning enhancement purpose of assessment rather than its certification and accountability purposes;

    b) increased attention to formative rather than summative aspects;

    c) more emphasis on a standards model of assessment, involving criterion-referenced assessment, and less on a measurement model, involving norm-referenced assessment;

    d) more frequent provision of descriptive comment and constructive feedback and less restriction of assessor response to marks, grades and summary labels;

    e) a move from dependence on one main method of assessment (and end-of-course assessment) to deploying a variety of methods (and within-course assessment);

    f) less reliance on assessment by teaching staff alone and more involvement of self, peers and workplace assessors;

    g) increased insistence on assessment as integral to teaching rather than a separate activity occurring after teaching.

In this next section of the paper, a brief overview of the documented advantages and potential problems associated with alternative forms of assessment is provided. An alternative model that focuses on peer review as a formative process to guide students in improving on their assignments prior to marking is proposed. The potential of this approach to engage teacher and learners in a collaborative process of self-reflection within the one "learning community" is discussed. A case study is presented to highlight the features and potential limitations of the model, and finally, the implications for application in a wider context are considered.

Alternative forms of assessment

Sluijsmans, Dochy and Moerkerke (1998) describe several alternative approaches to assessment including: (i) self-assessment; (ii) peer assessment and peer evaluation; (iii) self and peer-assessment and (iv) self and peer-assessment related to co-assessment.

Self-assessment is described as the process by which students are required to rate their own performance against a standard, whereas in peer assessment, students of equal status rate the performance of their peers (Topping, Smith, Swanson, & Elliott, 2000; Falchikov, 2003). Sluijsmans, Dochy and Moerkerke (1998) suggest that self-assessment is an effective means for increasing the role of students in their own learning and is most often used to foster reflection on one's own learning. Peer assessment is used in both a formative and summative approach and complements self-assessment, and both approaches can be used together requiring students to assess their peers and their own progress or performance as a means of self-reflection. Hanrahan and Isaacs (2001) assert that both self and peer-assessment skills are needed for students to develop life long learning skills since self-assessment helps students to

set goals, while peer assessment can help them to contribute constructively in collaborative efforts. The fifth approach identified by Sluijsmans, Dochy and Moerkerke (1998), and Dochy and McDowell (1998), co-assessment (also known as collaborative or cooperative assessment) involves the participation of both teacher and students in the assessment process. According to Sluijsmans, Dochy and Moerkerke (1998), co-assessment can be used for summative purposes and complements a formative approach involving self and or peer assessment, and as Dochy, Segers and Sluijsmans (1999) report, an assessment approach combining self, peer and co-assessment has been found to be particularly effective.

Benefits of alternative assessment approaches
The benefits of alternative assessment, particularly peer-assessment are well documented (Sluijsmans, Dochy, & Moerkerke, 1998; Falchikov, 2003, 2004; Davies, 2003; Langan & Wheater, 2003). These benefits are said to include:
- development of students' evaluative and critical abilities McDowell (cited in Sluijsmans, Dochy, & Moerkerke, 1998);
- increased opportunities to learn from the mistakes of peers as well as from exemplary work of others (Race, 1998 cited in Ballantyne, Hughes, & Mylonas, 2002; Langan & Wheater, 2003);
- more integrated knowledge and a better understanding of standards required (Hanrahan & Isaacs, 2001);
- increased confidence (Topping *et al*, 2000; Langan and Wheater, 2003),
- greater awareness of the dilemmas facing tutors in assessing student work (Hanrahan & Isaacs, 2001); and
- development of the learner's ability to self-evaluate and reflect (Langan & Wheater, 2003).

Limitations of alternative approaches
Falchikov documents several studies that have reported unfavourable attitudes to peer assessment, including a study by Olver & Omari (cited in Falchikov, 2004) which found that students were less than positive about peer assessment because of their fears about the effects of rivalries and competition. Cheng and Warren (1997) in a study of Hong Kong students reported that while students were in the main positive about the experience, 60% who originally responded favourably to the question relating to their confidence in assigning grades responsibly changed their mind in post-measurement testing. The reasons given for this shift towards a negative direction included lack of confidence about their qualifications to carry out the work; doubts about their ability to be objective and also about the objectivity of their peers, a feeling that there was too much responsibility placed on the shoulders of the student, and lack of training for the task. Topping, Smith, Swanson and Elliott (2000) reported that students undertaking formative peer assessment of a writing assignment found the process both time consuming and socially uncomfortable.

Falchikov (2003) acknowledges that it is unlikely that the first implementations of self or peer assessment will run smoothly, and has noted that the three common problems when such alternative schemes are introduced include: (a) students being resistant to the idea of being involved in assessment; (b) colleagues being suspicious or hostile to the approach and (c) the time involved in setting up alternative assessment approaches. Suggested strategies for addressing these identified problems include providing training for students and tutors in self, peer and collaborative assessment; ensuring students understand the benefits to be gained from participation in the assessment process; careful planning and involving students in discussion about potential problems before they arise (Falchikov, 2004).

Formative peer review

Based on review of the literature about the way assessment influences student learning behaviour and learning outcomes, Gibbs and Simpson (2002) have proposed a framework comprising eleven conditions under which assessment is most likely to support learning. These conditions can be classified into conditions that influence the design of assessment systems and assignments, and conditions that influence feedback and its effect on learning. The conditions identified by Gibbs and Simpson as impacting on the influence of feedback on learning are as follows:

- sufficient feedback is provided, both often enough and in enough detail;
- the feedback focuses on learning and on actions under the students' control, rather than on the students themselves and on their characteristics;
- the feedback is timely in that it is received by students while it still matters to them and in time for them to pay attention to further learning or receive further assistance;
- feedback is appropriate to the purpose of the assignment and to its criteria for success;
- feedback is appropriate, in relation to students' understanding of what they are supposed to be doing;
- feedback is received and attended to; and
- feedback is acted upon by the student.

Several of these conditions focus on the importance of formative assessment in providing timely, detailed feedback that students receive, attend to and act upon. A combination of self, peer and co-assessment which incorporates the following suggested strategies, may help students engage with the feedback they receive:

- asking students to specify, on their assignment, what they would like feedback on;
- providing feedback but no marks, so that students have to read the feedback to get any idea how they are progressing;
- requiring assignments to be self-assessed (without any marks being involved) so that students pay attention to whether teachers' views correspond to their own;
- using two-stage assignments with feedback on the first stage, intended to enable the student to improve the quality of work for a second stage submission, which is only graded;
- providing a grade only after self assessment and tutor feedback has been completed (Gibbs & Simpson, 2002).

Another approach to peer assessment reported in the literature involves peers in a process of peer assessment prior to final submission of assignments, thereby providing students with the opportunity to act on the feedback.

Falchikov (1996) reports several benefits experienced by students participating in a formative feedback approach, referred to as peer feedback marking, which enables them to act on the feedback received from peers prior to final making of their assignments. As Falchikov describes, this formative approach makes the criteria explicit to students, provides them with the opportunity to participate in a non-evaluative feedback session, review the work of their peers and to reflect on their approach to the assignment.

One of the advantages of this approach is that students who feel less confident about their ability to assign grades fairly can provide qualitative feedback without the associated concerns regarding competition or rivalry. This approach is also more likely to be acceptable to teachers who are resistant to relinquishing responsibility for final marking of student work,

and can provide students and teachers with a non-threatening opportunity to benefit from the collaborative peer review process.

In this next section, a case study describing the implementation of a non-evaluative formative peer review process implemented in an undergraduate multimedia design course is reported, and the benefits reported by students are discussed. The potential benefits to be gained by teachers engaged in a process of self-reflection on their teaching and the implications for enhancing the scholarship of learning and teaching are discussed.

Case Study: Implementation of a formative peer review approach in a final year undergraduate web design course

The formative peer review process described in the preceding section has been trialled in two undergraduate multimedia design courses at the University of South Australia over a two year period. In the case study reported here, the approach is introduced to the assessment process of the final assignment in a third year web design course, Electronic Publishing on the Internet (EPI), which is a core within the undergraduate multimedia design program at the University of South Australia. Students taking this course have previously completed a first year course in digital media (Digital Media Techniques), which introduces them to basic web design skills. The aim of EPI is to provide students with an understanding of the nature, effects of and future of electronic publishing, and for students to develop the knowledge, experience, and skills necessary to critically analyse and create effective websites that cater for a diverse audience.

In their final assignment, students design a website for a community organisation assigned to them at the beginning of the semester. Students work in teams with their client throughout the semester, producing needs assessment and design specification documentation for their client for assignment 1, a prototype design of the site for assignment 2, and the completed site for their final assignment.

The peer review process
A peer review approach was introduced to the assessment process at the commencement of semester 1 in 2005. The aim of this approach was to provide students with experience in critically reviewing websites, to encourage them to reflect on the feedback they received from their peers, and to act on this feedback to achieve a final product of a higher standard for their clients.

Students are required to submit their sites for online peer review prior to finalising their assignments and handing over the websites to their allocated clients. Students are asked to use the assignment marking criteria to guide them in their peer reviews and are also invited to post up their own preferred testing proformas for their reviewers to use when reviewing their sites. Each student is required to review at least one other student site, but are encouraged to review as many of their peer's sites as they wish. The course coordinator also participates in the peer review process, but does not post up reviews on students' sites until each student has received feedback from their peers. Students are free to engage in asynchronous online discussion with their reviewer and other students to clarify or challenge any comments they receive through the peer review process. The feedback provided by students and coordinator is qualitative; no marks are allocated during the peer review process. Students are allowed one week from the time they receive the last of the peer review feedback to make any changes they wish to their websites prior to final marking of their assignments by their tutors.

Tutors monitor the discussion forum throughout the peer review process, and note the feedback that has been provided by students and coordinator, and use the feedback as a guide when they finalise the marking of assignments and allocate grades.

Computer Assisted Feedback and Assessment System used for summative assessment

In 2006, a new approach to summative assessment involving a computer assisted feedback and assessment system (CAFAS) was trialled in EPI. CAFAS enables academic staff to efficiently and consistently provide developmental, diagnostic and summative feedback and assessment to students via online methods (for example, email or website). The current embodiment of the CAFAS prototype trialled in EPI is designed to enable staff to document feedback/assessment via the following eight interrelated mechanisms:

#	Name of Feedback/Assessment Mechanism	Description of Mechanism
1	'Performance Continuum' for each assessment criterion	Formative feedback which indicates the general performance for each assessment criterion.
2	'Comments' field for each assessment criterion and for 'Deliverables' and 'Grade Penalties' checklists	Formative feedback comments which specifically addresses particular assessment criteria.
3	'Summary Comments' field	Formative feedback comment which sums up the overall performance in the assignment.
4	Overall grade	Summative assessment which reports the overall grade for the assignment.
5	Assessment Criterion Descriptor field	Explanation of the scope and standards for each assessment criterion.
6	Performance Indicators graph (with editable descriptor fields)	Formative feedback addressing generic performance indicators.
7	List of Grade Descriptors (with editable descriptor fields)	Explanation of the basic requirements for each type of grade.
8	'Class Feedback' sheet	Formative feedback aimed at the whole class.

Following trials of CAFAS in several undergraduate courses in 2006 (including EPI), Freney and Wood (2006) reported on the positive responses received from students about the online delivery of feedback via CAFAS. The responses were obtained via an anonymous, end of course online survey.

In response to the question *"Digital Feedback and Assessment Sheets were emailed to you (PDF file) for each assessment. What are the benefits/disadvantages of this new system for providing feedback and calculating assessment?"* students commented on:
- the convenience of receiving feedback in an accessible electronic format (*"Convenience — I can receive them at home instead of going to Uni."*);
- the value of an assessment approach in which the criteria and marking scheme is made explicit ("*can see exactly where you lost marks, which is helpful to know what you need to improve on"*);
- the benefit of receiving feedback that could help them to improve on identified areas of weakness (*"this was very beneficial and excellent feedback! Just having a single comment and a score isn't very helpful, but having this digital feedback explains every*

assessment criteria, as well as percentage weightings, the grade and comments. This feedback should be kept this way"; "this was genuinely useful in seeing where criteria was and wasn't met and what to improve or look out for in future assessments");

- the time and effort teaching staff put into the assessment process (*"it was fantastic to receive such comprehensive feedback. Since I spent a lot of time on ensuring my assignments were at a high standard, it was nice to know that course staff made the effort to undertake a detailed review of my assignments and provide valuable feedback"*).

The CAFAS format was made available to students during the peer review process but was not used by the coordinator when providing feedback prior to final summative marking in the first trials of the system in semester 1 of 2006. The coordinator nominated to use CAFAS in subsequent trials in semester 2, for both formative and summative assessment, after noting that the feedback she provided to students without the aid of the criterion-based system was lacking in the detail students would require to act on all of the identified areas of weakness in their assignments.

Reflecting on the experience

EPI is offered three times a year both locally and transnationally in Singapore and Hong Kong. The following reflections relate to the experience of introducing the peer review process to onshore students. Over the two year period since the peer review process was first introduced, six cohorts of students have completed EPI within their program. While enrolment numbers vary from one semester to another, approximately 65-70 students enrol in each offering, with a total of 360 students participating in the peer review process since the commencement of the approach in 2005.

Local students have responded positively to the peer review process as reflected by the numerous postings to the peer review forum, the willingness of students to peer review several sites additional to the site they were assigned to review, and the number of students who elect to make changes to their final assignments prior to marking. Students have commented on the value of also receiving feedback from the course coordinator, with only one negative comment being posted about the time taken for the coordinator to post up their reviews. Several students posted comments reflecting an increased understanding of the difficulties faced by tutors in marking assignments, and the workload associated with providing detailed assignment feedback. There were very few negative comments posted about the quality or appropriateness of peer feedback in that time, however one student completing the course in the second semester of 2006 was highly critical of the coordinator's comments, indicating that at least one student had gained sufficient confidence to challenge the feedback he received and to express his opinions openly.

Students participating in the peer review process commented on:
- the benefits of being able to review their peers' assignments and to reflect on their own work;
- the value in comparing their work against the assignments of other students and to improve on their work prior to final marking; and
- the communication process which facilitated collaboration among peers.

Only one student commented on the lack of feedback he/she received from peers, expressing a degree of frustration that only three students reviewed his/her site even though he/she had reviewed more than 50% of students' sites.

EPI is also offered transnationally in Singapore and in Hong Kong. In late 2005, the peer review process was trialled with a cohort of 35 students completing the course in Singapore. The implementation varied slightly in that students were given the option to participate in peer review if they wished. Consistent with the observations of Nguyen, Terlouw and Pilot (2006) who caution against importing curriculum approaches from the West without sufficient attention being paid to the cultural differences of Asian Confucian Heritage Cultures, only two out of the thirty-five students participated in the peer review process by posting up their sites for review, and only one student provided peer feedback. Comments made by students in the evaluation questionnaire at the completion of the course indicated that most felt uncomfortable about the notion of peer review since it was not "their way" to publicly criticise their peers. Nguyen, Terlouw and Pilot (2006) offer several strategies that can overcome some of the concerns raised by students about collaborative group work and peer assessment in an Asian context, and it is evident from this experience, that significant changes would be required to the approach prior to implementation in Singapore in the future.

The scholarship of teaching and learning

The Boyer notion of scholarship is a framework for considering academic work that can be applied to teaching and learning within universities. Boyer identified four scholarships – discovery, teaching and learning, integration and application (Boyer, 1990). His approach is predicated on an understanding of the communal basis of all scholarly activity: that scholarship by its very nature is a public rather than private activity; that it is open to critique and evaluation by others; and that a field of study is progressed through the scholarly activity of building new ideas which are then open to the same processes of public scrutiny. All of the scholarships are exposed to the same rigorous approaches of peer review as a way of gaining quality, transparency and accountability (Shulman, 2002). Central to this notion of the scholarship of teaching and learning is that of the "learning community". One way to support and stimulate this kind of collegial activity is to provide structured opportunities for discussion and reflection (Boyer, 1990; Schön, 1983). While the term "learning community" is normally applied to a community of academic staff, the approach described in this paper suggests that students play an integral role together with the teacher as the "expert reviewer". Through the process of self, peer and collaborative assessment and by employing a combination of formative and summative approaches, both teacher and student are required to discuss, critique, and reflect on student work, the appropriateness of the assessment approach, and the feedback provided.

Conclusions

By temporarily divorcing feedback from assessment, students seem to feel less threatened by critical comments about their work and are more able to understand how to improve. Given the opportunity to improve their work and the chance to review and critique others' work, students are better able to integrate new knowledge and implement it successfully in subsequent revisions. When a summative assessment is finally made, students are more accepting of the outcome due to their better understanding of the standards required and because they have had the opportunity to improve their work.

The extended "learning community" ensures that students are an integral part of the feedback process rather than being passive recipients. This develops a higher level of cooperation between all members of the learning community. Ultimately students are more likely to

reflect upon and implement advice arising from this communal feedback process: for what good is feedback if it is ignored?

Further trials need to be conducted involving more rigorous evaluation processes to quantify the extent to which this model achieves the desired long term learning goals and can be successfully applied in a variety of educational contexts.

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