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

Web 2.0 and L3D’s Research

Gerhard Fischer

L3D Meeting, May 10, 2006
Past and Present → Future

- mainframes and timesharing
- personal computer and GUI
- interactive computing
- Web 1.0
- WWW, multi-media
- wireless, mobile
- Web2.0
- disappearing computer beyond the desktop
- social computing


- professionally-dominated design
- user-centered design, participatory design
- meta-design
- social creativity
## New Classes of Systems

- **generic systems** → **domain-oriented systems**
- **fundamentally different users** → **people with cognitive disabilities**
- **user interface** → **interaction, engagement**
- **ease of use** → **low threshold and high ceiling**
- **desktop** → **ubiquitous, pervasive computing**
- **decontextualized** → **context awareness**
- **closed systems** → **open systems**
- **productivity** → **innovation, creativity**
- **building from scratch** → **reuse, redesign, evolution, APIs, Mash-ups**
## Example: Web 2.0

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

<table>
<thead>
<tr>
<th>Web 1.0</th>
<th>Web 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britannica Online</td>
<td>Wikipedia</td>
</tr>
<tr>
<td>personal website</td>
<td>blogging</td>
</tr>
<tr>
<td>publishing</td>
<td>participation</td>
</tr>
<tr>
<td>content management systems</td>
<td>wikis</td>
</tr>
<tr>
<td>scheduled software releases</td>
<td>continuous improvements</td>
</tr>
<tr>
<td>individual contributions</td>
<td>collective intelligence</td>
</tr>
</tbody>
</table>

**claim:** network effects from user contributions (= knowledge sharing) are the key to market dominance in the Web 2.0 era
WWW: From Broadcast to Collaboration Medium

The Web as Broadcast Medium

Broadcast with Feedback

Evolutionary and Collaborative Design
Web 2.0 — Multiple Perspectives

- **technical**
  - AJAX
  - .NET

- **underlying business model**
  - open source
  - Wikipedia

- **political**
  - democratizing innovation
Web 2.0 — Multiple Perspectives

- **educational**
  - how do we educate the “minds of the future” to be citizens / members of the Web 2.0 culture — or: do they educate us?
  - with Wireless and Mobile Technologies (WMT) → tools for living

- **social:**
  - consumer → contributor
  - rewards

- **philosophical:**
  - change of mindsets

- **the challenges: how to keep things**
  - current
  - interactive
  - engaging
Lifelong Learning

- lifelong learning is more than adult education → its fundamental objective: “making learning a part of life”

- basic assumption: If the world of working and living relies on collaboration, creativity, definition and framing of problems, dealing with uncertainty, change, and distributed cognition — then education needs to prepare students for meaningful and productive lives in such a world

- objective: education from a lifelong learning perspective should
  - help learners enhance their abilities to learn and allow them to engage in meaningful activities
  - promote new civic discourses because a major role for new technologies is not to deliver predigested information but to support social debates and discussions
  - exploit the power of media
Distributed Intelligence

- **claim**: *human cognition* has been seen as existing solely “inside” a person’s head, and studies on cognition have often disregarded the physical and social surroundings in which cognition takes place.

- **distribution**:
  - distributed among people → collaborative learning and working
  - distributed between humans minds and artifacts → intelligence augmentation
The Seeding, Evolutionary Growth, Reseeding (SER) Model
Supporting Meta-Design

- **at design time:**
  - development of an initial system that can change over time (seed)
  - underdesign: creating design options for users

- **at use time:**
  - support for “unself-conscious culture of design”: users will experience breakdowns by recognizing “bad fit” at use time
  - end-user modifications allow users to address limitations they experience
  - evolutionary growth through incremental modifications

- **reseeding:**
  - significant reconceptualization of the system
  - account for incremental modifications, mitigate conflicts between changes, and establish an enhanced system
The Seeding, Evolutionary Growth, Reseeding (SER) Model
Motivational Aspects and Meta-Design

- what will make humans want to become designers/active contributors over time?
  - serious working and learning does not have to be unpleasant but can be personally meaningful, empowering, engaging, and fun
  - comment by an artist: “programming is not hard, but it is boring”

- what will make humans want to share? → requires: mindset change, culture change, community knowledge bases, gift cultures, social capital

- who is the beneficiary and who has to do the work? → organizational rewards
Utility = Value / Effort

- **increase in value:** motivation and rewards for a “design culture”
  - feeling in control (i.e., independent from “high-tech scribes”)
  - being able to solve or contribute to the solution of a problem
  - mastering a tool in greater depth
  - making an ego-satisfying contribution to a group
  - enjoying the feeling of good citizenship to a community (“social capital”)

- **decrease in effort:**
  - meta-design is hard
  - extending meta-design to design for design communities
Learning, Knowledge Sharing and New Media

- education, learning, teaching and knowing = \textit{f\{media\}}

- lifelong learning:
  - learning about $\leftrightarrow$ learning to be
  - learning when the answer is known $\leftrightarrow$ learning when the answer is not known
  - learning and teaching are not inherently linked
    - there is a lot of learning without teaching
    - there is a lot of teaching without learning
  - integration of formal and informal learning
Knowledge Sharing in a **Consumer Culture** ("Access")

- Strong Input Filters, Small Information Repositories, Weak Output Filters
- Limitation: Making All Voices Heard
Knowledge Sharing in Design Culture ("Informed Participation")

- Weak Input Filters, Large Information Repositories, Strong Output Filters
- Limitation: Trust and Reliability of Information
Trust

- open source software versus commercial software → “if there are enough eye balls, are bugs are shallow

- Wikipedia versus Encyclopedia Britannica

- South Korea's stem cell scandal → the results were published in *Science* and *Nature* (two of the most carefully reviewed journal)
Shift the Discourse

- **from**: a concern about who has access to new information technologies
  - 95% of the 15-24 years old population in Japan in 2001 owned a web-enabled cell phone
  - will the $100 laptop solve the problem?
  - differentiate between necessary and sufficient

- **to**: who will have the knowledge to design, create, invent, and use the technologies enhancing human lives
  - basic belief on earlier slide: “the deep and enduring changes of our ages are not technological but social and cultural”
Beyond the Unaided, Individual Human Mind

![Graph showing the power of the collective human mind, aided by technology, over time. The x-axis represents time from 2500 BC to 2006, and the y-axis represents the power of the collective human mind. The graph highlights the following key periods: 2500 BC, 1500, 1980, 1993, and 2006, indicating significant advancements in reading and writing, printing press, personal computer, internet, and wireless and mobile technologies.]