Center for LifeLong Learning & Design

University of Colorado at Boulder

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

Models of Teaching and Learning: Participation in a Community of Learners (CoLs)

Gerhard Fischer and Hal Eden
Spring Semester 2006
March 8, 2006

source: Rogoff, B., Matsuov, E., & White, C. (1998) "Models of Teaching and Learning: Participation in a Community of Learners." In D. R. Olsen & N. Torrance (Eds.), *The Handbook of Education and Human Development — New Models of Learning, Teaching and Schooling,* Blackwell, Oxford, pp. 388-414

Aims of this Lecture

- distinguish **theories of development** that cast learning as
    - a **one-sided process** in which only teachers or learners are responsible for learning
    - a **community process** of transformation of participation in socio-cultural activities

- **distinguish** between
    - **theoretical perspectives** on learning
    - **models of instruction** that are aligned with these theoretical perspectives

theoretical perspectives	models of instruction	new media/technologies
transmission	adult-run	lecture, access to information
acquisition	children-run	simulations, programming, discovery learning, reinventing the wheel
transformation of participation	CoLs with varying responsibilities	integrated environments such as the Swiki, the EDC

Participation in a Community of Learners

- **"adult-run education":** learning is a process managed by experts who transmit knowledge to learners

- **"children-run education":** learning is the province of learners who acquire knowledge through their active exploration

- **"community of learners"**
    - active learners and more skilled partners provide leadership and guidance → asymmetry of roles

    - learning involves transformation of participation in collaborative endeavor ("legitimate peripheral participation (LPP)"; Lave and Wenger)

    - all participants are active: no one has all the responsibility and no one is passive → symmetry of ignorance

    - learner/teacher = f{person} → learner/teacher = f{context}

- question: in which category fits **our course**?

Beyond Binary Choices

Choice1:	Choice2:	(Partial) Resolution
direct manipulation	programming	integrated in DODEs
tool-based assistance	agent-based assistant	integrated in DODEs (e.g., with critics
adaptable	adaptive	malleable
generic	domain-oriented	layered architectures, substrates
human support	computational support	distributed intelligence
emulate	complement	collaborative human-computer systems
usable	useful	useful and usable
instructionism	constructionism	self-directed learning and contextualized tutoring
training (skill/knowledge transfer)	solving new problems (knowledge construction)	lifelong learning
adult-run	**children-run**	**community of learners**
individual	social	Envisionment and Discovery Collaboratory

Beyond Binary Choices — Continued

Choice1:	Choice2:	(Partial) Resolution
use	design	meta-design; low threshold and high ceiling
access	informed participation	incremental learning; LPP
physical	computational	ubiquitous computing
problem solving	problem framing	co-evolution
planning	situated action	meta-design
design, action, experience	argumentation, reflection	reflection-in-action
readers' interface	writers' interface	Dynasite, Swiki
browsing	search	use artifacts and work context for retrieval (access and/or delivery); Codebroker

for more information see:

Fischer, G. (2005) "Beyond Binary Choices: Understanding and Exploiting Trade-Offs to Enhance Creativity." In J. S. Gero, & M. L. Maher (Eds.), Computational and Cognitive Models of Creative Design, Key Centre of Design Computing and Cognition, University of Sydney, Sydney, Australia, pp. 71-92.

http://l3d.cs.colorado.edu/~gerhard/papers/final-heron05-final.pdf

Adult-Run Model

- p 391: "in most classrooms the teacher stands at the front of the room, dispensing 'inert ideas' to his passive students, as if they were so many empty vessels to be filled"

- p 392: "our schools are factories in which the raw products (children) are to be shaped and fashioned into products to meet the various demands of life"

- students learn
  - to solve problems → but **not** how to frame them
  - to produce "correct" answers → but do **not** have experience examining how to determine what is correct
  - to participate in tasks → but these tasks are **not** of their own personal interest
  - to be motivated by the teacher → but **not** how to develop their own interests

Child-Run Model

- the opposite **one-sided** approach (supports self-directed learning, but misses contextualized tutoring)

- children are active constructors of knowledge and **adult involvement is seen as a potential impediment to learning**

- **curriculum debates:** curriculum should build on the great resources of civilization, not on children's spontaneous impulses

- a **different view** of discovery learning → Hirsch, E. D. (1996) *The Schools We Need And Why We Don't Have Them*, Doubleday, New York.

"Discovery Learning" as Understood by E.D. Hirsch

- The phrase refers to the teaching method which sets up projects or problems so that students can discover knowledge for themselves through hands-on experience and problem solving rather than through textbooks and lectures.

- Progressivists made discovery learning the chief or exclusive form of teaching starting with the "project method".

  - The premise is true that knowledge acquired on one's own, with difficulty and by expending lots of time and effort, is more likely to be retained than knowledge presented verbally.

  - It is also true that knowledge gained in a realistic context as part of an effort to solve a problem is likely to be knowledge that is well understood and integrated.

  - Unquestionably, then, discovery learning is an effective method—**when it works**.

Discovery Learning by E.D. Hirsch — Continued

- But there are two serious drawbacks to preponderant or exclusive reliance on discovery learning.
  - First, students do not always make on their own the discoveries they are supposed to make; in fact, they sometimes make "discoveries" that aren't true. Hence, it is essential to monitor students to probe whether the desired learning goal has been achieved, and if not, to reach the goal by direct means.

  - Second, discovery learning has proved to be very inefficient. Not only do students sometimes fail to gain the knowledge and know-how they are supposed to gain, but they do not gain it very fast. Research into teaching methods has consistently shown that discovery learning is the least effective method of instruction in the teacher's repertory.

Guided Discovery Learning

- **source:** Mayer, R. E. (2004) "Should There Be a Three-Strikes Rule Against Pure Discovery Learning? — The Case for Guided Methods of Instruction," American Psychologist, 59(1), pp. 14-19.

- **discovery learning** = students are free to work in a learning environment with little or no guidance

- **social constructionism** = students are expected to work in groups in a learning environment with little or no guidance

- **some findings** reported in this article by the author: *"guided discovery learning was more effective than pure discovery learning"*

- **a claim by the author**: an important role for psychologist is to show how educational practice can be guided by evidence and research-based theory rather than ever-shifting philosophical ideology

Learning— Illich's "Deschooling Society"

- the pupil is thereby "schooled" to **confuse** teaching with learning, grade advancement with education, a diploma with competence, and fluency with the ability to say something new

- we need research on the **possible use of technologies** to create institutions which serve personal, creative and autonomous interaction and the emergence of values which cannot be substantially controlled by technocrats

- an illusion on which the school system rests: *"most learning is the result of teaching"*

- **educational webs** = heighten the opportunity for all people to transform each moment in their living into one of learning, sharing and caring

The Discovery Learning Initiative (DLI) and the Discovery Learning Center (DLC)

- **DL-*Initiative* foci:**
  - *vertical integration* (undergraduate research apprentices, graduate students, post-docs, faculty, community members)
  - *horizontal integration* (collaborative design, shared understanding, overcome "symmetry of ignorance")
  - *innovative* uses of new media and technology serving these goals

- **vertical integration: learning about → learning to be**
  - model: community feeling in sports
  - L3D's "Undergraduate Research Apprenticeship Program (URAP)"

- **horizontal integration → Digital Bauhaus (Pelle Ehn):**
  - "to unite the 'two sides': the hard (technology and natural sciences) with the soft (values, democracy, art and ethics). One remarkable such project was the Bauhaus. Today, in the digital age we can witness new more post-modern attempts to meeting between 'art' and 'technology'."

Community of Learners

- **all participants** are active: no one has all the responsibility and no one is passive
    - consumer → designer
    - access → informed participation (end-user authoring and end-user modification)

- more **skilled partners** (e.g., experienced teachers and coaches) provide leadership and guidance → asymmetry of roles

- learning involves **transformation of participation** in collaborative endeavor

- **analogies** of communities of learners in
    - communities of practice (legitimate peripheral participation)
   - communities of interest (making all voices heard, diversity)

Community of Learners in Schools — Some Results / Hypotheses

- in the community of learners model students **appear to learn**
    - how to coordinate
    - to become responsible and organized their management of their own learning
    - to build on their previous interests to learn
    - to sustain motivation to learn
    - to focus on their own improvement, rather than on comparison with others
    - they become skilled in self-evaluation

- in the adult-run models students appear to learn
    - how to manage individual performance (often measured against the performance of others)
    - to carry out tasks that are not of personal interest and may not make sense to them
    - to demonstrate their skills in basic test questions
    - to figure out criteria by which adults will judge their performance

- **a possible explanation:** *"attempts to use the community of learners model in U.S. schools confront unique challenges because most teachers and parents have been "raised" in a one-sided model of teaching an learning (usually adult-run)"*

Motivation

- **claims:**
    - the chief impediments to learning are not cognitive but **motivational**
    - people can learn many things if **they want to**
    - motivation is a tricky problem in learning because while it plays a major role, it is **not well understood**
    - **Rogoff et al, p 404:** *"inherent motivation is fostered along with development of responsibility for one's choices"*
    - **Csikszentmihalyi:** optimal flow as a motivating and driving force in learning
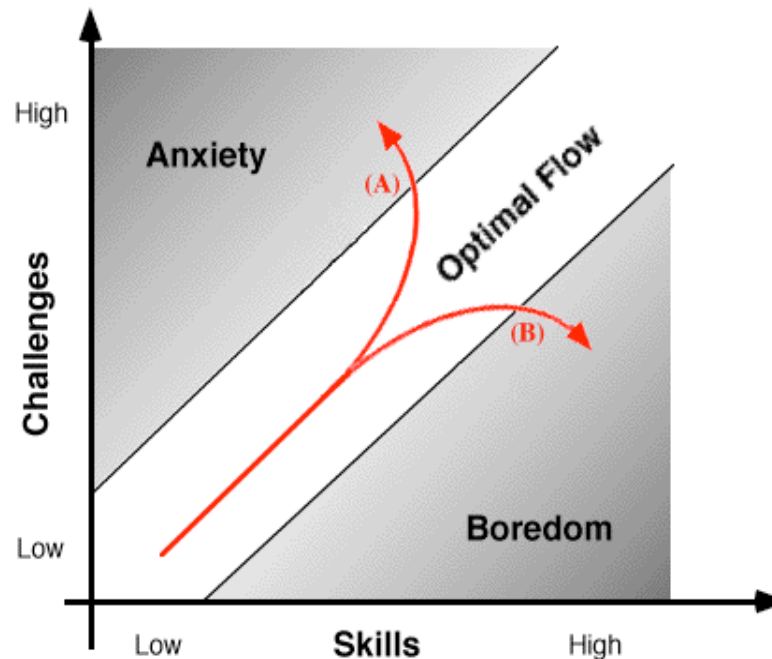
Mismatch Problem

| Teacher	Student	Example
authority ("sage on the stage")	dependent, passive	lecture without questions, drill
motivator and facilitator	interested	lecture with questions, guided discussion
delegator	involved	group projects, seminar
coach/critic ("guide on the side")	self-directed, discovery-oriented	self-directed study group, apprenticeship, dissertation

- **major mismatches :**
    - dependent, passive learners take courses with non-directive teachers, and
    - self-directed, discovery-oriented active learners take courses with directive, authoritarian teachers.

Technologies to Support Communities of Learners
—
WWW: From Broadcast to Collaboration Medium

M1

The Web as Broadcast Medium

M2

Broadcast with Feedback

M3

Evolutionary and Collaborative Design
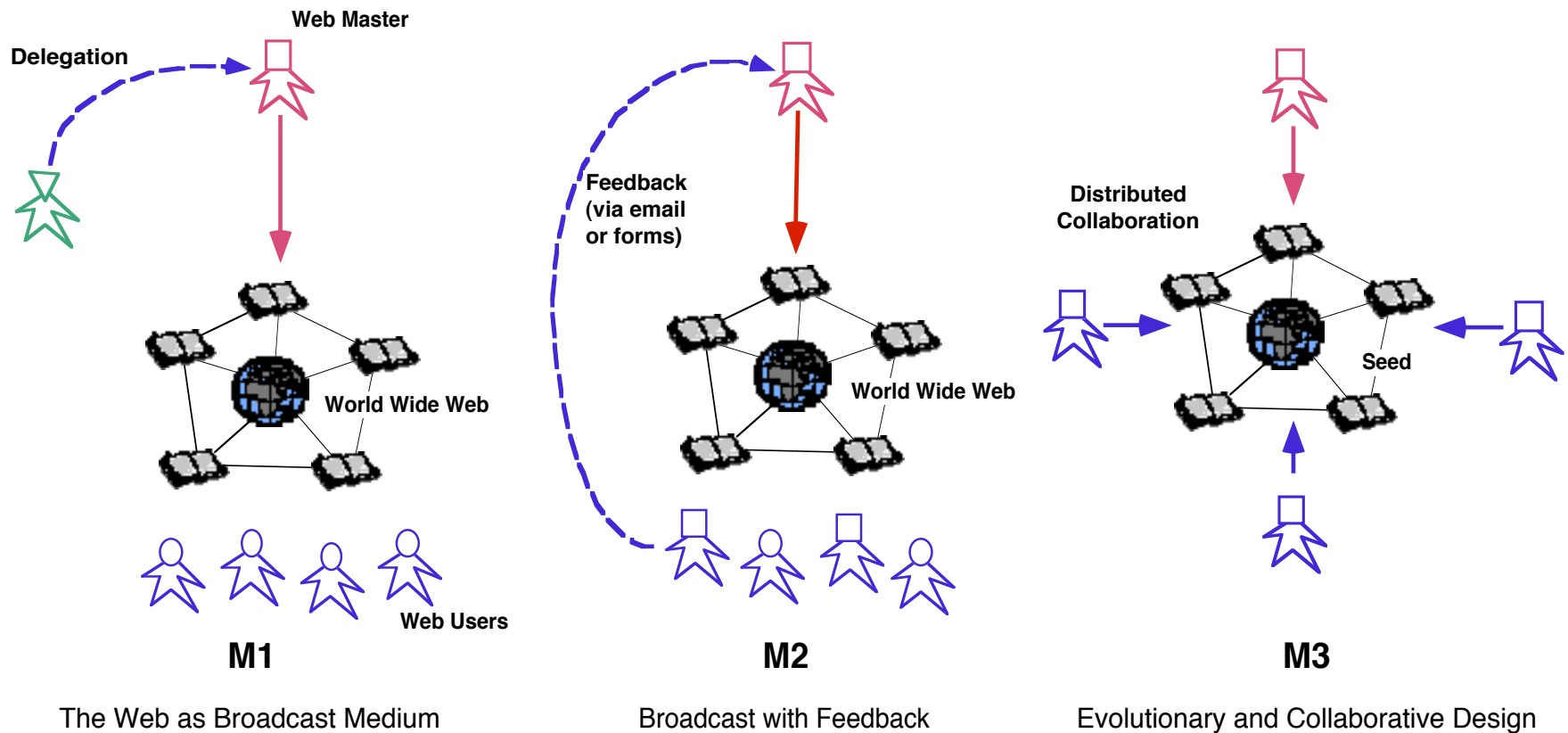
Example: Web 2.0

- **source:** Tim O'Reilly *"What is Web 2.0 — Design Patterns and Business Models for the Next Generation of Software"*

Web 1.0		Web 2.0
Britannica Online	→	Wikipedia
personal website	→	blogging
publishing	→	participation
content management systems	→	wikis
scheduled software releases	→	continuous improvements
individual contributions	→	collective intelligence

- **claim**: network effects from user contributions (= knowledge sharing) are the key to market dominance in the Web 2.0 era

Summary Statement of Rogoff, Matsuov, & White (p 410)

- in **communities of learners** models, students appear to learn how
    - to coordinate with, support, and lead others,
    - to become responsible and organized in their management of their own learning,
    - to be able to build on their own previous interests to learn in new areas,
    - to sustain motivation to learn

- in **adult run** models, students learn how
    - to manage individual performance that is often measured against the performance of others,
    - to carry out tasks that are not of personal interest and may not make sense to them
    - to demonstrate their skills in the format of test questions
    - to figure out the criteria by which adults will judge their performance to be better than that of others