Enhancing creativity in group collaboration: How performance targets and feedback shape perceptions and idea generation performance

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ABSTRACT

As Information and Communication Technologies (ICTs) have become established tools for communication, organizations increasingly use computer-mediated work groups to support various business processes and find creative solutions to organizational problems. In such a context, groups' creative performance can greatly contribute to organizational success. Previous literature has examined the influence of various factors on different outcomes of group collaboration. However, mechanisms through which creativity can be improved, and how to design ICT's interfaces to increase creativity have received little attention. In this study, we aim to understand the effects of two specific motivational affordances, namely, performance targets and performance feedback, on people's perceived competence and creativity within the context of computer-mediated collaboration. Using computer-mediated idea generation as an instantiation of collaboration systems, we test the effects of performance targets and different types of feedback on people's perceived competence and creativity in a controlled laboratory experiment. Our results show that the difficulty of performance targets and the type of performance feedback interact, influencing people's perceived competence, which in turn influences their creativity in group collaboration. We conclude our study with a discussion of implications for the design of human–computer interfaces for computer-mediated idea generation.

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1. Introduction

Increasing globalization has created tremendous opportunities (such as the ability to reach new markets) and challenges (such as increased competition) for organizations. In an attempt to gain and sustain competitive advantage, organizations need to continue innovating by devising novel and creative products or services (Muller & Välikangas, 2002). In many contexts, generating creative ideas can be essential for survival and success of organizations. In other words, "innovations that enable even modest increases in the quality of ideas available for consideration could be of immense practical value" (Heslin, 2009, p. 129). To achieve such goal, organizations are trying to bring together geographically distant individuals from both inside and outside the organization to devise novel and creative products or services; however, many organizations have realized that geographical distance between group members can create challenges for generating creative ideas. To harness the creativity of diverse and often geographically separated individuals, a broad range of Information and Communication Technologies (ICTs) are ever more utilized, with collaboration becoming increasingly virtual, and novel and creative solutions often being a crucial outcome of computer-supported collaboration (Goncalo & Staw, 2006).[2]

As prior group collaboration research has shown that the performance of each individual group member is an important contributor to success (e.g., Chidambaram & Tung, 2005), the effects of various factors on group performance have been extensively studied. An area that has received little attention, however, is the mechanisms through which individuals' creativity can be enhanced, and how to modify the design of ICTs to increase individuals' creativity.

Therefore, our overarching question guiding this study is: How can the human–computer interfaces of collaboration environments

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[2] We admit that the creation of novel and creative solutions is only one of many uses of computer-supported collaboration, and may not be the focus of other applications, such as the use of computer-supported collaboration for education.

be designed to enhance individuals' creativity in group collaboration? In this study, integrating research from human–computer interaction, motivation, technology supported group work, and psychology, we theoretically derive mechanisms for increasing individuals' motivation by increasing their perceived competence, which in turn serves to increase their creativity in a group collaboration environment. We manipulate the interface of a computer-mediated idea generation system (a widely used collaboration setting) to enhance the system's motivational affordance—i.e., the system's properties that fulfill users' motivational needs (Zhang, 2008a)—by providing different performance targets (moderate vs. challenging) in combination with different types of performance feedback (informational vs. controlling) during an idea generation session. We test the effectiveness of these mechanisms using a laboratory experiment. Using a simulated collaboration environment, we ask participants to generate creative ideas about how to help solve global warming. The analysis of the ideas' creativity suggests that indeed, varying the difficulty of performance targets and type of feedback has an interaction effect on people's perceived competence, which in turn influences their creativity.

In the next section, we provide an overview of the theoretical background, followed by our hypotheses. We then describe our research methodology, and present our findings. Finally, we discuss the implications of the findings for the design of the human–computer interfaces of computer-mediated idea generation and collaboration environments.

2. Theoretical background: motivational affordance and self-determination theory

Previous studies in Information Systems (IS) literature have assessed how ICTs can influence group collaboration and support individuals in generating high-quality and creative ideas in different contexts (e.g., e.g., Connolly, Jessup, & Valacich, 1990; Diehl & Stroebe, 1987; Jung, Schneider, & Valacich, 2010; Michinov & Primois, 2005; Valacich, Jung, & Looney, 2006). These studies have examined various group-level (e.g., group size, anonymity) and environmental-level (e.g., the use of multiple dialogues) variables which may influence group performance in various tasks (see Jung et al. (2010) for a brief review). However, relatively little is known how human–computer interfaces of ICTs can be designed to enhance creativity (Jung et al., 2010).

According to Amabile's (1983) componential theory of individual creativity, three main components influence individual creativity: domain-relevant skills, creativity-relevant skills, and task motivation. Woodman, Sawyer, and Griffin (1993) further propose additional group and organizational characteristics influencing creativity in the context of organizations. Notwithstanding these findings, a comprehensive understanding of creativity can only be developed "gradually, as progress is made in creativity research" (Amabile, 1983, p. 362). As a step toward developing a more complete understanding, we focus on task motivation to examine how elements of the human–computer interface of collaboration systems influence people's motivation, which in turn influences their creativity in group collaboration.

Owing to the positive effects of motivation on people's levels of energy and persistence (Ryan & Deci, 2000), motivation is an important topic in various disciplines (Amabile, 1983; Steers, Mowday, & Shapiro, 2004; Tubbs & Ekeberg, 1991; Venkatesh & Speier, 1999; Wang & Clay, 2012; Wasko & Faraj, 2005). For example, "managers see motivation as an integral part of the performance equation at all levels, while organizational researchers see it as a fundamental building block in the development of useful theories of effective management practice" (Steers et al., 2004, p. 379). Similarly, researchers in IS are increasingly trying to

understand the antecedents and outcomes of motivation in various contexts, such as technology adoption and acceptance (Venkatesh & Speier, 1999) and content contribution (Wang & Clay, 2012; Wasko & Faraj, 2005), and recent studies have begun to adopt a motivational approach to understanding the design and use of ICTs.[3] Specifically, Zhang (2008a) argued that in using ICTs people seek to fulfill psychological, cognitive, social, and emotional needs, and ICT should offer "motivational affordance" (p. 145) to support and satisfy these needs. Following this premise, Jung et al. (2010) demonstrated that increasing a system's motivational affordance can effectively increase performance. Still, further studies are needed to understand how different designs can motivate people by satisfying people's needs (Jung et al., 2010; Zhang, 2008b) and improve their performance and, in particular, their creativity.

To understand how to satisfy people's needs and enhance people's creativity, we draw on Self-Determination Theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000). SDT emphasizes that humans are active and growth oriented organisms striving toward personality development and behavioral self-regulation (Ryan, Kuhl, & Deci, 1997), and explains individuals' "inherent growth tendencies and innate psychological needs that are the basis for their self-motivation as well as for the conditions that foster those positive processes" (Ryan & Deci, 2000, p. 68). SDT proposes three psychological needs to foster individuals' propensities for growth and self-motivation: the need for competence (Harter, 1978; White, 1963), autonomy (DeCharms, 1968; Deci, 1975), and relatedness (Baumeister & Leary, 1995; Reis, 1994). Specifically, the need for autonomy is defined as the need to experience choice and feel like the initiator of one's own actions (DeCharms, 1968); the need for relatedness deals with people's desire to establish and maintain a sense of mutual respect and care for each other (Baumeister & Leary, 1995; Harlow, 1958); lastly, the need for competence refers to the desire to succeed at optimally challenging tasks and being able to attain desired outcomes (Skinner, 1995; White, 1959). As the overarching purpose of our study is to understand how to enhance individuals' creativity in group collaboration, we examine how to help people succeed in group collaboration (a challenging task) and generate creative ideas (i.e., the desired outcomes). Therefore, satisfying the desire to attain desired outcomes in challenging tasks appears to be most relevant in the context of the current study, so as to help improve individuals' creativity in a computer-supported idea generation setting.[4] Next, we develop our hypotheses to examine how different designs can motivate people by satisfying their need for competence (i.e., increasing their perceived competence), which in turn helps enhance creativity.

3. Hypotheses development

Prior studies have shown that the design of human–computer interfaces can have strong effects on people's motivation and performance; for example, in the context of group idea generation, Jung et al. (2010) demonstrated that providing participants

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[3] According to Zhang (2008a), a motivational approach can address questions such as "Why do people use ICTs in different intensity?" "Why do people continue or stop using ICTs?" Research in the area of adaptive learning and intelligent tutoring systems (e.g., Brusilovsky, 1996; Paramythis & Loidl-Reisinger, 2004) similarly attempts to assess how adaptive content can enhance learners' motivation and learning performance; however, this study is primarily concerned with enhancing people's creativity in the context of group collaboration, rather than on learning performance.

[4] Note that by focusing on need for competence, we do not imply that other needs are not relevant for computer-supported idea generation. Indeed, we believe that these needs can also quite relevant and encourage future studies to further examine these needs. Again, as Amabile (1983) suggests, examining these variables can "only be completed gradually" (p. 362). Further, we acknowledge that the desired outcomes of the users and the systems' designers may differ; yet, in organizational settings, the desired outcomes are likely to be aligned.