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)

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Aim of this Chapter

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

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

<table>
<thead>
<tr>
<th>theoretical perspectives</th>
<th>models of instruction</th>
<th>new media/technologies</th>
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<tbody>
<tr>
<td>transmission</td>
<td>adult-run</td>
<td>lecture, access to information</td>
</tr>
<tr>
<td>acquisition</td>
<td>children-run</td>
<td>simulations, programming, discovery learning, reinventing the wheel</td>
</tr>
<tr>
<td>transformation of participation</td>
<td>CoLs with varying responsibilities</td>
<td>integrated environments such as the EDC</td>
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</table>
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)
## Beyond Binary Choices

<table>
<thead>
<tr>
<th>Choice1:</th>
<th>Choice2:</th>
<th>(Partial) Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct manipulation</td>
<td>programming</td>
<td>integrated in DODEs</td>
</tr>
<tr>
<td>tool-based assistance</td>
<td>agent-based assistant</td>
<td>integrated in DODEs (e.g., with critics)</td>
</tr>
<tr>
<td>adaptable</td>
<td>adaptive</td>
<td>malleable</td>
</tr>
<tr>
<td>generic</td>
<td>domain-oriented</td>
<td>layered architectures, substrates</td>
</tr>
<tr>
<td>human support</td>
<td>computational support</td>
<td>distributed problem solving</td>
</tr>
<tr>
<td>emulate</td>
<td>complement</td>
<td>collaborative human-computer systems</td>
</tr>
<tr>
<td>usable</td>
<td>useful</td>
<td>useful and usable</td>
</tr>
<tr>
<td>instructionism</td>
<td>constructionism</td>
<td>lifelong learning, discovery learning</td>
</tr>
<tr>
<td>training (skill/knowledge</td>
<td>solving new problems</td>
<td>lifelong learning</td>
</tr>
<tr>
<td>transfer)</td>
<td>(knowledge construction)</td>
<td></td>
</tr>
<tr>
<td>adult-run</td>
<td>children-run</td>
<td>community of learners</td>
</tr>
<tr>
<td>individual</td>
<td>social</td>
<td>Envisionment and Discovery Collaboratory</td>
</tr>
</tbody>
</table>
## Beyond Binary Choices — Continued

<table>
<thead>
<tr>
<th>Choice1:</th>
<th>Choice2:</th>
<th>(Partial) Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>design</td>
<td>low threshold and high ceiling</td>
</tr>
<tr>
<td>access</td>
<td>informed participation</td>
<td>incremental learning</td>
</tr>
<tr>
<td>physical</td>
<td>computational</td>
<td>ubiquitous computing</td>
</tr>
<tr>
<td>problem solving</td>
<td>problem framing</td>
<td>co-evolution</td>
</tr>
<tr>
<td>planning</td>
<td>situated action</td>
<td>meta-design</td>
</tr>
<tr>
<td>design, action, experience</td>
<td>argumentation, reflection</td>
<td>reflection-in-action</td>
</tr>
<tr>
<td>readers’ interface</td>
<td>writers’ interface</td>
<td>Dynasite, Swiki</td>
</tr>
<tr>
<td>browsing</td>
<td>search</td>
<td>use artifacts and work context for retrieval (access and / or delivery)</td>
</tr>
</tbody>
</table>
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 \(\rightarrow\) but **not** how to frame them
  - to produce “correct” answers \(\rightarrow\) but do **not** have experience examining how to determine what is correct
  - to participate in tasks \(\rightarrow\) but these tasks are **not** of their own personal interest
  - to be motivated by the teacher \(\rightarrow\) but **not** how to develop their own interests
Child-Run Model

• the opposite one-sided approach

• 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

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.

- 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.
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'.”
Learning: Current Theories

- learning is a process of **knowledge construction**, not of knowledge recording or absorption → *constructionism*

- learning is **knowledge-dependent**; people use their existing knowledge to construct new knowledge → *user models, personalization*

- learning is highly **tuned to the situation** in which it takes place → *domain-orientation, human problem-domain communication*

- learning needs to account for **distributed cognition** requiring to combine knowledge in the head with knowledge in the world → *learning on demand, using on demand, “basic” skills*

- learning is affected as much by **motivational issues** as by cognitive issues → *low threshold, high-ceiling*
“Basic” Skills

- question: if most job-relevant knowledge must be learned on demand what is the role of “basic” education?

- what is the critical background knowledge which makes learning on demand feasible?

- question: do “basic skills” change their meaning under the influence of technology?

- examples of “basic” skills
  - ............................................................
  - ............................................................
  - ............................................................
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

optimal flow as a motivating and driving force in learning
Community of Learners

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

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

- learning involves transformation of participation in collaborative endeavor
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)”
## 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.
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
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