Inquiry Based Learning

"Tell me and I will forget; show me and I may remember; involve me and I will understand."
Confucius

What is Inquiry Based Learning?

- Inquiry is "seeking for truth, information, or knowledge. An investigation."
- More than just asking questions
- Converting information/data into meaningful, useful, applicable knowledge
- Gaining the skills and abilities to continue learning are important outcomes of IBL.

Image Credit: http://www.sagevista.org

Characteristics of IBL

- Based on the philosophy of John Dewey that education begins with curiosity
- Student Centered
  - Ask questions
  - Identify problems
  - Form theories
  - Collaborate
  - Reflect
- Active Learning
- Focuses On:
  - Critical thinking
  - Problem Solving
  - *Questioning*

PBL vs. IBL

Primary difference is in the role of the tutor/teacher.

PBL
- Supports process
- Expects learners to clearly explain thinking
- Does NOT provide information related to problem

IBL
- Facilitator of learning
- Expects and encourages higher order thinking
- Provides information to learners
  - Prompts
  - Structures
  - Expert models

Application

- Science - Scientific Method
  - Ask Questions
  - Generate Hypotheses
  - Test Hypotheses
  - Draw Conclusions
  - Ask More Questions
  - Do more testing
- Reading
  - Generate hypotheses for meanings of symbols, metaphors, etc.
- Social Studies
  - Exploring relationships

Assessing Learning

- Direct observation by the teacher
- Use of checklists, rubrics
- Portfolios to assess growth over time
- Exhibitions
- Interviews
- Extended Projects
- Self Assessment
  - Develop criteria
  - Set standards for self
  - Owners of learning

Role of Technology

- Enrich and provide structure for problem contexts
  - Enhance representation richness and present problems in contexts relevant to children's everyday lives
  - Support development of "expert thinking" in an inquiry problem domain
  - Structure complex tasks by setting learning boundaries, specifying activity procedures and offering expert guidance
  - Support multiple, clear, and increasingly complex presentations
  - Increase motivation and engagement levels
- Facilitate resource utilization
  - Enable access to resources of various perspectives and qualities
  - Help learners search and process multiple resources in a timely manner
- Support cognitive and metacognitive processes
  - Automatically handle routine tasks to enable focused attention on more challenging cognitive tasks
  - Individualize learning according to learning styles, patterns, progress, etc.
  - Allow learner to manipulate existing or create new visual representations
  - Enable learners to conduct experiments to test hypotheses and alternate solutions
  - Help learners become more aware of their own thinking
  - Enable social learning through peer collaboration

(Wang, Kinzie, McGuire & Pan, 2010, p. 383)

Example

- Exploring Sound
  - Various instruments (drums, xylophones, tuning forks, cylinders of water)
  - Learners can explore sounds made, make observations
    - Virtual Notebook
  - Ask questions
    - Virtual teacher to guide questioning ("What would you like to learn about sound?")
  - Generate hypotheses
  - Test
    - Give prompts as needed (what can you change? How can you find out?)
    - Maybe by manipulating the instruments
    - Transfer to other objects that make sound
  - Resources to explore (links, videos, etc.)
  - Teacher prompted reflection

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- http://www.thirteen.org/edonline/concept2class/inquiry/index.html

Other Resources

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Other Resources

- Hulshof, C., & deJong, T. (2006). Using just-in-time information to support scientific discovery learning in a computer-based simulation. *Interactive Learning Environments*, *14*(1), 79-94.
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*, *41*(2), 75-86.
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