Making a Match Between Technology and Problem-based Learning: Acquaintances, Friends, or Lovers

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The Rationale for PBL and Learning Technologies

Because Wisdom Cannot be Told

"So he had grown rich at last, and thought to transmit to his only son all the cut-and-dried experience which he himself had purchased at the price of his lost illusions: a noble last illusion of age."

Balzac
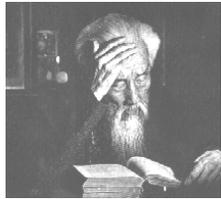
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Goals of Professional Education

"Education in the professions should prepare students for action."

Charles Gragg, 1940 Harvard Business School
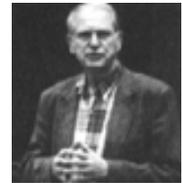
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Who's "At-Risk"?

"One definition for the at-risk student is "any student who leaves school before or after graduation with little possibility of continuing learning."

Roland Barth
Harvard Grad School of Education, 1994
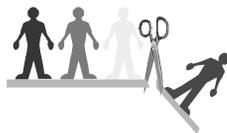
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Problem-based Learning:
A Definition

PBL is the learning that results from the process of working towards the understanding or resolution of a problem. *The problem is encountered first in the learning process*, rather than facts or information, and serves as a stimulus and focus for problem-solving and learning.

Barrows and Tamblyn,

Problem-based Learning, 1980

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Competencies Obtainable Through PBL

- Adapting to and participating in change
- Making reasoned decisions in unfamiliar situations
- Reasoning critically and creatively
- Adopting a more universal or holistic outlook
- Practicing empathy, appreciating other viewpoints
- Collaborating productively in groups or teams
- Identifying own strengths and weaknesses and undertaking appropriate remediation

From Charles Engel, 1991

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Developing Knowledge-able Students: PBL at Harvard Medical School

- Content coverage vs. depth
- Motivation vs. control
- Developing lifelong learners
- Students as knowledge workers
- Mix of lecture and PBL

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Research on the Outcomes of PBL

- Results on most cognitive outcomes are comparable to those from traditional curriculum.
- Students enjoy the PBL curriculum more , demonstrate higher motivation, and more productive attitudes towards their learning.
- Students complete their programs at a higher percentage and in less time.
- PBL curricula cover less content but in more depth.

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Learning Technologies and PBL

"Young people must have a global perspective, high personal integrity, strong language ability, be computer literate, able to think independently, and creatively."

Moses Cheng, 1998
Hong Kong Ed. Commission

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Developing Knowledge-able Students: Role of Technology

"Information technology -- the Internet, for example -- only gives us access to *information*. To understand that information requires knowledge. Applying that knowledge ethically requires wisdom."

Lee Kuan Yew, 1996
Senior Minister, Singapore

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Ways of Incorporating Technology into PBL

- To Convey Problem
- To Facilitate the Instructional Process
- As Tools for Problem-solving
- A a Means of Demonstrating the Product

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Multi-media Can be Used to Convey the Problem

- ➢ Use video to give information on the problem
- ➢ Embed info in video and text description
- ➢ Provide a query-based system of info-giving and retrieval about the problem

JWIntro
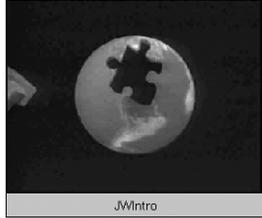
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Convey the Problem

- ■ Expert v. Novices
- ■ Develop ability to:
  - • "Notice key info"
  - • Recognize patterns
  - • "Find" problems
  - • Analyze situations

Denki-New

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Aims of Education

"Pedants sneer at an education which is useful. But if education is not useful, what is it?"
A. N. Whitehead, 1950
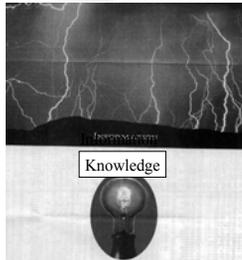
Knowledge

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Technology as a Tool to Facilitate the Instructional Process

- ■ Simulate a work process
- ■ Embed a database of knowledge
- ■ As a shell providing access to other knowledge resources

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Learning How to Learn

"In times of change, learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists."
Eric Hoffer

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Example of Simulation: Making Change Happen!

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Example of Simulation:
Improving Student Success

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Tools for Creating Simulations

- Forio.com
- Macromedia Director
- Macromedia Flash
- Others

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Tech as a Tool Students Use to
Analyze and Create a PBL Product

- Tech can be used by learners to create a product
  - Word processor
  - Web design
  - Database program
- Tech is a tool for generating or analyzing info to make a decision and solving the problem
 - Excel or Statistics
  - CAD software

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PBL as a Tool for Representing
the PBL Product

- Software for building and showing a website
- PowerPoint for a presentation

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"Seeing and hearing is
believing, but eating is knowing"

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