ABSTRACT

We are investigating the design of tools to support everyday scientific creativity in distributed collaboration. Based on an exegesis of theoretical and empirical literature on creativity and group dynamics, we present and justify three requirements for supporting creativity: support for divergent and convergent thinking, development of shared objectives, and reflexivity. We elaborate on these requirements by describing three implications for design to support creativity in context of computer supported cooperative work (CSCW): integrate support for individual, dyadic, and group brainstorming; leverage cognitive conflict by preserving and reflecting on minority dissent; and support flexibility in granularity of planning. We conclude by outlining a future research trajectory for designing and evaluating creativity support tools in the context of collaboratories.

Keywords: computer supported cooperative work (CSCW); distributed collaboration; everyday scientific creativity

INTRODUCTION

The social and collaborative nature of science has been emphasized by historians and philosophers of science, and sociologists interested in knowledge creation and diffusion (Crane, 1972; Thagard, 1998). To this end, history has documented numerous examples (Pycior, Slack, & Abir-Am, 1996; Watson, 1968).
A central aspect of and reason for scientific collaboration is creativity. Scientific creativity can be characterized as a process toward achieving an outcome recognized as innovative by the relevant community (Csikszentmihalyi, 1996). Creativity does not happen inside one person’s head, but in the interaction between a person’s thoughts and a socio-cultural context (Csikszentmihalyi, 1996).

Creativity has been a traditional focus of study in psychology. More recently, it has gained momentum as a research area in Human Computer Interaction (HCI) and Computer Supported Cooperative Work (CSCW). In context of these domains, we are interested in supporting—that is, evoking, enhancing, and sustaining—scientific creativity in distributed collaboration through socio-technical interventions. Requirements for such interventions have not been systematically investigated.

In this article, our goal is to articulate design requirements for supporting scientific creativity, drawing on diverse socio-psychological literature on creativity and group dynamics. Although our article does not present new empirical data, our integrated analysis marshals empirical findings from existing literature. We describe a working prototype to support the suggested design requirements and discuss the feasibility, effectiveness, and consequences of supporting creativity in distributed scientific collaboration with technology. We conclude by describing how our contribution fits into a broader research program for investigating creativity in CSCW.

RESEARCH SCOPE AND MOTIVATION

Creativity is critical to invention, innovation, and social progress at both the individual and societal levels (Candy & Hori, 2003; Florida, 2002, 2005; Sternberg & Lubart, 1999). Individuals are able to refine and improve their own performance, and groups, organizations, and societal institutions are able to sustain their existence and grow if and only if they can adapt and solve problems creatively in ever-changing circumstances (Feist, 1999).

The modern era of creativity research can be traced to Guilford’s 1950 presidential address to the American Psychological Association (APA). Creativity in psychological and social sciences continues to be studied and written about in professional books (Boden, 2004; Sternberg, 1999) and journals (e.g., The Journal of Creative Behavior, since 1967; Creativity Research Journal, since 1988).

Since the early 1990’s, computer and information science researchers have studied creativity in the context of technology. The first symposium on Creativity and Cognition (C&C) was held in 1993. Since then, five more C&C conferences have been held, with ACM SIGCHI sponsoring the conferences in 1999, 2002, 2005, and 2007. A special issue of Communications of the ACM was published in 2002 on Creativity and Interface. A special issue of Inter-
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