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THE EFFECT OF PEER AND LAB REVIEWS ON BUSINESS STUDENT WRITING¹

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ABSTRACT

This study was conducted to statistically assess the impact peer reviews and writing lab reviews have on student writing. The subjects of this research were business students taking an international business class that requires a writing assignment from all students. Four different sections of this class were used in the study. With one section as a control group, another section required students to participate in a student peer review of papers before submitting the final draft for grading. A third class was required to have its papers reviewed at a writing lab before submission. The fourth class did both. The scores were compared after the unidentified papers were graded by the same instructor. This study adds to the literature by showing that a peer review is comparable to a lab review, but that using a peer review and a lab review could lead to an even higher performance.

Keywords: Peer Reviews; Writing Lab Reviews; Business Student Writing; Effect of Peer Reviews on Student Writing; Effect of Writing Lab Reviews on Student Writing

THE EFFECT OF PEER AND LAB REVIEWS ON BUSINESS STUDENT WRITING

One of the perennial challenges business schools have is to improve the writing of its students. To this end, many schools have written business communication classes supplemented with other required writing assignments throughout students' other business courses. Some schools also have writing labs that students may use (or must use) for their writing assignments. In addition, courses may employ peer reviews to help students compare their work to others, and thus improve their writing. But how effective are these methods when used individually and when combined? This study was conducted to help answer this question. The subjects of this research were junior-level business students in an international business class. This class requires a 1500- to 2000-word writing assignment from all the students. Four different sections of this class were used in the study. With one section as a control group, another section required students to participate in a student peer review of papers before submitting their own final draft for grading. A third class was required to have its papers reviewed at a writing lab before submission. The fourth class was required to do both. The papers were graded using a standard rubric, and then the scores were compared.

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LITERATURE REVIEW

Writing is one of the most important skills students need in order to perform well in school and later in careers and in personal life. It is common to note that many students do not write well, or not as well as we expect them to, in both K–12 and colleges across the United States (Petersen 1982; Davis 2009; Cardine 2015; Chtena 2015; Dickson 2016). Educators from many of those schools have studied this problem and put forward their recommendations to educators at all levels (Smit 2019). The following paragraphs review the existing literature on the writing problem students have, research educators have done, and the recommendations they have made to the academic world.

The Crisis in Writing

Study results and research articles indicate that students do not have enough opportunities to write in school, including K–12 and colleges and universities across the United States. Students in K–12 have limited writing assignments, and the types of writing practice usually comes from information searches on the web, summaries of historical events, or documenting field trips. When students enter colleges and universities, they are expected and required to write much longer and more complex papers, usually argumentative or analytical, within a certain context area such as sciences or business management. In other words, a gap exists between writing expectations in colleges and universities and the writing practices of K–12. Once in college, students are usually required to take one lower-level and one medium-level writing class, and then they are expected to write a higher-level paper toward the end of their undergraduate career (Applebee and Langer 2006; Thaiss and Porter 2010; Christesen et al. 2004; Chtena 2015; Dickson 2016; Smit 2019).

Chtena (2015), a former foreign-language instructor at the University of California at Los Angeles (UCLA), was surprised to see that the quality of the papers by his undergraduate students varied significantly. Many students wrote papers without good organization, coherent content, and proper use of grammar. The UCLA administration was apparently aware of the issue and recommended that Chtena refer his students to the writing center for help. Chtena went on to research the reasons for the poor writing skills of his students, and he found that public K–12 schools do not provide enough opportunities for students to write, and even when they do write, they do not get enough feedback from their instructors or peers.

Perhaps the article posted on the Stanford University's *Tomorrow's Professor Posting* gives a better idea about the so called "writing crisis" that exists among students in the United States (Smit 2019). This article states that in a recent report by The National Assessment of Educational Progress (NAEP), only 16% of eighth graders tested can write at the level of "skillful" or better, and that only 26% of twelfth graders can write sufficiently and persuasively. Surprisingly though, between 60% and 70% of these two groups of students were labeled as "sufficient writers" by the NAEP.

Given the NAEP test results, we might question if there is indeed a writing crisis among our students. However, the historical data suggest that the writing crisis has been in stable existence for more than one hundred years (Smit 2019). In fact, the crisis was reported to begin at the end of the nineteenth century as public education became more ubiquitous. However, Hillocks (1986)

argues that the writing crisis might be a subjective term due to our attitudes about and expectations toward the quality of student writing. He indicates that no national common standard has been established to help us determine what constitutes good or poor writing skills for students at various levels of education. Furthermore, the author argues that writing is a complicated process, and that we do not have a clear agreement about the meaning of the claim that students do not write well. For example, we may mean that the article is not well organized, or it does not have enough content or evidence, or we may also mean that the article does not use appropriate grammar or tone. We must understand the issues students have in order to help them improve their writing (Hillocks 1986).

It is interesting to note from a student's perspective why college writing is such a challenging task. Cardine (2015) points out that writing exists in a very subjective world in which rules are substituted with various guidelines, and that instructors do not communicate effectively about their expectations for the writing assignment. Cardine even suggests that professors themselves should first learn how to effectively deliver their messages to students before making the assignment. Cardine also asks professors to understand the diversity in student writing background because some students may have a better foundation in writing than others. She further argues that the writing students are asked to do in college is very specialized, and many students do not know what each kind of paper requires in terms of content and organization. In Cardine's perspective, clear expectations from the instructors who make the writing assignments are extremely important.

In addition, many are concerned that the widespread use of social media is contributing to the crisis in writing as well. Posting or texting on social media platforms does not require complete sentence and perfect grammar, and students tend to use abbreviated phrases for quick communication. There has been wide concerns and debate on whether social media plays a positive or negative role on student writing. Researchers believe that social media helps with student writing performance because they must spell and type in words or sentences instead of talking over the phone (Risto 2014; Alrubail 2015; Ashraf 2019). Without a good number of academic studies performed on this subject, it is probably premature to draw conclusions on the real impact of social media on student writing. More research in this area is needed.

Strategies to Improve Student-writing Skills

Throughout the U.S., educators who teach writing have recommended ways to improve student writing, and their recommendations are quite similar and consistent. Many instructors recommend that students think critically and carefully about the writing assignment before starting to write. They recommend that students understand the expectations and guidelines from their instructors. On the other hand, education researchers also make many suggestions on how instructors can help their students improve their writing ability. In fact, the most effective way found to prepare students to write well is called *structured learning* or *strategy instruction*, both of which emphasize the importance of goal setting, content organization, and style formation. Those teaching pedagogies stress the benefits of creating a supportive and collaborative learning environment for students (Graham 2006). One such specific structured learning strategy is called the *environmental mode* (Hillocks 1986), which emphasizes providing clear expectations from the teacher, preparing materials and exercises to engage students with each other to learn together, and

engaging in activities with a large number of peer interactions to give students opportunities to work collaboratively.

In general, instructors can help students write better by teaching them to learn and write rhetorically. The bottom line is to give students more writing opportunities and timely feedback on their drafts (Petersen 1982; Walvoord 1986; Tollefson 1988; Watkins 1990; Davis 2009; Smit 2019; University of Wisconsin 2019). Specifically, the writing assignments should give students a rhetorical situation for the writing task in terms of the purpose, theme, and audience. Instructors should also teach and emphasize the process of good writing by helping them generate ideas, plan the content and organization, and edit and revise their draft. The instructor should give students ample time to practice writing skills and give them focused and detailed evaluations on student performance at different stages of the writing assignment.

Standard University professors also point out that it is important to realize that students do not get enough practice writing if they only write in English classes (Smit 2019). We should recognize that all majors and concentrations need to require significant writing outside of English classes. Trained instructors should be able to teach students to write effectively in all academic disciplines such as law and business.

Strategies to Improve Business Students' Writing Skills

It is not surprising to note that surveys showed that business schools have failed to adequately prepare students for effective communications, and those schools need to revise their curricula across the business schools (Siegel and Sorensen 1999; Albrecht and Sack 2000; Christensen et al. 2004). Nevertheless, business school faculty have a deep understanding of how important it is to prepare students for a successful career in various fields of today's world (Campbell and Kresyman 2015). They also actively explored effective pedagogical methods to provide a collaborative learning environment that promoted student engagement with the learning subjects and interactions with their instructors and peers (Harker and Harker 2007; Kirkham and Ringelstein 2008; Einfalt and Turley 2009; Scutter and Wood 2009; Dobozy 2012; Douglas 2012). Those efforts from the business faculty are in line with the learning strategy of the *environmental mode* (Hillocks 1986).

Many accounting departments in the United States added communication assignments in response to the demand, and a few studies found a positive impact on writing from such assignments (Mohrweis 1991; Stout et al. 1991; Stocks et al. 1992; Garner 1994; Riordan et al. 2000; Ashbaugh et al. 2002). For example, some instructors at Southern Utah University (Christensen et al. 2004) conducted an experiment to see how to improve the writing skills of accounting students in their university. To test if accounting students can improve their writing skills through systematic learning and practice, the researchers gave a series of one-page short essays to students in four different accounting classes (intermediate accounting, cost accounting, auditing, and advanced accounting) during the 2002 fall semester. The experiment was designed as a "one group pretest-posttest" writing score comparison with the first essay being the pretest observation and the last essay the posttest observation. "Treatment" was the feedback from the instructor for each essay for the whole semester. All essays had the same format but different topics pertinent to each accounting class. The results indicate that students' writing skills improved

significantly at the end of the semester, and the students regarded the feedback from the instructor on each essay as a main factor for their improvement.

Strategies for Peer Review in the Classroom

Peer review and peer editing are two different types of peer feedback. Rieber (2006) defines peer review as “a process in which students individually, or in groups, evaluate and assign grades to other students’ work.” In contrast, peer editing is often the practice of low-stakes editing of a classmate’s written work. Various approaches to peer review include open-ended peer review, guided peer review, and directed peer review; each approach has benefits and drawbacks (Rieber 2006). Studies suggest structured peer review with detailed rubrics provide reliable, efficient, and effective feedback that is consistent with instructor feedback (Marcoulides and Simkin 1995; Cho et al. 2006).

Higher education often uses peer review as a learning tool for students. Several research studies examine the effects of peer review on student writing. Topping (1998) suggests that those assessing others’ work spend more time “thinking, comparing, contrasting, and communicating” the topic. These activities are demanding for the reviewer but can help the reviewer solidify his or her own knowledge on the subject. Students also use peer reviews as a reference and for comparison of their own work among the work of their peers (Topping 1998). Baker (2016) suggests that instructors who implement peer review force the students to begin writing earlier. The research also showed that students make more substantial changes before submitting the final paper (Baker 2016). Crossman and Kite (2012) find that students have statistically significant gains between the first draft and the final draft when peer review assignments are present. Law and Baer (2017) also find that students improve their revision skills through writing labs and peer review. Thus, multiple revisions and drafts are helpful for students to improve their writing (Crossman and Kite 2012; Law and Baer 2017).

Lundstrom and Baker (2009) studied groups of students who participate in peer review assignments: one group of students who only received feedback and one group of students who only gave feedback. Both groups benefit from peer review, but those who give the feedback learn much more than those who receive the feedback. In addition, the group of students who give peer feedback were better able to implement better writing skills in their own writing (Lundstrom and Baker 2009). Additionally, Mon and Zein (2017) find that written feedback is beneficial to students’ work, and students found more errors than instructors did. However, the students who receive both student and instructor feedback will implement instructor feedback at higher rates (Mon and Zein 2017).

Li and Gao (2016) find that peer review impacts learning abilities differently. For example, students in the low-achieving and average-achieving groups of the study perform significantly better on the project than those who did not have a peer review assignment. Students in the high-achievement group also did better than those without a peer review assignment, but there is no statistically significant difference in scores. However, Crowe, Silva, and Ceresola (2015) review the effects of peer review by implementing group peer feedback during class periods. During class, the students gathered in small groups and read each paper and provided feedback based on detailed instruction and rubrics. The researchers note that the peer review did not affect grades or

performance on learning objectives. They even suggest that peer review is a waste of in-class time and should be an entirely out-of-class experience.

Related to attitudes toward peer reviews, some studies examine strategies to close the gap between feedback students received and feedback ultimately used by students. Specifically, the literature studies how students perceive and use peer review feedback received from other students, and how various types of peer review methods can influence student performance and satisfaction differently (Lu and Bol 2007; Xiao and Lucking 2008; Cartney 2010; Evans 2013). Cartney (2010) studies how a peer assessment process can ensure students use the feedback they receive. She finds it is important for students to appreciate “the emotional as well as the cognitive aspects of peer learning.” Cartney (2010) suggests that cultural changes in the peer assessment system may be necessary before the feedback can be more effectively used by students who receive it.

Evans (2013) conducted a literature review on assessment feedback that college students received within their courses from various sources from 2000 to 2012. The author developed and presented a feedback landscape based on “sociocultural and socio-critical perspectives” to be used as a framework for further research. Xiao and Lucking (2008) compared how two peer review methods can impact college students’ writing performance as well as their satisfaction with the peer review process. The researchers found that students in the experimental group improved more in their writing ability and were more satisfied with the peer assessment methods and feedback than their peers in the control group.

Lu and Bol (2007) studied how anonymous and identifiable electronic (e-peer) review may impact college student writing performance as well as the degree of critical peer feedback differently over a two-semester period. With the same instructor teaching two of the same classes over the two-semester period and all other elements held constant, the results of the study suggest that students in the anonymous e-peer review group outperformed the students in the identifiable e-peer review group in both writing performance and in the extent of critical feedback provided to their peers. These results suggest that in an anonymous environment, students are more likely to give valuable and more critical feedback to their peers, and those students are more likely to incorporate feedback from their peers.

Effects of Writing Labs on Student Writing

In addition to peer reviews, writing center visits offer a good opportunity for student feedback on written work. Writing centers can be an excellent collaborative learning tool for students. Annett (1997) suggests that tutors in the writing centers practice collaborative learning with the students attending the center. The students who attended the writing center learn to develop better writing skills. Missakian, Olson, Black, and Matuchniak (2016) suggest that it is imperative to manage the expectations and perceptions of the writing center to various stakeholders, including students, administration, and faculty.

To manage the expectations, writing centers use assessments to convey their value to the university and provide feedback for growth. In her review of literature on writing center assessments, Gofine (2012) provides an in-depth look at the published research on the effectiveness of writing centers on student satisfaction, student writing ability, grades, and college

retention. Morrison and Nadeau (2003) evaluated the student satisfaction with writing center visits. The students were asked to complete satisfaction surveys before and after receiving a grade on the writing assignment. The students were more satisfied with the writing center before receiving their grade than after receiving the grade across all grade levels (A, B, C, D). The results suggest that students expect the writing center tutors to correct and edit their entire paper before final submission.

Jones (2001) finds that writing centers and the peer interaction between the two parties is an effective teaching strategy. Online and face-to-face writing centers improved student writing, although measuring the improvement directly is difficult to achieve. Often course grades are used as a measure of writing improvement; however, Lerner (1997) suggests they are questionable since the overall class grade includes other aspects such as participation. A couple of studies suggest that students feel annoyed when required to visit the writing lab; however, after visiting the writing center students report multiple benefits like higher grades, an increase in voluntary usage of the writing center, and a higher writing skill (Gordon 2008; Henson and Stephenson 2009; Pfrenger et al. 2017). Pfrenger, Blasiman, and Winter (2017) also find that student failure and withdrawal rates decrease with required use of the writing center. Ball (2014) finds that students who use the writing center are more engaged and persistent in school.

Other studies research the impact of using writing centers directly in courses or subject areas. For example, Kastner et al. (2018), embedded writing center support (e.g., dedicated writing tutors, dedicating office hours, and frequent class attendance by the writing center assistant director) in a criminology course to evaluate the impact on student writing. The researchers find that students have fewer grammatical errors per page and are more engaged with the subject matter with the embedded writing center support. Walker (2000) reviewed the impact of a subject specific writing center located in the engineering department. The technical writing lab focused on helping engineering students improve their writing. The professors who encourage their students to visit the writing center saw improved assignment scores and improved writing ability (Walker 2000).

Combining the Use of Peer Review and Writing Labs

Few papers examine the mix of peer review assignments and the use of writing centers as a way to improve student writing. Harris (1992) defined and disentangled writing center tutoring from peer review sessions and assignments. Writing center tutors focus on helping students learn and develop better writing skills while peer review assessments typically provide a critique of the draft. Harris (1992) suggests the benefits of collaborative learning, although peer review and tutoring sessions at a writing lab far outweigh any disadvantages. After seeing the lack of research and writing skills, researchers at Texas Tech University created four sequential writing assignments to develop and strengthen these skills (Lumpkin 2015). The professor provided resources for the students such as information on how to conduct research at the university library as well as suggested visits to the writing center. The instructor also held peer-review sessions during class using a detailed rubric. The students who used the provided resources—library, writing center, and peer feedback—received higher scores (Lumpkin 2015).

Schneider (2017) suggests using peer review in a significant writing assignment and encourages students to send their peers to the writing center for further help. She also advocates

for the establishment of a writing center at every university as it helps significantly with student writing. Cohen and Williams (2019) use both peer review and writing center visits to improve student writing in large introductory economics courses. By using the available resources such as writing centers, peer review, and TAs, the authors suggest the large time cost of grading papers in a large class is minimized. In addition, the article provides detailed information about the assignments and detailed rubrics for the peer review assignments, and also suggests training for the writing lab tutors. Although the authors did not specifically measure changes in student grades, Cohen and Williams (2019) suggest the added writing activities benefit students by increasing their exposure to writing throughout the business school curriculum.

METHODS

This study was done at a public university in the Intermountain West. The university is an open-enrollment institution with about 50,000 students, including over 6,000 business majors. About 37% of the students are in the first generation of their families to attend college. We used four sections of the Survey of International Business class as subjects for this project. The class required a 1,500- to 2,000-word writing assignment as homework that compares the business culture of the student's home country with that of another country of the student's choosing. The assignment was worth 15% of the class grade. The assignment required students to analyze these two cultures using one or more cultural paradigms taught in the class. Four sections of this class were used in the 2019 spring semester for the research. In one section of thirty-seven students, the students were required to visit with the business writing lab to have their paper reviewed and to apply the suggestions given. Another section of thirty-one students was required to complete three peer reviews of the same paper written by other classmates, as well as having their own paper reviewed by three classmates. These peer reviews were conducted online using the Canvas learning management system with students completing a writing rubric and posting general comments as part of each review. In a third class, twenty-six students were required to both visit with a tutor in the writing lab and to conduct peer reviews. In all three classes, students were given time to incorporate the comments from the reviews before submitting a final paper. A fourth class of forty-one students was used as a control and had neither peer reviews nor a review from the writing lab.

In conducting the peer reviews, students were required to upload a draft of their research paper. Students were then assigned to review three papers from other students on their class teams, which were assigned at the beginning of the semester. In turn, each student received three reviews from teammates. The papers' authors were fully identified, as were the names of those that completed the reviews. These reviews were required a week after the drafts were submitted. Students then have a week to incorporate the information from the peer reviews into their papers and to submit a final draft for grading. The students were given participation credit for completing the reviews, and no assessment of the reviews themselves were given. The same papers that were used for class grades in each of the classes (at 15% of the grade) were also used for this research project.

In the section that required a visit to the writing lab, students met one-on-one with a peer tutor for twenty minutes. To become a peer tutor, a student must have received a grade of an A- or higher in the written business communication class, a class that is required for all students

matriculating into the business school. Peer tutors are trained specifically for business writing by the lab's writing consultants and director. Peer tutors also receive additional training under the auspices of the university's writing center. The tutors engage students in a dialog to help them identify effective writing strategies to improve the format, content, organization, and style (COS Rubric) of their papers, using the business school's approved COS Rubric (See Appendix A). The tutors try to create a safe space where students can talk about their writing and learn how to address their individual writing concerns.

The writing lab is seen as an extension of the classroom—not an editing service. During a tutoring session, the tutor first addressed formatting errors. Second, content was looked at in terms of context, audience, and purpose. Third, organizational issues were addressed, making sure that what is said is placed in an appropriate location using clear transitions. Finally, grammar and punctuation errors were addressed, using the first paragraph or first page of the paper, while the student watched. Students were then asked to address the grammar and punctuation errors they saw in the next paragraph or page while the tutor watched and assisted when needed. After a specific plan for improving the paper was made, revisions became the student's responsibility. Those students in the section that required both the peer review and the review by the writing lab were required to first complete the peer review before going to the writing lab.

Once the student papers were collected, all identifying information was removed from each paper. This was done so that the grader would not be influenced by names of students that she might know. The papers were then put in a random order and numbered so the reviewer would not know from which group each paper came. A single grader then graded each paper on content, organization, and style. The grader, one of the authors, is the director of the business writing lab and developed the COS rubric used in grading. The COS Rubric is used as the basis for all business school writing assignments and supports the Assurance of Learning Outcomes and AACSB accreditation standards. Out of one hundred possible points, forty points come from content, thirty points is based on organization, and thirty points addresses tone, format, punctuation, and grammar. Content, or what is said, assesses four areas: Is the audience and context understood? Is the purpose achieved clearly, concisely, and completely? Is the writing logical, analytical, critical, and creative? And are all claims accurately supported? Organization looks at when and where something is said: How easy is it to access the information? Are the transitions cohesive and coherent? And how effective are the rhetorical strategies? Style, or how something is said, assesses format, tone, punctuation, and grammar.

The scale was out of forty for content and thirty points each for organization and style, with a total of one hundred possible points on a paper. Once graded, the scores were recorded, and the papers were organized by treatment groups and the control group. There were forty-one completed papers in the control group, thirty-seven in the group that used just the lab, thirty-one in the class that used just peer reviews, and twenty-six in the class that did both.

DATA AND ANALYSIS

We first analyzed the different review methods on the assignments' total score with a two-way ANOVA. The ANOVA was a 2 (Peer Review: Yes, No) X 2 (Lab Review: Yes, No) as the independent variables and Total Score as the dependent variable. The results were a significant

main effect for Peer Review, $F(1,131)=3.03$, $p=0.042$, one tailed, and for Lab Review, $F(1,131)=2.79$, $p=0.049$, one tailed, while the interaction was nonsignificant, with $F(1,131)=0.17$, $p=0.68$. For both main effects, the review led to significantly higher scores. There was a nonsignificant trend for the Lab Review scores to be higher than the Peer Review scores as seen in Figure 1.

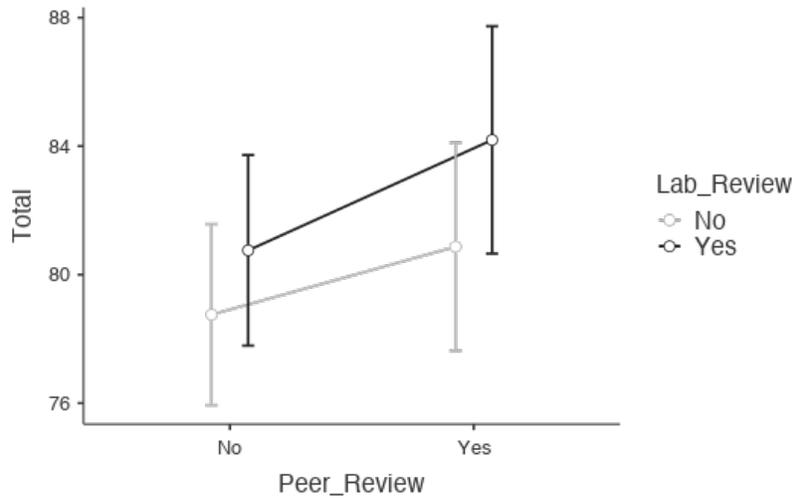


Figure 1. Peer and Lab Review effects on the Total assignment score.

We also analyzed the three components of the assignment (Content, Organization, and Style) separately. For Content, we analyzed the different review methods on the assignments' Content score with a 2 (Peer Review: Yes, No) X 2 (Lab Review: Yes, No) ANOVA with Content score as the dependent variable. The results were a significant main effect for Peer Review, $F(1,131)=2.84$, $p=.047$, one tailed, and for Lab Review, $F(1,131)=3.14$, $p=0.040$, one tailed, while the interaction was nonsignificant, with $F(1,131)=0.43$, $p=0.51$. For both main effects, the review led to significantly higher scores. There was a nonsignificant trend for the Lab Review scores to be higher than the Peer Review scores as seen in Figure 2.

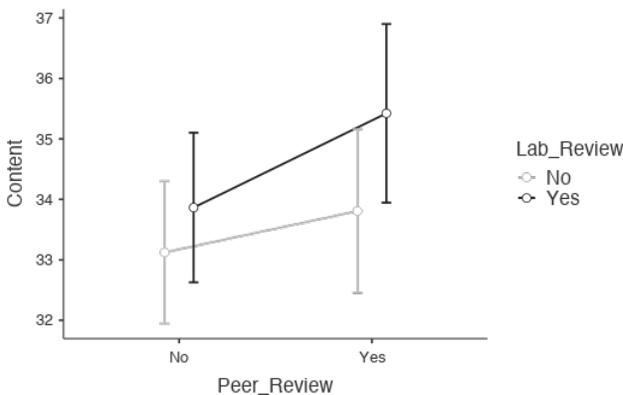


Figure 2. Peer and Lab Review effects on the Content assignment score.

For the Organization subscore, we analyzed the different review methods on the assignments' Organization score with a 2 (Peer Review: Yes, No) X 2 (Lab Review: Yes, No) ANOVA with Organization score as the dependent variable. The results were that all effects were nonsignificant, with the main effect for Peer Review, $F(1,131)=2.26$, $p=0.068$, one tailed, being marginally significant, and for Lab Review, $F(1,131)=1.45$, $p=0.230$, while the interaction was also nonsignificant, with $F(1,131)=0.06$, $p=0.80$. The trends can be seen in Figure 3.

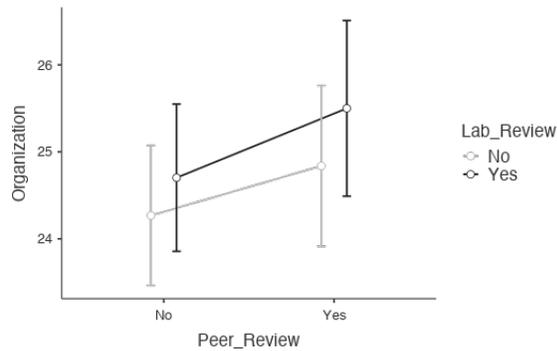


Figure 3. Peer and Lab Review effects on the Organization assignment score.

For the Style subscore, we analyzed the different review methods on the assignments' Style score with a 2 (Peer Review: Yes, No) X 2 (Lab Review: Yes, No) ANOVA with Style score as the dependent variable. The results were that the main effect for Peer Review was marginally significant, $F(1,131)=2.62$, $p=0.054$, one tailed, and for Lab Review, $F(1,131)=2.43$, $p=.061$, while the interaction was also nonsignificant, with $F(1,131)=0.03$, $p=0.86$. The trends can be seen in Figure 4.

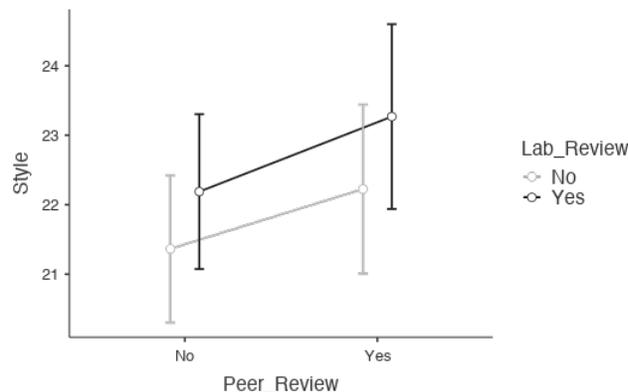


Figure 4. Peer and Lab Review effects on the Style assignment score.

DISCUSSION

The data show that either a lab review or a peer review can have a significant positive impact on the quality of the student research paper. This confirms research (Topping 1998; Lundstrom and Baker 2009; Crossman and Kite 2012) that shows a positive impact with the use of peer reviews. Although some of the research related to the use of a writing lab for students' assignments is mixed, this research does confirm much of the research that shows a positive

outcome from its required use (Jones 2001; Gordon 2008; Henson and Stephenson 2009; Ball 2014; Pfrenger et al. 2017).

The combination of both peer review and lab review did show a continuing trend for improved writing; however, it failed to produce statistical significance. This is probably due to the small sample size (twenty-six) of students that were required to complete both a peer review and a lab review of the same paper. This trend is consistent with research that shows a positive impact from using both review methods (Law and Bear 2017; Mon and Zein 2017).

An important finding of this study is that a peer review process can produce improvements very close to that of using a writing lab. For many institutions, the cost of establishing and maintaining a writing lab may be prohibitive, but peer reviews can be set up in classes without the costs associated with a writing lab, and still have most of the positive impact that writing labs produce. This research proffers the question of why would students without specific training do nearly as well in a peer-review system as those students that received help from senior students who had specific training, as well as showing superior skills in writing? Perhaps the answer is because the peer-review system has students participating in two parts: reviewing and being reviewed. Lundstrom and Baker (2009) showed that in an experiment in which students only either gave reviews or received them, those that only completed reviews did better than those that only received reviews. Therefore, although the peer reviews do not come from trained reviewers, the process of conducting a review itself gives students a better perspective on their writing through analyzing the writing of others. Writing labs may give better reviews, but they do not give students the experience of conducting reviews that is provided by a peer-review system.

In this study, the students were in a third-year class, and they would have already taken the business communications class, which is a prerequisite for this class. The writing lab for this study is also used by the students when they took the business communications class. Nevertheless, the use of either peer reviews or lab reviews improved the quality of the writing. This suggests that students are reminded of writing principles that they learned in the business communication class, rather than learning new writing skills. Thus, the use of reviews in this study worked to reinforce writing skills and prevent their decline. Without such reinforcement of writing skills, students' writing would probably decline steadily through graduation.

LIMITATIONS AND FUTURE RESEARCH

The results of this study are limited to a particular group of undergraduate students, and results could vary with groups from other institutions. Another limitation is that the individual sections ranged from twenty-six to forty-one students, which produces results that are not as statistically strong as larger sections would be. The use of just four sections, with all students in the same section receiving the same treatment, leaves open the possibility of unexpected impacts related to the time of day that classes are offered. A future study might randomize students into each of the four possible conditions, so that there is a mix of students from the different times of day in each treatment.

This research indicates likely additional writing improvements when both peer reviews and lab reviews are applied, but the result did not reach statistical significance. Future research might

use larger sample sizes in order to assess this improvement through the application of both treatments.

The study did not separate students into first-generation college students and those that were not. It would be interesting to see if there is a difference in the effectiveness of each review method based on this category. An interesting hypothesis to test would be to see if first-generation college students respond better to the formal lab review and the others do better with the less formal peer review.

The peer reviews were all done by teammates whereas the lab reviews were done by trained senior students who were unknown to the students. The connection with reviews by known associates, as opposed to strangers, might engender more effort to look good in the eyes of peers. Thus, an interesting follow-on study would be to compare the results of peer review by teammates in a class and by students in other classes to see if a difference exists between improved scores.

The assignment used in this study was an academic paper. Future studies might see if the improvements found here would also occur in common business writing, such as emails, business briefs, etc. Also, student peers received no training for conducting their reviews and points were given just for completion of the reviews. Additional research might see if greater writing improvement would be garnered from either training in reviewing or a grade given for the quality of the review, or both. An additional concern is that since the reviewers and reviewed were on the same team, the peer reviews may have been less rigorous than they would have been in an anonymous system.

CONCLUSION

Despite these limitations, this research adds to the literature a confirmation of the value of peer-reviewed and lab-reviewed student writing assignments. In particular, by comparing both approaches in the same study, we found that peer reviews and lab reviews produce similar improvements in student writing. The study also showed that a combination of peer and lab reviews can produce even better results.

An academic program that has improving student writing as a main learning objective should benefit from a coordinated effort between faculty and writing labs to provide students with reviews of their writing. Although having both peer reviews and lab reviews produced the best results, institutions that have limited funds should consider adding peer reviews in classes before going to the expense to add a well-staffed writing lab. Indeed, the peer review process should be added first, as it has no direct costs, and then the writing lab added later for the best use of resources.

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APPENDIX A

COS Rubric: Format for Grading

Requirement	Weight	Excellent		Adequate		Marginal	
		+	-	+	-	+	-
Content Audience Appropriately Addressed Context Understood Purpose Achieved Logical, Analytical, Critical, and Creative Accurately Supported Correct, Considerate, and Complete Concise Graphics Included When Appropriate	40/100						
Organization Appropriate for Genre Headings Effective Information Easily Accessible Paragraphs Use Topic Sentences Sentences Use Specific, Concrete Words Transitions Create Coherence	30/100						
Style Uses Unbiased Language Creates an Appropriate Tone Uses Concise Language Draws the Reader into the Message Wording Does Not Draw Attention to Itself Has a Consistent Point of View and Mood Contains No Errors or Only Minor Errors in <ul style="list-style-type: none"> • Punctuation • Grammar • Capitalization • Number Usage • Spelling • Other Mechanics Uses the Correct Format for the Genre	30/100						