

**AN ANALYSIS OF SUCCESSFUL AND UNSUCCESSFUL EXAMPLE
SOLUTIONS TO ENHANCE OPEN-ENDED TECHNOLOGICAL
PROBLEM-SOLVING EFFICIENCY AMONG MIDDLE SCHOOL STUDENTS**

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(Abstract)

This study investigated the usefulness of providing successful and unsuccessful example solutions in enhancing students' technological problem-solving efficiency. Prior research exploring worked example solutions indicated improved problem-solving efficiency when solutions were structured in a fashion that decreased the amount of extraneous cognitive load and increased the amount of germane cognitive load as specified by cognitive load theory. Fifty-one 7th and 8th grade students enrolled in technology education courses were selected from one school in the southwest region of Virginia. Participants completed three technological problem-solving tasks that included elevated load, cantilevered weight, and energy absorption using supply kits containing simple modeling materials. Problem-solving efficiency was determined by combining the amount of elapsed time across all three tasks. A 3 x 3 mixed factorial ANOVA was used to analyze the data. Data analysis revealed trends similar to worked example research in mathematics and science, but no significant difference among the three groups was found in this study.