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FEATURE

**An Evaluation of Peer Review in US
Graduate Research Courses**

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Abstract. *The use of peer review is a valuable tool that can improve the quality of writing and the ability to work collaboratively in a learning community. This paper investigates the use of the peer review process in research methodology courses on the graduate level. A peer-review process was implemented with a doctoral-level course and a master-level course at a small, private university in Pennsylvania, United States of America. The researcher implemented peer-review assignments in two sixteen-week courses and measured student perceptions with a survey created for the research. A total of 27 master and doctoral students participated. The results of the study indicate that students were engaged in the activity and conveyed positive perceptions, such as increase in self-efficacy toward using a peer review process to encourage engagement in the course material. The results of this pilot study should be examined in order to promote future research on peer review as a learning strategy to increase self-efficacy of graduate students. It is also recommended that further measures be constructed to seek richer feedback on the process.*

Keywords: Peer review, self-efficacy, graduate learning strategy, survey research

Introduction

In a time of accreditation and increased accountability for universities, it is imperative that faculty have the tools to adequately measure their instructional practices beyond the traditional assessment instruments. Outcome-based assessment and instructor self-reflection have become the norm as faculty search for means to improve instructional pedagogy and student outcomes. By engaging

students in a multitude of ways of learning, instructors can formatively assess their instruction and students' ability to apply concepts in coursework. Active learning and peer engagement are two ways that can foster such evaluation of course outcomes. Peer engagement can take many forms, yet, specifically for this research, peer engagement is considered to be an activity of students collaborating and providing feedback on assignments. Formative evaluation, a sharp contrast to traditional summative assessment, can help students “manage their learning processes” and work toward meeting course objectives and goals (Odem, Glenn, Sanner, & Cannella, 2009, p. 108).

Peer review, a form of peer engagement, is a valuable tool to improve writing and work collaboratively in a learning community. It requires judgment about the relative quality of a piece of writing and adds merit to the research in hopes of removing personal biases from writing. By engaging students in a peer review process, university faculty have the unique opportunity to teach graduate students the process of peer review while formatively assessing their instruction and students' abilities to apply concepts in coursework. Doctoral and master's students can adequately engage in peer review by reading their classmates' work and formulating opinions and strategies for improvement. This can ultimately lead to better writers and researchers at the graduate level.

Literature Review

Student engagement with content is a fundamental tenant of active learning. Active learning, in particular, is a useful pedagogical strategy in helping students become involved in their own learning while thinking critically and engaging in problem-solving (Page, 1990). Bonwell and Eison (1991) defined active learning as engagement in peer review, class debate, cooperative learning, and role-play. “The philosophy of active learning fosters student engagement by emphasizing students' responsibility for their own learning as well as their peers” (Odom, Glenn, Sanner, & Cannella, 2009, p. 108). Simply put, active learning requires students to take ownership of the knowledge and use it constructively.

Furthermore, Odem et al. (2009) posits that active learning promotes a higher level of learning through the process of metacognition, and this metacognition is demonstrated when students verbalize, transfer, and apply what is learned. It is through student engagement in active learning and engagement with course material that instructors can observe mastery of content. Duron, Limbach, and Wauch (2006) theorize that university faculty should provide multiple opportunities for students to engage in higher levels of Bloom's Taxonomy such as analysis, synthesis, and evaluation (Bloom, 1956). Active learning has the potential to naturally nurture these complex processes.

It is imperative that university faculty provide opportunities conducive for active learning to occur through course projects and activities that foster this engagement. Peer evaluation, engagement in group projects, and online threaded discussions has been popular vehicles for cultivating active learning. Vos and de Graaff (2004) postulate that in order for active learning to occur, students must develop cooperative relationships with peers. Essentially, peer evaluation helps students to bridge the gap from working and learning in isolation to working and learning in collaboration.

Peer Review and Assessment

In this paper, peer review and peer assessment are an instructional strategy involving active participation in student-to-student formative evaluation. Moreover, such a peer-review process is ungraded, meaning that students do not grade each other, or do not receive a grade for the peer-evaluation exercise. It is essentially a teaching strategy that involves one student working with another in an informal, yet critical, manner to appraise writing. Peer review includes reading, analyzing, informally evaluating, critiquing, and commenting on a peer's written work.

Prins, Sluijsmans, Kirschner, and Strijbos (2005) identify peer assessment as an effective way to help students develop the skill of providing feedback and suggestions for improvement on assignments. Providing feedback to fellow students is a learning exercise in itself in that a student assesses a peer's work, which in turn may develop a skill to examine their own work with a more critical eye. Formative peer assessment helps students identify their strengths and weaknesses, develop and manage their learning processes, and work toward achieving the specified learning outcomes during the learning process itself (Gueldenzoph & May, 2002; Nicol & Macfarlen-Dick, 2006; Weimer 2003). Likewise, peer review builds a classroom community that fosters collaboration that mimics practical situations. Students are charged with the task of knowing the skill/content well enough to be able to provide feedback and work with a peer in an evaluative fashion without the consequence of assigning a grade.

Peer review should be non-threatening and informative, and ultimately, learning is constructed by this engagement with others on multiple levels such as a further understanding of the assignment, team building on common goals, the development of constructive feedback, and the development of editing skills. Peer review can be effective with or without an official peer-evaluation component. In itself, peer evaluation in this sense would be the student providing either a grade or a response to a rubric in analyzing performance.

Peer Review of Written Works

Peer review can be a useful tool at not only the baccalaureate level, but also within a graduate-level setting. An appropriate design and use of this tool is paramount. Research conducted previously in the field reveals that the use of a fellow student as a peer reviewer increases the quality of the final writing product (Cho & MacArthur, 2010; Van Swet, Smit, Corvers, & Van Dijk, 2009; Crossman & Kite, 2012). When working and providing feedback to another student, the peer brings with them many beneficial traits, including cultural perspectives, which can assist students to come to know other worldviews that are not their own (Crossman & Kite, 2012, Van Swet, Smit, Corvers, & Van Dijk, 2009). This social aspect helps students to develop essential skills and professional relationships (Maher et al., 2008). These skills are requisite for students seeking graduate degrees as the expectations of graduate students are at the higher end of Bloom's Taxonomy.

Peer review can add an interpretation and application piece to student work. Students find that they appreciate the feedback that improves the writing, but that they become better researchers and learn to work as a team (Van Swet, Smit, Corvers, & Van Dijk, 2009). Cho and MacArthur (2010) examined peer and expert (instructor) feedback. These researchers found that increasing the number of peer reviewers led to incremental improvement especially when compared to using only one peer or the instructor. Not only can this approach be useful in many disciplines, but also it can be used across disciplines (Baguley & Brown, 2009). The use of peer reviews at the master's and doctoral levels allows the student to think critically about his or her work and provide feedback to others in order to improve the work, build social relationships, and gain skills that will be useful in becoming a professional in the a chosen field.

Self-Efficacy

Graduate students bring many skills and abilities to their coursework, and their perceptions of their abilities to perform certain tasks are well established. Motivation plays a role in their self-perception. Social cognitive theory and Bandura's self-efficacy theory have proven to be an effective predictor of students' motivation (Zimmerman, 2000) and can have great impact on how students perform on individual tasks. Bandura's theory of self-efficacy, situated in social cognitive theory, is defined as an individual's belief in his or her ability to perform a given task. Bandura (1997) theorizes, "perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (p. 3). It is with this self-efficacy and perceived success, that graduate students have the ability to internalize course content and apply it appropriately to preparing professionally written papers. Bandura's work emphasized that human behavior is a driving force behind

whether a student believes he or she can be successful with a given task, and this self-awareness can lead to better performance on required tasks. Thus, self-efficacy can have a relationship to peer review. At the graduate level, it can be pre-supposed that students possess a greater level of self-efficacy in graduate school, meaning peer review can be conducted in a deeper, more meaningful manner. In fact, such learning activities allow students to grow “skill in confidence”(Maher et al., 2008). The more students are engaged, the more they take ownership, and the more confidence they may develop.

While much of the literature on peer review conveys insight to the strengths and the benefits of the learning exercise, there is little research that examines the graduate student perceptions. Graduate students must be able to take the learning in the classroom, tie it to their professional settings, and be able to apply the material. The goal of the present study was to investigate student perceptions on the possible impact of the use of peer review on their self-efficacy.

Theoretical Framework

The basis for integrating peer review into graduate courses originates from sociocultural theories that hold that human development “is founded upon social interactions” (Hopwood, 2010, p. 832). Therefore, peer review provides the student those social interactions that are not only useful to the benefit of course assignments, but also experiences that that is transferable future social engagement in the work place. Billet (2006) theorizes that social experiences represent what individuals experience and encounter when they engage with other people and situations. Many graduate students, both at the master and doctoral level, are preparing to enter new work experiences, and the shared experience of working within a social, peer review setting will assist them as they move from the classroom to their respective professional field. More specifically, adopting a sociocultural perspective that integrates structured social interaction and understanding will aid in their ability to transition into higher education positions. “It is argued that doctoral experience and its outcomes are actively shaped by students themselves” (Hopwood, 2010, p. 830), and the professional doctorate is designed for professional investigation.

These professional investigations necessitate social interaction on many levels. This is evident in the work by Maher et al. (2008) who studied the use of writing groups by doctoral students. During the investigation, students utilized precious skills, and further developed writing skills (Maher et al., 2008). Moreover, those in graduate school should “develop their own knowledge and should develop into reflective practitioners and researchers” (Van Swet et al., 2009). The active participation in peer review can allow students to become reflective and active. It could be theorized that learning is a by-product of engagement and social interaction the catalyst.

In this study, the students who participated were enrolled in either a doctoral cohort program or a master of instructional leadership program. Both groups were enrolled in a research-based course. The courses in which the peer-review strategy was implemented were similar with both groups. The courses were both in a 16-week format. The master's course was a research practicum in which students created a research design paper and the doctoral course was a co-taught combined methodology course. Each of the courses used a peer-review process which encouraged collaboration in and out of the classroom. Peer review was employed to ensure students were held accountable for content and able to actively engage and review the work of peers in a professional, timely manner.

Methodology

This research study investigated the perceptions of graduate students who participated in peer review during a 16-week course using survey design. The research questions were (1) What are students' perceptions of the peer review process in graduate level courses? and (2) What perceived effect did a peer review process have on students' self-efficacy in the writing process?

Research Design

Survey research was utilized because it can gather "individuals' opinions relatively effectively, accurately, and cost effectively" (Huer & Saenz, 2003, p. 212). Surveys are primarily quantitative in nature (Polit & Beck, 2010). The study employed a survey that consisted of a 12-question Likert Scale. A 4-point Likert scale was utilized because of the small sample of responses and to ensure a forced response. This instrument was piloted and beta tested 1 year prior to this study.

Research Participants

Twenty-seven master and doctoral students participated in this study. It is important to note that students were recruited by virtue of their being involved in one of the two university courses. First, doctoral students enrolled in a 16-week research methodology course were selected. The second set of participants was master's students enrolled in a 16-week research practicum course.

Participants were informed of their rights, the confidentiality of responses, and ethical considerations. Students completed the survey at the end of the course of study. The two courses were similar in that the students were working on research papers. The doctoral students completed a proposal utilizing all the research designs discussed in the course, while the master's students were responsible for creating and carrying out research in the field. Class time was

provided for students to meet and discuss their work and students were encouraged to communicate outside of class. Students were paired with a peer by use of random assignment.

Research Setting

This study was conducted at a small, private university in Pennsylvania, in the United States. Both courses are categorized as research methodology courses that ran for 16 weeks or one semester, taught by two different instructors.

Data Collection and Analysis

In order to collect the data, the researchers, who were the instructors for the courses, administered the survey on the last day of classes. Once collected, the results of the close-ended Likert-type questions were entered into the Statistical Package of the Social Sciences (SPSS). The frequency of participant response to the scale for each item was examined. The open-ended items were transcribed by the primary researcher and coded into themes.

Each course instructor required students to actively participate in the semester-long, peer-review process. Specifically, students were assigned to a peer with whom to work over the course of the semester in a peer-review role, which included reading, analyzing and commenting on written work, discussing ideas, theories, positions in class, collaborating on research-related in-class activities, and essentially serving as a peer coach for all written work prior to submission to the instructor. The peer-review role was described to the students at the start of the semester. Students called their peer-review partner their “critical friend” as cited in the survey.

During the last week of classes, the survey was administered to participants. Students completed the survey in class. There were no incentives to complete the survey. The survey was constructed to provide insight to the two research questions. Ten items on the survey related to Research Question 1, the process of peer review as a learning activity, while two questions addressed Research Question 2 self-efficacy. This study served as a pilot for future implementation.

Results

The purpose of the survey was to ascertain graduate student perceptions of peer review as a learning tool and the relationship to self-efficacy. Overall, students in both groups expressed positive perceptions of the peer-reviewed process and expressed a high level of self-efficacy due to the use of the teaching strategy. These results were substantiated by both the qualitative and quantitative

data gleaned from survey responses and open-ended prompts. The following results are organized by the chosen research questions.

Peer Review as a Learning Tool (RQ1)

The results of the survey showed dissimilar patterns of responses between doctoral and master's students in regard to their responses to items on the survey that related to RQ1 (See Table 1 & 2). The results indicate a positive perception of the peer-review process. Items 1-4 and 8-12 on the survey relate to RQ1. These items can be separated into three categories; features of the critical friend exercise (1-4, 7-8), relationships (9, 10), and time spent on the learning activity (11, 12). Overall, the majority of the participants either agreed or strongly agreed with the statements about the features of the critical friend (peer-review) exercise, the details of which will be explored. Overall, the master's students responded more favorably on average than the doctoral students to each of these items. In fact, 100% the master's students either agreed or strongly agreed to each of the items that examine the features of peer review. While both student groups responded favorably to item 1 on the survey, 93.3% of the doctoral students agreed or strongly agreed. Both student groups understood their role in the peer review process (Item 7) and believed that the feedback received from the peer was both constructive and clear (Item 2 and 3 respectively).

Another feature of the peer-review process is the ability to give constructive feedback to the peer (Item 8). Of the doctoral students, 92.9% agreed or strongly agreed that they gave such feedback whereas all of the master's students responded favorably. The greatest difference between the two student groups was in regard to item 4. This survey question inquired as to the engagement of the peer-review partner during the course of the semester. Some of the doctoral students, 13.4%, either disagreed or strongly disagreed about peer engagement. The master students all responded favorably to the item on peer engagement. This is a concern and, while future research will be necessary to examine this perception, it is noteworthy that 86.7%, or the majority, of doctoral students still believed that they were engaged with their peer review partners. Many factors course play a role in this difference. One might assume that doctoral students are juggling more family or life issues than master's students, as well as, carrying a heavier course load. This however cannot be substantiated through the responses.

In order for peer review to be effective, the students must immerse themselves in the activity. In item 12, 93.3% of the doctoral students used in-class time to discuss various features of the research time, whereas 100% of the master's students used the time to work on their research projects. Therefore, the master's students used the time in class to gather feedback on the research process and writing whereas the doctoral students performed additional activities in formulating research agendas and reviewing written work on several varying assignments connected to research methodology.

Table 1

Frequency of Responses to the Critical Friends Survey by Master's Students

Statement	<i>n</i>	SD	D	A	SA*
1. Using a critical friend was helpful in my work in this course.	12	0%	0%	50.0%	50.0%
2. The feedback from my peer was constructive.	12	0%	0%	58.3%	41.7%
3. The feedback from my peer was clear.	12	0%	0%	50.0%	50.0%
4. My critical friend was engaged throughout the semester with my work.	12	0%	0%	41.7%	58.3%
5. After engaging with my critical friend, I feel better prepared to share my writing in a public setting.	12	0%	0%	50.0%	50.0%
6. I feel better about my own writing after engaging in work with my critical friend.	12	0%	0%	50.0%	50.0%
7. I understood my role as a critical friend.	12	0%	0%	41.7%	58.3%
8. I was able to give constructive feedback to my critical friend.	12	0%	0%	41.7%	58.3%
9. My professional relationship was strengthened by engaging with my critical friend.	12	0%	16.7%	25.0%	58.3%
10. My personal relationship was strengthened by engaging with my critical friend.	12	0%	8.3%	41.7%	50.0%
11. I worked with my critical friend outside of class.	12	0%	33.3%	41.7%	25.0%
12. I worked with my critical friend in class.	12	0%	0%	33.3%	66.7%

*SD: strongly disagree; D: disagree; A: agree; SA: strongly agree

Table 2

Frequency of Responses to the Critical Friends Survey by Doctoral Students

Statement	<i>n</i>	SD	D	A	SA*
1. Using a critical friend was helpful in my work in this course.	15	0%	6.7%	53.3%	40.0%
2. The feedback from my peer was constructive.	15	0%	0%	46.7%	53.3%
3. The feedback from my peer was clear.	15	0%	0%	46.7%	53.3%
4. My critical friend was engaged throughout the semester with my work.	15	6.7%	6.7%	66.7%	20.0%
5. After engaging with my critical friend, I feel better prepared to share my writing in a public setting.	15	0%	13.3%	46.7%	40.0%
6. I feel better about my own writing after engaging in work with my critical friend.	15	0%	20.0%	46.7%	33.3%
7. I understood my role as a critical friend.	15	0%	0%	46.7%	53.3%
8. I was able to give constructive feedback to my critical friend.	14	0%	7.1%	50.0%	42.9%
9. My professional relationship was strengthened by engaging with my critical friend.	15	0%	6.7%	40.0%	53.3%
10. My personal relationship was strengthened by engaging with my critical friend.	15	0%	6.7%	33.3%	60.0%
11. I worked with my critical friend outside of class.	15	13.3%	20.0%	40.0%	26.7%
12. I worked with my critical friend in class.	15	0%	6.7%	33.3%	60.0%

*SD: *strongly disagree*; D: *disagree*; A: *agree*; SA: *strongly agree*

Additionally, the final paper for the doctoral students was the proposal of various quantitative and qualitative research designs while the master's students were choosing and implementing one in an educational setting in the field.

Additionally, while both student groups were encouraged to work with their partner outside of class; when responding to item 11, only 66.7% of the both student groups indicated that this occurred. From the doctoral students, 13.3% strongly disagreed and 20% simply disagreed that they worked outside of class with their peer-review partner. This is a critical piece of the process. Putting forth the extra effort needed to work as a reliable peer reviewer takes time and patience. Doctoral students may have perceived this as added work to their already overloaded schedule. From the survey results, it becomes clear that students expected to work with their critical friend (peer-reviewer) primarily during class time. Although this would seem like a valuable component of the exercise, it is not always feasible in graduate courses. It was difficult for many students to connect outside of class time, but as a peer reviewer, it is imperative. Especially for doctoral students, the exercise was meant to validate the concept that writing and revising is a recursive process that takes a great deal of time to master, and writing, revising and communicating outside of the classroom walls are mandatory.

The last piece in regard to RQ1 relates to both personal and professional relationships. Both sample sets agreed to *strongly agree* with item 10, that their personal relationships, those relationships outside of the classroom, were most likely not enhanced due to the peer review process. The doctoral students responded favorably at 93.3% while the master's students rated the area at 91.7%. It would be assumed that professional relationships would be created from this exercise, and this may have to be revisited both in the wording of the item 9 and the implementation of the process. The findings were surprising considering that 83.3% of master's students and 93.3% of doctoral students agreed or strongly agreed that professional relationships were strengthened in the process. While the doctoral students responded similarly to both item 9 and 10, it is interesting to see the different pattern of response with the master's students. Overall, it can be stated that the core features of peer review was positive as per the results of this research. While differences exist between master and doctoral students, future research on a larger scale will need to be conducted in order to examine the usage of peer review on graduate level work.

Self-Efficacy (RQ2)

The second research question sought to examine whether students perceived that their self-efficacy was increased by use of the peer-review learning strategy. There were two items on the survey that sought to answer this question. In order to measure self-efficacy, the researcher asked about two abilities of the students, namely that they would be able to share their writing in a public setting (Item 5) and that they had more positive perceptions about their own writing ability after engaging in the peer-review semester-long exercise. In regard to these two items,

100% of the master's students agreed or strongly agreed that the peer-review process increased their level of self-efficacy. This result, while still favorable, was not rated as highly by the doctoral students. Specifically, 86.7% of the doctoral students responded that they agreed or strongly agreed that they were more prepared to share their writing in a public setting. Additionally, 80% of these students had an increased self-efficacy in relation to their own writing at the end of the process. While the results of this pilot study show favorable outcomes on these two indicators of self-efficacy, future research should be conducted, perhaps extending the survey, to more accurately measure the self-efficacy of graduate students.

Discussion and Conclusion

In this pilot study, the data collected showed positive perceptions and support of the peer review process. Overall, the participants responded favorably to peer-review as a learning strategy. Although the master's students expressed a higher level of satisfaction with the process, this may be due to other factors, such as the nature of the course designs or the structure set forth by the professors of the courses. Additionally, the findings of this pilot study should be examined in order to promote future research on peer review as a learning strategy to increase self-efficacy of graduate students. It is also recommended that further methods should be employed to collect data. It may be prudent to implement a qualitative, phenomenological approach in order to uncover the lived experiences of graduate students partaking in a peer-review writing assignment. Future research should investigate the value of the peer-review approach at both the doctoral and master's level. Finally, the small sample size participating in this study is a limitation and should be regarded as such. Future research would be imperative with a larger sample size to compare results. It is through peer collaboration and a structured process that effective feedback can be provided for students, and this pilot study will serve to begin the conversation about peer review.

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