

Guide to Student Peer Review

*An instructor's manual for incorporating
peer review into tertiary courses*

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Chapter One: An introduction to student peer review

What is peer review?

Student peer review involves students giving and receiving feedback on each other's work, thereby providing the opportunity for students to further improve upon work prior to final assessment. Peer review involves a shift away from the traditional notion of assessment and feedback being the responsibility of the instructor, and encourages students to take an active role in their learning.

Peer review can be used in various forms and has broad applications. Peer review can be incorporated into a range of assignment types such as essays, reports, website designs, oral presentations and performances. Examples of disciplines that have incorporated peer review include: engineering (p. 11), information systems (p. 12), music (p.13), science communication (p. 14), veterinary science (p. 15) and zoology (p. 16). In addition, the development of online tools, such as PRAZE makes the administration of peer review simple and easy (p. 17).

What are the benefits?

There are many benefits to both students and teaching staff by incorporating peer review into courses/subjects. These benefits are documented in the literature, but are also clear from student comments:

- Students receive **prompt** and **detailed feedback** which they can take on board before submitting assignments (Topping *et al.* 2000; Liu & Carless 2006; Rubin 2006).

“ *It's refreshing to get thorough feedback which you can actually use to improve your work and hopefully your mark, rather than just a mark and perhaps a brief comment...* ”

- Development of **critical thinking** and **problem solving skills** (Somervell 1993; Topping 1998; Dochy, Segers & Sluijsmans 1999; Liu & Carless 2006).

“ *I think it helps you think more about your own writing when evaluating someone else's...* ”

- Engagement with the assessment criteria, which **reinforces knowledge** and **understanding of subject** (Topping 1998; Liu & Carless 2006; Hounsell *et al.* 2008).

“ *Seeing other students' work and working through assessment criteria was very useful...* ”

- Students are exposed to a greater **diversity of perspectives** (Hansen & Liu 2005; Lundstrom & Baker 2009).

“ *It was interesting to see the different perspectives that people had on the topics. Often, people chose to focus on different things that I would have if I had been writing the article, but it was no less right – just different...* ”

- Development of a **collaborative** and **participatory learning environment** (Cheng & Warren 1997; Fallows & Chandramohan 2001).

- Promotion of **independent learning** and **improved self-confidence** (Brindley & Scoffield 1998; Topping *et al.* 2000; Nicol & Macfarlane-Dick 2006).

“ At first I wasn't sure I would be able to find anything to critique when I was writing my reviews, but when I started reviewing I was surprised that there were lots of things that I could comment on, both positive and negative...

- Development of **social and communication skills** such as: **negotiation** and **diplomacy**; **verbal/written communication**; and **giving/accepting criticism** (Topping *et al.* 2000; Gehringer 2001; Hansen & Liu 2005; Lundstrom & Baker 2009).

“ Peer review really encourages a better understanding of how to write a piece well, by assessing the good and not so good aspects of other pieces...

- Student **work is improved** through self-reflection and incorporation of comments/suggestions made by peers (Paulus 1999; Van Den Berg, Admiraal & Pilot 2006; Cho & MacArthur 2010; Mei & Yuan 2010).

“ Seeing another high quality draft helped steer me in the right direction because it made me think critically about my own concepts and ideas...

How to use this guide

This guide is designed for teaching staff interested in implementing peer review into their course or subject. The guide introduces readers to the concept of peer review by detailing:

- The **mechanics of peer review** (p. 5) – including guidelines for planning how to incorporate peer review; training students; designing review and feedback forms; and common issues and pitfalls
- **Case studies** (p. 11) describing the use of peer review in a range of disciplines.
- A range of **resources** (p. 17) including information about online peer review tools such as PRAZE; examples review and feedback forms, and student questionnaires; as well as other online resources and literary publications.

This guide is not intended to be read cover to cover; rather it is designed to be used as a reference guide for instructors thinking about using student peer review. The student and staff comments included in this guide are sourced from feedback surveys following experience with peer review.

Chapter Two: The mechanics of peer review

How does it work?

There are a number of variations on how peer review can be used; however the basic process is as follows:

- 1) Students submit work to be reviewed
- 2) The submitted work is anonymously distributed
- 3) Students review other students' work
- 4) Students receive reviews of their own work
- 5) Students use these reviews to reflect on and improve their work

This is the most basic form of student peer review and there are additional factors that can be incorporated to make the process a more effective learning experience. These are discussed in the following pages.

Planning

Careful planning will help to ensure peer review is an effective learning process. When incorporating peer review into your course or subject, there are several key factors that need to be considered prior to beginning the process:

➤ **Distribution of work**

How will student work be distributed? If there are only a small number of students the distribution may be done manually; for larger classes you may want to consider using one of the peer review tools available, such as PRAZE (p.17). These tools handle a lot of the administration associated with implementing peer review, thereby reducing instructor workload. It may also be important to consider whether you are happy for the distribution to be random or wish to include "distribution rules" (i.e. students working in groups must review work from a different group).

➤ **Reviewer identity**

Who will be undertaking the reviews? The inclusion of 'expert' reviews (written by instructors/tutors) in addition to student reviews can be an effective way of reducing review variation and allaying student concerns about receiving poor quality reviews. However, in classes with large enrolments, this can increase instructor workload substantially.

“ It was good to hear the comments made by my fellow peers regarding the paper I wrote, however I feel that it would be more useful to hear comments made from the lecturer because they are the expert...”

➤ **Number of reviewers**

How many reviews will each student write and receive? Increasing the number of reviews each student receives is likely to increase the overall level of review reliability and allow authors to learn by comparing multiple opinions. Research suggests that the number of reviewers can affect the improvements made to students' work, with students that receive multiple reviews making the greatest improvement to their work (Cho & MacArthur 2010). Cho, Schunn and Wilson (2006) have also shown that the reliability of individual student reviewers tends to be modest and is lower than that of instructors, whereas a collection of four to six peers produce very high levels of reliability. As

a general rule of thumb, instructors should consider a minimum of two to three reviewers per assignment, and ideally more.

➤ **Student training**

How will the students be prepared for peer review? Many students have never participated in any kind of academic peer review before, and therefore advice and training in reviewing are critically important forms of support that should accompany peer review assignments. Training can help students gain a better understanding of what is expected from them, and improve the quality of reviews they write. More advice about training students is available below (p. 7).

➤ **Reviewer feedback**

Will there be an opportunity for authors to provide feedback on the quality of the reviews they received? Once student authors receive their reviews, it can be valuable for them to provide feedback to the reviewers on the quality and usefulness of the review. Such feedback may be provided via a structured feedback form incorporating key criteria such as clarity, helpfulness and balance (example on p. 19). Alternatively, students could write a “Letter to the Editor”-style response justifying which reviewer comments were incorporated or dismissed.

➤ **Time management**

How much time will be allocated for each step of the review process? It is important to provide enough time for the students to provide adequate feedback, and then receive their reviews and make changes to the assignment before final submission. The time allocated to writing reviews will be dependent on: (a) number of reviews to write; and (b) level of detail required.

“ It was a lot of work and I don't feel that the time allocated for all reviews to be completed was fair – everything felt too rushed...”

Example: In a 12-week semester, the timeline for an assignment in which students write two peer reviews and are required to spend approximately two hours on each review, may look like this:

- Week 2: Introduce assignment
- Week 6: Draft assignment due
- Week 7: Reviews due
- Week 8: Final assignment due

➤ **Grading**

Will any stage of the review process be assessed? There are several ways in which grading can be involved in the process. However it should be emphasised that peer review is designed to be a *formative* process focussed on learning rather than assessment. There are two main ways that grading can be incorporated into the peer review process. The first is to have students grade the drafts they are reviewing. This grade can be reviewed by the instructor, and contribute to the final grade for the assignment. The second way is to have student authors grade each reviewer on the quality of their review according to certain criteria (example on p. 19).

The advantages of including grading in the review process are that it can partially reduce instructor marking load, and it can motivate students to participate more actively in the process (Hanrahan & Isaacs 2001; Rubin 2006). The disadvantages are that students can feel as though there is a lack of standardised marking, or that they may experience excessively harsh marking. If you do decide to include grading in the process, it is advisable to address this issue through revision and moderation of marks where appropriate.

“ I think the marks allocated were fair and definitely provided an incentive to upload a draft.

Of course, grading of reviews can also be carried out by the teaching staff instead of by the students. This encourages students to put effort into their reviews and can be a relatively light-weight task. The varied case studies (p. 11) provide examples of ways in which grading can be incorporated into peer review.

➤ Student feedback

Will any feedback be sought from students about their perceptions of the review process? It may be beneficial to solicit students about their expectations and experiences of peer review. This can be done informally through verbal feedback from students in class, or more formally through questionnaires or interviews. Feedback from students can be used to tailor the peer review process more effectively to your subject area and improve the student learning experience.

Examples of such questionnaires are available on page 19.

“ *Doing peer review was more interesting than just doing an assignment and handing it in. It was more interactive and allowed us to get a perspective on other students' work and aided in learning the ideas of other topics indirectly...*

Student training

Most students will have limited experience of academic peer review, and therefore it is critical to provide support in the form of advice and training when conducting peer review assignments (Sluijsmans 2002; Hansen & Liu 2005; Rubin 2006). Running a tutorial or information session can be useful way of introducing the general concept of peer review and conducting a discussion on how to write effective reviews as well as how to interpret and reflect on reviews. Ideally, this information session should cover:

- An outline of what peer review entails and the benefits of participating
- Details of how peer review works, and how it will be undertaken (assignment type; timeline; use of online tools etc.)
- Guidelines for writing reviews
 - How to give helpful, balanced and constructive feedback
 - Examples of helpful and unhelpful feedback
 - Workshop examples of high and poor quality reviews
- Guidelines for receiving reviews
 - Managing emotional responses
 - Dealing with reviewers who disagree
- Responding to reviewers (if this step is to be included): how to judge a good review

Additional resources such as student handouts may also be beneficial. A student handout and a tutorial template is available from: <http://peerreview.cis.unimelb.edu.au/teaching-resources>

Designing review forms

Providing clear and detailed criteria and guidelines for reviewing can lessen students' uncertainty about the peer review process. One of the most effective ways of providing these guidelines is to supply students with a **structured review form** which they can use to construct their review.

Students sometimes express concern that they don't know what to comment on when writing a review. Using structured review forms provides reviewers with cues to the issues that need to be addressed and gives guidance on what to focus on when reviewing peers' work. It also reminds students of the assessment criteria, which can encourage them to think more critically about their own work.

“It made me think of the task questions and how appropriately I had actually answered my questions...”

Review forms can be structured to include items requiring reviewers to:

- Answer Yes/No questions
- Rank elements along a Likert scale
- Indicate the presence or absence of certain information using checkboxes
- Provide feedback in an open format such as text box

Structured review forms can also help the author judge the value and authority of the reviewer's comments. For example, a review form question such as “Justify your earlier comments by referring to principles developed during the subject” will hopefully prompt a justification that may help the recipient judge whether or not the reviewer shows insight into the topic. An example of a structured review form is available on page 18, and further examples from different disciplines are available from: <http://peerreview.cis.unimelb.edu.au/teaching-resources>

Common issues & pitfalls

There are a number of practical and potential impediments to the successful implementation of student peer review. These factors need to be considered to ensure students achieve the intended learning benefits of engaging in peer review.

➤ **Student perceptions**

There are several potential concerns that students may have with the peer review process and it is important to be aware of these issues, and tailor the process to suit your student cohort.

Some students may dislike the process of evaluating other students' work as they see assessment as the teacher's responsibility (Brindley & Scofield 1998; Fallows & Chandramohan 2001; Biggs & Tang 2007). Students may also lack confidence in their ability to evaluate their peers' work or may doubt the competence of their peers (Cheng & Warren 1997; Sluijsmans 2002; Kaufman & Schunn 2011). However, this perception can change after experiencing peer review (Moore & Teather 2013), and it is suggested that this can be partially overcome through the provision of guidelines and training for reviewers (Fallows & Chandramohan 2001). Students may feel that peer review is time-consuming and this cost outweighs any potential learning benefits (Topping *et al.* 2000; Hanrahan & Isaacs 2001):

“I found it really lengthened out the assessment until I lost interest in my own work...”

This may result in a lack of motivation and investment by students, particularly if grading is not part of the process. Low student motivation can result in reviewers producing poor quality reviews, as well as authors not taking feedback seriously (Hanrahan & Isaacs 2001). Peer review will only work as intended if all participants are engaged in the process. Levels of student motivation will vary between classes, but the inclusion of grading at some point in the process may help to increase student motivation (see p. 6).

➤ **Review quality variation**

A common issue with peer review is the variation in quality of reviews received. This variation is likely due to either a lack of skill and experience, or a lack of motivation. The former can be partially overcome through adequate training and the provision of structured review forms to ensure the review is focused on the assessment criteria. Incorporating a reward system or grading element into the process may help to overcome variation caused by a lack of motivation.

“ *The reviews on my work helped however they were a bit confusing as they all said different things. One review would say something is good but another would say that it needs a lot of work, so it made it harder to pin point exactly what was wrong with my article...*

Increasing the number or diversity of reviewers involved in reviewing a piece of work will help to give students a better perspective on the quality of reviews received (see p. 5).

Variation in review quality may result in a mismatch between the feedback received from peers and the final marks awarded by the instructor, causing student dissatisfaction. This can sometimes occur when student authors expect a higher skill level from reviewers than what has actually been attained. While this can be partially overcome through more extensive training and experience, it is also important to highlight to students that it is unwise to interpret peer reviews as accurate predictors of their final mark from the instructor and the opinions of peer reviewers are always potentially limited. Peer review is a good exercise in gaining skills in judging opinions of others.

➤ **Time constraints**

Setting up a peer review system can be relatively time-consuming. The organisational and administrative load can be substantial, particularly in large classes. Using an online tool can help alleviate some of this load, particularly after the initial set-up. More details about online tools can be found on page 17.

“ *Administering peer review across a large class is a lot of work. It isn't necessarily a time-saver compared to manually marking assignments... – Instructor*

➤ **Plagiarism**

Plagiarism is often suggested as an impediment to the success of peer review, with reviewers taking ideas or material from the work they review and incorporating it into their own. This is most likely to occur when students all work on the same topic. As such, one potential solution is to set multiple topics and allocate reviews reciprocally so no reviewer receives an assignment to review on their own topic. The online tool PRAZE has the capacity to do this (p. 17). The plagiarism detection program TurnItIn could also be used (p. 17).

Summary of key considerations

- Distribution of work – *How will student work be distributed?*
- Reviewer number – *How many reviews will each student write and receive?*
- Reviewer identity – *Who will be undertaking the reviews (i.e. will an expert review be included)?*
- Student training – *How will students be prepared for the peer review process?*
- Review form design – *How will the review form be used to structure the peer review process?*
- Reviewer feedback – *Will there be an opportunity for authors to provide feedback on the quality of the reviews they received?*
- Time management – *How much time will be allocated for each step of the review process?*
- Grading – *Will any stage of the review process be assessed?*
- Student feedback – *Will any feedback be sought from students about their expectations and perceptions of peer review?*
- Managing student expectations – *Do students have a clear understanding of what is expected from them and what to expect from the reviews they receive?*
- Review quality variation – *Has potential variation in review quality been considered?*
- Plagiarism – *Has the potential for plagiarism been minimised?*

Chapter Three: Case studies

Peer review can be adapted to a range of disciplines and assignment types. This chapter contains short examples of how academics from several different disciplines have incorporated peer review into their subjects. More information and additional case studies are available from the Student Peer Review website (<http://peerreview.cis.unimelb.edu.au/case-studies>).

Case A: Engineering

Academic staff: Gavin Buskes, Melbourne School of Engineering

University of Melbourne

Students: Undergraduates (1st Year)

Engineering Systems Design is a first-year subject in the Bachelor of Engineering and attracts approximately 700 students. The subject requires students to complete weekly entries in a reflective journal.

Aims of peer review:

- To reduce the assessment load on academic staff
- To allow students to rate contributions to group work

Process:

Students submit their reflective journals for feedback over the course of the semester and perform three reviews of other students' work. Students write the reviews according to set criteria from a review form rubric. Originally, students gave marks for the reviews, but students expressed concerns about potential corruptibility. To overcome this, students now just provide reviews and staff members conduct the marking at the end of the semester. Students receive marks for participating, and writing reviews.

In a separate assignment, students rate individual contributions to group work from themselves and other group members three times during the semester. These ratings must be justified by the student and are used to scale the final project mark.

Student perceptions:

Peer review is popular with the students, as it provides extra feedback for their work and they feel there were mechanisms in place to ensure every team member was contributing to group assignments.

Lessons learned:

- Peer review is a valuable tool because it can teach students skills, such as teamwork and reflection, which can be hard to integrate into other Engineering subjects.
- Using group self-assessment can be helpful in giving students an opportunity to express concerns about group dynamics and contributions. In this subject there was a large reduction in the number of complaints about group work when group self-assessment was introduced.
- Using an online tool (i.e. PRAZE) makes the administration of peer review much easier.

Case B: Information Systems

Academic staff: Jon Pearce, Department of Information Systems

University of Melbourne

Students: Undergraduates (2nd Year)

Multimedia and Communications is a second-year subject in which students work in small groups to develop a website, with the aim of improving science communication through the use of multimedia.

Aims of peer review:

- To provide students with formative feedback during the web design process
- To provide feedback on each student's contribution to the group

Process:

Student groups prepare their websites and submit the URLs, which are distributed to four or five other students from different groups. In addition, each website is reviewed by an instructor, resulting in each group receiving five of six anonymous reviews, including one (unidentified) review from a staff member. The review process is guided by an extensive online questionnaire and a standard website usability checklist. The comments in the reviews help students to identify bugs and design issues, and correct them before final submission of their website.

Students are also asked to peer assess the performance of each member of the group (including themselves), and this is used to modify the mark that each individual earns for their project. Prior to the review process, students receive one tutorial session devoted to discussing peer review and giving examples to guide students through the process.

Student perceptions:

In an end-of-semester survey (with approximately 50% response), all students stated that the comments they received in the peer reviews were 'helpful'. About one half of the respondents considered that the peer review process actually helped to improve the quality of their website, while about one quarter did not. Students did appreciate that the comments they received came from a 'real user' rather than a lecturer, and felt that the structured review form helped to identify specific aspects of their work that they could improve. Only two or three students expressed concern about the fairness of other students contributing to the assessment of their work.

Lessons learned:

- Peer review can be used as part of a *design* process rather than a *writing* process.
- Students are able to see examples of the work of others, which highlights issues in their own design and receive multiple pieces of feedback
- Some students expressed concerns about fairness or potential to manipulate the system, but the anonymity of the system and the fact that each mark was an average of five or six independent reviews suggest this is not a significant issue
- Group peer self-assessment is a valuable way of adjusting marks in cases where groups decided that there was significant unevenness in their contributions

Case C: Music

Academic staff: Melanie Plesch, Melbourne Conservatorium of Music
University of Melbourne
Students: Undergraduates (1st Year)

The subject *Medieval and Early Modern Music* is a first-year core subject in the Bachelor of Music, with over 140 students. Students work on a research- and performance-based group project consisting of two written assignments and a performance.

Aims of peer review:

- To produce a combined mark for different group assignments
- To allow students to rate individual contribution to group work, and help prevent unfairness from one student riding on the work of others

Process:

The first assignment is a topic proposal for a performance, and requires students to identify a theme they intend to focus on. The second assignment requires the students to draft the entire script of the presentation, and the final assessment is an actual performance. Peer review is performed during each of these assignments, and is used to assess the students. 60% of a student's mark is based on the mark for the actual product, and the remaining 40% is based on what their peers give them for their contributions to the project.

Student perceptions:

Students invariably comment favourably on the peer review exercise, and feel that it prevents other students from taking a 'free ride': "*I was grateful for the peer review function, because I worked very hard and it was assuring to know I would be fairly assessed compared to others who didn't put any effort in*". Students are generally very fair and compassionate markers and also self-critical and honest in their self-assessment.

Lessons learned:

- It is important to start early to ensure any online tools that you are using are running smoothly prior to the beginning of the review period.
- Student cohorts are always changing and it is important to be constantly revising the subject to accommodate their strengths and weaknesses.
- Providing a framework with clear guidance on expectations will help to keep students focused on the review task and ensure they know what is expected from them.

Case D: Science Communication

Academic staff: Jenny Martin, Faculty of Science

University of Melbourne

Students: Undergraduates (2nd Year) & Postgraduate (Masters)

The *Communicating Science and Technology* (undergraduate) and *Science Communication* (postgraduate) subjects aim to teach students to communicate effectively about science and technology. Students are assigned the task of writing the same scientific story for three different audiences: scientific journal readers; local newspaper readers; and primary school teachers.

Aims of peer review:

- To give the students the opportunity to redraft their work prior to assessment on the basis of feedback from someone other than the instructor
- To give students the opportunity to gain experience in giving constructive feedback

Process:

In both undergraduate and postgraduate subjects, students submit three versions of the same scientific story written for different audiences. These assignments are then anonymously distributed to two different student reviewers, meaning each student receives two reviews of their work. The review process is guided by a structured review form. No part of the review process is assessed – peer review was used as a purely formative process.

Student perceptions:

Almost all the students find peer review to be useful to some degree and are happy to have the opportunity to improve their writing before submission. Some are frustrated that the comments from their peers are different from the feedback they received from the instructor during final assessment.

Lessons learned:

- Be cautious of whether it is important to set rules about which students review each others' work. For example, it is beneficial not to have two non-native English speaking students reviewing each other's work.
- It is important to manage student expectations, and reiterate that reviewers vary in quality and may provide feedback that is different from instructors.

Case E: Veterinary Science

Academic staff: Angus Campbell, Faculty of Veterinary Science

University of Melbourne

Students: Undergraduates (3rd Year)

The subject *Small Ruminants* in the third year of the Bachelor of Veterinary Science covers medicine and surgery of sheep, goats, alpaca and deer. Students are required to develop an imaginary scenario presenting a disease problem in one of these species.

Aims of peer review:

- To engage students in processes of critical thinking, both as creators of material and as reviewers of someone else's material
- To use a method of assessment that helps make the marking process more efficient

Process:

Students write their imaginary disease scenarios, which are reviewed by one other student based on criteria such as realism and clarity. This same reviewer then conducts a 'virtual disease investigation' which involves answering a series of questions about their diagnosis of the disease in the scenario. The answers to this investigation are returned to the original student author for them to provide feedback to the investigator on whether they have correctly diagnosed the disease. The peer review assignment is worth 15% of a year-long subject. These marks are determined by the peers, with moderation from the instructor where necessary.

Student perceptions:

Generally, students give very good feedback about the peer review process. A few students have specifically stated they didn't like peer review, although some went on to acknowledge that this was just a personal preference. Underlying reasons for dissatisfaction seem to be associated with feeling like there was a lack of standardised marking or excessively harsh marking from peers, even though this is addressed by academic staff by reviewing and moderating marks where appropriate.

Lessons learned:

- Peer review can be used as a learning tool (i.e. students were learning from investigating the diseases) as well as a reviewing tool.
- Students enjoy and benefit from peer review, and it allows students to examine a topic from a different perspective.
- Administering peer review across a large class can be relatively time-consuming.

Case F: Zoology

Academic staff: Raoul Mulder and Mark Elgar, Department of Zoology

University of Melbourne

Students: Undergraduates (3rd Year)

Experimental Animal Behaviour is a third year Zoology subject which consists of students working in small groups to conduct an experiment into an aspect of animal behaviour under the supervision of a supervisor. Students analyse the results of their experiments and then individually prepare and submit a scientific report.

Aims of peer review:

- To help students improve the quality of their report before final submission
- To introduce students to the type of peer review that takes place for journal article publications in science

Process:

After groups complete their research, each student uploads their individual draft report (which is not graded) for distribution to three reviewers: two student reviewers from different groups, and the group's tutor. Thus, each student writes two reviews and receives three (anonymous) reports on their own work. Reviews are guided by specific review questions which are aligned with the assessment criteria. Report authors use the reviews to improve their final submission, and write a 'letter to the Editor' in which they detail how they have dealt with the reviewers' comments. Students' final reports are assessed together with their 'letter to the Editor'. Students are also assessed on the quality of their reviews by the review recipients (10%).

Prior to the review process, students participate in a 2-hour tutorial session which covers the peer review process generally, and then gives more detailed descriptions of issues to consider when writing a review.

Student perceptions:

Students respond very positively to the peer review process. A survey (approximately 80% response rate) showed that the majority of students believed the review process had helped them to improve the quality of their final submission. This was supported by written feedback comments such as "*Reviews were a great help*" and "*Reviews were a very good aspect of this subject*". Some students expressed concern about the perceived variability in quality of reviews and some students also commented that writing the reviews was a lot of work.

Lessons learned:

- In order to overcome students' concerns about variability in quality of reviews, it may be possible to increase the number of reviews each student receives. Including a tutor as one of the anonymous reviewers also helps to overcome these concerns.
- Ensuring that review forms are structured around assessment criteria is a useful way of reinforcing and reminding students of what the assessment criteria are.
- Including a feedback mechanism allows students to give feedback to reviewers on the quality of their reviews.
- Including assignment topics and ensuring students do not review their own topic will help prevent plagiarism.

Chapter Four: Online tools and resources

Online tools

The learning benefits of peer review are well documented (e.g. Sluijsmans 2002; Liu & Carless 2006; Cho & Schunn 2007; Lundstrom & Baker 2009). However, administering anonymous peer review without the aid of custom-designed software can be challenging and time-consuming, particularly with large class sizes, and can impede the wider adoption of peer review as a pedagogical tool. Online tools offer a potential solution to this problem by automating all or part of the peer review process.

There are several online tools available that vary widely in their capabilities and degree to which they can be customised to suit different needs. Several of the most widely used online peer review tools are listed here, and reviewed in Pearce, Mulder and Baik (2009):

- **CPR** (Calibrated Peer Review, Russell 2004)
<http://cpr.molsci.ucla.edu/Home.aspx>
- **PeerMark** (works in conjunction with TurnItIn)
http://turnitin.com/en_us/products/peermark
- **PRAZE** (Peer Review from A to Z for Education, Mulder & Pearce 2007) - discussed in detail below
<http://www.lms.unimelb.edu.au/teaching/assessment/praze/>
- **SPA in Blackboard** (Self and peer assessment)
<http://www.blackboard.com>
- **SWoRD** (Scaffolded Writing and Reviewing in the Discipline, Cho & Schunn 2007))
<http://www.pantherlearning.com/blog/>

More information on these and other online tools is available from:

<http://peerreview.cis.unimelb.edu.au/tools>

About PRAZE

PRAZE (Peer Review from A to Z for Education) is an intuitive online system that facilitates flexible management of all aspects of peer review (Mulder & Pearce 2007). The many features of PRAZE make it flexible and versatile, as well as simple and easy to use. Instructors can set up, customise and manage a peer review process within a subject, allowing students to then anonymously review each others' work, and send and receive feedback. PRAZE also has the capacity for recipients to give feedback on the quality of the reviews they have received and enables the involvement of both peers and instructors in the review process. In principle, there is no limit to what assignment type can be reviewed. Instructors can create their own structured review form, or select one from the extensive library.

Groups and topics can be incorporated into the structure of the peer review process, allowing distribution rules to be set for the reviewing process (e.g. to mandate or eliminate the possibility of reciprocal review among group members). This helps to minimise plagiarism and potential issues associated with students reviewing work on the same topic to their own. PRAZE also has a group assessment capability which allows students to rate group members (including themselves) on their contribution to group work.

PRAZE can be accessed by instructors outside the University of Melbourne by registering for use at: www.lms.unimelb.edu.au/teaching/assessment/praze

Teaching resources

This section contains examples of a structured review form, reviewer feedback form and a questionnaire designed to gather feedback on student perceptions of peer review. Further review form examples, teaching resources and links to online resources are available from:

<http://peerreview.cis.unimelb.edu.au/teaching-resources>

➤ **Structured review form example**

Assignment: Students were assigned the task of producing a succinct account of a recent publication in the style of a 'News & Views' piece for the journal *Nature*. These assignments were then distributed anonymously, and each student reviewed three peer assignments using the structured review form below.

Review form:

Overall:

1. What do you think are the main strengths of this News and Views article?
2. What are your main suggestions for improvement to this article?
3. Did you feel that the article had good flow and structure? Was it easy to follow the author's train of thought from one paragraph to the next?
4. Has the article been carefully proofread - is it free of grammatical and typographical errors?
5. Is the balance between the different sections about right? Or has too much space perhaps been allocated to one section (e.g. background) at the expense of another (e.g. results)?

Structure:

1. Was the title short, informative and catchy?
Yes/No
Comments/justification
2. Does the 3-line summary adequately relay the essentials of the study (problem - solution - wider implications)?
Yes/No
Comments/justification
3. Is the problem clearly stated? Does it agree with your own understanding, from reading the paper?
Yes/No
Comments/justification
4. As a reader, did you feel that enough background information was provided to allow you to understand the study's key outcomes?
Yes/No
Comments/justification
5. Have the key results of the study been outlined? Is all the information necessary?
Yes/No
Comments/justification
6. Has the author made an attempt to critically appraise an aspect of the study?
Yes/No
Comments/justification
7. Is the importance of the study placed into perspective?
Yes/No
Comments/justification

➤ **Feedback form example**

1. This review helped me improve my News and Views article
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
2. This review was:
 - a) **Balanced:** it highlighted both strengths, and areas for improvement
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
 - b) **Insightful:** the review pointed out things I hadn't thought of myself
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
 - c) **Helpful:** it contain specific suggestions that I will be able to implement
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
 - d) **Authoritative:** the review had read the literature and knew their stuff
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
 - e) **Clear:** the review was well-written and easy to understand
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
3. I would take the opportunity to participate in peer review again
Yes/No
Comments/Justification

➤ **Questionnaire example**

Pre-review survey questions:

1. Have you had any previous experiences critically reviewing the work of peers (fellow students) in your University studies?
Yes – a few times / Just once / No / Not sure
2. As a learning tool, I expect that peer review will be:
Very useful / Useful / No opinion / Not very useful / Useless
3. I expect I will learn most from:
Writing reviews of the work of other students / Receiving reviews of my own work / Equal value from writing & receiving reviews / Not sure
4. I think my peers are well-qualified to provide me with critical feedback on my own work
Strongly agree / Agree / No opinion / Disagree / Strongly disagree
5. Please list any concerns you may have about the peer review process.

Post-review survey questions:

1. What is the year of your study at University X?
2. As a learning tool, I found the peer review process to be:
Very useful / Useful / No opinion / Not very useful / Useless
3. I found that I learned most from:
Writing reviews of the work of other students / Receiving reviews of my own work / Equal value from writing & receiving reviews / Not sure
4. I think my peers did a good job of providing me with critical feedback on my own work
Strongly agree / Agree / No opinion / Disagree / Strongly disagree
5. I think that I improved my written work as a result of the reviews that I received or wrote
Strongly agree / Agree / No opinion / Disagree /Strongly disagree
6. Please list any comments you may have about the peer review process.

References

Biggs, J. & Tang, C. (2007) Teaching for quality learning at university, 3rd edition. Open University Press, Berkshire.

This book provides an introduction to university teaching, giving practical advice to academics who want to improve their students' learning.

Brindley, C. & Scoffield, S. (1998) Peer assessment in undergraduate programmes. *Teaching in Higher Education*, 3, 79-90.

In this paper, Brindley & Scoffield describe the positive and negative responses of students exposed to peer assessment. Some students felt the process motivated them to engage with the assessment process, while others felt that assessment should be entirely the tutor's responsibility.

Cheng, W. & Warren, M. (1997) Having second thoughts: Student perceptions before and after a peer assessment exercise. *Studies in Higher Education*, 22, 233-239.

This paper describes student attitudes to peer assessment before and after involvement, and focuses on discussing the negative responses and the reasons behind them.

Cho, K., Schunn, C.D. & Wilson, R.W. (2006) Validity and reliability of scaffolded peer assessment of writing from instructor and student perspectives. *Journal of Educational Psychology*, 98, 891-901.

This paper examines the validity and reliability of peer-generated grades. Results suggest that combined ratings of four peers on a piece of writing are highly reliable, and as valid as instructor ratings.

Cho, K. & Schunn, C.D. (2007). Scaffolded writing and rewriting in the discipline: a web-based reciprocal peer review system. *Computers and Education* 48, 409--426.

This study focuses on the effects of giving feedback and whether students writing is improved through student peer review.

Cho, K. & MacArthur, C. (2010) Student revision with peer and expert reviewing. *Learning and Instruction*, 20, 328-338.

This study investigated how the reviewer arrangement (single expert; single peer; multiple peers) affects the improvement made to students' work, and found that multiple reviewers resulted in the greatest work improvement. The paper includes an interesting discussion on the differences between the way experts and students approach reviewing.

Dochy, F., Segers, M. & Sluismans, D. (1999) The use of self-, peer and co-assessment in higher education: a review. *Studies in Higher Education*, 24, 331-350.

A review of the use of self- and peer assessment, including guidelines for educational practitioners.

Fallows, S. & Chandramohan, B. (2001) Multiple approaches to assessment: reflections on use of tutor, peer and self-assessment. *Teaching in Higher Education*, 6, 229-246.

This paper discusses the experiences of two academics with the introduction of both self and peer assessment into a literature module at a new UK university.

Gehringer, E.F. (2001) Electronic peer review and peer grading in computer-science courses. ACM SIGCSE Bulletin, pp. 139-143. ACM.

This paper describes one of the first projects that used the web for the entire peer review process, through the software Peer Grader, and includes suggestions for ways that peer review can be incorporated into the curriculum.

Hanrahan, S.J. & Isaacs, G. (2001) Assessing self- and peer-assessment: the students' views. *Higher Education Research & Development*, 20, 53-70.

This paper focuses on summative assessment and describes the views of a large group of students who had experienced self- and peer assessment.

Hansen, J.G. & Liu, J. (2005) Guiding principles for effective peer response. *ELT Journal: English Language Teachers Journal*, 59, 31-38.

A list of guiding principles for teacher planning and student training that are essential for implementing effective peer review, divided into "before", "during" and "after" the peer review process.

Hounsell, D., McCune, V., Hounsell, J. & Litjens, J. (2008) The quality of guidance and feedback to students. *Higher Education Research & Development*, 27, 55-67.

This paper describes a six-step framework for the peer review process that was developed based on student experiences of guidance and feedback gained through the use of questionnaires and interviews.

Kaufman, J. & Schunn, C. (2011) Students' perceptions about peer assessment for writing: their origin and impact on revision work. *Instructional Science*, 39, 387-406.

A discussion of students' negative perceptions of summative peer assessment and what factors influence these negative perceptions.

Liu, N.-F. & Carless, D. (2006) Peer feedback: the learning element of peer assessment. *Teaching in Higher Education*, 11, 279-290.

This paper emphasizes the importance of feedback in enhancing student learning, rather than simple peer assessment using grades, and recommends strategies for promoting peer feedback.

Lundstrom, K. & Baker, W. (2009) To give is better than to receive: The benefits of peer review to the reviewer's own writing. *Journal of Second Language Writing*, 18, 30-43.

This study compared the benefits of peer review to the reviewer to the student giving feedback, showing that more benefits were seen to student writing when the focus was on reviewing student work.

Mei, T. & Yuan, Q. (2010). A case study of peer feedback in a Chinese EFL writing classroom. *Chinese Journal of Applied Linguistics*, 33, 87-98.

This paper explored how much peer feedback is incorporated and whether revisions lead to improvement in student work. Results suggested that students incorporated a significant amount of feedback leading to substantially improved revised drafts.

Moore, C. & Teather, S. (2013) Engaging students in peer review: Feedback as learning. In Design, develop, evaluate: the core of the learning environment. Proceedings of the 22nd Annual Teaching Learning Forum, 7-8 February 2013. Perth: Murdoch University.

A study describing a positive change in student perceptions of peer review before and after involvement, including student comments. This paper also includes recommendations for effective engagement of students in peer review.

Mulder, R.A. & Pearce, J.M. (2007). PRAZE: innovating teaching through online peer review. ICT: Providing choices for learners and learning. Proceedings of the 24th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, pp. 727-736. Singapore.

This paper describes the development of the online peer review tool PRAZE, and discusses the issues associated with implementing online peer review.

Nicol, D.J. & Macfarlane-Dick, D. (2006) Formative assessment and self-regulated learning: a model and seven principles of good feedback practice. *Studies in Higher Education*, 31, 199-218.

This paper explores research on formative assessment and feedback to show how these processes can help students take control of their own learning.

Paulus, T.M. (1999) The effect of peer and teacher feedback on student writing. *Journal of Second Language Writing*, 8, 265-289.

This study examined the effect of feedback in an English as a Second Language classroom, and found that changes made as a result of teacher and peer feedback were more substantial than those students made on their own.

Rubin, R. (2006). The academic journal review process as a framework for student developmental peer feedback. *Journal of Management Education*, 30(2), 378-398.

This paper gives a detailed example of a peer review system including background, implementation, student reactions and potential costs and benefits of adopting the method.

Sluijsmans, D. (2002) Establishing learning effects with integrated peer assessment tasks. The Higher Education Academy, Available from: <http://78.158.56.101/archive/palatine/files/930.pdf>.

This paper provides a framework which can be used to integrate peer assessment activities into higher education courses.

Somervell, H. (1993) Issues in assessment, enterprise and higher education: The case for self-, peer and collaborative assessment. *Assessment & Evaluation in Higher Education*, 18, 221-233.

This paper highlights a need to change the assessment structure in higher education and move towards a system where the student is more involved.

Topping, K. (1998) Peer assessment between students in colleges and universities. *Review of Educational Research*, 68, 249-276.

This research investigated the effect of student peer review on writing and showed that there is a positive effect on student achievement and attitudes that are equivalent or better than the effects of teacher assessment.

Topping, K.J., Smith, E.F., Swanson, I. & Elliot, A. (2000) Formative peer assessment of academic writing between postgraduate students. *Assessment & Evaluation in Higher Education*, 25, 149-169.

This study explored the reliability and validity of formative peer review, and found that staff and peer assessors showed a similar balance between positive and negative comments, and there was little conflict between their views.

Van den Berg, I., Admiraal, W. & Pilot, A. (2006) Design principles and outcomes of peer assessment in higher education. *Studies in Higher Education*, 31, 341-356.

This paper compares several different peer review designs which were tested and evaluated with respect to learning outcomes. This information was then used to identify several features that are key to the design of effective peer review systems.