Creativity Challenges and Opportunities in Social Computing

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Abstract

There is a convergence in recent *theories of creativity* that go beyond characteristics and cognitive processes of individuals to recognize the importance of the social construction of creativity. In parallel, there has been a rise in *social computing* supporting the collaborative construction of knowledge. The panel will discuss the challenges and opportunities from the confluence of these two developments by bringing together the contrasting and controversial perspective of the individual panel members. It will synthesize from different

perspectives an analytic framework to understand these new developments, and how to promote rigorous research methods and how to identify the unique challenges in developing evaluation and assessment methods for creativity research

Keywords
creativity, social computing, relationship between individual and social creativity

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Specific Topics
The *main* topics to be presented, debated, discussed, and enacted during the panel are:

- recent *theories of creativity* that go beyond characteristics and cognitive processes of individuals to recognize the importance of the social construction of creativity;

- analysis and rise in *social computing* supporting the collaborative construction of knowledge and exemplified by examples such as open source software, wikis, blogs, multi-player games, and warehouses;

- the confluence of creativity and social computing and the resulting challenges and opportunities for innovative HCI research;

- the tensions and synergistic effect between individual and social creativity; and

- experience reports and critical analysis of social-technical environments including Scratch and CreativeIT Wiki.

The panel will explore the following *controversial* topics:

- most of the pressing and important problems of today's world are systemic problems making collaboration supported by social computing not a luxury but a necessity;
- will social computing *enhance or hinder* creativity?
- how can we nurture collaborations across disciplines of research and practices, particularly those historically viewed as disparate from each other (e.g.: CS/HCI and the Creative Practices?)?
- does the integration of creative practices in research only require new production techniques, or does it necessitate new ways of thinking, questioning and processing information thereby requiring not only new technologies, but new mindsets?
- how can we exploit the creative arts practices that have been engaged in a rich history of critical thinking to envision new HCI methods and techniques?
- how can we sow the seeds for a more creative society by educating students as creative thinkers?
- how will creativity research support the emergence of new intellectual cultures between HCI and digital arts?
- how do communities and technologies co-evolve in social computing environments in the pursuit of creativity?
- what is the impact of powerful creativity support tools supporting collaboration, visualization, reflection, and critiquing?

A Timely Topic. The panel members have been actively involved in the following *workshops* (mostly supported by the NSF CreativeIT Program) and will be able to contribute the insights gained to the panel:

- "Creativity Support Tools", Sponsored by the National Science Foundation, June 13-14, 2005, Washington, DC
- "About Face: Interface - Creative Engagement in the New Media Arts and HCI", 22-23 April 2006, CHI 2006, Montreal, Canada.
- "Synergies Between Creativity and Information Technology, Science, Engineering, and Design: Defining a Research Emphasis", November 2 and 3, 2006, Arlington, Virginia
- "Success factors in fostering creativity in IT research and education", January 18-20, 2008, Arizona State University, Tempe, AZ
- "Studying Design Creativity'08: Design Science, Computer Science, Cognitive Science and Neuroscience Approaches: The State-of-the-Art", 10-11 March 2008, Aix-en-Provence, France
- "Creativity and Rationale in Software Design", 15-17 June 2008, Penn State University

Statements from Panelists

GERHARD FISCHER: INTEGRATING INDIVIDUAL AND SOCIAL CREATIVITY
The power of the unaided individual mind is highly overrated. Although society often thinks of creative individuals as working in isolation, creativity result in large part from interaction and collaboration with other individuals. Much human creativity is social, arising from activities that take place in a context in which interaction with other people and the artifacts that embody collective knowledge are essential. My contribution will explore: (1) how individual and social creativity can be *integrated*; (2) how the creation of *shareable externalizations* ("boundary objects") and the adoption of *evolutionary process models* can enhance creativity and support emerging design activities; and (3) how new design competencies can be acquired to foster *synergetic activities and reflective communities*; and (4) how *innovative media* can support the interplay between individual and social creativity.

Individual creativity is grounded in the unique perspective that the individual brings to bear in a specific problem. It is the result of the life experience, culture, education, and background knowledge of the individual, as well as the individual's personal interest associated with a particular situation. Individual creativity, however, has limits. In today's society, the Leonardesque aspiration to have people who are competent in all disciplines has to fail because the individual human mind is limited. The symbiotic relationship between individual and social creativity is expressed nicely by Rudyard Kipling: *"For the strength of the Pack is the Wolf, and the strength of the Wolf is the Pack."*

PAMELA JENNINGS: CRITICAL CREATIVE TECHNOLOGY
Critical Creative Technology is a framework for the design of information technologies and creative practices (ITCP) that promote presence, engagement and action among the people in publicly shared spaces. My research interests and practices initiate from basic observations and inquiries about the impact of technology on the human condition. These inquiries are the driving force to the development of new creative and thought provoking ways to interact with technology in our everyday lives. This includes the exploration of new frameworks for creating, sharing and learning with emphasis on inter-cultural exchange and experiences that encourage shifts in perception of the self and the everyday lived world. Examples of such research projects include the "Constructed Narratives Construction Kit" and classroom exercises such as the "urban nomad" and "worn identity". The goal is the development of intelligent, responsive, environments that can be embedded into the fabric of everyday life as an interface between the public and private sphere, the built environment and emergent human behaviors.

Nurturing collaborations across disciplines of research and practices, particularly those historically viewed as disparate from each other, is a critical process for fostering an environment for open exploration, creativity, scholarship and training. Integrating the creative practices in research is not only about adopting a production technique, but also adopting a way of thinking, questioning and processing information. In the creative arts critical thinking is one such form of intellectual production. Critical thinking refers to a rigor in research that includes the ability to understand and problem solve, integrate multi-domain knowledge in new ways. Understanding historical and contemporary practices to support multiple perspectives enables one to articulate known and new discourses and understand their implications on society. With these skills critical thinkers are able to develop new ideas from the foundations of old, understand the political and social implications of media development, and learn the skills to transform ideas of critical thinkers into the actions of critical makers.

MARY LOU MAHER: MODELS OF CREATIVE COGNITION
Computers provide an interactive environment for externalizing our ideas and problem solving processes. The way in which we interact with this external representation has an impact on our cognitive behavior. For example, a study of designers using traditional HCI devices such as a keyboard and mouse focus on processes and products that are less likely to produce creative designs than designers using tangible interfaces to the same digital models. If the "tools" that we use impact our focus and cognitive behavior, how can we use models of creative cognition to rethink HCI so that creativity is enhanced rather than stifled?

This question can be extended to consider the potential for social computing environments to enhance creativity by critically assessing how we externalize information in these environments in ways that encourage or stifle creativity. In social computing, we interact not only with externalized information and models but also with potentially large numbers of other people. The tradition of HCI in focusing on how people interact with computers is being revolutionized by the phenomena in which many people interact with many computational systems, where the system may act as mediator, resource, or mentor. How can cognitive models and theories of creativity inform the future of social computing so that creativity is encouraged and enhanced?

Can creativity as a social construction provide a model for social computing so that creativity is recognized and rewarded?

MITCHEL RESNICK: SOWING THE SEEDS FOR A MORE CREATIVE SOCIETY
In today's rapidly-changing world, people must continually come up with creative solutions to unexpected problems. Success is based not only on what you know or how much we know, but on your ability to think and act creatively. We are living in the *Creative Society.*

New technologies play a dual role in the Creative Society. On one hand, the proliferation of new technologies is quickening the pace of change, accentuating the need for creative thinking in all aspects of people's lives. On the other hand, new technologies have the potential, if properly designed and used, to help people develop as creative thinkers, so that they are better prepared for life in the Creative Society.

How can new technologies help students develop as creative thinkers? By engaging them in what I call the *"creative thinking spiral."* In this process, people *imagine* what they want to do, *create* a project based on their ideas, *play* with their creations, *share* their ideas and creations with others, *reflect* on their experiences – all of which leads them to *imagine* new ideas and new projects. As students go through this process, over and over, they learn to develop their own ideas, try them out, test the boundaries, experiment with alternatives, get input from others, and generate new ideas based on their experiences.

My presentation will focus especially on a new software environment, called Scratch, that we designed specifically to engage students in the creative thinking spiral. With Scratch, students (ages 8 and up) can create their own interactive stories, games, and animations – and share their creations on the web. Since our group at the MIT Media Lab launched Scratch in May 2007, more than 300,000 interactive projects have been shared on the Scratch website (http://scratch.mit.edu). More than 15% of these projects are remixes, meaning that young people modified and extended projects contributed by others. As young people create and share interactive projects in Scratch, they learn to design creatively, think systematically, and work collaboratively – and, more generally, develop as creative thinkers.

BEN SHNEIDERMAN: FACILITATING VISUAL DISCOVERY IN SOCIAL NETWORKS
It is satisfying that the Visual Information Seeking Mantra, proposed in 1996, has caught on so strongly. It's arc of action goes from "Overview first" to "zoom and filter" and finally to "details-on-demand." This compact phrasing captures the importance of getting oriented by seeing the big picture. Then the central role for users is to decide where to zoom and how to filter, before clicking to get the details. By now the literature has come to include refinements and variations on this mantra as well as appropriate complaints about its vagueness, incompleteness, and lack of validation.   The task of visualizing social networks is a substantial challenge because the current layout algorithms often present tangled networks with crossing links, occluded nodes, and unreadable labels. The idea of Network Nirvana has four goals for designers: make all nodes visible, enable users to count degree for every node, allow users to follow every link from source to destination, and show meaningful clusters.

Replacing the often-chaotic layout of force-directed algorithms with meaningful spatial substrates may enable users to make insights about their data. Of course user control over visual properties such as size, color, and shape is just as important as zooming and filtering.

These principles are only a starting point. They need clarification, expansion, and validation. Demonstrations of these principles will be shown.