Shared Practices in Articulating and Sharing Rationale: An Empirical Study

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ABSTRACT
This paper reports a classroom study in which group learners brainstormed ideas in virtual group space and justified their ideas through articulating their rationales in the shared rationale space. The investigation focused on the learners’ practices of articulating and sharing rationales. The results suggest that group members would brainstorm the ideas and generate rationales to justify the ideas before reading the others’ ideas and rationales. Also, the members in general brainstormed all the ideas first and then elaborated the rationales to justify the ideas; and grouped the shared rationales according to their authors. The group members’ reasoning styles were examined by using Rhetorical Structure Theory to analyze the shared rationales. It was found that similar reasoning styles existed across the groups. Additionally, the group context seemed to have affected the members’ strategies of using contextual and additional information to justify their ideas. Several design implications are presented to support the practices of articulating and sharing rationales in virtual group workspace. The authors also articulate how their work contributes to other research areas such as project management, crowdsourcing, and online deliberation. Based on their study, the authors argue for a rationale-based knowledge management approach to complex collective activities in the online environment.

Keywords: Design of Shared Rationale Space, Knowledge Awareness, Rationale Awareness, Rationale Sharing, Shared Reasoning Practice

INTRODUCTION
Constructivist learning theorists believe that it is important to encourage learners to think about how they approach problems, how they explore the problem space, and how they identify the solutions and why. When learners are aware of their thinking process, they engage in higher order learning experiences - they form more meaningful links within their knowledge structures and develop a more elaborate understanding of new concepts. Prior research has shown that a learners’ reflective thinking process needs to be nurtured in learning and knowledge building activities (Lund & Baker, 1997; Kim, 2005; Singh, Hawkins, & Whymark, 2007). Education

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Software programs have also been researched to promote reflective thinking in the processes of learning and teaching (e.g., Lai & Calandra 2010).

Fleck and Fitzpatrick (2010) identified five levels of reflection from describing the experience (level 0) to considering social and ethical issues and wider implications of the experience (level 4). In the education context, a student’s learning journal that describes what the student did or learned can be considered to be level 0 reflection. Studies have reported that learning journals are useful in assisting students to develop reflective thinking and practice (Bain, Ballantine, Packer, & Mills, 1999; Hettich 1990; Carson & Fisher, 2006; Constantinou & Kuys, 2013). According to Fleck and Fitzpatrick (2010), one’s reflective description that provides his/her rationales is considered to be a level 1 reflection. A rationale is an explanation of the reasons underlying decisions, conclusions, and interpretations. Design rationale studies have shown that capturing design rationales help designers reflect on their design reasoning and identify the errors (Burge & Brown, 2000; Conklin & Burgess-Yakemovic, 1995). In the learning activities, requiring students to document their rationales encourages them to reflect on how and why they come to the solution of the given problem and helps them to discover the flaws in their reasoning. Xiao, Clark, Rosson, and Carroll (2008) also demonstrated that in a computer-supported collaborative learning activity documenting the rationales in the virtual group space helped the students engage in higher order thinking process related to the course subject. Level 2 – 4 reflections address higher level issues such as organizational, social, and ethical concerns of the experience and are less common in pedagogy.

Groupware technologies have been explored to support collaborative learning (e.g., Hall, 2014; Bratitsis & Demetriadis, 2012; Papanikolaou & Gouli, 2013). Researchers also explore various ways of providing technological support for the reflective thinking in collaborative learning activities (Mulder, Swaak, & Kessels, 2004; Xiao et al., 2008; Phielix, Prins, & Kirschner, 2010). Likewise, there is a growing interest in investigating the effects of shared reflections in the group activities. It is shown that the shared reflection improves the members’ understanding of the others’ role and contribution (Dyer, 1995; Xiao, 2013a), promotes distance learners’ critical reflection in web learning environment (Kember et al., 1996; Kim, Hong, Bonk, & Lim 2011), and encourages teachers to collectively reflect on their teaching strategies (Boerboom et al., 2011). One topic that has been underexplored in these research communities is the groups’ practices around reflective thinking. Through the process of sharing information and experiences with the group members, the group members develop shared knowledge and practices (Lave & Wenger, 1991; Wenger, 1998). Do learners develop shared ways of reflecting on things and/or tasks, and how? For example, do they become similar in terms of what to reflect on, when to reflect, and how to share the reflection? Do they develop similar reasoning styles with respect to justifying their solutions or approaches in the activities? These are just a few research questions in this line of research that have been unexplored in the existing literature. A richer understanding the shared practices around reflective thinking processes would help us better design collaborative technologies to foster the processes in the collaborative learning activities.

As our first attempt to address this research gap, we explored the group practices on articulating and sharing rationales – the level 1 reflection according to Fleck and Fitzpatrick’s (2010) reflection framework. In our study, the students engaged in five collaborative learning activities that required them to propose and justify their ideas, and articulate and share the justifications of their ideas, i.e., their rationales. They conducted the activities in a virtual group workspace that provided a dedicated rationale space. We examined whether or not the group members developed similar practices in proposing and justifying their ideas, and whether or not their reasoning styles became similar over time.
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