Wisdom is not the product of schooling but the lifelong attempt to acquire it.
- Albert Einstein

The New Education: E-Learning

Gerhard Fischer and Hal Eden
Fall Semester 2008

Chapter 6, Leonardo Book, September 22, 2008
Some Claims / Statement from Ben Shneiderman’s Chapter

- the art studio model has many advantages, but adapting it to large number of students is difficult

- the chapter proposes an active learning approach → new computing + collaboration + authentic projects

- collect + relate + create+ donate
  - **collect**: gather information and resources
  - **relate**: work in collaborative teams
  - **create**: develop ambitious projects
  - **donate**: produce meaning results (for people outside the classroom)

- old-fashioned standardized tests seem safer because of their easy-to-grade objective answers, but they don’t measure many important aspects of learning
**A Global Framework**

- **claims:**
  - in the world outside of school, communicating, calculating, and thinking are being carried out with powerful tools in technological environments
  - schools cannot ignore what is happening in the world outside → they simply cannot prepare people to live in a twenty-first century world using nineteenth-century technology
  - see our previous discussion: tools for living versus tools for learning

- **three major eras of education**
  - apprenticeship era: personal, resource intensive, and engaging
  - schooling era: education was mass oriented, efficient, and bureaucratic
  - lifelong learning era: interactive, customized, and collaboration

- **claim:** education will not necessarily become better, but it will be **different**
Why Now?

- "punctuated equilibrium" (Stephen Jay Gould): fossil record = long periods of stasis followed by rapid bursts of evolution (instead continuous evolutionary change) brought about by changes in the environment

- **claim**: the evolution of social systems follows a similar pattern

- **pressures to force a change in education:**
  - the introduction of new media/technologies (digital media, communication) into every aspect of life
  - technology can carry out the routine tasks in the world → there is less and less demand for people to do such tasks and more and more demand for people do work that requires thinking and problem solving
  - more concerns around accountability of schools
  - wider distribution of work and communities
## How the World Has Changed

<table>
<thead>
<tr>
<th>dimension</th>
<th>old paradigm</th>
<th>new paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td>information</td>
<td>scarce</td>
<td>plentiful</td>
</tr>
<tr>
<td>reproduction of documents</td>
<td>expensive and restricted</td>
<td>cheap</td>
</tr>
<tr>
<td>specialization</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>change within a human life time</td>
<td>slow</td>
<td>fast</td>
</tr>
<tr>
<td>interaction / collaboration</td>
<td>physical proximity</td>
<td>shared professional interests</td>
</tr>
<tr>
<td>economy</td>
<td>rigid, hierarchical organizations,</td>
<td>dynamic economy, flexibility, networking,</td>
</tr>
<tr>
<td></td>
<td>long-term personal identity</td>
<td>no long-term</td>
</tr>
</tbody>
</table>
## Learning Paradigms of the 21st Century

<table>
<thead>
<tr>
<th>Form</th>
<th>Complementing Form</th>
<th>Contribution toward Mindset Creation</th>
<th>Major Challenges</th>
<th>Media Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>self-directed learning</td>
<td>prescribed learning</td>
<td>authentic problems culture of inquiry</td>
<td>problem framing purposive activities</td>
<td>understanding evolving tasks</td>
</tr>
<tr>
<td>learning on demand</td>
<td>learning in advance</td>
<td>coverage is impossible obsolescence is guaranteed</td>
<td>identifying breakdowns integration of working and learning</td>
<td>critics support for reflection-in-action</td>
</tr>
<tr>
<td>informal learning</td>
<td>formal learning</td>
<td>learning by being in the world</td>
<td>larger, purposive activities provide learning opportunities</td>
<td>end-user modifiability</td>
</tr>
<tr>
<td>collaborative learning</td>
<td>individual learning</td>
<td>community social capital</td>
<td>shared understanding informed participation</td>
<td>boundary objects understandable by all stakeholders group memories</td>
</tr>
</tbody>
</table>
Old Model: Learn in School what is Needed in Life
Problem with the Old Model in Today’s World
—
Coverage and Obsolescence
Movie: A Private Universe

- video from the late 1980s of graduates at the Harvard commencement
- explaining why it's hotter in summer than winter
- the Harvard Edge: being confident (despite the answers are wrong)
What's Wrong with the Universities of Today

- **lecture dominated** — emphasizing passive knowledge absorption instead of active knowledge construction

- **curriculum dominated** — little room for authentic, self-directed learning activities

- students solve **given problems** — they do not learn to frame problems)

- problems in school have **right or wrong answers** — problem in the real world are wicked, ill-defined, ill-structured

- **closed book exams** — ignoring distributed cognition

- little emphasis on **collaborative learning and communication skills** — working together is regarded as “cheating”
# The Mismatch Problem

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Student</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>authority (&quot;sage on the stage&quot;)</td>
<td>Dependent, passive</td>
<td>lecture without questions, drill</td>
</tr>
<tr>
<td>motivator and facilitator</td>
<td>Interested</td>
<td>lecture with questions, guided discussion</td>
</tr>
<tr>
<td>Delegator</td>
<td>Involved</td>
<td>group projects, seminar</td>
</tr>
<tr>
<td>coach/critic (&quot;guide on the side&quot;)</td>
<td>self-directed, discovery-oriented</td>
<td>self-directed study group, apprenticeship, dissertation</td>
</tr>
</tbody>
</table>

- **major mismatches:**
  - dependent, passive learners take courses with non-directive teachers, and
  - self-directed, discovery-oriented active learners take courses with directive, authoritarian teachers
Debate: Use of Clickers in the Classroom

- **theory** behind it
  - .................................................................
  - .................................................................

- **strength** → **advantage**
  - .................................................................
  - .................................................................

- **weaknesses** → **disadvantages**
  - .................................................................
  - .................................................................

- **when to use and when not to use**
  - .................................................................
  - .................................................................
Example: Massachusetts Institute of Technology (MIT)

- **OpenCourseware (OCW)**
  - MIT will put all its course content, undergraduate and graduate, into Web-based format
  - the OCW website will be open and freely available to the world
  - MIT will commit to OCW as a permanent, sustainable activity

- **President Vest on OpenCourseWare's impact on education at MIT:**
  "We believe OpenCourseWare will have a strong impact on a residential learning at MIT and elsewhere. Let me be clear: We are not providing a MIT education on the Web. We are providing our core materials that are the infrastructure that underlies an MIT education. Real education requires interaction, the interaction that is part of American teaching."
6.803 / 6.833 The Human Intelligence Enterprise
Spring 2006

Course Highlights
This course features an extensive list of readings and assignments for the course. Information about the graduate project is also available.

Course Description
6.803/6.833 is a course in the department's "Artificial Intelligence and Applications" concentration. This course is offered both to undergraduates (6.803) and graduates (6.833). 6.803/6.833 is designed to help students learn about progress toward the scientific goal of understanding human intelligence from a computational point of view. This course complements 6.034, because 6.803/6.833 focuses on long-standing scientific questions, whereas 6.034 focuses on existing tools for building applications with reasoning and learning capability. The content of 6.803/6.833 is largely based on papers by representative Artificial Intelligence leaders, which serve as the basis for discussion and assignments for the course.
The Challenges Created by MIT-OpenCourseware:

- commoditizing the ‘content’ sharpens the focus on the substantive values of residential education: **personal attention** from faculty and **participation** in learning and research communities

- allows MIT to move away from large passive lectures towards **active learning environments**

- look beyond the simplicities of information to the **complexities of learning, knowledge, judgment, communities, and organizations**

- emphasize “**learning to be**”
E-Learning versus / and Residential, Research-Based Universities

- **e-learning:**
  - has its place for *specific objectives*
  - will *complement* not replace learning at residential, research-based universities

- **beyond gift-wrapping:** “*distance learning is different from classroom learning at a distance*”

- **Peter Drucker:** “*There is nothing so useless as doing efficiently that which should not be done at all.*”