Teaching Students To Give And To Receive: Improving Interdisciplinary Writing Through Peer Review

Julia Morris
Old Dominion University
5115 Hampton Boulevard
Norfolk, Virginia 23529
1 (704) 490 2068
Jmorr005@odu.edu

Jennifer Kidd
Old Dominion University
5115 Hampton Boulevard
Norfolk, Virginia 23529
1 (757) 683 3248
Jkidd@odu.edu

ABSTRACT

The context for this study is a multi-disciplinary collaboration of six faculty members using peer review in their respective disciplines with the goal of improved student writing. Faculty members developed their own assignments and methods for implementing peer review, but each followed the same guidelines. Students submitted drafts to peers who made comments and used a rubric to provide formative feedback. The instructors used a variety of tools to support peer review, including Google Drive, Blackboard, and Expertiza, a dedicated peer-review system. Students reflected on the peer review process in an online survey after each round of peer review. The survey results varied considerably between the classes, suggesting the importance of the instructor, assignment, and peer review process. There were also common themes that emerged across courses, such as the common value of giving reviews. This paper examines one participating faculty member's fall 2015 and spring 2016 education course and how students' perceptions of peer review evolved positively across the two semesters.

Keywords

Peer review, feedback, student writing, multi-disciplinary writing

1. INTRODUCTION

Technology enhanced peer review enables students the opportunity to work collaboratively with each other, more than ever before. Online peer review systems have increased students' opportunities to provide and be given expeditious feedback. Writers are able to benefit from multiple perspectives more immediately through the various modalities of technology, further expanding upon present classroom peer review processes. Peer review promotes learning autonomy for students during the writing process. The positive effects of learning for both reviewers and reviewees, facilitated by advances in classroom technology, have allowed students to improve their writing through peer review.

This study describes the data from one faculty member who participated in this yearlong exploration into student perceptions of peer review. This study describes the second phase of an exploration into these perceptions through the multi-disciplinary collaboration of six faculty members. These faculty, representing four disciplines, implemented peer review into their classrooms in order to improve undergraduate student writing. Students engaged in formative peer review and reflected on their experience in an online survey. The results of the initial fall 2015 study showed variation between classes, indicating the effect of the instructor and assignment for the peer review process.

The results from the spring 2016 student data show a more complete picture of how peer review can be implemented to promote student investment in this autonomous learning process. Further, results show that students' can, and do, recognize that peer review should promote substantive changes in their writing. This study's hypothesis stated that feedback from the fall 2015 students would facilitate increased satisfaction with and utility of the peer review process in spring 2016 students. This paper describes the progression of responses from education students in one class between the fall and spring semesters.

2. REVIEW OF LITERATURE

Once considered the "neglected variable in education," peer review and student interaction have the potential to transform practices in higher education [1]. Comer et al. discuss how peer-to-peer interactions in two MOOCs enhance learners' understanding of course learning objectives and highlight the value of online learning environments. This is due to the fact that interactions occur almost entirely in written form. Comer et al.'s findings indicate that peer review fosters a networked learning experience as online interactions require the primary form of communication to occur through writing, thus improving both course specific and composition skills.

Lui and Sadler [2] also demonstrate the success of technology-infused peer review for higher education students by comparing face-to-face peer review with online peer review. The authors find that technology greatly enhanced the number of comments, the number of revision-oriented comments, and the number of revisions made by students after engaging the technology-enhanced peer review process. However, the incorporation of technology builds upon but does not eradicate pre-existing issues prevailing in face-to-face peer review. One of the most prevalent points discussed is the concept of anonymity. The literature is varied in its stance on anonymity. Lee [3] discusses how anonymity is peer review's most significant inhibitor as it does not encourage self-regulated learning. Similarly, Huahui et al. [4] found that non-anonymous peer review partners encourage a social presence, born of an optimal level of participation and interaction, which promoted a "more supportive learning environment" [4, p.812]. However, in contrast, Raes et al. [5] concludes that increased anonymity can decrease peer pressure

and increase comfortability with peer review. Similarly, Lu and Bol [6] found students participating in anonymous peer review outperformed students in identifiable peer review, and provided more critical feedback to their peers. With these antithetical conclusions, the best approach to anonymity in peer review is still undetermined.

The skills required and refined by peer review prove advantageous across classrooms. It is understood that peer review has ventured beyond English and education courses; it is now a regularly utilized tool in computer programming, engineering, environmental science, and business and entrepreneurship courses [7,8]. However, as peer review transcends disciplines, it remains a cooperative effort between students and faculty. Peer review is no longer an educational arrangement devised to benefit students and alleviate staff workload, but instead, a "rather complex undertaking," that merges students' ability to assess and students' knowledge of course content [7, p. 181]. With the unavoidability of variability amongst students in any given classroom, faculty must mediate reviews in order to assure students of reliability.

The nature of student perceptions of peer review is limitedly studied. Studies at an Australian university found that 90% of surveyed students expect peer review to be helpful [7]. Half of these students expressed anxieties about peer review due to an uncertainty of how to be constructive without seeming too harsh. Conversely, some students were worried that reviews they received would be too nice and thus provide little substance. Post peer review, the number of students who considered peer review to be helpful dropped to 70%, indicating what Mulder et al. refer to as the "modest downward shift" in positive perceptions of peer review. No study has yet simultaneously considered student perceptions in conjunction with what feedback is incorporated affects learning outcomes [8]. In a recent study, students' most critical impressions found formative peer review to be plagued with inconsistencies in quality and reliability [6]. As a result, less than one-third of surveyed first-year students felt they had helpful feedback via peer review, complaining of "unreliable" and "inconsistent credibility." More than half of students reported that they were disillusioned with partners who lacked expertise. These students instead preferred an "expert review" from faculty or staff. These impressions, according to the authors, suggest that peer review can be effective, as students are looking for ways to improve their artifacts, but further research must be done that explores more effective implementation. When this study is complete it will provide new insight into students' attitudes and behaviors, helping to delineating what type of feedback students find most helpful and to uncover the processes and procedures that prompt students to revise their work. This preliminary report of student attitudes begins this work.

3. METHODOLOGY

Six faculty members agreed to incorporate peer review into their undergraduate courses with the intention of improving student writing. Although two of the participants had significant experience peer review, the intention was to create a learning community with the faculty learning from and with one another as they designed and later revised writing prompts, rubrics, and peer review protocols. Each faculty member developed their own assignments and peer review process, but followed the same general guidelines. Students were required to submit a draft(s) on a major writing assignment (instructors could institute a single or multiple rounds of peer review). The drafts could be preliminary (pre-writing) assignments or they could be complete papers in an initial state. Reviewers provided formative feedback via comments and a rubric. Authors made changes as desired and submitted a final product. This was graded by either the instructor, or by students via a summative round of peer evaluations.

The instructors used a variety of tools to support peer review including *Google Docs*, *Blackboard*, and *Expertiza*, a peer-review system developed at North Carolina State University. Students reflected on their peer review experience in an anonymous online survey with scaled and open-ended items after each round of peer review. To assess the impact of peer review on student writing, instructors graded a selection of student submissions before and after the peer reviews using a common interdisciplinary writing rubric. This enabled them to judge the quality of student writing and to assess the extent to which students revised (and hopefully, improved) their writing after participating in peer reviews. Faculty also completed mid and end of semester surveys to gauge their perceptions of the costs and benefits of peer review. As the data collection from faculty is still underway, this paper presents the results of the student reflection survey, focusing on the data from one instructor.

The instructor discussed in this study has taught foundational educational assessment to pre-service teachers for 10(+) semesters. After implementing peer review during the first semester of this study and reflecting on the corresponding fall data, changes were made in order to respond to students' concerns and suggestions for the spring semester. Several changes were implemented to bring about change. Specifically, instead of a variety of tools being used (i.e. Google Docs, *Expertiza*, face-to-face), students conducted all peer review in one consistent tool. The assignments were all submitted, peer reviewed, received, and meta-reviewed through *Expertiza*. The instructor also added a calibration assignment where students were given the opportunity to simulate peer review, comparing their attempts at review with the instructor's expert review. Students were also guided through the peer review process gradually. Peer review stages were time restricted meaning students could not work ahead of the current state of review (i.e. submission, peer review, and/or meta-review). This is a semester-long course and therefore methods described from the fall 2015 semester were amended for the new students enrolled in the spring 2016 semester. The results discussed reflect the trend in data from fall to the spring semester.

4. RESULTS

4.1 Peer Review Design

This excerpt of the study into student perceptions of peer reviews discusses results from an education course geared towards pre-service teachers. Students were asked to participate in multiple rounds of formative peer review, culminating in a final round of summative assessment where peers graded each other's developed lesson. Students were asked to create a digital lesson to teach peers about a topic in education. Students completed multiple stages for this scaffolded assignment, each followed by a round of peer reviews: a 3-paragraph research essay on their topic, followed by formative peer reviews; an initial draft of their lesson, followed by formative peer reviews; and, their final lesson, submitted for summative peer review during which students assigned grades to one another. All peer review was conducted through *Expertiza* and was designed to be anonymous.

Figure 1: Peer Review Procedures by Course

Subject/Course	Number of Responses	Technology	Purpose & Process of Peer Review
Education	331	Expertiza	Three Rounds: 1 & 2 were formative; 3 was summative -Round 1 = 3-paragraph essay -Round 2 = complete draft -Round 3 = final draft All reviews were anonymous

4.2 Participants

In the fall 2015 semester and spring 2016 semester, students in an education course agreed to participate in the research (see table below). The students were asked to complete an anonymous online survey after engaging in each round of peer review. Students completed multiple rounds of peer review, and thus completed the survey multiple times during the semester. Accordingly, the numbers reported below indicate *survey responses* rather than *numbers of students*.

Figure 2: Demographics/Logistics of Participants

Fall 2015	Spring 2016
Gender o Female 88% (N=142) o Male 11% (N=17) o Prefer not to answer <1% (N=1) Student Status o Full-time 88% (N=141) o Part-time 12% (N=19) Age o 18-22 66% (N=104) o 23 or older 34% (N=56) Delivery Modality o Face to Face 70% (N=110) o Online 30% (N=50) Round of Peer Review o Round 1 52% (N=86) o Round 2 43% (N=71) o Round 3 0% (N/A) Anonymity o I knew who reviewed my work Yes 37% (N=58) No 63% (N=102) o I knew whose work I reviewed Yes 55% (N=88) No 45% (N=72)	Gender o Female 82% (N=137) o Male 18% (N=30) Student Status o Full-time 92% (N=153) o Part-time 8% (N=14) Age o 18-22 56% (N=93) o 23 or older 44% (N=74) Delivery Modality o Face to Face 73% (N=122) o Online 27% (N=45) Round of Peer Review o Round 1 54% (N=91) o Round 2 44% (N=74) o Round 3 (N= 84) Anonymity o I knew who reviewed my work Yes 2% (N=4) No 98% (N=163) o I knew whose work I reviewed Yes 14% (N=24) No 86% (N=143)

4.3 Quantitative Survey Results

The quantitative survey items revealed that education students' impressions varied between semesters; however, the overall impressions were positive (see table below). Across both semesters, students found being reviewed and reviewing to be beneficial and reported comfortability in both roles. During the fall semester, the lowest scores were reported when students were asked whether they would like to see a similar peer review process implemented by more instructors. In variation, the lowest scores in the spring semester were reported when students were asked whether they received new insight into their work. Highest scores were reported in the fall semester when students were asked if they intended to change, or had already changed, their work based on the peer review process. The spring semester's students reported the highest scores when asked about the peer review system's ease of use. The overall rating of the peer review experience improved between the two semesters.

Figure 3: Mean Scores from the Quantitative Survey Items

Formative Assessment Survey Questions	Fall 2015	Spring 2016
	N=160	N=167
1. The reviews I received addressed the questions/ concerns I had about my work.	3.90	3.77
2. The reviews I received gave me new insight into my work.	3.86	3.76
3. The reviews I received helped me understand what I needed to change about my work.	3.97	3.81
4. I trust the feedback I received.	3.87	3.86

* 5. I plan to change (or already changed) my work based on the review process.	4.11	4.20
* 6. I felt comfortable giving feedback to my peers.	3.86	4.11
* 7. I felt comfortable receiving feedback from my peers.	3.97	4.10
* 8. The peer review system was easy to use.	3.82	4.29
9. The reviews I received were beneficial to me.	3.90	3.80
* 10. The process of reviewing other students' work was beneficial to me.	3.89	4.17
* 11. I wish more of my instructors would use this type of peer review in their classes.	3.34	3.81
Overall Evaluation of Peer Review Process (Composite of 1-11)	42.5	43.7
* = Increase occurred > All means are from a 1-5 scale		

The greatest difference between the semesters occurred when students were asked if they would like to see peer review of this type implemented in other courses (3.34 vs. 3.81). In contrast, the largest decrease occurred when students were asked if the reviews they received helped them identify necessary changes (3.97 vs. 3.81). Overall, the increased positivity between results in the fall and spring semester was greater than the rate of decrease, and the comprehensive results increased from the fall to the spring (42.5 vs. 43.7).

The consensus impression was positive, with every question indicating more strongly agree/agree responses across both semesters. Fall students responded most positively to the items related to recognizing and making changes in their artifacts (i.e. "The reviews I received helped me understand what I needed to change…" and "I plan to change my work based on the review process"). In contrast, spring students rated the utility and logistics of the peer review process most positively (i.e. "The process of reviewing other students' work was beneficial to me," and "The peer review system was easy to use"). While the responses were predominately positive, a small number of students responded very negatively to certain items. Fall students responded most negatively to the idea of using peer review in other classes. In the spring, students responded most negatively to the helpfulness of the reviews they received (i.e. "The reviews I received gave me new insight into my work"). The differences between the semesters support current literature that students benefit more meaningfully while acting as the reviewer. The increase in Question 11 indicates that spring students were more satisfied with the peer review experience than their fall counterparts. The decrease in Questions 1, 2, 3, 4, and 9 indicate that students did not receive the type of helpful feedback they were anticipating. These results are further enforced by the open-ended responses. Similarly, the increase in Questions 5, 6, 7, 8, 10, and 11 indicate that spring students were more comfortable with the peer review process than fall students.

4.4 Summary of Qualitative Data

The survey included five open-ended questions. Students were asked to consider both what they liked and what they found challenging about the peer review process, what kind of feedback they valued most, and what suggestions they had for peer review. They also had an opportunity to add additional information not specifically requested. In both the fall and spring semesters, education students saw peer review in a positive light. One fall student observed, "When I am reviewing the work of someone else, I find my self [sic] noticing things that I need to work on in my own work; I end up with a whole sheet of paper of revisions I need to make on my own work." Similarly, a spring semester student stated, "I was able to understand how to review as well as when I reviewed what I should improve."

Students valued the peer review feedback as a form of copy editing much more in the fall semester than those students in the spring. While students from both groups mentioned the benefits of input on formatting, grammar, and sentence structures, spring students appreciated, and were looking for, more substantive changes. One spring student stated in response to the item that asked what kind of feedback was most beneficial: "The feedback about what was good, the feedback about what I could change, AND [sic] advice on how to do so." Another stated, "One reader stated what she learned from my paper and I think having someone reflect what they see in your lesson is about is helpful, making sure what your readers are getting and what you wanted to communicate are lining up." When giving feedback, however, students were uncomfortable giving critical feedback and questioned their ability to give good feedback because they felt they lacked expertise. Assigning grades during the summative round of review (round 3) was felt to be especially difficult for this reason. Students felt it was hard to think of what to say when they saw the work as being quality work or to not repeat what others had said when such feedback was visible to them.

Technology concerns were less prevalent in the spring responses. Where fall students struggled while experimenting with multiple technology platforms (i.e. Google Docs, *Expertiza*), spring students found the technology to be an asset. The instructor streamlined the spring peer review assignment to exist entirely in *Expertiza.* Students responded very positively to *Expertiza,* with one student reporting: "I really enjoy using Expertiza for this type of assignment." Where technology issues were mentioned in more than 60% of open-ended responses from the fall responses, technology was only mentioned 6 times in the (4%) 167 responses made in the spring data. Instead, the predominant theme of the spring data found students to be critical of their peers' level of investment in the peer review process. Students were disillusioned about mismatched feedback, where "the chosen [ratings] did not always match up with the comments." Valid, reliable, constructive, and thorough feedback emerged as

students' greatest desires, and subsequent disappointments. Students were neutral/positive about receiving summative scores from one another but were dissatisfied/negative about reviewing unexplained or mismatched feedback that accompanied that grade. One comment read, "I didn't have any problem with being graded by other students. I just didn't like how I never received feedback on why they gave me the grade [they] did." Another student recounted, "I received a good grade but it was not a perfect score and I wish I knew what was lacking…I heard a couple of my peers stating the same desire."

Positive responses from students discussed how students enjoyed seeing others' work as this helped "clarify" the assignment. Students from both semesters valued constructive criticism more than complimentary "vague" commentary, as well as differing perspectives on their work. Students from the spring semester felt a deeper practical connection to the peer review process after it was compared to grading. A practice, or training exercise, was added to the spring semester. These students completed a calibration assignment in *Expertiza* that allowed them to assess two artifacts against an expert assessment. Students were asked to consider what was effective and ineffective in two example lessons plans. These lesson plans were created by students from a past semester, and each were representative of noteworthy positive and negative aspects. Students compared their rankings to an "expert" review completed by the instructor. By evaluating these two lessons, spring students had an advantage over fall students; they were provided with a model to guide their own submissions and peer review responses. As pre-service teachers, spring students were instructed during the assignment introduction that peer review is a dry run for future students. While this point was mentioned in the fall semester, peer review was presented as a more practical skill for these teachers during the peer review training process.

While the data responses from both semesters were mostly positive, the negative commentary evolved from the fall to the spring to show a progressive direction for peer review in this instructor's classroom. Far fewer students were disillusioned with peer review during the spring semester. Negative-toned commentary was centered almost entirely on students' dissatisfaction with feedback (or, a lack thereof). Students wanted "slacker" peers to be held accountable for their failure to provide substantive and "constructive" feedback. Of the twenty open-ended responses coded as "negative" (indicating unhappiness, dissatisfaction, *et cetera*), 16 mentioned a dissatisfaction with incomplete, mismatched, or unreliable feedback. A student responded by stating, "I think that for the reviews, students should be graded on completing the comment section. It was really frustrating receiving grades below a [perfect] score and not have [sic] an explanation as to why. It made me feel as though my peers were not actually taking time to assess my work."

5. CONCLUSIONS

While there are changes in students' impressions of peer review between the fall and spring semesters, this study's hope to find students making changes to their writing after engaging in peer review consistently occurs between both semester. Students consistently rated that they planned to make changes to their work after engaging in the peer review process. The improvements implemented by the course instructor, including training and streamlined technology, positively affected the students in the spring semester, increasing their agreeableness with this goal from an average of 4.11 to 4.2 (see Figure 3). Students across the study questioned peer review's credibility and reliability, which reflects previous scholarship [4]. While in the survey information does present trends towards overall improvement in students' perceptions of peer review, it should be acknowledged that not every question showed improvement. For instance, questions 5 and 9 show contradictory changes. While question 5 showed that more students in the spring 2016 semester made changes to their work based on the peer review process, question 9 showed that fewer students in the spring 2016 found the reviews they received during peer review to be beneficial. The instructor attributed this difference to students' participation in the calibration training prior to the first round of peer review. Having practiced giving critical feedback and having seen expert feedback from the instructor, spring 2016 students were more critical of their peers' feedback and therefore found fewer reviews to be beneficial when compared with fall 2015 students. However, due to this training, students found the peer review process to be more helpful in the spring 2016 semester as they were more engaged in the peer review process. As supported by current literature, students learn more from reviewing their peers than being reviewed. Further research and analysis should investigate how to foster reliability in reviews, or more precisely, how to help students *trust* the feedback they receive from their reviewers. More significant stakes should be placed on open-ended responses as students so highly value commentary from their reviewers.

As this snapshot is part of a larger study, the data from this course will be combined with the arcs from other instructors' courses in order to provide a more thorough understanding of how the structure of peer review can effectively promote student investment and learning. This research is ongoing and part of a larger investigation into student perceptions of peer review. The effects of these peer review processes on course instructors will also be discussed. Student perceptions of peer review have shown a positive trend as the data from this study is further probed; students are feeling more and more positively about using peer review in their classes. More importantly, students are becoming more critical of using the peer review process in order to maximize their outcomes of making changes to their writing.

6. ACKNOLWEDGEMENTS

The Peerlogic project is funded by the National Science Foundation under grants 1432347, 1431856, 1432580, 1432690, and 1431975.

7. REFERENCES

[1] Comer, D. K., Clark, C. R., & Canelas, D. A. (2014). Writing to Learn and Learning to Write across the Disciplines: Peer-to-Peer Writing in Introductory-Level MOOCs. *International Review Of Research In Open And Distance Learning*, 15(5), 26-82.

[2] Liu, J., & Sadler, R. W. (2003). The effect and affect of peer review in electronic versus traditional modes on L2 writing. *Journal Of English For Academic Purposes*, 2193-227.

[3] Lee, Chun-Yi. (2015). The Effects of Online Peer Assessment and Family Entrepreneurship Experience on Students' Business Planning Performance. *Turkish Online Journal Of Educational Technology*, 14(1), 123-132.

[4] Huahui Zhao1, Z., Sullivan, K. H., & Mellenius, I. (2014). Participation, interaction and social presence: An exploratory study of collaboration in online peer review groups. *British Journal Of Educational Technology*, 45(5), 807-819.

[5] Raes, A. T. (2015). Increasing anonymity in peer assessment by using classroom response technology within face-to-face higher education. *Studies In Higher Education*, 40(1), 178-193.

[6] Lu, R., & Bol, L. (2007). A Comparison of Anonymous Versus Identifiable e-Peer Review on College Student Writing Performance and the Extent of Critical Feedback. *Journal Of Interactive Online Learning*, 6(2), 100-115.

[7] Wang, Y., Ai, W., Liang, Y., & Liu, Y. (2015). Toward Motivating Participants to Assess Peers' Work More Fairly: Taking Programing Language Learning as an Example. *Journal Of Educational Computing Research*, 52(2), 180-198.

[8] Mulder, R. A., Pearce, J. M., & Baik, C. (2014). Peer Review in Higher Education: Student Perceptions before and after Participation. *Active Learning In Higher Education*, 15(2), 157-171.

[9] 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*(1), 30-43.