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SUPPORTING EXPLANATION, JUSTIFICATION, AND ARGUMENTATION THROUGH MULTIMEDIA: A QUANTITATIVE STUDY OF STUDENT PERFORMANCE (112 pp.)

Co- Directors of Dissertation: Bradley Morris, Ph.D.

Richard Ferdig, Ph. D.

The purpose of this quantitative study examined the effects a classroom blog had on student performance in the area of conceptual and procedural understandings of fractions. Specifically, the study examined the effects of self-explaining with a peer (explain, justify, and argumentation) to the solving of traditional paper pencil mathematical tasks alone (solving on your own). The experimental groups (i.e. face-to-face and blog groups) solved identical mathematical tasks to the traditional alone group by explaining their solution through justification with evidence from the task by self-explaining with peers. Both experimental groups engaged in mathematical discourse by explaining and justifying their understandings, as well as critiquing and arguing the thinking of other student responses through self-explaining with peers; however, one group used a multimedia tool. This quasi-experimental design study further explored how interactive and constructive mathematical discourse (i.e. explanation, justification, and argumentation) through a classroom blog supported student performance of fifth-grade students on conceptual and procedural fraction knowledge and the retention of this knowledge over time. To measure the change in student performance, a pretest- posttest, and delayed posttest was administered to measure the conceptual and procedural knowledge of fractions. Participants included 134 fifth grade students, ages 9-11 years old. Data collection was analyzed using repeated measures ANOVA with one between –subjects factor.