Dynamic Digital Text: An Innovation in STEM Education

SAVI — Science Across Virtual Institutes
Innovations in Learning and Education

CoMPASS — Concept Mapped Project-based Activity Scaffolding System

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Goals of the Studies: To investigate the cognitive, metacognitive, and navigation strategies used by middle school students with different levels of reading ability to interact with digital texts. Exploring the role of the teacher in facilitating learning with digital texts.

What we've Learned: Reading ability was not predictive of cognitive, metacognitive, and navigation strategies. Navigation behavior was related to learning outcomes. Teachers facilitation of the use of digital texts seemed to influence students' navigation behaviors.
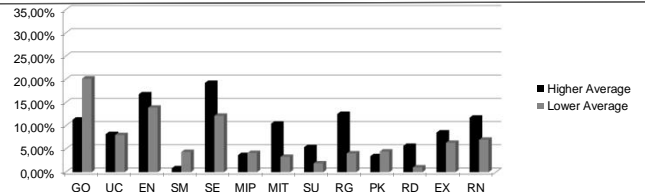
Study 1:
- *Question* – How do students with different reading abilities navigate CoMPASS?
- *Context* – one 6th grade science classroom
- *Data* – Gates-MacGinitie Comprehension (GM-C) test & think alouds, N = 12
- *Analysis* – coding of support and thinking processes during navigation

Study 2:
- *Question* – Do navigation behaviors in a digital text environment mediate the relationship between prior knowledge or reading ability and learning outcomes?
- *Context* – ten 8th grade science classrooms with the same teacher
- *Data* – physics pre/posttest, GM-C test & navigation log files, N = 189
- *Analysis* – path analysis was used to test a model of hypothesized relationships

Study 3:
- *Question* – Are CoMPASS navigation patterns of student groups receiving different whole class facilitation substantially distinct at the end of the unit?
- *Context* – two 6th grade science teachers with three classes each
- *Data* – navigation log files, N = 150 with approximately 20 groups per teacher
- *Analysis* – Pathfinder used to create network representations of navigation

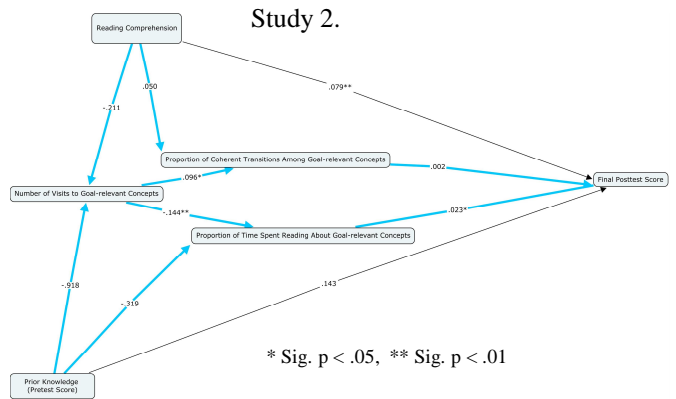Study 1. Strategies used at the beginning of the curriculum
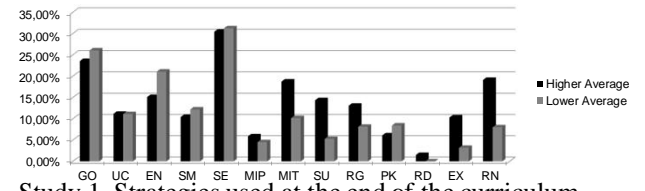
Study 1. Strategies used at the end of the curriculum
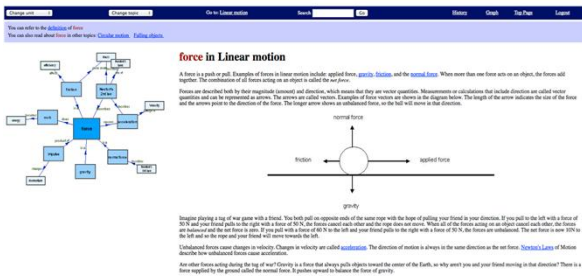
CoMPASS system provides conceptual representation and textual representation

Maps are dynamic and zoom in and out - provide conceptual support

Study 2.

* Sig. $p < .05$, ** Sig. $p < .01$

Study 3.

Navigation Log Files – measure to identify differences in navigation patterns
- Analyzed using Pathfinder
- Comparing small groups in classes of two teachers