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

Beyond Binary Choices: Integrating Individual and Social Creativity

Gerhard Fischer and Hal Eden
Fall Semester 2008, October 1

The Basic Message

- Individual **versus** Social Creativity → Individual **and** Social Creativity

- **why:** the **complexity** and **uniqueness** of design problems transcends the unaided, individual human mind → it requires **social creativity**

- **example:** a movie (director and 300 contributors)
Research in Creativity

- **a timely and hot topic**

- **workshop** supported by the National Science Foundation, June 2005

- **conference** “Creativity & Cognition”, June 2007

- **new program** “CreativeIT: Creativity and IT”; National Science Foundation (2007) → [http://swiki.cs.colorado.edu:3232/CreativeIT](http://swiki.cs.colorado.edu:3232/CreativeIT)
Creativity —The “Wrong” Image?

“The Thinker” by Auguste Rodin
Individual Creativity

- creative individuals can make a huge difference — for example: movie directors, champions of sports teams, leading scientists and politicians, architects and urban planners

- individual knowledge, imagination, inspiration and innovation are the basis for social creativity

- but:
  - “An idea or product that deserves the label ‘creative’ arises from the synergy of many sources and not only from the mind of a single person” — Mihaly Csikszentmihályi
  - “Great discoveries and improvements invariably involve the cooperation of many minds!” — Alexander Graham Bell
Social Creativity

- **the Renaissance scholar** (who knows “everything”) does not exist anymore
  - the individual, unaided human mind is limited
  - the great individual $\rightarrow$ the great group/community

- **distinct domain of human knowledge exist** $\rightarrow$ of critical importance: mutual appreciation, efforts to understand each other, increase in socially shared cognition and practice

- exploit the “**symmetry of ignorance**” as an opportunity
  - none of the stakeholders solving a complex problem can guarantee that their knowledge is superior or more complete compared to other people’s knowledge
  - to overcome the “symmetry of ignorance” $\rightarrow$ activate as much knowledge from as many stakeholders as possible with the goal of achieving mutual education and shared understanding
Individual **versus / and** Social Creativity

“The strength of the wolf is in the pack, and the strength of the pack is in the wolf.” — Rudyard Kipling

- **individual:**
  - human collaboration is not only needed but central to social creativity
  - individuals participating in collaborative inquiry and creation need the individual reflective time depicted by Rodin's sculpture
  - without such reflection it is difficult to think about contributions to social creativity

- **social**
  - Rodin's sculpture "The Thinker" dominates our collective imagination as the purest form of human inquiry — the lone, stoic thinker
  - the reality is that scientific and artistic forms emerge from joint thinking, passionate conversations, and shared struggles
The Fish-Scale Model for Social Creativity

Evidence and Arguments for Social Creativity


- “Linux was the first project to make a conscious and successful effort to use the entire world as a talent pool” → Raymond, E. S. & Young, B. (2001) The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary, O'Reilly & Associates, Sebastopol, CA.
Conceptual Framework

- **distances in social creativity**
  - spatial, temporal, conceptual, and technological

- **communities of practice and communities of interest**
Distance “Spatial Dimension” — Voices from Far Away

- bringing spatially distributed people together: supports the shift that shared concerns rather than shared location becomes the prominent defining feature of a group of people interacting with each other

- allows more people to be included, thus exploiting local knowledge

- success model: open source communities

- transcending the barrier of spatial distribution is of particular importance in locally sparse populations
Distance “Temporal Dimension” — Voices from the Past

- design processes often take place over many years, with initial design followed by extended periods of evolution and redesign

- importance of
  - design rationale
  - redesign and reuse (“complex systems evolve faster if they can build on stable subsystems”)

Distance “Conceptual Dimension” — Voices from Collaborators

- **Communities of Practice (CoPs)**

- **Communities of Interest (Cols)**
Communities of Practice (CoPs): Homogenous Design Communities

- **CoPs** = practitioners who work as a community in a certain domain

- **examples**: architects, urban planners, research groups, software developers, software users, kitchen designers, computer network designer,

- **learning**:
  - masters and apprentices
  - legitimate peripheral participation (LPP)

- **problems**: "group-think" → when people work together too closely in communities, they sometimes suffer illusions of righteousness and invincibility

- **systems**: domain-oriented design environments (e.g.: kitchen design, computer network design, voice dialogue design, …..)
Communities of Interest (Cols): Heterogeneous Design Communities

- **Cols** = bring different CoPs together to solve a problem

- **membership** in Cols is defined by a shared interest in the framing and resolution of a design problem

- **diverse cultures**
  - people from academia and from industry
  - software designers and software users
  - students and researchers from around the world

- **fundamental challenges:**
  - establish common ground by creating boundary objects
  - build a shared understanding of the task at hand
  - learn to communicate with others who have a different perspective
  - primary goal: not “moving toward a center” (CoP) but “integrating diversity and making all voices heard”
Distance “Technological Dimension”

—

What are good Creativity Support Tools?

- Searching & browsing large information repositories (e.g.: Google Search)

- Visualizing Data & Processes

- Thinking by Free Associations

- Exploring Solutions - What If Tools (Spreadsheets, Simulations)
Examples of Environments Supporting Creativity

- **Envisionment and Discovery Collaboratory and Caretta** — focused on social creativity in design → class meeting on October 15

- **Renga Creations:** Entwining Individual Creativities in Interactive Art

- **CodeBroker:** Fostering Social Creativity by Facilitating Reuse in Open Source

- **SketchUp, 3D Warehouse and Google Earth** — exploiting the power of mass collaboration (and Web 2.0 technologies) → class meetings on October 20 and 22
The Envisionment and Discovery Collaboratory (EDC)

- the EDC supports:
  - collaborative design
  - integration of problem framing and problem solving
  - social creativity (“learning when the answer is not known”)
  - meta-design (design for designers)

- the EDC is based on:
  - reflection-in-action
  - creating shared understanding in communities
  - allowing all stakeholders to act as informed participants and active contributors (→ a Web 2.0 environment)

- the EDC has been applied to:
  - urban planning
  - emergency management
The Envisionment and Discovery Collaboratory
Face-to-Face Collaboration around the EDC Action Space
Boulder City Council and University of Colorado Regents
Sketching Support in the EDC
Buildings Sketched into a Google-Earth Client
Land Use in the Action Space
Summary View of Land Use Generated in the Reflection Space

Land Use Table

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th># of Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Space</td>
<td>62</td>
</tr>
<tr>
<td>Commercial</td>
<td>5</td>
</tr>
<tr>
<td>Light Industry</td>
<td>27</td>
</tr>
<tr>
<td>Single Family</td>
<td>107</td>
</tr>
<tr>
<td>Multi-Family</td>
<td>8</td>
</tr>
<tr>
<td>Agriculture</td>
<td>17</td>
</tr>
</tbody>
</table>

![Graph showing blocks per land use type]
Emerging Insight: Illustrating Multiple Walking Distances
Integrating Individual and Social Creativity: Caretta
Sketchup — a 3D Modeling Environment
3D Warehouse

- a feature of Google SketchUp → search, share, and store 3D models

- models in the 3D Warehouse include: buildings, houses, bridges, statues, sculptures, couches, cars, people, pets, …

- download the 3D models to use in SketchUp models

- if the model has a location on earth → download it and view it in Google Earth

- share 3D models by uploading them from Google SketchUp into the 3D Warehouse.
CU Boulder in 3D
Downtown Denver in 3D
Implications

- transdisciplinary education and collaboration
- creativity and outsourcing
- exploiting the long tail for creativity, discovery, and innovation
Reflective Practitioners → Reflective Communities

Large Conceptual Distance — Limited Common Ground
Software Professionals Acquiring Domain Knowledge
Domain Experts Acquiring Media Knowledge
From Reflective Practitioners to Reflective Communities
Assessment of Social Creativity

- what will make people want to engage in social creativity?
  - requires: culture change, new mindsets, new reward systems
  - organizational rewards
  - social capital

- self-application of this idea to L3D:
  - value gained by the individual to contribute to the social is greater than the effort expended
  - barriers with creating and evolving organizational memories:
    - individuals must perceive a direct benefit
    - the effort required to contribute must be minimal so it will not interfere with getting the real work done

- “collaborative systems will not work in a non-collaborative society”
  - a student’s observation in one of our classes using technologies to enhance peer-to-peer learning, sharing of information, self-evaluation, etc.
  - collaboration should not be considered as cheating
Conclusions

- **the basic message**
  - the complexity and uniqueness of design problems transcends the unaided, individual human mind
  - support individual and social creativity