Designing Interactive and Personalized Concept Mapping Learning Environments

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Overall Research Goals

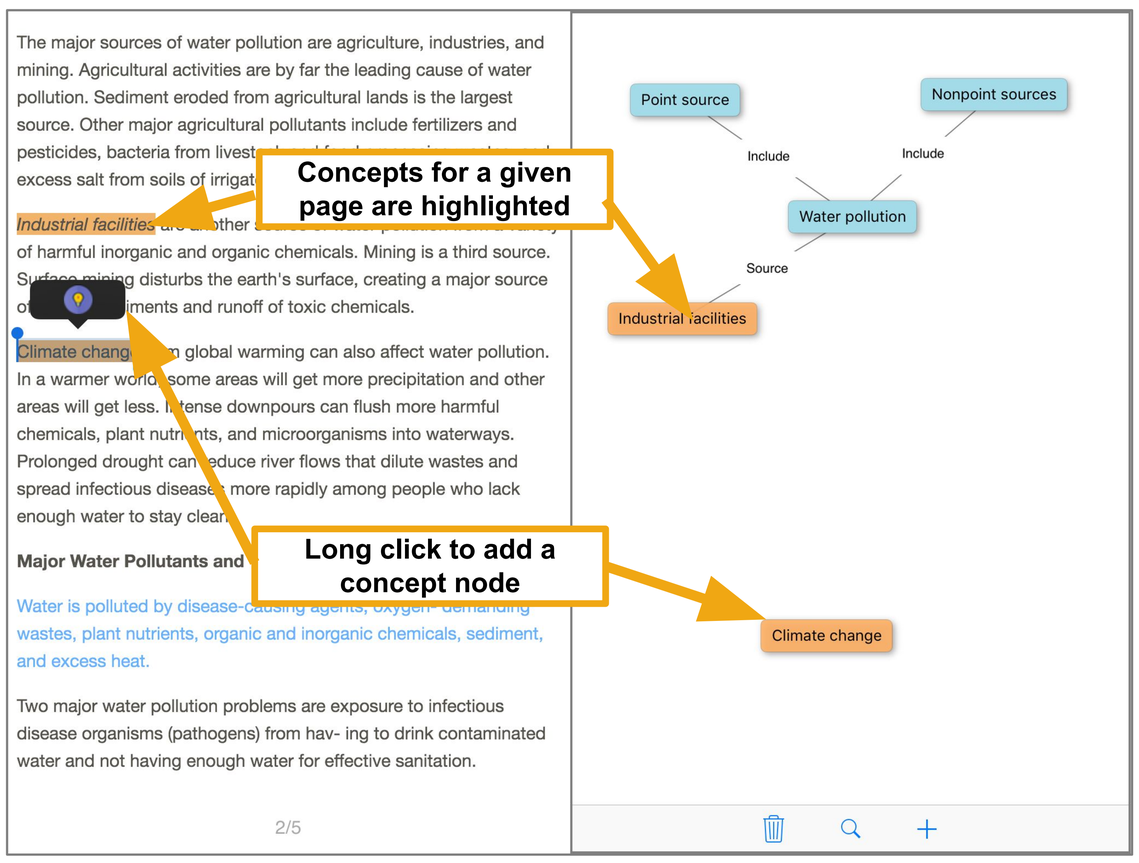
How does personalized scaffolding facilitate learning with concept maps?

How does hyperlinking enhance student navigation and support learning?

How do we design an interactive and personalized concept mapping environment to support meaningful learning?

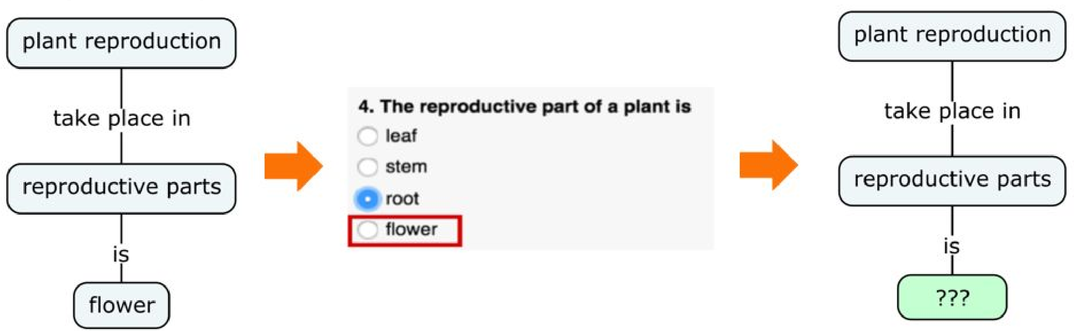
Approach

We developed an iPad-based digital textbook integrated with a concept mapping tool. Students can construct concept maps directly from the textbook and use the hyperlinking feature for navigation.



Personalized Scaffolding

To support the process of integrating new knowledge to existing knowledge structure, we present students with incomplete templates with the unlearned concepts (incorrect in the pre test) left blank for students to fill in.



Hyperlinking Navigation

Hyperlinking navigation offers flexibility in comparing concepts located in different pages, developing personalized navigational path and other learning behaviors.

Ongoing Studies

We are currently running an Amazon Mechanical Turk study and a high school study to evaluate the system.

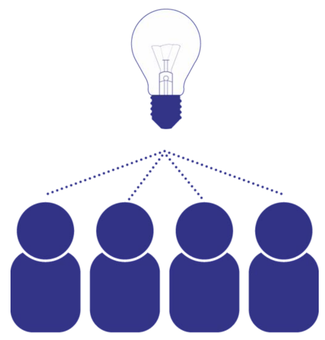
Amazon Mechanical Turk Study

Participants: Amazon Mechanical Turkers.

Period: 30 minutes.

Conditions: Students will be presented with randomized incomplete templates.

Goal: Evaluate how different designs of templates affect student learning.



High School Study

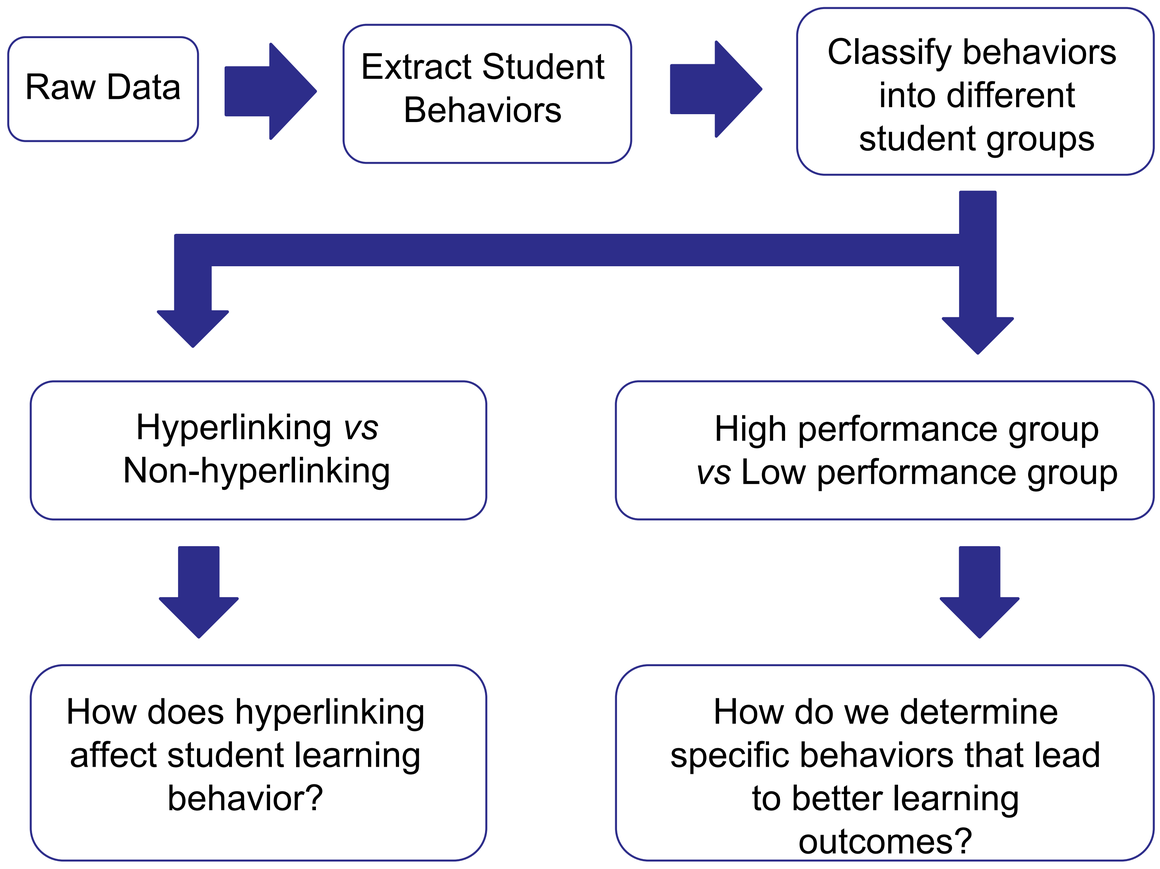
Participants: High school seniors.

Period: 20 minutes per day for 5 days.

Conditions: A hyperlinking condition and a non-hyperlinking condition.

Goal: Examine how hyperlinking affects student navigation.

Analysis



Open Questions

- Amazon Mechanical Turk participants are very different from high school students. How should I validate the Amazon Mechanical Turk study results?
- What data mining techniques can be used to determine how hyperlinking feature affects student navigation and what learning behaviors would yield better learning outcomes?

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