Discovery Learning

Presented by Xinyun Peng

Outline

- What is discovery learning?
- The fundamental study of discovery learning
- The debate
- Case study

What is discovery learning?

- Inquiry-based
  - Active learning
  - Experimental and analytical skills development
- Constructivist-based
- Effectiveness is open to debate

The Fundamental Study of discovery learning

- Jerome Bruner (1961)

Discovery is not restricted to "the act of finding out something that before was unknown to mankind, but rather include all forms of obtaining knowledge for oneself by the use of one's own mind…"

"Discovery, like surprise, favors the well prepared mind."

Teachers' aim is to make students as autonomous and self-propelled thinkers as we can who will go along on their own after formal schooling has ended.

The Fundamental Study of discovery learning

- Expository vs. Hypothetical mode of teaching
  - Expository mode: the decision concerning the pace and style of exposition is determined by the teacher; students are listeners.
  - Hypothetical mode: the teacher and the student are in a more cooperative position; students take a part in the formulation.

Characteristics of Discovery Learning

- Increase intellectual Potency
- Shift from Extrinsic to Intrinsic motives
- Learn the heuristics of Discovering
- Aid memory processing

The Debate

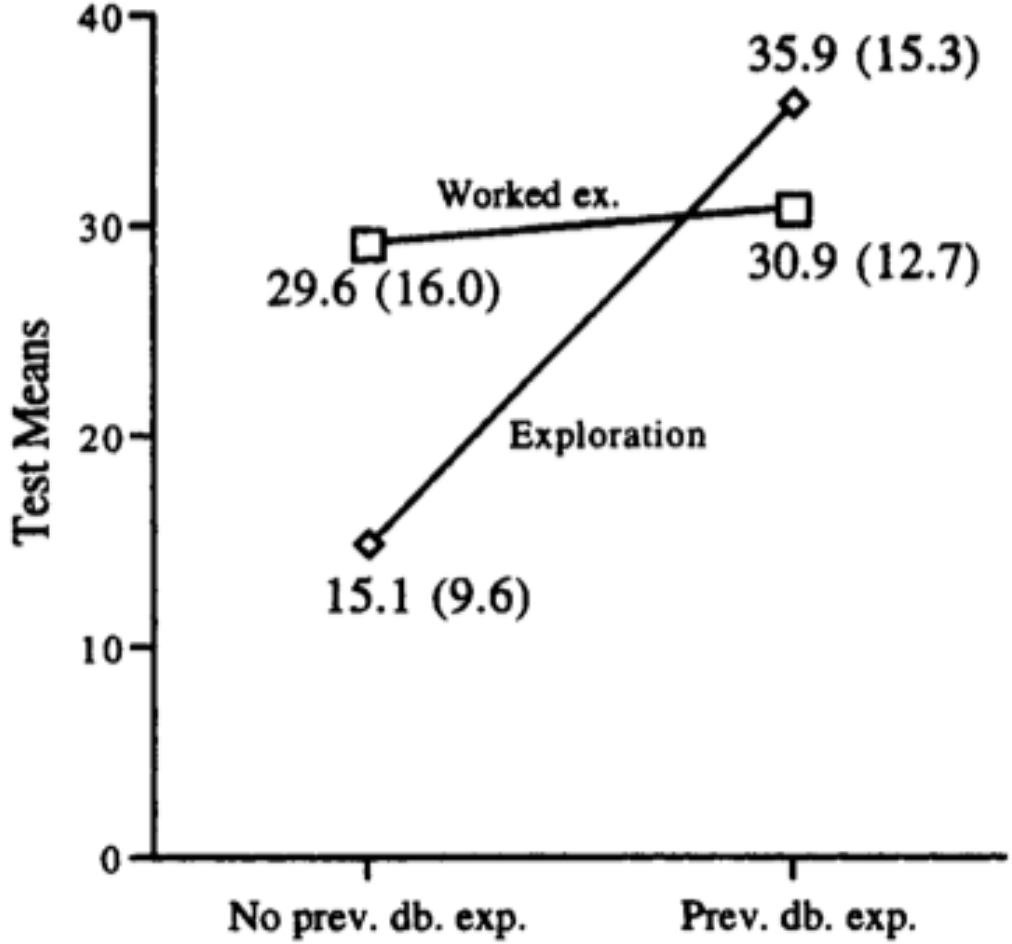
- Bruner (1961): Students learn concepts better by discovering them on their own.

- Tuovinen and Sweller (1999):

  - Exploration practice
    - Based on discovery learning principles
    - Place a considerable load on working memory
    - No significant advantage on learning for learners having prior familiarity with the content

  - Worked-examples practice
    - Based on cognitive load theory
    - Reduce extraneous mental load
    - Benefit learners who have no familiarity with the content

The Debate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Exploration
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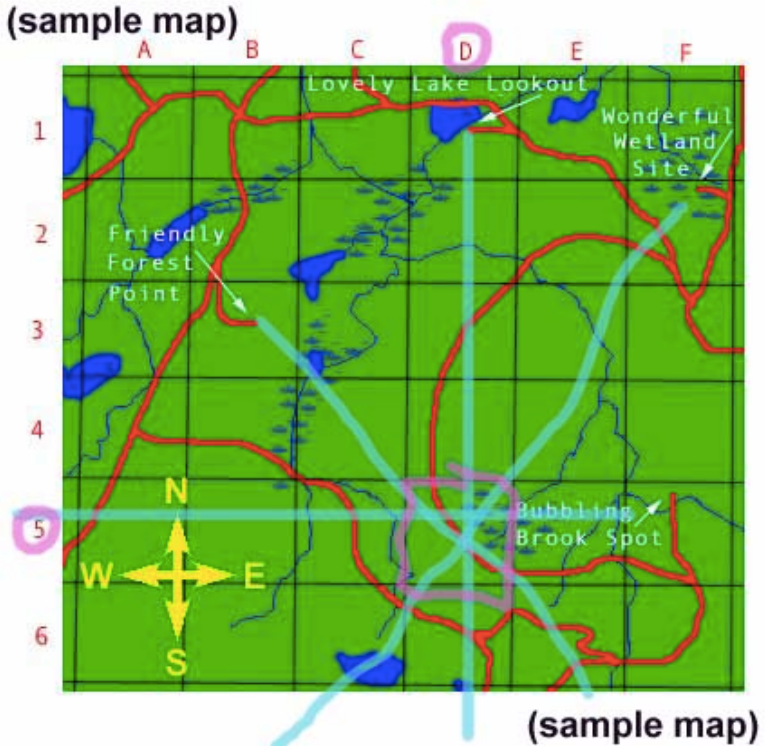
No prev. db. exp.
Prev. db. exp.

The Debate (cont.)

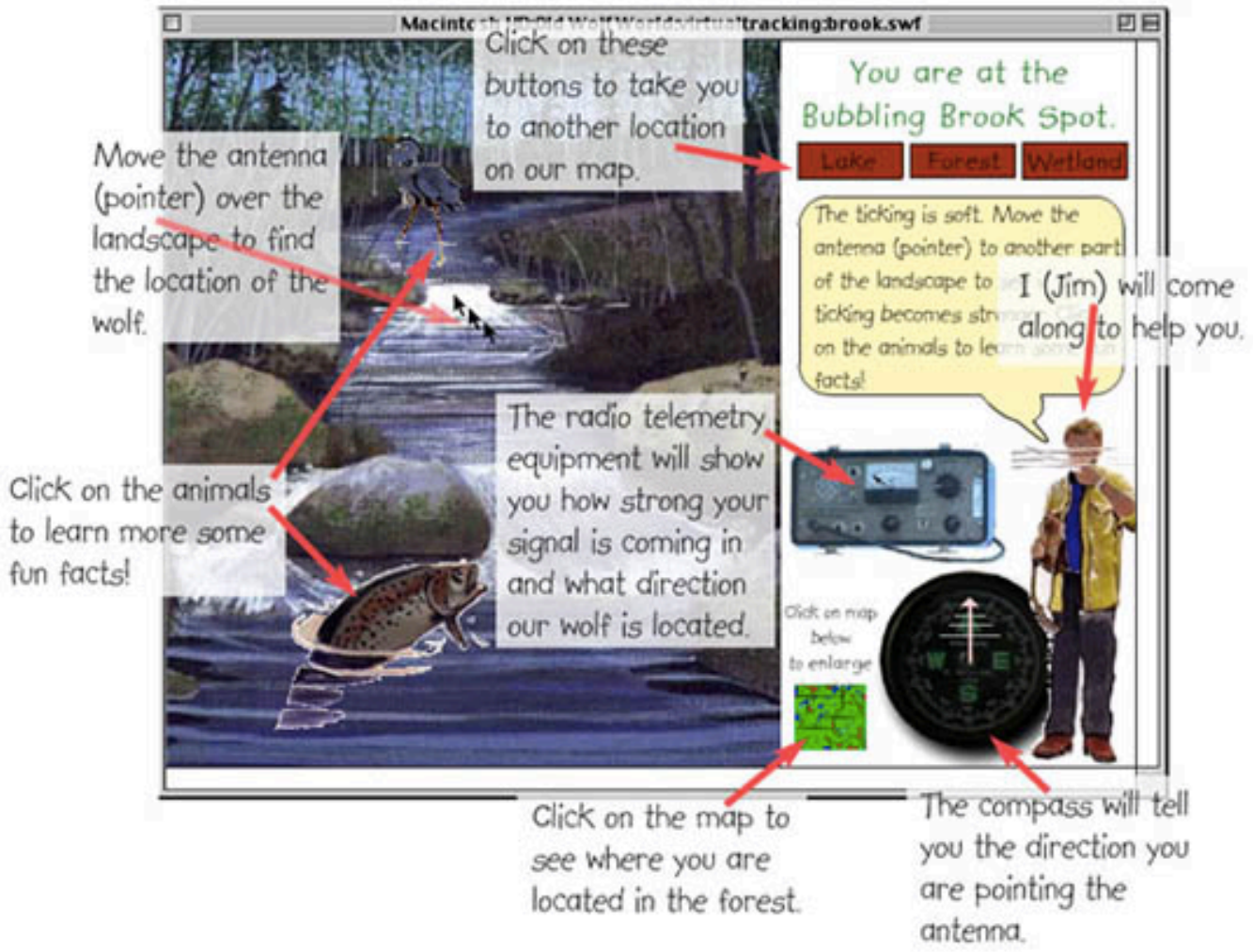
- Kirschner, Sweller and Clark (2006):
  - Discovery learning is less effective than direct instruction; it is often used inappropriately to teach novices.
  - Learners should be given direct instruction prior to discover using what they have learned.
  - Pure discovery instruction may cause misconceptions.
  - Direct instruction leads to better learning.
  - Unguided learning may cause loss of learning to low-aptitude learners.
  - It is a mistake to exclusively focus on application.

A Case of Discovery Learning in Virtual Environment

- http://www.discoverycenter.net/virtual-tracking-instructions.html



A Case of Discovery Learning in Virtual Environment



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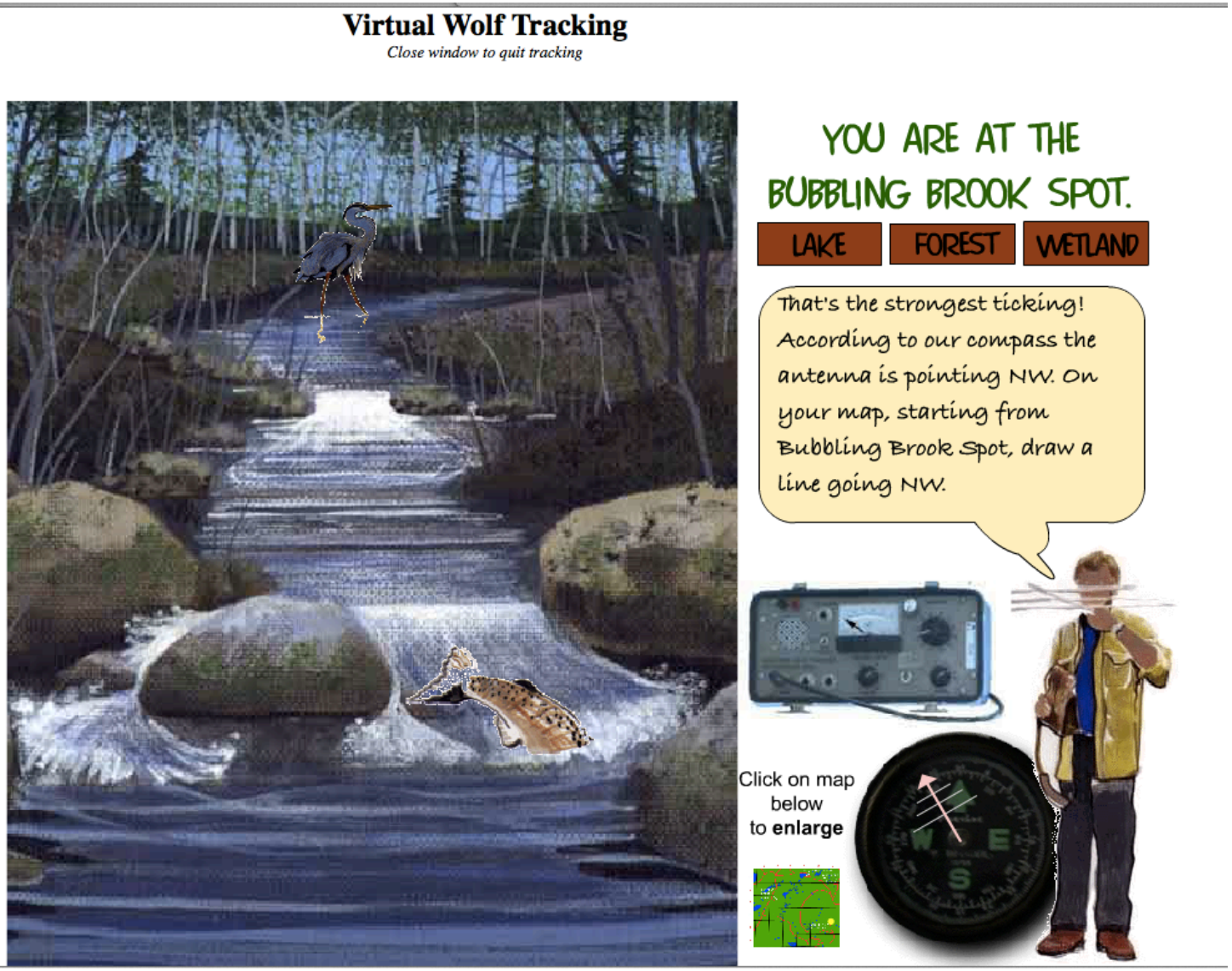

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