
PEER FEEDBACK FOR ENHANCING STUDENTS’ PROJECT DEVELOPMENT IN ONLINE LEARNING

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EXECUTIVE SUMMARY

The use of peer feedback is a strategy for online educators to facilitate collaboration among students and increase critical reflection. Through the well-designed use of peer feedback, students can, with help from other students, master concepts and ideas that they cannot understand on their own (Lu & Bol, 2007; Vygotsky, 1978). The process of giving and receiving peer feedback closely resembles professional practice (van den Berg, Admiraal & Pilot, 2006; van der Pol, van den Berg, Admiraal & Simons, 2008) and helps students develop lifelong skills. This case study describes the use of peer feedback in an online graduate practicum course to support students and increase their exposure to different educational environments. It includes suggestions for effectively using peer feedback in online courses.

ORGANIZATION BACKGROUND

The latest Sloan-C report of online education at US higher education institutions states that over 5.6 million students at took at least one online course during the fall 2009 semester, a 22 percent increase from 2008 (Allen & Seaman, 2010). The College of Education at a large public university in the United States has offered online courses since 2004 and more recently began offering online programs leading to degrees in a Master of Education and Doctor of Education. In fall 2011, a total of 47 courses were offered completely online and 1,700-1,800 students accessed these courses from all 50 states in the US (Campbell, 2011). Online courses are hosted in the Learning Management System Moodle and supported
by a team of experts at the college’s Office of Distance Learning. Instructors link to several types of online resources in these courses, such as research articles in the education library, podcasts, videos, and external websites. Several instructors also create their own online materials. Interactions in online courses are typically asynchronous interactions between students, between students and the instructor, and between the students and content (Moore & Kearsley, 2005). Several courses also include synchronous or real-time sessions using Elluminate software.

The College of Education offers a Master of Education in Educational Technology that is completely online. Students enrolled in this program are usually employed as in-service teachers or instructors, instructional designers, and training professionals. Students complete 36 credits of online courses to achieve their degree, including a 16-week practicum that they have to successfully complete to graduate. The practicum consists of a teacher inquiry/action research project that students implement in their practice and that is supervised virtually by an instructor in the program.

SETTING THE STAGE

Instructor supervision and support of distance students’ practicum experiences poses multiple challenges for online university programs (Simpson, 2006). On-campus teacher education programs typically include a practica where students collaborate with a teacher or expert in their practice while simultaneously mentored by an instructor in the program. Regular meetings between these three stakeholders (the student, the collaborator in their practice, and the instructor in the program) provide opportunities for updates, support, and advice. Face-to-face programs or courses that involve field experiences also consist of regular on-campus student meetings in order for them to share experiences, discuss issues and plan together. In the online environment, however, it is difficult to organize or replicate the face-to-face interactions that occur between the three stakeholders. Likewise, coordinating a face-to-face meeting of all students engaged in field experiences in different locations is a difficult task.

The practicum in educational technology is offered both as an on-campus course and an online course. On-campus students meet as a group once a month to share project updates, discuss their experiences, and plan further actions as a group. The practicum experience serves to immerse students in a specific educational environment and to make them familiar with the integration of instructional technologies in that environment. Group meetings of students engaged in such practica at a distance not only provide support to students who might feel isolated but also expose students to multiple classroom situations and technology integration in different environments when students share their experiences (Ishler, Edens, & Berry, 1996; Harsh, 1995). Furthermore, such discussions can facilitate critical reflection on teaching and learning relationships in educational environments and organizational culture in several environments. Mirroring successful earlier reports of the use of computer-mediated communication in teacher education practica at a distance (Laffey & Musser, 1998), students in the online offering of the practicum course used to share status updates or information about their experiences in online discussion forums. These postings usually consisted of a couple of paragraphs, included questions for the instructor of the course, and were often directed at the instructor. Students in the course, therefore, were focused on their own setting for the practicum and were not sufficiently exposed to other settings or implementations of technology in other environments. They did acquire an overview of peer projects but not an understanding of the integration of different types of technology in educational environments. Nor did they gain an appreciation of the challenges of conducting teacher inquiry in technology integration implementations in situations different from their own. In an attempt to overcome this limitation, peer feedback cycles at various parts of the practicum were introduced.

Peer feedback, also termed peer assessment, has been defined as “an arrangement in which individuals consider the amount, level, value, worth, quality or success of the products or outcomes of learning of peers of similar status” (Topping, 1998, p. 250). In the online environment, peer feedback can
build community, increase communication and result in meaningful interactions (Corgan, Hammer, Margolies & Crossley, 2004; Ertmer & Stepich, 2004). To ensure that students become thoroughly acquainted with each others’ educational environments and attempts at technology integration, and to reduce student anxiety or isolation in completing their projects at a distance, peer feedback was included as a component of the online practicum course. Prior research on peer feedback in online environments was reviewed and best practice suggested by earlier studies was integrated into the instructional design of the practicum course.
Peer feedback has been found to be effective in online environments when accompanied with student-centered pedagogy. Receiving peer feedback provides students with necessary information to “self-regulate their own performances” (Nicol & Macfarlane-Dick, 2006, p. 206) and helps them become more goal-oriented (Shin & Dickinson, 2010). In project-based courses, peer feedback in the form of formative feedback loops can “improve learning while it is happening…rather than…determine success or failure only after the event” (Topping, Smith, Swanson, & Elliot, 2000, p. 150). Formative feedback from peers in project-based courses is useful to students’ development of their projects, and the process of offering feedback benefits student learning and positively affects student achievement and attitudes (Dochy, Segers, & Sluijsmans, 1999; Ertmer & Stepich, 2004; Ertmer et al., 2007; Falchikov & Goldfinch, 2000; Liu, Lin, Chiu, & Yuan, 2001; Topping, 1998; Topping et al., 2000). Moreover, the assessment of peer work and the process of providing peer feedback resembles professional environments in the real world (van den Berg, Admiraal, & Pilot, 2006). Despite the several benefits to using peer feedback in courses, the process of giving peer feedback can be time consuming for students, and some students may simply dislike providing feedback (Falchikov, 1995; Topping et al., 2000). Relationships, power processes, and individual dynamics within an educational environment can influence peer feedback or cause students to feel uncomfortable, leading to consequences for student learning (Topping, 1998). Given the expertise of the instructor, students also generally perceive instructor feedback to be more valuable than peer feedback (Ertmer et al., 2007; Ko & Rossen, 2001; Topping, 1998).

The process of reviewing peer work, reflecting on it, and providing feedback can help improve students’ work in a course (Dunlap, 2005; Ertmer et al., 2007), but several variables such as the types of feedback provided, the number of peers providing feedback, and student perceptions of peer feedback can influence the usefulness of peer feedback (Cho & MacArthur, 2010; Van Gennip, Segers, & Tillema, 2009). Ertmer et al. (2007) and Shin and Dickinson (2010) suggest that providing a timeline for peer feedback, ensuring timeliness and explaining the benefits of peer feedback to students at the beginning of the course can increase student motivation to provide feedback and improve their perceptions of its value of peer feedback. The setting of expectations and provision of examples of effective feedback can decrease students’ feelings of inadequacy when providing peer feedback (Ertmer et al., 2007). In addition, the provision of feedback by multiple peers can increase the quality of peer feedback and be more useful than feedback from only one peer (Bouzidi & Jaillet, 2009; Falchikov & Goldfinch, 2000). The ways in which these researchers’ suggestions were integrated into the design of peer feedback activities in the practicum course is described later in this paper.

CASE DESCRIPTION

Context

The setting for this case was an online educational technology practicum course enrolling ten graduate students (n=10; 7 F, 3 M) who were K-12 teachers or college instructors. Students were required to implement a teacher inquiry project involving the integration of digital media or a new technology to address a need or to supplement learning in their educational environments. The textbook used for the course was The Reflective Educators Guide to Classroom Research by Dana and Yendol-Hoppey (2009). Students were contacted one month before the course began and asked to purchase and read the first two chapters before they began the course. During the 16-week course students were required to design the research, implement it, and report the results in a final paper. Four stages of the project were explicitly defined along the lines of Dana & Yendol-Hoppey’s (2009) description of teacher inquiry: Context description; Research design; Implementation/Results; and Discussion/Significance. Students were asked
to submit their written drafts of each defined step on the discussion board for review by peers and the professor. For example, the first step in the project required students to describe the setting of the project, participants, stakeholders, the problem that they were trying to solve, the rationale that led to their research question, their own role in the project or their environment, and any bias or hypothesis before they began the project.

In the first step, students were asked to read the papers of all their peers and provide feedback, i.e., suggestions that would contribute to improving peers’ action research projects. In the second and third stage, students had the option of choosing any three peers and providing detailed feedback on their writing and research. As students reported the results of their action research and the projects became longer towards the end of the course, the instructor randomly assigned two peer projects to each student such that at least two peers reviewed each student project. This ensured that feedback loops were used in the course - that peers and the instructor provided formative feedback at different stages of the project that students could implement in subsequent stages. The instructor also reviewed and provided feedback on students’ drafts within one week of student submission.

Several suggestions for best practice in prior research were integrated into the peer feedback activities in the educational technology practicum course:

— An introductory email from the instructor during the first day of the online course explained the benefits of peer feedback in the context of the course project and included links to online resources that highlighted student learning through peer feedback.
— The instructor provided model postings of peer feedback in the first week of the online course.
— Specific dates were provided for the submission of project stages and for the submission of peer feedback, stressing the importance of timely submission for effective communication and maximum interaction. For instance, a time limit of one week was set for students to provide feedback on the first stage. Students received 15% of the course grade for providing timely and constructive feedback on each stage of peer projects.
— Feedback was structured so that every student received feedback from all peers on the first stage of his/her paper and at least two peers during subsequent stages.
— A feedback rubric and guiding questions were provided to the students to help them structure their feedback. The goal was to ensure that students reviewed peer submissions according to criteria that would be used by the instructor, but also to encourage them to consider other aspects of the paper such as logic, writing, and use of APA style.

Concerns During Implementation

Students’ familiarity with the technology used for online interactions in the learning management system (LMS) is usually a concern for instructors when designing such activities as online discussions or attaching papers to their discussion posts. In this case, the instructor was not concerned about students’ comfort level with these technologies because this was the last course in the online Masters program, and students had used the same software in previous courses. The privacy of students’ educational environments and the data that students collected during their projects was an anticipated concern because peers in the course were reading their descriptions of context. To resolve this issue, students were made cognizant of the importance of protecting the privacy of their environment and were required to use fictitious names and aliases when writing their papers. A discussion during the first week of the course also highlighted the importance of respecting the sensitivity of information shared by peers during the course.

In case students were not confident posing certain questions or sharing certain information about their educational environments online, real-time synchronous sessions were conducted once a month using Elluminate software. The synchronous sessions served as a time for students to discuss any problems or challenges that they faced in their environment, pose questions, and for the instructor to resolve administrative issues. Examples of constructive criticism as opposed to negative feedback and the
importance of asking positive questions that would help a peer move his/her project forward were also emphasized during the synchronous sessions. All the students could not attend the synchronous sessions due to other commitments, so the sessions were recorded in case they wanted to review them later. Due to time limitations and the limited attendance of students it was not possible to include real-time peer feedback in real-time during these sessions.

Data Collection and Analysis

The implementation of peer feedback activities in the educational technology practicum was a real-life context that required rich description of the organizational context and of students’ experiences, making it suitable for a case study methodology (Yin, 2003). Quantitative and qualitative data in the form of a student survey and student reflections respectively were used to answer the following questions at the end of the course:

- Do students in an online educational technology practicum perceive the giving and receiving of formative peer feedback as valuable to the development of their projects and to their understanding of course content?
- Do students in an online course perceive peer feedback to be as valuable as instructor feedback in the course?

A peer feedback survey from research by Ertmer et al. (2007) was used with the author’s permission to survey students’ perceptions of peer and instructor feedback after the course was completed. The survey used a Likert scale asking students to rate the importance of timeliness, quality, and quantity of peer and instructor feedback for student projects and for their learning of course content. The two scales used for item responses ranged from ‘not at all important’ (1) to ‘very important’ (5) and from ‘strongly disagree’ (1) to ‘strongly agree’ (5). One question that was specific to the practicum project was added to the original survey. It addressed student perceptions of the importance of peer feedback at each of the four steps that reflected stages in the project. Survey results were imported into SPSS and analyzed.

As part of the course assignments, students submitted final reflections of about one to three pages about receiving peer feedback, giving peer feedback, and the usefulness of peer feedback for course projects. These reflections were coded by two researchers for benefits, challenges, and students’ perceptions of peer feedback. First, the reflection assignment of one student was open coded separately by both researchers and then the codes were compared. The coders were at agreement on the codes, where the main differences were semantic, i.e., the coders had used different phrases to code the same piece of text. For instance, one coder used the words “concern - when giving feedback” while the other coder used “giving peer feedback - worried/sensitivity.” Likewise, one piece of text was coded “gave specific example” by one coder and “provides concrete example” by the other coder. The coders then agreed on common phrases to denote the codes in the first reflection and these phrases were used to code the remaining nine student reflections. Finally, all the codes from both coders were compared and axial coding (Strauss & Corbin, 1990) used to collapse the codes into larger themes.

Peer Feedback Survey Results

Seven out of 10 students responded to the survey. All the respondents perceived the timeliness ($M=4.71; SD=0.49$) and quality ($M=5.0; SD=0$) of feedback that they received to be more important than the quantity of feedback ($M=3.71; SD=0.95$) for their learning in the course. Peer feedback was rated as most important during the first step of student projects ($M=4.29; SD=1.25$) compared to the last step ($M=3.57; SD=1.27$). Students perceived the giving of peer feedback to be more valuable than the receipt of peer feedback for their learning in the course, their understanding of course content, and their
project progress (Table 1). However, students mean rating on the importance of receiving instructor feedback \((M=4.86; \ SD=0.38)\) on their projects was higher than their rating for the importance of receiving peer feedback \((M=3.29; \ SD=0.95)\). Students’ ratings of instructor feedback with respect to timeliness, quality, quantity, and value were also consistently higher than their ratings of peer feedback in those categories (Table 2). In open-ended responses, students explained that the instructor was an expert on the subject-matter whereas their peers were conducting research projects for the first time. Students’ found the timeliness \((M=4.86; \ SD=0.38)\) and quality \((M=4.86; \ SD=0.38)\) of instructor feedback to be useful in the development of their course projects \((M=5.0; \ SD=0)\) and their understanding of course content \((M=5.0; \ SD=0)\).

Table 1: Student ratings of the value of giving and receiving peer feedback

<table>
<thead>
<tr>
<th></th>
<th>Giving Feedback</th>
<th>Receiving Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance to learning in the course</td>
<td>3.43 0.79</td>
<td>3.29 0.95</td>
</tr>
<tr>
<td>Improved quality of inquiry project</td>
<td>3.71 0.76</td>
<td>3.29 0.76</td>
</tr>
<tr>
<td>Increased understanding of teacher inquiry</td>
<td>4.00 0.82</td>
<td>2.86 0.69</td>
</tr>
</tbody>
</table>

Table 2: Student ratings of instructor and peer feedback

<table>
<thead>
<tr>
<th></th>
<th>Instructor Feedback</th>
<th>Peer Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeliness</td>
<td>4.86 0.38</td>
<td>4.00 0.00</td>
</tr>
<tr>
<td>High Quality</td>
<td>4.86 0.38</td>
<td>3.43 1.13</td>
</tr>
<tr>
<td>High Quantity</td>
<td>4.14 1.21</td>
<td>3.14 0.90</td>
</tr>
<tr>
<td>Improved quality of inquiry project</td>
<td>5.00 0.00</td>
<td>3.29 0.76</td>
</tr>
<tr>
<td>Increased understanding of teacher inquiry</td>
<td>5.00 0.00</td>
<td>2.86 0.69</td>
</tr>
</tbody>
</table>

**Student Reflections on Peer Feedback**

Three main themes emerged from the analysis of student reflections - students’ perceived value of peer feedback, challenges faced by students when giving feedback, and the impact of peer feedback on students’ projects.

**Students’ perceived value of peer feedback**

Nine of ten students appreciated the inclusion of the peer feedback activity in the course. Students stated that they felt supported, appreciated, and less overwhelmed completing the research project. One student asserted that “the peer interaction and feedback in this course is needed when...
completing an inquiry project” while another wrote, “giving and getting acknowledgement for my inquiry was reinforcing.” Students highlighted different stages and aspects of the feedback activity as particularly useful. Some students reflected that having to explain their context or articulate their rationale in a manner understandable to their peers helped them become clearer in their own understanding of their projects. Other students found that the questions posed by their peers forced them to reflect. One student stated, “The truth is that these comments, questions, and statements that are made help you look at your work in a different way.” Peer comments and questions prompted further discussion and clarifications from students. Moreover, positive statements reinforced students’ confidence in their work because, according to one student, they “helped me know that my writing made sense and that I was headed in the right direction.”

Seven students claimed that reading or reviewing their peers’ writing or projects was informative, provided them with more insight into other environments and peer experiences, and “depth of knowledge.” One student wrote, “Reading each others’ inquiries and sharing ideas and suggestions about how best to present our information provided an opportunity to learn from my peers, to discuss common interests, and to share the results of our hard work.” Students also provided other perspectives on the peer interactions - that they were motivating and that they simulated the real world. One student commented, “Because I found the forums to be so helpful, I participated willingly and often. I did not view the forums as an assignment, but rather as a venue to share and learn.” Another student reflected, “To apply a school assignment to a real world issue and to use the advice of other educators is invaluable in expanding my learning experience.” In general, students found it most useful to receive peer feedback during the early stages of their project.

Challenges faced when giving feedback

Although students found tremendous benefit in sharing their projects with their peers and in the feedback they received from their peers, they faced several challenges when giving feedback to their peers. A theme that appeared in several student reflections was students’ concern with hurting peers’ feelings, offending their peers or appearing negative when giving feedback. They worried about expressing themselves appropriately in the online medium where their feedback could not be qualified by the tone of voice or body language. Students were also not comfortable giving feedback online because they could not gauge a response immediately and would have to wait and hope that their peers did not react in a negative manner. One student stated, “since it is impossible to read body language online, one can only give the advice and sit back and wait for the fall out.” Three students did not feel familiar enough with their peers’ environment to provide feedback, while another student worried about “pointing out typos and mistakes” to peers in a graduate course. One student found this difficult and “held back a lot” while another student resolved this problem in the following way: “In an effort to prevent hurt feelings, I usually sandwiched my suggestions for improvement between a compliment at the beginning and an expression of goodwill and humility at the end.”

In later stages of the projects, students appreciated being assigned a specific number of peer projects to review due to the length of the papers. They also felt that they could provide better quality feedback and be more critical if they had fewer projects to review.

Impact of peer feedback on students’ projects

Eight of the ten students provided specific examples of ways in which their projects had changed due to peer feedback provided to them or due to feedback that they provided to peers. Students made decisions about how to use the technology during implementation, the types of data to collect, the types of questions to ask in their surveys or interviews, and the presentation of data in their papers, based on peer feedback. For example, one student initially intended to have students contribute to a blog that would be password protected. Following a comment from a peer that “the larger a writer believes his audience to be the more effort he will put into his compositions,” the student decided that letting students publish their blogs for a wider audience would promote better writing. Other examples of peer feedback
contributions to technology implementation during projects included the sharing of online resources and strategies for motivating students using new technologies.

The maximum number of examples provided by students referred to the data collection process. One student was alerted to the use of log data within a software due to questions from peers, while another attempted to compare the time spent by students who were engaged in a technology-based collaborative activity with their performance based on a suggestion from a peer. A student who had planned to use only quantitative data in the form of test scores realized after discussions with peers that qualitative data would be required to answer the inquiry questions. Students highlighted these peer contributions as improving their inquiry project because they, “did not think to look at something like that.” During the analysis stage, students found that those who worked in common contexts, taught similar subject-matter, or had learners with similar problems were able to offer the best advice or ask relevant questions that helped them interpret their data. An elementary teacher reflected, “In a class such as this one it is most helpful when a teacher in a similar setting gives you feedback. A college instructor, as some of our classmates are, may not understand the elementary classroom environment.” Overall, students felt responsible for contributing to peer projects and proud when peers integrated their feedback. Likewise, they were appreciative of the peer questions or comments that had facilitated their own project development.

Discussion

This research was conducted with a very small sample of students whose responses to a survey and reflections on the peer feedback activity were analyzed to answer the research questions. The survey contained questions on the value of giving and receiving peer feedback as well as questions on the value of instructor feedback, whereas students’ reflections were focused only on their provision and receipt of peer feedback. The first research question (students’ perceptions of the value of giving and receiving of formative peer feedback to their projects and to their understanding of course content) is discussed here using both sources of data. The second research question (students’ perceptions of the value of instructor feedback as opposed to peer feedback) is discussed on the basis of the survey.

Corresponding to prior research by Ertmer et al. (2007), Ko and Rossen (2001), and Topping, (1998), the survey results indicated that students perceived feedback from the instructor to be more important than feedback from peers, which can be explained by the perceived expertise of the instructor and the fact that the instructor was grading students’ projects. Nevertheless, students perceived great value in reading peer projects and in the comments and questions posed by their peers. Students in this study reported several ways in which their projects changed or improved due to peer feedback. These findings highlight the value of peer feedback for student learning and for students’ development of projects when it is used in formative loops during project work, reinforcing prior research (Topping et al., 2000). Likewise, some challenges faced by students in this research when providing peer feedback were mentioned by Ertmer et al. (2007) in their research. Students in this research were also not comfortable criticizing their peers and did not feel confident about providing feedback to peers while conducting such research for the first time. An additional area that emerged in this study was the difficulties of communicating in an online environment. Students were unsure how to convey their suggestions or comments appropriately in writing and in the absence of tone of voice or facial expressions. Another area not mentioned in prior research and not anticipated at the beginning of this study was the value of articulation or description of projects by students. Students worked hard to make their projects “understandable” to their peers, which they found to be valuable to their own learning.

Although students expressed several concerns in their reflection papers about their giving of feedback, in their survey responses they rated the process of giving feedback as more useful in helping them learn course content than that of receiving feedback. These findings were contradictory and will need to be explored further with a larger number of students for any significant conclusions to be made. In summary, the findings support the use of peer interaction and feedback in practicum courses where students conduct projects in different learning environments. Although students expressed some difficulty
in helping peers who were integrating technology in an environment unlike their own, they unanimously appreciated the opportunity to review peer work and learn from their projects.

SOLUTIONS AND RECOMMENDATIONS

The findings of this research indicate that the process of giving feedback can be problematic, but also extremely valuable to students and that receiving feedback can contribute to their learning. Future research that investigates similar peer feedback activities with a larger sample of students could provide insight into whether the process of giving feedback, albeit challenging for students, can help students learn. Earlier research (Ertmer & Stepich, 2004; Topping, 1998; Van Gennip et al., 2009) and these findings clearly reveal the value of peer feedback that is received for student learning and for project development in project-based online courses. For students to be comfortable providing that feedback to their peers, it is important that the process of giving feedback be modeled, scaffolded, and structured to decrease the level of discomfort students might experience. If possible, it might be more useful to partner students with others working in the same context or with the same background to increase students’ comfort level both providing and receiving feedback. Explaining to students what constitutes acceptable or good feedback in the context of a course, and setting ground rules for netiquette and criticism might motivate students to provide more feedback, thus increasing learning opportunities. It would also be useful to provide students with examples of all three types of feedback and an explanation of the different types of feedback (Cho & MacArthur, 2010). The process of peer feedback increases student-content and student-student interaction, both of which contribute to student learning. Simultaneously, students are using, modeling, and acquiring skills that they will need in the online environment in their future workplace.

REFERENCES


