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# **PEER REVIEW IN THE CLASSROOM: THE BENEFITS OF FREE SELECTION IN A TIME-RESTRICTED SETTING**

*Research in Progress*

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## **Abstract**

*This study examines the potential of a peer review approach in the time-restricted setting of a class session. In the free selection setting we explored, students had access to all peer work and they were allowed to select which work they want to read and review. The study was conducted during the 8th week of the course, right after students' first deliverable. A total of 18 Master students were asked to provide structured feedback to their peers, using a review template. In the 2-hour period of the peer review activity, students had to review two peer deliverables: one that was randomly assigned to them and one they could choose freely from the remaining set. Result analysis showed that while half of the students followed a minimum effort strategy, reading and reviewing only two peer deliverables, the other half read several deliverables before deciding which one to review. We maintain that reviewing peer work can be beneficial for the students, offering to them multiple perspectives (i.e., those of the reviewees). As such, the suggested approach could be proven more beneficial for the students, than the widely applied paired approach, in which two students review each other's work. The study also examines the criteria students use for selecting which peer work to review and comments on the limited overhead opposed to the teacher, making the method a useful and efficient instructional tool.*

*Keywords: Free selection, Peer review, Feedback, E-learning.*

## 1 Introduction

The use of peer reviewing techniques is a widespread practice across different domains and contexts. Since numerous different designs of the peer review process can be implemented, peer review represents a highly versatile and flexible method at the teachers' disposal. The basic structure of peer review activities includes (i) the production of the initial work, (ii) the assigning of reviewers, (iii) the feedback production, and (iv) the incorporation of the feedback into the initial product in the form of revisions. Within this general structure, educators have numerous degrees of freedom to adapt the process to a specific course context. For example, the initial production and review process can be based on individual or group work; the educator can determine the (number of) review assignments or allow for a free distribution among students; the mode of feedback can be oral or written; revisions can be performed once or until a quality threshold is reached; etc.

Many studies have focused on analyzing and evaluating the impact of the method, depending on the number of reviews given/received by each student/group. The role of technology is crucial in such settings, since the increased number of reviews could otherwise pose a significant administrative overhead for the teacher. Studies on e-learning have compared single versus multiple reviews in experimental settings (Cho & Schunn, 2007), and explored the benefits of increasing the number of peer reviewers (Tsai & Liang, 2009; Tseng & Tsai, 2007). Cho & Schunn (2007) found that students receiving feedback from multiple peers improve their writing quality more than students that received feedback from only one peer. In addition, studies found that students that were asked to give more than one peer feedback to their peers showed increased levels of domain conceptual knowledge and a more positive attitude towards the learning activity than students who only gave feedback once (Papadopoulos, Lagkas, & Demetriadis, 2012, 2016).

In the current study, we examine the effectiveness of the peer review approach, and more specifically, the feedback production phase during the restricted timeframe of a typical 3-hour classroom session.

## 2 Theoretical background

Peer reviewing is associated with higher-level learning skills, such as synthesis, analysis, and evaluation (Anderson & Krathwohl, 2001) as the students have the opportunity to analyze and evaluate peer work. McConnell (2001) argued that this facilitates a constructive and collaborative learning experience, by engaging the students in active learning exercises. Based on an implementation of peer reviews into school classes, Scardamalia and Bereiter (1997) showed that higher cognitive processes can be stimulated and guided by the peer review procedure. Peer review techniques are widely used across various fields and domains, such as computer science (Liou & Peng, 2009; Luxton-Reilly, 2009), statistics (Goldin & Ashley, 2011), second language writing (Lundstrom & Baker, 2009), and psychology (Cho & MacArthur, 2010).

A current issue in peer review research is addressing the benefits emerging from either giving or receiving feedback. In contrast to common assumption, some researchers argue that it is not the student receiving feedback that benefits the most from the peer review process, but the one giving feedback to others. Dunlap and Grabinger (2003) found that reviewing someone else's work proves beneficial for students, as the process of reflecting on and articulating their own views and ideas eventually leads to improvements of their own work. In addition, Ko and Rossen (2004) stated that while reviewing each other's works, students learn about the perspectives of their peers - not only the instructor's - and this process could provide further insights. In recent studies, Li, Liu, & Steckelberg (2010) referred to "assessors vs. assesses", similar to Lundstrom & Baker's (2009) "givers vs. receivers", and report different learning outcomes for these opposing peer roles.

The free selection peer review setting allows students access to multiple peer work, asking reviewers to decide on their own which peer work they want to read and review. Research findings suggests that in such settings, students tend to read and review higher volume of peer work than the minimum amount set by the instructor (Denny, Luxton-Reilly, Hamer, & Purchase, 2008; Papadopoulos et al., 2012, 2016). In addition, strong students tend to produce more feedback than others, with their comments being of higher quality (ibid.). Thus, the free selection review setting allows students to access and perform multiple peer reviews, asking reviewers to decide on their own which peer work they want to read and review, which leads to an increase in the number of peer reviews and an increase in the quality of peer feedback.

The feedback provided through peer reviewing could be of greater quantity than the one provided by a busy instructor (Silva & Moreira, 2003; Wolfe, 2004), while the process of analyzing peer work can support the development of students' self-evaluation skills (Davies & Berrow, 1998). Providing timely, high quality feedback to students can be a demanding task for the teacher, especially in cases of large classrooms. Peer feedback can alleviate some of the workload for the teacher, giving a larger role to the student in the activity.

The current study focuses on identifying the benefits of the free selection peer review approach in a time restricted setting, examining also the criteria students apply in selecting which peer work to review. In our setting, we asked students to conduct two peer reviews, applying a mixed methods approach in which the first review was assigned (randomly) and allowed students to select the second one freely amongst all the peer work produced. Although a double-blinded process would control biases, it was easier to apply an open format, since students had already discussed briefly their work in previous sessions, making it difficult to ensure anonymity.

### **3 Case study**

We tested our peer review setting in a Master level course, titled "Learning and Teaching with Digital Media" (LTDM), typically offered as an elective course to all Master students in the Faculty of Arts (which also includes Humanities and Education). This means that the course cohort is usually compiled with students from different study programs and, consequently, with different backgrounds. In the following, we present the activities in the LTDM course and the suggested approach for peer reviewing.

#### **3.1 Course content and learning outcomes**

LTDM is a 10 ECTS Master course, mixing equal parts of technology and learning theories, focusing on how the affordances of different technologies can be used in education. The course runs for 13 weeks, with one 3-hour session each week. Although the course could be relevant to different study programs in the Faculty of Arts, it is usually preferred by students that are already working or are planning to work as teachers in schools. By the end of the course, students are expected to be able to reflect and analyze the learning potential of digital media and build a short learning unit (LU). To produce the learning unit (which is a detailed text-based description), students have to incorporate different learning theories into their intended learning activities, along with meaningful use of technology (e.g., blogs, wikis, videos, annotation tools, co-authoring tools, etc.). The learning unit is further supported by a document on the theoretical foundation of the suggested learning design and a series of prototypes, in which students exemplify how their learning units would look like in an actual classroom session. In other words, the course puts the students into the position of a learning designer and asks them to create a teaching plan, that other teachers from the same discipline could try in their courses (e.g., how to teach the history of a specific era, integrating collaborative learning, inquiry learning, and problem solving, through the use of videos, blogs, and timelines).

To help students construct their learning units, we provide them with a template that offers guidance for each part of the learning unit (Table 1). Both the course and the provided template are following the concept of constructive alignment focusing on deliberate links between learning activities and outcomes (Biggs and Tang, 2011). The students have to provide the first draft of their learning units in Week 8, by filling in this template. Although the final version of a learning unit could span several pages, the first draft is usually approximately 2-page long for most of the students. Students in the course need to meet a 75% attendance requirement, in order to be eligible to take the exams. This requirement is met by participating in the course activities, such as the peer review process described in a following section.

Overview	Write, in short, what the learning unit is about. For example, what is the topic? You could also present why you picked this topic or what is your relationship with it?
Target Audience	What is the target audience that you have in mind for your learning unit? What is the age and learning profile of your learners?
Learning Goals and Outcomes	What are the learning goals and outcomes of the learning unit? Make sure that the learning goals (what you want to achieve) and the learning outcomes (what could be assessed at the end) are relevant to the topic and the audience.
Learning Tasks	The learning tasks of an activity should be linked to the intended learning goals and outcomes. Make a list of the activities that you plan for your learners. Make sure that they are linked to the intended learning goals and outcomes.
Collaborative Learning	Are there collaborative learning activities in the LU? If yes, are they clear? If no, is there space to include such activities in the LU proposed by your peers?
Technology	What technological tools are they used in the LU? Why do you think that the learning affordances offered by these tools are appropriate for the planned tasks?
Assessment	How are you going to assess the learning outcomes of your learning unit? In other words, what kind of tools and methods are you going to use in order to find out whether your learners reached the intended learning goals?

Table 1. Learning unit template.

### 3.2 Student profile and experience

In the Spring semester 2016, a total of 25 attended the LTDM course, with the majority of students (N=17) having a background in History, while the rest were following study programs in Journalism, Semiotics, English, etc.

In the beginning of the course, students filled a questionnaire regarding their experience with different technologies (e.g., social media, audio/video production, sharing services, etc.). The majority of students (N=18) had experience with Google Docs, while the rest were using Dropbox for sharing documents. We selected Google Docs as the tool for the peer review process, since the simultaneous co-authoring functionality offered in it was important for other activities of the course.

In the beginning of the class in Week 8, in which the peer review process took place, students filled in a questionnaire regarding their prior experience in peer reviewing. Out of the 25 attending students, 18 students attended the class that day and replied to this questionnaire. Only 6 students had adequate experience in providing written feedback to their peers, having done that several times in the past, while for the majority of the students (N=12) this was the first (or second) time in such an activity, saying that they were used to provide their comments to their fellow students verbally. Finally, when asked about their preference in an open/single-blinded/double-blinded process, only 5 students opted for the double-blinded setting, while the rest preferred single-blinded (N=3), double-blinded (N=7), or nothing in particular (N=3).

### 3.3 The peer review process

In the LTDM course, students are allowed to work individually or in groups of 2-4 members. Students that work in groups are expected to submit more elaborate prototypes and lengthier texts for the theoretical foundation of their learning units. In the Spring semester 2016, 10 students decided to work alone, while the rest 15 formed 5 groups. As such, there were 15 student assignments that semester.

The students received the learning unit template described above in Week 3 and they had 5 weeks to work on their learning units. Just before the class in Week 8, students had to submit the first draft of their learning units, by inserting the link to their documents, in a commonly shared list we created in Google Docs. Students, however, were allowed to use the sharing service they preferred (i.e., the links in the link could direct to students' accounts in Google Drive, Dropbox, OneDrive, etc.).

During the first hour of the 3-hour class, we described the peer review process to the students, providing examples and guidance to students in identifying the characteristics of constructive and meaningful feedback. In the two hours that followed, all students had to work individually as reviewers and provide feedback to two learning units. This means that the 18 students present had to provide feedback to the 15 student assignments. To make sure that all assignments would receive comments, we randomly assigned the first review and we asked students to freely select the second one they wanted to review (excluding, of course, their own and the one already assigned to them). In doing so, students were given the freedom to read any of the assignments available in the shared list in order to make a choice.

We provided students with a review template, mirroring the seven sections of the learning unit template (Table 1), and providing question prompts to guide students' attention (e.g., "*Learning Tasks – Are the learning tasks described clear? Do they cover all the intended learning goals and outcomes? Could you suggest additional tasks that could be performed in the LU?*"). Students had to fill in the review template for each of the peer assignments they reviewed and, once again, to share the link to their documents in the shared list, adding their links below the links of the learning units they reviewed.

At the end of the class, students had to fill in a questionnaire regarding the peer review process, focusing on the number of learning units they had read in total and their criteria in selecting the second learning unit they reviewed.

Finally, students (working in their respective groups or on their own) had the following week to read the feedback they received and submit their responses to reviewers, by writing a short description of their revision strategy and share the link, once again, in the shared list.

## 4 Results

The 18 students that attended the class in Week 8 produced 36 reviews in total for the 15 learning units, in the two hours period of the peer review activity. However, since students were allowed to choose the second learning unit they would review, the number of reviews each learning unit received differed ( $M=2.53$ ,  $SD=1.13$ ,  $min=1$ ,  $max=5$ ). Based on their responses in the questionnaire filled out after the peer review, we could extract basic strategies. While half of the students opted for a minimum effort strategy, reading (and reviewing) only two learning units, the rest read several learning units, before deciding which to review ( $M=2.94$ ,  $SD=1.26$ ,  $min=2$ ,  $max=6$ ). Finally, since students worked individually as reviewers, no selection patterns were detected amongst students of the same group. In other words, all students selected the learning units they reviewed independently.

Regarding their criteria in selecting the second learning unit they had to review, the questionnaire asked students to note how a set of different factors affected their selection process. Table 2 presents students' responses.

<b>How the following factors affected you in choosing the learning units you reviewed today? (1: Not at all; 5: Very much)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M</b>	<b>SD</b>
Q1. I chose randomly	4	9	0	4	1	2.39	1.24
Q2. I knew the people in that group	8	5	0	1	4	2.33	1.64
Q3. I liked the idea/topic of the learning unit	3	3	3	4	5	3.28	1.49
Q4. I wanted to review a short/detailed learning unit	7	4	4	3	0	2.17	1.15
Q5. I chose a learning unit I thought was good	4	5	4	5	0	2.56	1.15
Q6. I chose a learning unit that did not have many reviews	5	4	3	3	3	2.72	1.49

Table 2. *Students' selection criteria.*

In their responses to reviewers, all the students/groups mentioned planned revisions that were decided based on peer feedback. As expected, peer feedback was accepted in different degrees and there were also cases of students/groups that argued against a peer suggestion.

## 5 Discussion and conclusions

As mentioned above, one of the benefits of using a free selection review process is that students tend to produce more feedback in these settings, while strong students tend to also produce feedback of higher quality (Denny, Luxton-Reilly, Hamer, & Purchase, 2008; Denny, 2013; Papadopoulos, Lagkas, & Demetriadis, 2012, 2016). In addition, a free selection approach allows the student to review more peer work, thus getting to know alternative perspectives on an issue. This is related to the givers/receivers discussion on the peer review benefits (e.g., Lundstorm & Baker, 2009). In this study, the time restriction posed by the typical class session of the course lowered the amount of time for the students to reap the benefits of the approach, but placed our work in an authentic context, since teachers have only limited resources in performing such activities. As such, there was an upper limit on the number of reviews students had to submit (i.e., 2). Nevertheless, we maintain that some benefits of the free selection approach are still easily identifiable.

First, students tend to read significantly more material than in a simple paired review process. This is important, if we consider the fact that each reading of a peer's work could provide additional insights for improvement in the reviewer's own understanding (e.g., Li et al., 2010; Lundstrom & Baker, 2009; Papadopoulos et al., 2012, 2016). Especially in the cases where students worked in a learning unit as a group, the gains from the process could be multifold (e.g., in one case the 4 members of a group read 10 and reviewed 6 out of the 15 available learning units).

Second, regarding the way students selected the second learning unit, our results show that the most common criterion is students' appreciation of the learning unit topic (Q3), suggesting that students will spend more time on something they find interesting. Selecting peer work that has not received enough reviews was also an important criterion for the students (Q6), indicating that either students appreciated the value of peer feedback and wanted to share it evenly, or that they were not interested into providing comments and suggestions that someone else had already submitted. The quality of the learning unit was also an important criterion for some students (Q5), while random selection and interpersonal relationships were also mentioned (Q1 and Q2, respectively). Finally, it appeared that the length of peer work was not an important factor in students' selection process (Q4).

Finally, a major challenge for educators is to keep the administrative and technical overhead low in such activities. In this study, the technical barrier is low and teacher's role is focused on providing the instructions for the initial work and the review process. A teacher could also choose to add his/her feedback alongside students', although this should be done independently, not to affect the student-reviewers. In case of limited time, feedback from the teacher could also be offered in the form of endorsement (e.g., the teacher marks the student comments/suggestions he/she thinks are helpful for the student-author).

In conclusion, the findings of this study suggest that even in time-restricted settings, the free selection peer review approach could still be beneficial for the students, while the limited amount of overhead for the teacher makes this approach a useful and efficient instructional tool.

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