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The creative link: Investigating the relationship between social network indices, creative performance and flow in blended teams

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ABSTRACT

We present findings of an exploratory study, which investigated the relationship among the indices of social network structure, flow, and creative performance in students collaborating in a blended setting. Thirty undergraduate students enrolled in a Media Psychology course were assigned to five groups tasked with designing a new technology-based psychological application. Team members collaborated over a twelve-week period using two main modalities: face-to-face meeting sessions in the classroom (once a week) and virtual meetings using a groupware tool. Social network indicators of group interaction and presence indices were extracted from communication logs, whereas flow and product creativity were assessed through survey measures. The findings showed that specific social network indices (in particular those measuring decentralization and neighbor interaction) were positively related to flow experience. More broadly, the results indicated that selected social network indicators could offer useful insight into the creative collaboration process. Theoretical and methodological implications of these results are drawn.

1. Introduction

The integration of interactive social media, such as e-mail, chat, web conferencing, blogs, and Wikis, in instructional strategies is expanding the array of creative teamwork tools that can be used in the classrooms (Mortera-Gutierrez, 2006). In particular, blended environment that allows students to meet occasionally face-to-face but otherwise use technology to connect to the university and their peers has become an increasingly common delivery practice in higher education (Mazzoni, 2014; Mazzoni & Iannone, 2013). According to Graham (2006), this instructional approach becomes so ubiquitous "that we will eventually drop the word blended and just call it learning" (2006, p. 67). Although teams collaborating in blended setting have received substantial attention by scholars and educators over the last years, some of the issues that affect their effectiveness and performance have been scarcely investigated, with creativity constituting one of these currently under-researched issues. Consistent with this need, the purpose of this research was to examine a conceptual and methodological framework called "Networked Flow" (Gaggioli, Milani, Mazzoni, & Riva, 2011; Gaggioli, Riva, Milani, & Mazzoni, 2013) with an aim to study creative collaboration in blended setting. Drawing on previous research on social creativity, the model argues that the key to group creativity is the development of "collaborative zone of proximal development" in which actions of the individuals and those of the collective are in balance and a sense of social presence is established. Further, the model suggests that if this condition is achieved, the group has the opportunity to experiment group flow, an optimal experience that is able to produce a long-term change relevant to both the team and its individual members. At the methodological level, the Networked Flow framework identifies Social Network Analysis (SNA) as a potentially useful approach for investigating interaction dynamics that foster creative collaboration. The first section of the paper presents the concepts of the Networked Flow framework. Next, we describe preliminary results of a study in which longitudinal SNA and self-reported flow states were used to explore the creative collaboration in five groups of students engaging in a blended environment. Finally, we discuss potential implications of the Networked Flow model for research and practice.

2. Conceptual background

2.1. Group creativity and flow

Creativity has been commonly referred to as the ability to create objects, artifacts, or thoughts, which may be defined and recognized as original, unexpected, high in quality and useful (Sternberg & Lubart, 1996). Thus, creativity can be described as both an

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outcome and a process in which individuals, groups or organizations are engaged to produce creative outcomes, that is, novel and useful ideas. Traditionally, creativity has been mostly investigated from an individual perspective, i.e., by studying the psychological features that characterize the creative person, such as personality traits, cognitive abilities and intellectual development (Sternberg & Lubart, 1999). More recently, however, there has been a shift in the focus from the individual to the social aspects of the creative process (Amabile, 1983; Amabile, Conti, Coon, Lazenby, & Herron, 1996; Csikszentmihalyi, 1999; John-Steiner, 2000; Sawyer, 2003; Sawyer, 2007). In line with this perspective, Sawyer has proposed a model of creative collaboration in which he argued that a team performs at its best when it is able to achieve a state of "group flow", an optimal collective experience defined as a "collective state of mind" (p. 43). The concept of flow was originally introduced by Csikszentmihalyi (1975; 2000) who described it as an optimal experience characterized by global positive affect, high concentration and involvement, feeling of control, clear goals, and intrinsic motivation: in particular, a key feature of this experience is the perception of high skills matched by equally high personal resources (i.e. knowledge, abilities, proactive coping, positive engagement modes) to face them. Whereas Csikszentmihalyi studied the link between flow and creativity at an individual level, Sawyer (a former Csikszentmihalyi's student) extended the analysis to group collaboration by considering two specific domains: jazz and theater improvisation (Sawyer, 2003). He used a technique called "interaction analysis", which consists of an in-depth observation and classification of participants' conversations, gestures, and body language. By examining the data collected over ten years of observations of several performing groups, Sawyer concluded that group flow requires members to develop a feeling of mutual trust and empathy, which culminates in a collective mental state in which individual intentions harmonize with those of the group. Jazz music players often refer to this state as to achieving a "group mind" characterized by a profound emotional resonance, which allows artists to be fully coordinated within the improvisational flow. According to Sawyer, group flow "cannot be reduced to psychological studies of the mental states or the subjective experiences of the individual members of the group" (2003, p. 46). In other words, group flow cannot be broken down into the work of individuals; rather, this phenomenon emerges from the interactions occurring within a group and is able to positively influence overall performance. Furthermore, Sawyer suggested that the achievement of group flow involves a balance between the extrinsic/intrinsic nature of the goal and pre-existing structures shared by the team members (for example know-how, instructions, repertory of cultural symbols, set of tacit practices, etc.). An extrinsic goal, according to Sawyer, is characterized by a specific and well-defined objective (i.e., how to fix a bug in software); therefore, it requires the achievement of more shared structures. In contrast, an intrinsic goal is largely unknown and undefined (i.e., the task faced by an improvisation group in theatre); therefore, it requires the achievement of structures that are less shared (2003, p. 167).

2.2. Collaborative zone of proximal development

Armstrong (2008) carried out a study to examine the conditions that foster (or hinder) the emergence of group flow in middle school mathematics classroom setting. According to Armstrong, the occurrence of group flow indicates that the team is working in a mutual zone of proximal development (Goos, Galbraith, & Renshaw, 2002; John-Steiner, 2000), which the author defined as "an intellectual site where students are able first to negotiate shared meaning within their group (or part of their group)" (p. 102). In particular, the author drew on the complex systems model of mathematics classes developed by Davis and Simmt (2003) who identified five specific conditions that lead to the establishment of such "space of joint action". These conditions include (a) internal diversity, which is based on the various interests and expertise present in the group. According to Davis and Simmt, this quality cannot be imposed "from the top down", that is, it cannot be assigned or legislated; instead, it must be assumed. The second condition is (b) redundancy. It refers to the creation of a common ground shared by group members, which provides internal coherence to the interaction. Such common ground does not only involve shared vocabularies, symbol systems, and resources, but also a communion of experience, expectation and purpose (p. 151). Davis and Simmt argued that redundancy plays two key roles. First, it enables interaction among members and second, it allows members to compensate for others' weak points and failures. From this perspective, redundancy and internal diversity represent two complementary sides. Whereas the first is more outward-oriented, enabling new opportunities for actions in response to change in context, the latter is more inward-oriented, enabling the co-acting of the agents. The third condition is (c) decentralized control. This feature refers to a situation in which the actions of a group and the decisions that it takes are shared and distributed rather than managed by a single member. This condition is achieved when the knowledge does not reside within a particular member of the group and the authority is not confined to a specific person, argument or resource. Since decentralized control fosters greater participation, it allows the group to fully exploit its internal diversity, which would otherwise remain silent. Another condition concerns (d) organized randomness. According to Davis and Simmt, this is a critical aspect for the emergence of what they call a "collective learning system" (p. 163). It is achieved when the group is able to maintain the equilibrium between sufficient organization to guide members' actions and to obtain sufficient randomness to allow for heterogeneous responses. From this perspective, organized randomness can be seen as a structural condition that helps determine the balance between redundancy and diversity among members (p. 154). Finally, (e) neighbor interactions condition concerns the opportunity for group participants to communicate and exchange ideas. In this process, the artifacts used to mediate such interaction play a critical role. Written materials, such as notes, articles, and sketches not only facilitate the transmission of ideas, but also serve as a record of emergent ones, acting as extra-somatic memories.

To understand the role that these five conditions play in the emergence of group flow, Armstrong observed the working processes of two small groups of students collaborating on a problem-solving task. The sessions were recorded using videotapes and written transcripts. To identify the occurrence of group flow, Armstrong focused on specific physical and verbal behaviors, which would indicate a synchronization of actions and thoughts (i.e., physical closeness, echoing of gestures and phrases, the mirroring of each other's physical actions). The study found that although both groups had the prerequisite structures to experience group flow, only one group showed the characteristics of this optimal state. According to Armstrong, the absence of group flow that emerged in the second group could be explained by a lower level of decentralization because one student took the lead and presented a solution, which other team members accepted passively. Consequently, some members of this group failed to establish a collaborative zone of proximal development in which they could develop their ideas as a collective. Armstrong used these findings to draw implications for practice. For example, according to this author, it is important to assign students to groups "where they feel a high level of comfort and trust so that all members feel safe to contribute and develop a collective zone of proximal development" (Armstrong, 2008, p. 114). Furthermore, the author stressed the