The Desirability of Peer-Assisted Learning Spaces for Online Student-Centered Error Correction: A Preliminary Evaluation

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Abstract: The educational value of error correction is well recognized. However, studies have found that students often need support to achieve optimal learning from this activity. In light of the documented benefits of collaborative learning, peer-assisted learning spaces were developed to augment a student-centered error-correction system that incorporates a generic seven-step framework as technological scaffolding. This paper briefly outlines the theoretical basis of the peer-assisted space before presenting a study assessing its desirability. The quantitative finding from the preliminary study—showing that significantly more participants preferred the peer-assisted over the individual mode, X^2= 11.115, p < .001—support the desirability of peer-assisted learning spaces for student-centered error correction. Students' explanations further form explicit suggestions for system design.

Keywords: Error correction, learning from errors, online learning space, peer-assisted learning, preferred learning mode, student-centered approach

1. Introduction

Through decades of scientific inquiry, psychologists and educational researchers have identified essential pedagogical components (Dick et al., 2022). Feedback to students following practice has been recognized as one of the most powerful instructional principles for promoting learning (American Psychological Association, Coalition for Psychology in Schools and Education, 2015).

With the distinctive affordances of modern technologies, systems that support student practice with feedback are now abundant. While providing clear, automatic, explanatory feedback by such systems is technically feasible and financially viable, this approach does not support self-explanation. The self-explanation principle posits that people learn more deeply and meaningfully when they generate explanations (Roy & Chi, 2005) through the externalization process of articulating or justifying what, why, and how answers are given (Chi et al., 1989). Furthermore, given the challenges of error correction—such as students generally engaging in shallow behaviors and lacking the knowledge and strategies needed for productive outcomes) (Suarez, 2013)—we developed the world's first online drill-and-practice system designed to anchor student-centered error-correction activities. In this system, a generic seven-step error-correction framework—serving as technological scaffolding—was devised to guide students through the process (Yu, 2024).

Later, realizing that students often seek support from experts despite the guidance provided in technology-supported learning environments (Mercer & Fisher, 1992), we further enhanced the system by adding social scaffolding in the form of peer-assisted error correction. As the desirability of the incorporated peer-assisted space is not yet known, this study aims to assess that desirability—specifically for supporting error-correction activities—an aspect considered important in product evaluation (Bland & Osterwalder, 2020).

2. The Development of an Online Student-Centered Error-Correction System

with Peer-Assisted Learning Spaces

The theoretical basis for incorporating a peer-assisted component into the system is Puntambekar and Kolodner's (1998) distributed scaffolding theory, which suggests that integrating various agents and multiple sources of scaffolding can maximize learning outcomes. In our system, students can solicit assistance from their peers through the incorporated call-out-for-help function. As illustrated in Figure 1, once a request is entered in the designated space during any of the error-correction steps, an automatic notification is sent to initiate timely, on-demand peer assistance.
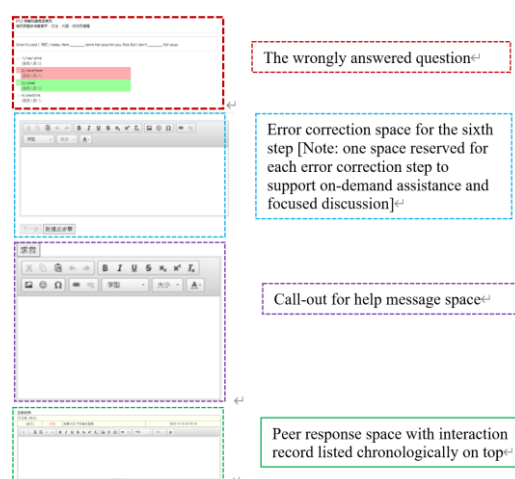

Figure 1. Peer-assisted interaction space enabling assistance seeking and provision during the error-correction process

3. A Preliminary Study on the Desirability of Peer-Assisted Learning Spaces for Online Student-Centered Error Correction

To examine the desirability of the incorporated peer-assisted space, four classes of sixth-grade students (*n*=104) taught by the same social science teacher at a primary school in central Taiwan were invited to participate. The error-correction activities were integrated into the classes' weekly drill-and-practice sessions to support learning. During this study, two of the three 40-minute instructional sessions each week were reserved for instruction delivery, and one was scheduled for online drill-and-practice and error correction.

In the first week, the session was used primarily to familiarize and equip students with the essential knowledge and skills needed to complete the tasks in the online drill-and-practice and error-correction systems. Starting in the second week, the weekly online activities followed a set routine: the teacher first provided whole-class feedback on student performance from the previous week, after which students engaged in online drill-and-practice, followed by online error-correction activities. For the online drill-and-practice activity, students answered 10-item multiple-choice questions on the instructional content covered that week. For the error-correction activity, students corrected their incorrectly answered questions by following the step-by-step procedures outlined in the system. To allow comparisons based on concrete personal experiences, students engaged in individual error correction in the second week before transitioning to peer-assisted error correction in the subsequent weeks. Because the size of interacting groups may affect students' experiences, a small group peer-assisted setting was used in the third week—with the system automatically forming groups of four—while a large group peer-assisted setting was used in the fourth week, in which all classmates could help each other in a single online interaction space. At the end of the fourth week, students responded to the question: *Which error-correction mode do you prefer—individual or peer-assisted? Please justify your answer*.

Quantitative data indicated that nearly two-thirds of the participants (66.35%) preferred the peer-assisted mode over the individual mode. A chi-square test further revealed a

statistically significant difference at the 0.001 level, X^2 = 11.115. Analysis of the explanatory descriptions revealed several major themes. Among those favoring the individual mode, the predominant theme was *accountability for one's own learning*—specifically, taking responsibility for finding the correct answer or source of information to promote deeper learning. For supporters of the peer-assisted mode, the most salient theme was *the value of mutual support among classmates in achieving deeper understanding and fostering close bonds.* Additionally, while many students appreciated *having the whole class at one's disposal* rather than limited to their group, quite a few reported feeling overwhelmed by numerous calls for help awaiting attention; as a result, they preferred the smaller-group arrangement within the peer-assisted mode.

4. Conclusion

Based on the findings, two suggestions are offered. First, online spaces for both individual and peer-assisted error correction should be built to accommodate students' differing needs while actualizing the concept of scaffolding theory—support-provision for those not yet ready for individual work and support-fading for those who have reached the desired state (Collins et al.,1987). Second, spaces supporting peer-assisted error correction with varying group sizes (e.g., small, large) may be desirable, ensuring that timely, on-demand assistance can be provided without overwhelming the help-giver and making the task more manageable for those involved.

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