Using Picture Books to Support Children’s Use and Understanding of the Control-of-Variable Strategy

Lynn G. Nguyen, Angela Nyhout, Nicole E. Larsen, Vaunam P. Venkadasalam & Patricia A. Ganea

Background

- The Control-of-Variable Strategy (CVS) is an experimental strategy in which one isolates a single variable.¹
- Children under age 7 fail to conduct controlled tests even when provided with direct instruction.²³
- Picture books can scaffold young children’s understanding of science concepts.⁴⁵
- We examine whether children’s CVS can be scaffolded with picture books focused on either a science or engineering approach.⁶

Current Study

Research Question: Can narrative picture books facilitate children’s use and understanding of CVS?

Participants
72 children age 6 to 8 (target N = 96) were read either a science or engineering picture book.

Procedure
Pre-Test → Picture-Book → Post-Test → Transfer
Science or Engineering

Sample Book Text

Science
“So if I wanted to figure out if the height of my ramp makes my cars go farther, then height is a variable?” said Charlie.

Engineering
“So if I wanted to figure out the height that I want to build my ramp, I have to measure it?” said Charlie.

Test Questions

Sample Pre-Test and Post-Test Question: “Can you show me how you would find out if the height of the ramp affects how a ball goes down the ramp?”

Sample Transfer Question: “Can you show me how you would find out if the size of the ball affects how a ball goes down the ramp?”

Results

- Generalized Estimated Equations (GEE) analyses were used to investigate whether age, test phase, and condition predicted children’s CVS score.
- Children’s scores increased from pre-test to post-test in both conditions (p = .008).

Conclusions

- Children as young as 6 years old improved their CVS ability with familiar and novel variables both when they learned about ramps in a science and engineering-focused book.
- Future work will use a control book not focused on ramps, and will extend the research to other concepts and science domains.

References