Oral Defense Announcement
University of Missouri – St. Louis Graduate School

An oral examination in defense of the dissertation for the degree
Doctor of Philosophy in Education with an emphasis in Teaching and Learning Processes

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Applying Retrieval Practice in Climate Change Education How Retrieval-based Learning May Enhance High School Students’ Conceptual Understanding on Climate Change Topics

Date: November 17, 2022
Time: 9:00 a.m. to 11:00 a.m.
Place: Remote

Abstract
This dissertation explored ways to apply retrieval practice strategy on climate change learning at the high school level. Three studies presented that retrieval practice could be used broadly on different topics of climate change and in different learning scenarios. The first study focused on the effect of question placement on learning when students studied sea level rise from an educational video lecture. The results suggested that applying retrieval practice in a style of embedded short-answer questions in videos has clear advantage over restudying the video lecture in both immediate and delayed tests, but no difference in students' performance was found between the two common question embedding practices - dispersed and stacked question styles. The second study expanded the application of retrieval practice by combining it with learner-generated drawing strategy. We explored the effect of retrieval-based sketching method with different levels of retrieval support when students studied the Earth's energy budget from a video lecture. Results did not show any significant difference in students' performance between the "no support", "50% support", and "100% support" drawing conditions on either the immediate or the delayed test. Building on the findings of the second study, the third study focused on the effect of retrieval practice combined with different drawing strategies (concept mapping or sketching) on carbon cycle learning. Results demonstrated that retrieval practice by paragraphing was more beneficial on learning than concept mapping or sketching with open access to the text learning material, or simply restudying the material. However, the results also revealed no difference between the two drawing types on learning, regardless of whether they were implemented with retrieval practice. Generally, retrieval practice could engage learners to deepen the learning processes by reconstructing their knowledge after initial learning. We have demonstrated retrieval practice can be implemented at the high school level to facilitate the learning of various climate science topics.

Defense of Dissertation Committee
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