EXAMINING THE IMPACT OF STUDENT-GENERATED SCREENCASTS ON MIDDLE SCHOOL SCIENCE STUDENTS' INTERACTIVE MODELING BEHAVIORS, INQUIRY LEARNING, AND CONCEPTUAL DEVELOPMENT

A Dissertation
by
SCOTT EDWARD STUCKEY

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ABSTRACT

EXAMINING THE IMPACT OF STUDENT-GENERATED SCREENCASTS ON MIDDLE SCHOOL SCIENCE STUDENTS' INTERACTIVE MODELING BEHAVIORS, INQUIRY LEARNING, AND CONCEPTUAL DEVELOPMENT

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Analysis of the results from this study indicate that student activities involving screencast production can serve as scaffolds to enhance inquiry behavior, heighten explanation development, and encourage the connection of conceptual ideas developed by eighth grade science students engaged in interactive computer modeling. The screencast recordings enabled students to simultaneously combine their narrative explanations with a visual record of their computer modeling activity. Students (n=210) generated numerous screencasts and written explanations while participating in an online exploration focusing on global climate change and the greenhouse effect. The quasi-experimental design used in this study prompted student groups in four classrooms to screencast their final explanations concerning their modeling activity, while groups in the four control classrooms used a text entry tool to provide their explanations. Results indicated that student groups constructing screencast explanations spent 72% more time with the model (t=7.13, p<.001, d=2.23) and spoke an average of 131 words compared to the 44 written by control classroom groups

(t=3.15, p=.002, d=0.99). Screencast groups were 42% more likely to mention inquiry behavior linked to specific values obtained from the model derived from two combined measures for on-task behavior (t=2.89, p=.003, d=0.90). The inclusion of causality within the explanations was examined as a measure of knowledge integration. The implemented research design assured that the composition of fully integrated student responses was reliant upon internalization, a cognitive attribute of autonomous learning. Only one text entry group (n=22) provided a discussion supported with at least one scientifically normative idea regarding causality, compared to five screencast explanation groups (n=21). This study also suggests that middle school science students who screencast explanations spend significantly more on-task time investigating computational models compared to those writing their explanations. Implications, limitations, and suggestions for further research are discussed in the presentation that follows.