The effects of trust and constructive controversy on student achievement and attitude in online cooperative learning environments

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ABSTRACT

This study investigated the effects of trust and constructive controversy on student achievement and attitude in online cooperative learning environments. Students in one university course were randomly assigned to one of the two treatment groups after they took part in a common initial workshop on general cooperative learning skills. The "trust" and the "constructive controversy" groups received subsequent associated skills training. The overall results indicated that after each group received the treatment during online cooperative group activities, the "trust" groups had significantly higher achievement than the "constructive controversy" groups. In addition, the "trust" groups had significantly more positive attitudes toward online cooperative learning than the "constructive controversy" groups. Specifically, using "trust" building strategies was significantly more effective than using "constructive controversy" strategies for improving the 'openness and sharing' and 'acceptance and support' components of student attitudes in online cooperative learning environments.

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1. Introduction

Online learning environments enable learners to implement their cooperative learning activities effectively by using innovative multimedia that have a user-friendly interface. In addition, online cooperative learning helps peers and instructors implement a fair assessment of other learners' online activities by recording each individual's and group's contributions. In addition, the development of communication tools such as social network services (SNS) helps learners develop and enhance diverse skills and competencies such as communication, interpersonal and social interactions, openness, involvement, engagement and participation in online cooperative learning environments (Rhem & Millis, 2012).

However, group cohesion and relationships between members of online learning environments are more fragile than those of face-to-face learning environments because many online activities and online communities lack face-to-face communication, and there is no guarantee that other group members will behave as learners are expected to do (Hsu, Ju, Yen, & Chang, 2007; Ridings, Gefen, & Arinze, 2002). If online communications are ineffective between learners, they do not focus on the online group activities and may perceive debates as personal attacks (Rourke & Kanuka,

2007). Thus, instructors need to help students maintain a positive attitude toward online cooperative learning by utilizing diverse instructional strategies to improve student interactions (Bailey & Card, 2009; Ku, Tseng, & Akarasriworn, 2013). In addition, if online group members concentrate on task-oriented activities too much, neglecting the importance of social aspects in cooperative learning, they fail to obtain strong cohesiveness and feelings of trust, belonging and satisfaction, which are preconditions for good common outcomes (Kirschner, Beers, Boshuizen, & Gijselaers, 2008).

Thus, instructors need to decrease undesired and opportunistic behaviors and increase interpersonal trust behaviors between group members in online cooperative learning environments (Hsu et al., 2007; Ridings et al., 2002). To effectively facilitate online communications with their instructors, students also need to receive appropriate guidelines or instructional support. Instructors can offer students the appropriate instructional support by teaching team-building skills and guidelines inducing students' active participation such as identifying areas of disagreement, attempting to reach a synthesis, focusing the discussion, and diagnosing misconceptions (Garrison, Anderson, & Archer, 2001).

Trust is a necessary condition to create active interaction between group members and facilitate productive learning processes and outcomes in online cooperative learning (Bulter & Cantrell, 1994; Hsu et al., 2007). In other words, the presence of trust has a key role in leading to cooperative behavior between group members, and it facilitates the group's performance and

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group members' satisfaction (Lui, Wong, & Liu, 2009). Trust also affects the components of organizational structure such as density and stability and creates a comprehensive cooperative group for effective interactions between the group members (Gefen, 2000; Hsu et al., 2007; McEvily, Perrone, & Zaheer, 2003). Jones, Dirckinck-Holmfeld, and Lindstrom (2006) examined how the condition of trust affects different types of relationships. They reported that the maintenance of weak links identified in network analysis can require a higher degree of trust than the strong links of community and collaboration. Although many prior studies have stressed the importance of trust in cooperative learning environments, they have mainly focused on trust as one single factor among student and team characteristics, and student relations or as a mediator which influences group performance indirectly (Cheung & Chan, 2000; Dirks, 1999; Hsu et al., 2007; Jarvenpaa & Leidner, 1999). A very few studies have focused on the effects of building trust as one significant instructional strategy on student learning outcomes or process in online cooperative learning.

In addition, efforts to resolve contradictions between learners' logic and that of other group members such as increasing communication between learners in the context of social interaction can motivate them to increase and effectively organize their knowledge (Doise & Mugny, 1986). However, group members often fail to integrate minority viewpoints because they disregard or ignore them, leading to biased processing of information (Buder & Bodemer, 2008; Johnson & Johnson, 2012; Roseth, Saltarelli, & Glass, 2011). Thus, instructors need to use some structured discussion or controversy strategies. One appropriate way to increase communication between learners in cooperative learning is to use constructive controversies. Constructive controversies are a necessary condition to activate interactions between group members in cooperative learning, and if an instructor uses constructive controversy strategies effectively, learners may be strongly motivated to solve ill-structured problems that may be given to the learners, and they can achieve high-level reasoning when they finish cooperative learning activities (Johnson, Johnson, & Tjosvold, 2006).

Many previous studies indicates that in order to conduct effective cooperative learning, it is needed for instructor and learner to use the components of positive interdependence, group processing, trust and constructive controversy as instructional and learning strategies (Jensen, Johnson, & Johnson, 2002; Johnson, Johnson, & Smith, 2007). Some prior studies have dealt with the effects of positive interdependence and group processing on cooperative learning activities (Brewer & Klein, 2006; Nam & Zellner, 2011; Swan, Shen, & Hiltz, 2006). Although trust and constructive controversy are also meaningful components and they can be utilized as effective cooperative strategies, very few studies have been conducted on the effects of trust or constructive controversy on online learning activities and outcomes when compared to positive interdependence and group processing (Janssen, Erkens, Kirschner, & Kanselaar, 2012; Rourke & Kanuka, 2007).

In the context of cooperative learning, trust focuses on the value, virtue or attitude such as interpersonal relations, openness, sharing and trusting climate, whereas constructive controversy focuses on specific roles and skills such as 'pro and con' positions. In online learning environments, distrust between group members can increase ambiguity and uncertainty in social perceptions and weaken interdependence between them (Jarvenpaa & Leidner, 1999; Wilson, Straus, & McEvily, 2006). The effects of constructive controversy on cooperative learning process or outcomes can depend on whether it is conducted in face-to-face or online settings (Roseth et al., 2011). Students may have some difficulties to manage social conflict because of the absence or lack of the non-verbal, social cues such as hearing their tone of voice, and sensing the atmosphere within the classroom in online learning environ-

ments (Walker, 2004). Thus, students need to obtain constructive controversy skills in order to resolve these social conflicts effectively by using some techniques such as practice of netiquette, direct apology, clarification, refocusing on learning and etiquette of silence in online cooperative learning environments (Xie, Miller, & Allison, 2013). Trust and constructive controversy as two factors of cooperative learning having different characteristics can be developed as meaningful and specific online instructional strategies if the relative effects of the two factors on learning process and outcomes are examined in online cooperative learning environments. In addition, although many previous studies have focused on constructive controversy as one construct for reaching an agreement between group members, they have mainly stressed constructive controversy as a mediating variable between student characteristics and group performance (Batool, Qureshi, Waheed, & Hijazi, 2012; Roseth, Saltarelli, & Glass, 2012). Few studies focused on the main effects of constructive controversy as one online instructional strategy on student achievement or attitude. However, previous studies that deal with interpersonal conflict can give us some insights regarding how conflicts among group members can affect group performance and their attitude toward collaborative works. For example, Järvenoja and Järvelä (2009) reported that students' self-regulation and emotional control can be a key role in successful collaborative learning when they experience diverse socio-emotional challenges within and between tasks. The conflict theory specifies interpersonal conflict by offering three distinct types of task conflict, relationship conflict, process conflict (Jehn, 1997). O'Neill, Allen, and Hastings (2013) reported that there are significantly negative relationships between all three types of interpersonal conflict and team performance. In addition, they mentioned that teamwork variables such as team potency, cooperative behaviors, competitive behaviors, and avoidance behaviors should be considered together when the relations between interpersonal conflict and team performance are examined. De Dreu and Weingart (2003) reported that there are strong and negative relationships between relationship conflict, team performance, and team member satisfaction. Martínez-Moreno, González-Navarro, Zornoza, and Ripoll (2009) mentioned that communication media can moderate the relationship between conflict types and team performance over times. They reported that task and process conflict may increase team performance in face-to-face teams when they are not complicated by relationship conflict, while process conflict can decrease performance in video-conference teams at the early stage of the teamwork. De Dreu and Van Vianen (2001) reported that when team experience relationship conflict, they generally express one among three types of conflict responses: collaborating responses, contending responses, and avoiding response. They also reported that collaborating and contending responses to relationship conflict can decrease team performance, while avoiding responses can be more helpful in team functioning such as voice, compliance, and helping behavior in that they help team members to pursue task performance effectively.

Many prior studies have also stressed that trust is a central dynamic of promotive interaction in cooperative learning (Hsu et al., 2007; Johnson & Johnson, 1994; Lui et al., 2009). However, a few studies focused on the main effects of trust as one online instructional strategy on student achievement or attitude by employing experimental research methods. However, without sufficient trust between group members, they spend too much time and energy protecting, checking and monitoring each other and their behaviors, and they negatively react to the feedback and critique of other group members (Fransen, Kirschner, & Erkens, 2011). In addition, group members are not willing to share meaningful information which is needed for successful collaborative process and outcomes and feel safe to do so (Nelson & Cooprider, 1996). Consequently, they cannot focus on conducting collaborative