Bridging Minds: A Mixed Methodology to Assess Networked Flow

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Abstract. The main goal of this contribution is to present a methodological framework to study Networked Flow, a bio-psycho-social theory of collective creativity applying it on creative processes occurring via a computer network. First, we draw on the definition of Networked Flow to identify the key methodological requirements of this model. Next, we present the rationale of a mixed methodology, which aims at combining qualitative, quantitative and structural analysis of group dynamics to obtain a rich longitudinal dataset. We argue that this integrated strategy holds potential for describing the complex dynamics of creative collaboration, by linking the experiential features of collaborative experience (flow, social presence), with the structural features of collaboration dynamics (network indexes) and the collaboration outcome (the creative product). Finally, we report on our experience with using this methodology in blended collaboration settings (including both face-to-face and virtual meetings), to identify open issues and provide future research directions.

Keywords. Networked Flow, Group Creativity, Flow, Social Presence, Interlocutory Logic, Conversational Analysis, Social Network Analysis

Introduction

In recent years, the increasing acknowledgment of the key role played by collaboration in creativity has resulted in several conceptual of group creativity. In a review of this field, Gl veanu [1] identified two main perspectives: the sociocognitive approach and the sociocultural approach. The first paradigm has mainly focused on the cognitive dimensions of group creativity and on the possible strategies to enhance its effectiveness. The sociocultural approach, in contrast, has put more emphasis on the process of creative collaboration, focusing in particular on its intersubjective and cultural dimensions. In an attempt to bridge these two views, Gaggioli et al. [2, 3, 4] introduced the Networked Flow (NF) model. Central to this model is the development of a shared intersubjective space, which the authors identify with high levels of social presence («we-intentionality»). When high social presence is achieved, participants can enjoy an optimal state that maximizes the creative potential of the group (Networked Flow, NF). The adjective «networked» is used to stress the conceptualization of NF as a systemic emergence, resulting from the micro-interactions between the components of the group [3]. In simple words, a central assumption of the model is that the a group

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enjoying NF shows specific features in terms of network structure with respect to a group that is not experiencing this optimal collective experience.

Methodology

A key challenge of the NF framework is to identify an appropriate methodology for capturing the multiple facets of optimal networked creativity, given the inherent complexity of the theoretical construct. NF is conceptualized as an evolving, interactive process, which leads to the emergence of stable group structures (eventually embodied in novel artifacts). Thus, a first methodological requirement is to take into account both processual and structural features of creative collaboration, as well as its outcomes (e.g. the creative product). Furthermore, the NF model assumes that in order to elucidate the evolution of the creative collaboration, one has to take into account both the micro, meso- and macro-genetic levels. The methodological translation of this assumption is that the focus of the analysis should be both on the interaction patterns occurring between group participants over time (micro); on the structural changes occurring in group internal dynamics (meso); and on the outcomes of micro- and meso- interactions, in terms of transfer of the creative product (the artifact) over a larger socio-cultural context (i.e. a community). A final methodological requirement is that, in order to identify the possible links between the experiential features of NF (social presence, flow) and the structure of group dynamics, both qualitative and quantitative data are needed.

To address the above issues, we propose a longitudinal, mixed methodology which combines qualitative and quantitative and topographical analysis of creative collaboration. Here, we use the term mixed method to refer to the specific procedure of collecting and analyzing both quantitative and qualitative data in the context of a single study.

Qualitative data

The proposed mixed methodology focuses on two types of qualitative data longitudinally collected troughout the collaboration process: the data collected to examine the *quality of experience* of group participants (intra-personal level); and the analysis of *communicative interactions* occuring between participants (inter-personal level). The quality of experience is investigated with specific reference to the constructs of flow and social presence. To assess Flow Experience, it is proposed to use the *Flow State Scale* [5], a widely-used tool to measure optimal experience. To assess social presence, the Networked Minds Measure of Social Presence is proposed [6, 7]. Although this tool has been specifically devised to study social presence in mediated contexts, its use can be extended to non-mediated settings (face-to-face interactions). Communicative interactions are investigated with specific reference to the constructs of collective zone of proximal development and dialogical style. To assess these two constructs, we propose to pay particular attention to dialogical processes taking place in conversations analysing them by means of Interlocutory logic [8] to individuate some dialogical patterns occuring between participants during their group's activity [9].

Quantitative and topographic data

An essential methodological requirement of NF is to take into account both processual and structural features of collaboration, as well as its outcomes (e.g. the creative product). To address the first issue, we propose to use the Social Network Analysis (SNA). By considering individuals as interdependent units as opposed to autonomous elements, SNA offers a suitable methodology to study group dynamics as well as to investigate the role of the individuals within these dynamics [10, 11]. On the other hand, SNA has proven useful for gaining insight into social network characteristics associated with creativity [12, 13]. SNA focuses on various aspects of the relational structures and the flow of information, which characterize a network of people, through two types of interpretation, graphs and structural indices [14, 11]. Graphs (or sociograms) plot the dots (individuals) and their social relationships (edges). Structural indices depict quantitatively the network of social relations analyzed based on several characteristics (e.g., neighborhood, density, centrality, centralization, cohesion, and others). For each structural characteristic of a relational network, SNA provides two types of indices: individual indices (i.e., based on relations and exchanges characterizing each actor of the networks) and group indices (i.e., based on relations and exchanges characterizing the network as a whole). To study the Networked Flow, different structural SNA indices have been proposed, such as Density, Group Centralization and Cliques Participation index (for a throughout description of these indexes, see Gaggioli et al. (2015). Further, it is possible to carry out SNA in two different modalities: focusing on the group structure in a precise moment in time, or adopting a longitudinal approach, which allows taking multiple "snapshots" of the network structure over time. Finally, for the quantitative evaluation of the creative outcome of the collaboration (the creative product), a suitable instrument is the *Creative Product Semantic Scale* [15] (CPSS). The CPSS uses 55 items organized into subscales to measure three main dimensions of creative products, each made up of underlying facets: novelty (the product is surprising, original), resolution (the product is logical, useful, valuable, and understandable), and elaboration and synthesis (the product is organic, well-crafted, and elegant).

Conclusion

In this contribution, we have described the key features of a mixed methodology to investigate Networked Flow, a theory of collective creativity that aims at integrating the cognitive, interpersonal and socio-cultural dimensions involved in the creative process. The proposed methodology is based on the longitudinal collection of qualitative and quantitative data to analyze the processual and structural features of creative collaboration dynamics. The final objective of this approach is to characterize and describe the emerging properties of NF and of creative collaboration process. Preliminary application of this mixed methodology suggest its potential for investigating NF, although several issues concerning i.e. the transformation of qualitative into quantitative data and the definition of appropriate statistical analysis techniques to deal with longitudinal nested data needs to be appropriately addressed.

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