Searching to Learn

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Introduction

• Students often have trouble selecting meaningful & refined topics for assignments

• Enter **searching to learn** strategy

• Today: hands-on session with a guided practice exercise

Previous slide Maze: http://www.flickr.com/photos/wwwworks/2786241330/sizes/z/in/photostream/
Searching to Learn
The Problem

• Difficulty selecting meaningful topics
• Low-level questions common
• Lack of background (world) knowledge
• Related struggles with
  • Formulating a search query
  • Determining what information is relevant
• Students need information seeking knowledge AND content knowledge
Searching to Learn

- Strategy to actively construct background knowledge
- Combining prior knowledge and the information found in the search results lists
- Begin with a general or broad topic
- Carry out searches – multiple resources
- Discover important concepts or aspects from the search results
- Expand basic understanding
- Observe specialized terminology in the topic area
Background

• **Pre-search and discovery process** (Fontichiaro, 2013)
  • Give students time to discover before settling down on a refined topic
  • Common strategies
    • Wikipedia, encyclopedia
    • Provide short introductory text

• **Additional strategy: exploratory searching**
  • Use *searching to learn* as a major part of the discovery process
Exploratory Phase Doesn't Come Naturally

- Kuhlthau (1994) research: Information Search Process
- Students did not consider the exploratory stages "a legitimate part of the search process"
- "...lack of tolerance for the early exploratory stages..."
- "Rarely did students acknowledge the need for time to read and reflect in order to formulate a focus to move the search ahead."
- Apparently school librarians need to teach this
Searching as a Learning Process

- Jansen, Booth, & Smith (2009) information searching can be considered a learning process
- Use searching not for decision making or problem solving but for learning
- Use learning theory to understand information searching
Learning Happens **While** Searching!

- Saito et al. (2011, 2012) investigated "the changes in users' mental representations of a topic during their exploratory search..."
- Used concept maps to "compare the users’ knowledge before and after a search."
- Analysis of the concept maps showed participants changed their knowledge structure based on what they learned during their search
Concept mapping
Concept Mapping

- Technique for representing knowledge in maps
- Concept maps are networks of concepts
- Networks consist of nodes and links
- Nodes represent concepts and links represent the relations between concepts
- Links might be labeled to describe relationship
- Hierarchical links (from general to specific)
- Cross-links (between domains, across hierarchy)
Concept Map

Graph is connected by Set N of Nodes represented as Points, Boxes, Geometric Shapes.

Set R of Relations represented as lines can be Straight, Curved.
Animals

dogs
are

can

are
cat

mow

http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/2f/7c/9c.pdf
Guided Exercise
Example – “reading”
Initial concept map – “reading”
1. Dimensions of Reading Motivation and Their Relation to Reading Behavior and Competence.
Subjects: READING motivation; READING -- Research; CURIOSITY; READING comprehension; CHOICE (Psychology); MOTIVATION (Psychology)

2. Associations Between Reading Achievement and Independent Reading in Early Elementary School: A Genetically Informative Cross-Lagged Study.
Subjects: EDUCATIONAL psychology -- Research; EXPERIMENTAL design; LONGITUDINAL method; READING achievement; INDEPENDENT reading; ELEMENTARY education

Subjects: READING comprehension; READING; MOTIVATION (Psychology); GRADING & marking (Students); LEISURE; QUESTIONNAIRES
4. Exploring intrinsic and extrinsic reading motivation among very good and very poor readers.
Subjects: READING motivation; MOTIVATION in education; READERS -- Evaluation; CHILDREN -- Books & reading; RESEARCH; READING -- Ability testing; CASE studies; ENGLAND

5. Helping Students With Moderate and Severe Intellectual Disability Access Grade-Level Text.
Subjects: CHILDREN with mental disabilities -- Education (Elementary); READING strategies; READING comprehension; READING comprehension -- Study & teaching; LITERACY; READING exercises; CHILDREN with mental disabilities --

6. Becoming the Reading Mentors Our Adolescents Deserve: Developing a Successful Sustained Silent Reading Program.
Subjects: CASE studies; SILENT reading; TEENAGERS -- Books & reading; LITERACY -- Research; LITERACY programs; READING(Secondary); Exam Preparation and Tutoring
Post-search concept map
Guided Exercise: Individually

- Create initial concept map on plate tectonics
  - 2 minutes
- Study search results on plate tectonics
  - 6 minutes
- Create new concept map on plate tectonics
  - 4 minutes
Guided Exercise: Individually

• Create initial concept map on plate tectonics
  • 2 minutes
• Study search results on plate tectonics
  • 6 minutes
• Create new concept map on plate tectonics
  • 4 minutes
Time’s Up!

Next Step: study the search results
Guided Exercise: Individually

- Create initial concept map on plate tectonics
  - 2 minutes

- **Study search results on plate tectonics**
  - 6 minutes

- Create new concept map on plate tectonics
  - 4 minutes
Time’s Up!

Next Step: create a new concept map
Guided Exercise: Individually

• Create initial concept map on plate tectonics
  • 2 minutes
• Study search results on plate tectonics
  • 6 minutes
• Create new concept map on plate tectonics
  • 4 minutes
Time's Up!

Next Step: organize into groups of 3
Guided Exercise: Groups

- Concept map discussion (10 minutes)
  - compare maps
  - discuss individual pre- and post-searching to learn differences
  - discuss between group map differences
Guided Exercise: Groups

- Concept map discussion (10 minutes)
  - compare maps
    - discuss individual pre- and post-searching to learn differences
    - discuss between group map differences

2 minutes
Time’s Up!

Next Step: debrief
Wrap-up

• What did you learn?
• Will you use searching to learn strategies?
  • If so, how?

• Presentation materials available:
  http://digitalcommons.usu.edu/itls_facpub/253/
Bibliography

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  http://www.flickr.com/photos/wwworks/2786241330/sizes/z/in/photostream/
1. A heat flow based cooling model for tectonic plates.
Subjects: PLATE tectonics; TERRESTRIAL heat flow; COOLING; HYDROTHERMAL circulation (Oceanography); LITHOSPHERE; OCEANIC crust; EARTH sciences; EARTH; EARTH -- Mantle

2. Active tectonics of plate boundary zones and the continuity of plate boundary deformation from Asia to North America.
Subjects: PLATE tectonics; BOUNDARIES; DEFORMATION of surfaces; HOMOTOPY theory; GEODESY; ASIA; NORTH America

3. An Interdisciplinary Theme: Topographic Maps and Plate Tectonics.
Subjects: TOPOGRAPHIC maps; PLATE tectonics; LANDFORMS; INTERDISCIPLINARY approach in education; MIDDLE school education; STUDENTS; SOCIAL sciences -- Study & teaching

4. Constraints of the topography, gravity and volcanism on Venusian mantle dynamics and generation of plate tectonics.
   Subjects: VOLCANISM; PLATE tectonics; CONVECTION (Meteorology); HOT spots (Geology); RAYLEIGH number; NUMERICAL calculations; CATASTROPHES (Geology); VENUS (Planet)

5. Deciphering tectonic phases of the Amundsen Sea Embayment shelf, West Antarctica, from a magnetic anomaly grid.
   Subjects: GEOLOGY, Structural; GEOMAGNETISM; ICE streams; PLATE tectonics; AMUNDSEN Sea (Antarctica); EARTH; ANTARCTICA; EARTH -- Crust

6. Depth-dependent viscosity and mantle stress amplification: implications for the role of the asthenosphere in maintaining plate tectonics.
   Subjects: PLATE tectonics; VISCOSITY; BOUNDARY layer (Meteorology); LITHOSPHERE; RHEOLOGY; COMPUTER simulation; EARTH; EARTH -- Mantle

7. Dynamic role of tectonic mélange during interseismic process of plate boundary mega earthquakes.
   Subjects: PLATE tectonics; MELANGES (Petrology); EARTHQUAKE zones; SUBDUCTION zones; ROCK deformation; SEDIMENTS (Geology); JAPAN

   Subjects: SEAMOUNTS; VOLCANISM; GEOMORPHOLOGY; MAGMAS; PLATE tectonics; NEW Zealand

   Subjects: GEODETIC satellites; GEODESY; VOLCANOES; PLATE tectonics; LITHOSPHERE; MAGMAS; TRANSIENTS (Dynamics); DEFORMATIONS (Mechanics); INTERFEROMETRY; MID-ocean ridges; ICELAND

10. How plate tectonics is recorded in chalk deposits along the eastern English Channel in Normandy (France) and Sussex (UK).
   Subjects: PLATE tectonics; STRAINS & stresses (Mechanics); FRACUTRE mechanics; DEFORMATIONS (Mechanics); CENOZOIC Era; ENGLISH Channel; NORMANDY (France); FRANCE; ENGLAND; SUSSEX (England)
Subjects: PLATE tectonics; OCEAN currents; OCEAN bottom; EARTH; EARTH -- Surface

Subjects: GRAVITY; MAGNETIC fields; GEOLOGY, Structural; PLATE tectonics; MANCHURIA (China); CHINA

13. Linking continental drift, plate tectonics and the thermal state of the Earth's mantle.
Subjects: CONTINENTAL drift; PLATE tectonics; QUANTITATIVE research; MAGMATISM; INSULATION (Heat); VOLCANISM; SNOWMELT; EARTH; Roofing, Siding, and Insulation Material Merchant Wholesalers; Drywall and Insulation Contractors; EARTH -- Mantle

Subjects: PLATE tectonics; SUBDUCTION zones; BASINS (Geology); OPHIOLITES; EARTH; FIJI; EARTH -- Mantle

15. Mantle convection models featuring plate tectonic behavior: An overview of methods and progress.
Subjects: PLATE tectonics; CONVECTION (Meteorology); HEAT flux; TEMPERATURE; GEODYNAMICS; FORCE & energy; EARTH; EARTH -- Mantle; EARTH -- Surface

16. New paradigm for the early Earth: did plate tectonics as we know it not operate until the end of the Archean?
Subjects: GEOLOGY, Stratigraphic -- Archaean; MID-ocean ridges; PLATE tectonics; GEODYNAMICS; PLANETS; VENUS (Planet); CRUST

17. Non-random distribution of euler poles: is plate tectonics subject to rotational effects?
Subjects: PLATE tectonics; GEODYNAMICS; ROTATIONAL motion; DISTRIBUTION (Probability theory); INFORMATION theory; PHANEROZOIC Period; LAUSANNE (Switzerland); SWITZERLAND; UNIVERSITY of Lausanne (Lausanne, Switzerland)

18. Plate tectonics and planetary habitability: current status and future challenges.
Subjects: PLATE tectonics; PLANETS; ATMOSPHERE; SOLAR system -- Evolution; SOLAR system; EARTH; EARTH - - Mantle

Subjects: THRUST faults (Geology); PLATE tectonics; MATHEMATICAL models; GEOLOGY, Structural; LITHOSPHERE; CADIZ Bay (Spain); SPAIN

20. Trench migration and upper plate strain over a convecting mantle.
Subjects: PLATE tectonics; SUBDUCTION zones; DEFORMATIONS (Mechanics); INTERFACES (Physical sciences); DRAG (Aerodynamics); CONTROL theory (Mathematics); EARTH; EARTH -- Mantle
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Plate tectonics (from the Late Latin tectonicus, from the Greek: τεκτονικός "pertaining to building") is a scientific theory that describes the large-scale motions of...
List of tectonic plates - Lithosphere - Convergent boundary - Category: Plate tectonics

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Interesting animations of plate tectonics movement. Including gif, avi and mov formats.

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www.enchantedlearning.com/subjects/.../Continents.shtml
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Full and clear information about Plate Tectonics: Convergent Boundaries, Divergent Boundaries, Transform Boundaries.

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science.nationalgeographic.com/.../the.../plate-tectonics-article/ Get information, facts, photos, news, videos, and more about plate tectonics from National Geographic.

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www.pbs.org/wgbh/aso/tryit/tectonics/
A hands-on exercise about plate tectonics and earthquakes from PBS. Requires Shockwave plug-in.

29. A Science Odyssey: You Try It: Plate Tectonics: Intro
www.pbs.org/wgbh/aso/tryit/tectonics/intro.html
Plate tectonics is the theory that Earth's outer layer is made up of plates, which have moved throughout Earth's history. The theory explains the how and why ...

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Plate tectonics is a relatively new theory and it wasn't until the 1960's that Geologists, with the help of ocean surveys, began to understand what goes on ...
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In this educational animated movie about Science learn about Pangea, tectonics, crusts, mantle, volcanoes, earthquakes, mountains, fault lines, disasters, and ...

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This map shows the major tectonic plates that make up the Earth's crust and the directions in which they are moving. Map adapted from NOAA. Simply defined ...

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There are several major plates floating across the surface of the earth The basic idea behind plate tectonics is that there are eight major plates on the surface of ...