The Role of Information Elaboration for Co-Construction of Meaning during Idea Convergence: A Causal Mediation Analysis

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Abstract. Teams need to co-construct meaning to establish shared understanding about concepts when converging on the best ideas generated from crowdsourcing events. Facilitation interventions can aid the co-construction of meaning. The causal mechanism is believed to be the extent exchanged information is elaborated on. However, this mediating role has not been empirically confirmed in past research. Information elaboration in teams with and without facilitation intervention was tested with causal mediation analysis by drawing on data collected in a laboratory experiment. The findings suggest that facilitated teams had better information elaboration and co-construction than non-facilitated teams. Moreover, information elaboration could be identified as a strong causal mechanism through which facilitation interventions affect the co-construction of meaning. The study contributes to unravelling the black box of team processes through which this causal effect of facilitation intervention arises and helps fostering the design of improved automated feedback mechanisms.

Keywords: causal mediation analysis; co-construction; facilitation intervention; feedback; idea convergence

1   Introduction

In practice this means that teams need to identify 10 – 40 ideas out of hundreds and thousands of ideas [1-3]. It is difficult to deduce the value of an idea [2, 4], which makes idea convergence a demanding decision-making process [3]. Unlike traditional convergence teams, teams working with crowdsourced ideas need to converge on ideas that are not their own. This requires convergence teams to elaborate on raw idea descriptions without knowing how the idea came about [5]. For this purpose, they need to establish shared knowledge [6]. Facilitation techniques for idea convergence allow intervening into information elaboration processes in order to drive shared understanding [7]. Empirical evidence investigating *how* such facilitation interventions can achieve better convergence outcomes is scarce [6] particularly in crowd settings [5]. It is unclear to what extent facilitation interventions affect information elaboration among team members and if the extent of information elaboration is the *causal mechanism* for the co-construction of meaning, an antecedent of shared understanding.

This study contributes to closing this gap by investigating the mediating role of information elaboration in teams that converge on crowdsourced ideas with or without facilitation intervention.

2   Background and Hypotheses Development

The team learning processes of individual construction, co-construction, and constructive conflict have been established as antecedents of shared understanding [8]. The team learning process of co-construction is particularly relevant to idea convergence, which strives to establish a shared understanding of the meaning of concepts [9]. Over the last decade, facilitation techniques have been designed that directly aim at helping team members to converge on ideas [9]. By actively intervening into the execution of the process and the discussion, the facilitator affects information processing in teams [10], which, in turn, alters how the team co-constructs the meaning of shared concepts [6]. Thus, *H1: Teams with facilitation intervention will have better co-construction of knowledge than teams without facilitation intervention.*

Team members need to elaborate on exchanged information [11] in order to synthesize individual understandings into shared meaning [12]. While information elaboration is conceptualized in this study as exchanges about the nature of knowledge in different domains, such as viewpoints or beliefs, co-construction of meaning is about the joint construction from previous exchanges [13]. Facilitation stimulates such kinds of deeper information processing of team members with feedback cues. Thus, *H2: Teams with facilitation intervention will have more information elaboration than teams without facilitation intervention.*

It is not clear to what extent the team process of information elaboration is affected by facilitation intervention and in case it is affected, if the extent of information elaboration is the *causal mechanisms* that defines the co-construction of meaning, an antecedent of shared understanding [8]. It is argued that facilitators can intervene into interaction processes to avoid shallow processing of exchanged information [14] and keep the team's interaction on topic [10]. This can be accomplished by asking questions, clarifying statements, and co-creating artefacts representing their common understanding [15]. Thus, *H3: The effect of facilitation intervention on co-construction of meaning will be mediated by the extent of information elaboration in teams.*

3   Methods

A laboratory experiment was conducted to test the hypotheses. The treatment condition was instantiated with a facilitation technique from the design pattern language for collaborative work practices called thinkLets [16]. The external facilitators were trained by a professional facilitator and worked at the department as PhD-students or post-doctoral students. For their interventions, facilitators relied on a pre-tested and predefined script that included step-wise instructions how to run the convergence process and 26 prompts. Subjects were recruited from an undergraduate information systems course and were randomly assigned to the experimental condition. The task

described a flooding event in the fictitious city called Norvos, which was based on another emergency response task [17]. All teams were supported by the collaboration software ThinkTank by GroupsSystems. Co-Construction of meaning was adopted from [8]. Information elaboration was measured with two items adopted and adapted from [18]. Two additional items were added. The control variables were collaborative orientation, working history, gender, and team size. Validity tests were satisfactory.

4   Results, Contribution, and Limitations

Hypothesis 1 ($F(1,84)=10.272$, $p < 0.05$) and 2 ($F(1,84)=11.454$, $p < 0.05$) were accepted and suggest that teams with facilitation intervention will differ from teams without facilitation intervention. H3 suggested that the extent of information elaboration is the causal mechanism through which facilitated teams will show higher co-creation of meaning. The result shows that the indirect effect (ACME) [19] due to information elaboration is in fact significantly mediating the relationship between the treatment and the outcome with an estimate of 0.439 ($p < 0.01$). Sensitivity analyses were conducted and also found that the causal mediation results seem to be robust to unmeasured confounders.This study found support for the mediating role of information elaboration. Findings of this study help to unravel the black box of team processes through which the causal effect induced by facilitation or feedback arises [20]. Given the increasing demand to design effective automated feedback mechanisms [10] into collaboration environments, it is important to understand what team processes are affected, how they change and if they change into what direction team processes should change. There are some limitations to consider that provide additional avenues for future work. First, the causal mediation analysis did not consider any moderating influence on the mediation path. Second, the construct information elaboration is a mix of items deduced from past research and self-developed items. Third, this study focused on a single causal mechanism, information elaboration.

5   Acknowledgements

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