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

Design, Learning, and Collaboration

Gerhard Fischer
Spring Semester 2002

Introduction and Overview of Course, Jan 14, 2002
Intersection of Design, Learning and Collaboration and their Changing Nature through New Media
Design, Learning and Collaboration — the “Old” View
Design, Learning and Collaboration — the “New” View
The Tension between Human and Computational Power

The power of the unaided individual human mind remains constant over time.

Computing power increases at an exponential rate.
The Aided, Collective Human Mind — Exploiting the Social

Power of Collective Human Minds, Aided by Technology

2500 BC
Reading & Writing

1500
Printing Press

1980
Computers

2000
Collaborative Systems

Collaborative Systems

Fischer, Spring 2002

Design, Learning, and Collaboration
Design

- **design** = although there is a huge diversity among design disciplines, we can find common concerns and principles that are applicable to the design of any object, whether it is a (scientific, mathematical) notation / poster, a household appliance, a housing development, a software system, .......

- **some relevant publications:**
Learning

- learning = is a new form of labor and working is often a collaborative effort among colleagues and peers. In the emerging knowledge society, an educated person will be someone who is willing to consider learning as a lifelong process. More and more knowledge, especially advanced knowledge, is acquired well past the age of formal schooling, and in many situations through educational processes that do not center on the traditional school.

- some relevant publications:
Collaboration

- **collaboration** = the individual, unaided human mind is limited: there is only so much we can remember and there is only so much we can learn.

- **some relevant publications:**
Innovative System Development Efforts In Support of Design, Learning and Collaboration

http://www.cs.colorado.edu/~l3d/

<table>
<thead>
<tr>
<th>Domain-Oriented Design Environments (DODEs)</th>
<th>kitchen design, computer network design, voice dialog design, .....</th>
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<tbody>
<tr>
<td>Dynasite</td>
<td>WWW support for collaborative design, Sources, Dynagloss, ....</td>
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<td>Agentsheets,</td>
<td>substrate for DODEs</td>
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<td>Visual AgenTalk</td>
<td>simulation, end-user programming</td>
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<td>Behavior Exchange</td>
<td>sharing the work</td>
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<td>Envisionment and Discovery Laboratory (EDC)</td>
<td>integrated physical and computational environments creating shared understanding, studying authentic problems</td>
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<td>PiTABoard</td>
<td>innovative interaction mechanisms in face-to-face-collaboration</td>
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<td>CodeBroker</td>
<td>software reuse and information delivery</td>
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<tr>
<td>Swiki / Squeak</td>
<td>organizational memories created by collaborative knowledge construction</td>
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Fundamental Difference between Printed and Computational Media

**Print media:** A fixed context is decided at design time.

**Computational media:** Decision at use time can take advantage of contextual factors only known at use time.

**Challenge:** Articulation of contextual factors at use time (about tasks, users, social systems,.....) — end-user programming and modification, customization, specification sheets, usage data, .......

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The Course

• This course will consist of lectures, guest lectures, independent research activities by students, demonstration of existing major prototype systems, experiments, and a major project by groups of students.

• Independent Research Activities by Students
  This part of the course will provide students with an opportunity to engage in self-directed learning in the context of independent research explorations (this work is more conceptual and complements the work in the course project). Students will present their research about these topics in class some ideas. A list of suggested topics will be provided by the instructor.

• Major Project (by groups of students)
  purpose: to gain an in-depth understanding of a theme relevant to the course. Projects need to be carried out through a learning-by-doing approach throughout the semester, preferably as a collaborative activity of team(s).

  Requirements for Projects include:
  - An Initial Description of your Course Project
  - Project Proposal
  - Progress Report
  - Final Report
Expectations about Involvement of Students

• active participation → presence in class

• readings and small assignments

• independent research

• projects

• create a community: (peer-to-peer learning, website, take picture)
Self-Application: A “New Culture” for this Course

• “symmetry of ignorance” — stakeholders are aware that while they each possess relevant knowledge, none of them has all the relevant knowledge

• teacher, learner = f{person} → teacher, learner = f{context}

• the knowledge for (re)solving complex, real-world problems does not exist *a priori*, but is generated through collaboration among stakeholders
Passion for Learning — Beyond Tests