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The role of collective efficacy, cognitive quality, and task cohesion in computer-supported collaborative learning (CSCL)

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ABSTRACT

Research has suggested that CSCL environments contain fewer social context clues, resulting in various group processes, performance or motivation. This study thus attempts to explore the relationship among collective efficacy, group processes (i.e. task cohesion, cognitive quality) and collaborative performance in a CSCL environment. A total of 75 Taiwanese college students (divided into 25 groups) participated in the study. Both quantitative and qualitative methods were applied for data analysis. The results indicate that collective efficacy significantly predicted task cohesion but not cognitive quality in the CSCL environment. For the role of group processes in performance, both task cohesion and cognitive quality significantly predicted group performance, but cognitive quality predicted better than task cohesion. In addition, for the predictive capability of prior performance, task cohesion, and cognitive quality in collective efficacy, the results showed that only task cohesion predicted subsequent collective efficacy significantly in the CSCL environment.

1. Introduction

Recent researchers have suggested that computer-supported collaborative learning (CSCL) plays an important role in learners' performance (Francescato et al., 2006; Wang & Lin, 2007b). For example, it has been suggested that CSCL helps students to facilitate high order cognitive processes and to create new knowledge (Bruckman & De Bonte, 1997; Butler, 1995; Francescato et al., 2006). However, other researchers have shown that students in CSCL environments contribute differently in cognitive activities (De Laat & Lally, 2003; Hurme, Palonen, & Järvelä, 2006) and in on-line discourse (Caspi, Chajut, Saporta, & Beyth-Marom, 2006; De Laat & Lally, 2003; Häkkinen & Järvelä, 2006; Salovaara & Järvelä, 2003). Research further suggests that motivation should play an important role in such varied contributions in CSCL discourse (Rienties, Tempelaar, Van den Bossche, Gijselaers, & Segers, 2009). As Bandura (1997, 2000) suggested, collective efficacy, the perception of group capability to achieve the goal, one of the most powerful group motivation beliefs, has positive influences on various areas of group learning and performance. However, very little research has examined the influences of collective efficacy in CSCL, this study thus attempts to investigate the role of collective efficacy on group process behaviors such as cognitive quality and task cohesion in the CSCL environment.

In addition, research has suggested that CSCL environments contain fewer social context cues (González, Burke, Santuzzi, & Bradley, 2003), as compared to traditional collaborative learning. For example, computer-supported collaborative learning in general is more text-based, and lacks physical gestures, tone of voice, and emotional expression, while traditional collaborative learning conveys more non-verbal information, such as status difference, appearance, and facial expression (González et al., 2003). Considering the absence of such social context clues, but with its text-based features, CSCL may result in various different group processes and performance. Although researchers have suggested that group process behaviors such as task cohesion and cognitive quality are important for group performance (Hooper, 2003; Willoughby, Wood, McDermott, & McLaren, 2000), whether these two constructs still exert the same significance in CSCL, which lacks social clues and teachers' monitoring, is in need of investigation. This study thus attempts to further investigate task cohesion and cognitive quality, as well as their importance in CSCL performance.

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Moreover, as previously noted, collective efficacy has strong effects on various aspects of collaborative learning. The factors influencing collective efficacy should be worthy of more attention. As Bandura (2000) suggested, group interaction processes play an important role in constructing collective efficacy, while researchers also suggest that the performance accomplishment of groups is the most powerful source of information for collective efficacy (Whyte, 1998; Zaccaro, Blair, Peterson, & Zazanis, 1995). Therefore, this research also attempts to investigate whether group process behaviors (i.e. group cohesion, cognitive quality) or prior group performance exerts stronger influences in developing collective efficacy in the CSCL environment. To further explore the role of task cohesion, cognitive quality and prior group performance in collective efficacy, collective efficacy is therefore administered twice in this study. This is also consistent with Klassen and Krawchuk's (2009) suggestion that collective efficacy is a socially shared cognition that develops over time.

2. Theoretical background

2.1. Collective efficacy, group process behaviors (task cohesion, cognitive quality), and group performance

According to Bandura (1997), collective efficacy is defined as a group's shared beliefs in its conjoined capabilities to execute the courses of action required to achieve assigned goals. In other words, collective efficacy is perceived as the performance capability of a group as a whole. Bandura (1997) also suggests that two descriptions of collective efficacy can be used to estimate perceived group efficacy. The personal description sums members' judgments of their own efficacy beliefs, while the group description aggregates the members' perceived efficacy of their group as a whole. Aggregated perceived group efficacy is particularly relevant when group goal attainment requires a significant interdependent effort. In this study, the collaborative tasks require highly interdependent effort, and all students need to contribute their efforts to achieve their group's goals.

Researchers have indicated that collective efficacy has strong influences on collaborative performance in schools, organizations and sport (Bandura, 1997; Goddard, 2001; Hodges & Carron, 1992; Peterson, Mitchell, Thompson, & Burr, 2000). A meta-analysis in collaborative learning indicates a significant positive relationship between collective efficacy and group performance (Gully, Beaubien, Incalcaterra, & Joshi, 2002). In addition to the significant impact on group performance, researchers have also suggested that collective efficacy has a significant effect on group processes, such as levels of effort, group cohesion and persistence (Bandura, 1997; 2000; Lee & Farh, 2004; Wang & Lin, 2007a). For example, a recent study has indicated that collective efficacy plays an important role in group cohesion (Lee & Farh, 2004). Mullen and Copper (1994) also suggest that task cohesion, focusing on task commitment, has a stronger relationship with collective efficacy than does social cohesion. Therefore, this study further hypothesizes that collective efficacy should have similar effects on task cohesion in the CSCL environment.

Moreover, researchers have extensively indicated that motivation is very critical for students' use of cognitive strategies or cognitive quality (Pintrich, 1999; Pintrich & De Groot, 1990; Pintrich & Schrauben, 1992; Schunk, Pintrich, & Meece, 2008; Wang & Lin, 2007a). Researchers also suggest that cognitive strategies on their own cannot promote learning; students need to be motivated to do so (Pintrich & De Groot, 1990). A recent study in CSCL indicates that highly intrinsic motivated learners contribute both more and a higher quality of cognitive discourse in CSCL (Rienties et al., 2009), but there is still very limited attention on the influence of collective efficacy on cognitive quality in CSCL. This study thus attempts to further empirically examine the role of collective efficacy in cognitive quality in the CSCL environment.

2.2. Group cohesion, cognitive quality and group performance

Group cohesion has been found to exert an important impact on group dynamics or group processes in various areas, such as organizations, schools and sports (Mullen & Copper, 1994). According to González et al. (2003), group cohesion is the force to bind group members together to commit to the group goals. Two aspects of group cohesion are in general noted: one is social cohesion, addressing interpersonal attractions, and the other is task cohesion, focusing on task commitment. As the research suggests, social cohesion, which represents the degree of positive relationships among group members, leads to more frequent interactions (Zaccaro & Lowe, 1988). On the other hand, task cohesion, which shows group members' commitment to the group task, enhances group productivity.

Research in general has shown that group cohesion is positively related to group performance (Mullen & Copper, 1994). In a meta-analysis of 49 studies evaluating the effects of group cohesion on group performance, the results indicate that the cohesion-performance effect is highly significant but of small magnitude (Mullen & Copper, 1994). Although researchers in general support that both social and task cohesion are important group processes (Zaccaro, 1991; Zaccaro & Lowe, 1988; Zaccaro & McCoy, 1988), the meta-analysis reveals that only task cohesion positively predicts group performance (Mullen & Copper, 1994). González et al. (2003) also further validate the positive influence of task cohesion on the quality of group work. This study thus attempts to use task cohesion to predict CSCL performance in this study.

In addition to task cohesion, the cognitive quality of members' discourse should also be important for CSCL performance. Researchers have shown that students using higher level learning strategies have better performance (Garavalia & Gredler, 2002; Pintrich & De Groot, 1990; Schunk et al., 2008). Willoughby et al. (2000) further suggest that, when sophisticated strategic information can be shared within the group, the group members are more likely to make contributions which promote knowledge. However, research has rarely investigated the cognitive quality of on-line collaborative discourse in the CSCL environment. This study thus attempts to investigate the cognitive quality of on-line discourse along with its influences on computer-supported collaborative performance.

2.3. The role of prior group performance and group process behaviors (task cohesion, cognitive quality) in collective efficacy

Given the strong influences of collective efficacy on group processes and collaborative performance as previously noted (Bandura, 1997; Goddard, 2001; Peterson et al., 2000; Zaccaro et al., 1995), it is important to explore the factors affecting collective efficacy, which should help to facilitate collaborative learning. Researchers have suggested that, collective efficacy, a similar construct to self-efficacy, is derived from four major sources: prior performance, vicarious performance, verbal persuasion, and emotional arousal (Bandura, 1997; Whyte, 1998). Among these sources, prior group performance accomplishment plays the most important role in forming collective efficacy (Zaccaro et al.,