Learning to Argue: The Role of Peer Assessment

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Abstract: The present study explored how peer assessment may influence the development of students' skills in constructing written arguments. Twenty-two college freshmen participated in this qualitative research to provide feedback on their peer's written arguments about popular psychology topics. Constant comparative analysis of multiple data sources revealed three main categories of feedback that students provided: cognition-based, metacognition-based, and affection-based. While receiving cognition-based feedback had the most impacts on how students would later evaluate others' work, those who had previously provided metacognition-based feedback were more likely to make observed progress in constructing arguments. This work adds to our understanding about the complex nature of peer assessment and proposes a potentially effective approach to facilitate students' skills in written argumentation.

Keywords: peer assessment, argumentation, feedback

Introduction

Peer assessment is an educational arrangement where students evaluate their peer's performance and provide feedback to each other (Topping, 1998). Fostering a culture of collaborative learning, engagement in peer assessment allows students to be in charge of their own learning (Kollar & Fischer, 2010). This not only motivates them to be more actively involved in the classroom but also helps them to be more reflective on their learning performance. Ultimately, students become more proficient in self-assessment and metacognition (Cho & MacArther, 2010). Considering its various learning benefits, peer assessment has been broadly employed in higher education and incorporated into the classrooms in different disciplines (Strijbos & Sluijsmans, 2010).

However, not all peer assessment provides positive learning effects. Several main factors may contribute to the learning outcomes of peer assessment, including the frequency and levels of detail in the feedback (Gibbs & Simpson, 2004), the nature of the tasks to accomplish (Topping, 2009), and instructional support provided (van den Berg, Admiraal, & Pilot, 2006). While in recent years a significant number of studies have evaluated approaches to structure peer assessment (e.g., Cho & Shunn, 2007; Orsmond, Merry, & Reiling, 2002), further research is needed to expand the scope of this line of research to explore how peer assessment may affect various aspects of learning (van Zundert, Sluijsmans, & van Merriënboer, 2010).

The present study explores how incorporating peer assessment may influence students' learning of argumentation. Argumentation is a social and verbal means of trying to resolve a conflict or difference that exists between two or more parties (Sampson & Clark, 2008). Constructing arguments requires individuals to analyze data and rationalize its use as evidence for a claim (Sandoval & Millwood, 2005). Previous research has shown that students experience difficulty in generating evidence-based arguments in both the sciences and social sciences (e.g., Acar, Turkmen, & Roychoudhury, 2010). As students tend to overlook the importance of argumentation and are often confined to only one perspective, engaging students in productive argumentation in the classrooms is particularly challenging (McNeil, 2008). With an overarching goal of exploring the role of peer assessment in written argumentation, the present study investigates three research questions:

1. What types of feedback do students provide when assessing peer's written arguments?
2. How does engagement in peer assessment relate to the development of argumentation skills?
3. What is students' perceived effectiveness of peer assessment?

Methods

Context and participants

Twenty-two college freshmen at a large public university in the Midwestern U.S. participated in this study (15 females and 7 males, M_{age}=18.20). They were all from at-risk backgrounds (5 African American, 4 Hispanic, 13 Hmong) and enrolled in the university's TRiO program, which provided extensive academic support for under-represented students to navigate through college. The study was conducted in an introductory psychology course that focused on developing students' cognitive and metacognitive skills. The curriculum was primarily centered on collaborative learning activities to foster students' critical thinking and self-regulated learning. None of the participants had taken any psychology courses prior to this course.

As part of the curriculum, written assignments were designed for students to critically evaluate different sources of information, construct evidence-based written arguments, and engage in peer assessment (see Table 1). Instructional support was developed to help students understand and practice writing arguments as well as evaluating other's writing. In addition, they were asked to reflect on their writing processes and experience in peer assessment in a journal every week. A whole-group discussion was led by the instructor at the end of every other week to help students further reflect on their learning experience.

Table 1: Timeline of instructional design on written argumentation and peer assessment

Content	Timeline	Activity
Introduction to written argumentation and peer assessment	Week 1	Group practices
Topic 1. Is development gradual and continuous, or abruptly in separate stages?	Week 2	Written Assignment 1
	Week 3	Peer assessment 1
Topic 2. Which form of learning, *conditioning* and *observational learning,* is more effective in scenarios such as classroom management and business?	Week 4	Written Assignment 2
	Week 5	Peer assessment 2
Topic 3. Do you think we have one general intelligence or multiple intelligences?	Week 6	Written Assignment 3
	Week 7	Peer assessment 3
Topic 4. Which psychological theory do you think best characterizes our personality?	Week 8	Written Assignment 4
	Week 9	Peer Assessment 4
Summary and debrief	Week 10	Group discussion

A detailed rubric was provided to guide students' own writing and evaluation of others' work regarding both the general quality of their writing as well as the content and structure. Rather than adopting a single-assessor approach, this study was designed to have each student receive feedback from two peers for more learning benefits (Cho & Shunn, 2007). To reduce the potential negative influence on learning outcomes, the grades students received from their peers were not counted toward their course grade.

Data collection and analysis

Data sources included four components: feedback that students provided to their peers; feedback that students received from their peers; students' written arguments; and students' weekly reflection journals. A qualitative approach, *constant comparative analysis* (Strauss & Corbin, 1990), was employed to integrate the different sources of data and identify main themes that may emerge. *Moodle*, an online course management system, was used for students to submit their own work and evaluate others'. All data were exported from Moodle and entered into NVivo 10 for analysis. Data analysis underwent an iterative process to establish credibility.

Findings

Research question 1

Three main categories were identified to capture the feedback that students provided: cognition-based, metacognition-based, and affection-based (see Table 2). In particular, *cognition-based feedback* entailed three levels: *corrective*, *confirmatory*, and *suggestive*. While *corrective feedback* mainly identified grammatical errors and conceptual incorrectness, *confirmatory feedback* included comments that reiterated the agreement between the assessor and the author. *Suggestive feedback,* in contrast, was the most cognitively demanding: it entails both diagnosis of misconceived knowledge and constructive suggestions for improving the quality of the written arguments. The second main category, *metacogntion-based feedback,* illustrated how the assessor reflected on their own work and would make improvements if they were to rewrite it. Last, *affection-based feedback* primarily consisted of encouraging and complimentary comments on the work being assessed.

Based on in-depth qualitative analysis, this categorization aligned with the typology that Topping (1998) proposed. More importantly, it shed light on how existing characterization of peer feedback should be extended given the diverse types of tasks. Constructing written arguments is a challenging task and thus rather cognitively demanding. Students who are new to this task may find themselves less prepared for either completing the task or commenting on other's work. As a result, affection-based feedback may be more prevalent in this context. However, affection-based feedback may not necessarily appear in other less challenging situations. Future research should explore how different types of task may yield variations in the categorization of peer feedback.

Table 2: Categorization of feedback participants provided in peer assessment

Main Category	Subcategory	Definition	Example
Cognition-based	Corrective	Focused on basic aspects such as the length and grammatical issues of the arguments	"*A couple of times you said 'change' when it was supposed to be 'changes'* "
	Confirmatory	Discussed agreement with the author in aspects such as conceptual understanding or personal beliefs	"*The information in the summary reveals a correct understanding of the concept*"
	Suggestive	Focused on the quality of the argument, such as evidence used, the strength of justification in the arguments, and so on; constructive suggestions were made for further improvement	"*You believe that development is in separate stages, but throughout your argument, I feel as if you got lost. For a strong argument try to give examples that support your claim*"
Metacognition-based		Self-reflective comments on others' work, often discussing how they would improve their own work	*"I never thought of using this example."*
Affection-based		Encouraging and/or complementary comments on others' work, usually focusing on its overall impression rather than its content	*"Great job!"* *"I really liked the way you organized the paragraphs."*

Research question 2

Students' written arguments were evaluated based on the rubric they were provided with. Considering the nature of this investigation and the limited sample size, the relationship between peer assessment and student learning of written argumentation was investigated qualitatively and three patterns were identified to illustrate the nature of this relationship. First, the feedback students provided was mostly affection-based during the first peer assessment, with few students using both affection-based and cognition-based feedback. More cognition-based and metacognition-based feedback emerged during the third and fourth peer assessments. Second, the more cognition-based feedback one received, the more likely they would later provide feedback with similar focus. For example, when a student received corrective comments on their grammar, they tended to also evaluate others' arguments in this aspect the next time. Last, changes in students' own arguments were observed to occur mostly when they had previously received or made metacognition-based comments during peer assessment.

This finding, while limited in its generalizability, implied the complex nature of peer assessment and how it may influence students' learning outcomes. It revealed a potential alternative to understand the mixed findings in the literature regarding the effectiveness peer assessment. As the types of feedback one may provide and receive vary largely, it is critical that future studies investigate this topic in more depth at a micro level. Such efforts will not only enrich our understanding of peer assessment but also provide implications for improving students' skills in self- and peer assessment.

Research question 3

Students' reflection journals were analyzed to obtain an understanding of their perceived experience in peer assessment. While it was a common concern among students that they would not be able to provide their peers with helpful feedback, most students valued the opportunities to read their peer's written work. At the same time, students mentioned several drawbacks of engaging in peer assessment. First, it was time-consuming as they needed to carefully read through the writing before providing any feedback, and without much previous experience, this process took them much longer than expected. Second, when there was inconsistence between their own understanding of a concept and that of the peer's, students felt lack of confidence to make a mark but also did not necessarily resort to others for clarification. Additionally, being aware of the quality of others' work may lead students to be less committed to completing their assignments with high quality. Students reported having trouble to devote the same levels of efforts to their own work after reading a peer's sloppy writing.

Students usually need to see the value and relevance of assessing their peers to make the most out of this experience (Hanrahan & Isaacs, 2001). The current findings indicated that when exposed to a relatively challenging task, such as writing a quality argument, students may find peer assessment valuable, yet overly difficult. Therefore, how to incorporate peer assessment so that students are more motivated and actively engaged remains to be further studied. Nonetheless, as shown in previous research, novices tend to view their peer's

evaluation more understandable and acceptable in comparison with experts' (Cho & MacArthur, 2010). Receiving peer feedback is more likely to lead one to revisit their work and make further revisions (e.g., Gielen, Peeters, Dochy, Onghena, & Struyven, 2010). Hence, in this study, students' perception of the value of peer assessment may also help to explain the observed progress in their learning of written argumentation.

Conclusions

The present study explored how engaging in peer assessment may influence students' learning of written argumentation. Our findings suggested that providing and receiving peer feedback may enhance the quality of the arguments students generate, but this effect varied depending on the type of the feedback. By exploring the potential benefits of peer assessment, this study adds to our understanding of how collaborative learning activities may facilitate students' performance in generating evidence-based arguments. At the same time, the discussion of student argumentation also extends the scope of previous research on peer assessment, as it proposes an alternative approach to evaluate the learning outcomes of peer assessment.

Given the nature of the course that served as the study context in this work, the sample size was relatively small and interpretation of the findings should be carried out with cautions. However, the in-depth qualitative analysis of multiple data sources in this study helped to gain a deep insight into how peer assessment may affect students' learning processes. The current findings invite further research to investigate the impact of peer assessment on students' argumentation skills. In all, this research proposes a potentially effective approach to facilitate student learning in written argumentation and constitutes first steps in enhancing under-represented students' academic performance and helping them succeed in college.

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