Impact of Computer-Assisted Peer Feedback on Student Learning and Performance in Agricultural Graphic Design Course

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Introduction/Need for Research

College students often criticized receiving feedback after submitting their work, as it did not enable them to revise and improve their work based on the feedback received (Nicol et al., 2014). The feedback process has improved after shifting from traditional feedback to feed-forward timing where students engaged with and were influenced by the received peer feedback before submitting a graded assignment (Sadler, 2010). Peer feedback was crucial to facilitate student engagement, enhance self-efficacy, exchange constructive feedback, and improve student performance (Nicol et al., 2014; Zimmerman, 2000). Wagner and Rutherford (2019) documented the benefits of computer-based peer review for achievement in agricultural graphic design. Still, they suggested future studies address an alternative learning management system's (LMS) capabilities and student preparation for peer review. This study investigated the impact of peer feedback on student learning and performance in an agricultural graphic design course using Canvas. These objectives guided the study:

1. Describe how computer-assisted peer feedback influenced student attitudes and learning.
2. Describe academic performance on assignments before and after computer-based peer review.

Conceptual Framework

Principles of social constructivism and assessment as learning serve as the conceptual framework. Social constructivism emphasizes the role of social interactions in the construction of knowledge, where students learn through dialogue and collaboration (McGarrigle, 2013). Assessment as a learning approach focused on students' active role in their learning process through self-assessment and peer feedback (Quirke-Bolt, 2020). The feed-forward approach aligned with the assessment as learning approach because students used the feedback to revise their work and positively influenced their development prior to grading (Quirke-Bolt, 2020; Ramsden, 1992).

Methodology

The target population was 23 undergraduate students enrolled in an in-person agricultural graphic design course during the fall 2022 or 2023 semesters. The instructor shared examples of critical but supportive and unhelpful feedback for a logo and had students improve the unhelpful comments. Students created a logo, restored photo, print ad or poster, and brochure saved in a cloud system. They submitted the URL addresses to their work's cloud folders in the course's LMS to avoid the LMS's file size and format limitations. They engaged in four computer-based peer reviews using rubrics that required comments and grading marks in the LMS. Students had a week to edit their work before submitting it to the instructor. We adapted 13 statements on a 5-point Likert scale from Quirke-Bolt (2020) to identify attitudes and experiences toward peer feedback. We established an acceptable Cronbach's alpha of .90 for the construct. We emailed students an anonymous survey link through Qualtrics after they completed the last peer review. The survey was open for 10 days, with one reminder email sent. The response rate was 78.3%.

Results

All respondents strongly agreed (n = 12, 66.7%) or agreed (n = 6, 33.3%) that they had the necessary skills to participate in the peer review process. All respondents also strongly agreed (n = 11, 61.1%) or agreed (n = 7, 38.9%) that they developed and improved their work from seeing the examples of others. All respondents strongly agreed (n = 9, 50.0%) or agreed (n = 9, 50.0%) that receiving feedback was helpful and participating in the peer review experience provided them with a skill they could use in the workplace, respectively. Respondents indicated either strong agreement (n = 9, 50.0%) or agreement (n = 9, 50.0%) that they felt comfortable assessing their peers' work using a rubric. Most respondents strongly agreed or agreed (n = 17, 94.4%) that they developed a deeper engagement and understanding of the course material covered in the assignments, while one respondent (5.6%) neither agreed nor disagreed. Most respondents strongly agreed (n = 9, 50.0%) or agreed (n = 8, 44.4%) that they are more confident in submitting their work for assessment after seeing the work of others. Seventeen respondents (94.4%) agreed or strongly agreed that the peer review process helped them identify their mistakes. Sixteen respondents (88.8%) recognized the increased sense of responsibility inherent in peer assessment. Fifteen respondents (83.3%) strongly agreed or agreed that they trusted their peers' feedback and that the peer review process helped them learn from their peers' comments, respectively. For objective two, Wilcoxon signed-rank tests show respondents' final grades on the assignments were significantly higher than the rough draft scores (Table 1).

Table 1.

Changes in Scores in Peer-Reviewed Assignments (n = 21)

Assignment	Rough draft *Mdn*	Final *Mdn*	*z*	*p*
Logo	20.0	48.0	4.02	< .001
Restored photo	38.0	47.0	4.02	< .001
Print ad or poster	43.0	46.0	3.39	< .001
Brochure	39.0	42.5	3.62	< .001

Note. Each assignment is worth 50 points.

Conclusions/Implications/Recommendations

We conclude that computer-based peer review enhances undergraduate student performance and increases engagement and learning in an agricultural graphic design course. This peer review process encourages detailed attention to assignments, improving overall quality and comprehension, which aligns with Quirke-Bolt's (2020) findings on using peer feedback within an "assessment as learning" approach. This approach enhanced student learning and equipped them with design skills employers desire (Wagner & Rutherford, 2019). Respondents' attitudes toward trusting their peers and their competence in feedback aligned with previous research (Nicol et al., 2014). We suggest that agricultural communication educators incorporate computer-based peer review across other courses to enhance student engagement, learning, and academic performance. Future research should explore peer review's efficacy across Adobe Creative Cloud design software programs and in other educational contexts.

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