



The effects of group composition of self-efficacy and collective efficacy on computer-supported collaborative learning

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Abstract

Although research has suggested that group composition plays an important role in collaborative learning, the role of motivation in group composition has rarely been taken into account. This study investigates the effects of group composition of self-efficacy (e.g. low, high, and mixed self-efficacy) on group motivation (i.e. collective efficacy), collaborative learning behavior, and performance in a computer-supported collaborative learning environment. The results indicate that high self-efficacy groups have higher collective efficacy beliefs than low self-efficacy groups. Furthermore, high self-efficacy groups use more high-level cognitive skills during group discussion than low self-efficacy groups, despite no significant difference in usage of lowlevel cognitive skills among the three groups. This study also demonstrates that collective efficacy has positive effects on discussion behaviors and group performance. Students with higher collective efficacy not only use more high-level cognitive skills in group discussion, but also demonstrate better academic performance. Our research further indicates that students' use of high-level cognitive skills in group discussion has positive effects on group performance. Finally, implications and suggestions for future research are also provided.
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Keywords: Self-efficacy; Group composition; Collective efficacy; Computer-supported collaborative learning; Motivation; Learning strategies

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1. Introduction

In the past several decades, educational research has increasingly focused on the importance of collaborative learning (Cohen, 1994; Johnson, 2003; Johnson & Johnson, 1999; Slavin, 1990; Webb & Palincsar, 1996). Research has shown that collaborative learning encourages the use of high-level cognitive strategies, critical thinking, and positive attitudes toward learning (Garrison, Anderson, & Archer, 2001; Hsu, 2003; Johnson & Johnson, 1998, 1999). Research further suggests that computer-supported collaborative learning provides students with a more flexible means of working collaboratively with their peers without constraints of time and distance (Palmieri, 1997). For example, a meta-analysis of studies in the technical support of group process indicates that both synchronous and asynchronous systems increase the quality of group analysis, participation, and decision-making compared to manual groups (Pinsonneault & Kraemer, 1989).

In a review of research on collaborative learning, Johnson and Johnson (1989, 1992) suggest that collaborative learning has positive effects on students' academic performance. Merely placing students in groups, however, does not guarantee effective collaborative learning (Johnson & Johnson, 1999; Kreijns, Kirschner, & Jochems, 2003). It is therefore necessary to delineate and evaluate collaborative learning methods, particularly when group learning taking place on the web where teachers' monitoring is not as direct as it is in the classroom. Research in collaborative learning (e.g. Abrami et al., 1996; Huxham & Land, 2000; Shaw, 1980) claims that group composition, an initial input factor for grouping learning, exerts a significant influence on group process and learning outcomes. Research further suggests that heterogeneous group composition, based on members' ability, gender, social economic status, or race, promotes diversity and is more conducive to collaborative learning (Webb & Palincsar, 1996). Research on collaborative learning, however, has rarely taken motivational factors into consideration when addressing group composition.

Research has suggested that self-efficacy, people's beliefs of their capabilities to achieve designated goals or performance, is one of the most important motivational factors in predicting students' choice of activities, effort, and persistence and academic performance (Bandura, 1986; Pintrich & Schunk, 2002). Research has identified that group success benefits from the group members with higher motivation (Johnson & Johnson, 1999), thus this study attempts to investigate the effects of group composition of self-efficacy on group motivation (that is, collective efficacy, in this study), group discussion and group performance.

1.1. Group composition

Research suggests that there are a number of ways to assign students to groups. For example, students may choose their own groups, but this type of student-selected group composition is often too homogenous with high achievers with other high achievers, minority students with other minority students, and males with other males (Johnson & Johnson, 1999). Johnson and Johnson (1999) suggest that teacher-selected groups often result in the best mix because teachers are better able than students to form optimal combinations. In addition, many cooperative learning methods recommend heterogeneous, rather than homogeneous, group composition in order to reflect varying student abilities and backgrounds in the class. Research further suggests that heterogeneous groups exhibit greater degrees of elaborative thinking, providing and receiving explanations, and perspec-

tive taking in discussion material; these in turn lead to deeper understanding, better reasoning abilities, and accuracy in long-term retention (Johnson & Johnson, 1999). Webb and Palincsar (1996) summarize the justifications for heterogeneous group composition as maximization of opportunities for peer support and helpful mutual exchange, improvement in cross-race and cross-gender relations, assurance that every group has at least one member capable of task completion, and preparation of comparable groups for fair intergroup competition. Webb and Palincsar, however, also draw attention to the lack of empirical evidence relating heterogeneous grouping to optimal group learning.

One of the major arguments for forming heterogeneous ability groups is that it benefits low-ability students by creating chances for them to learn from their more capable peers. Several studies that have addressed ability grouping show mixed results (Campion, Medsker, & Higgs, 1993; Fuchs, Fuchs, Hamlett, & Karns, 1998; Leonard, 2001; Linchevski & Kutscher, 1998; Pearce & Ravlin, 1987). For example, research suggests that heterogeneity in terms of ability and experience leads to better performance when a wide range of competencies are required, but homogeneity leads to better performance when satisfaction, conflict, and communication are taken into account (Campion et al., 1993; Pearce & Ravlin, 1987). Several studies (Azmitia, 1988; Hooper & Hannafin, 1988; Hooper, Ward, Hannafin, & Clark, 1989; Webb, 1980) have addressed the concern that high ability students are held back when assigned to heterogeneous groups, but have found that high ability students nevertheless learn as well as low-ability peers. The effect of homogeneity or heterogeneity in self-efficacy grouping, however, remains unknown. Therefore, this study explores the effects of self-efficacy grouping (e.g. high, low, and mixed self-efficacy) on computer-supported collaborative learning behavior and achievement.

1.2. Self-efficacy, collective efficacy, and collaborative learning

Three motivational components are believed to exert a significant influence on academic achievement: (a) an expectancy component (“Can I do the task?”), which includes students’ beliefs about their capability to perform a task (e.g. self-efficacy), (b) a value component (“Why am I doing this task?”), which consists of students’ beliefs about the importance and interest of the task (e.g. task value), and (c) an affective component (“How do I feel about this task?”), which includes students’ emotional responses to the task (e.g. anxiety) (Pintrich & De Groot, 1990; Pintrich & Schunk, 2002). Particularly, self-efficacy, students’ perceptions of their capability to reach a desired outcome, is most powerful in predicting academic performance than other motivational beliefs (Lent, Brown, & Larkin, 1987; Pintrich & De Groot, 1990; Pintrich & Schunk, 1996; Pintrich & Schunk, 2002).

To date, there has been very little research on the grouping effects of motivational factors, particularly self-efficacy, on collaborative learning. Self-efficacy has been found to have a very significant impact on academic achievement (Bandura, 1996, 1997, 2000; Gibson, Randel, & Earley, 2000; Joo, Bong, & Choi, 2000; Linnenbrink & Pintrich, 2002; Little & Madigan, 1997; Pajares & Kranzler, 1995; Pajares & Miller, 1995). Bandura (1997) has suggested that individuals are most likely to obtain their efficacy beliefs from their performance experiences, which are the most influential efficacy information because they provide the most authentic evidences. In addition, research has also shown that self-efficacy can be enhanced by modeling the successful performance of similar others (Bandura, 1986). For example, observing similar peers completing a task successfully may convey a sense of efficacy. Therefore, grouping students on self-efficacy very likely affects

collaborative learning. Thus, this study attempts to examine the effects of group composition of self-efficacy on collaborative learning behavior and achievement.

Aside from group composition, group motivation factor, particularly collective efficacy, has been proven to be positively correlated to group performance in a number of studies on fields such as schools, organizations, and sports (Bandura, 1997; Goddard, 2001; Greenlees, Graydon, & Maynard, 1999; Hodges & Carron, 1992; Peterson, Mitchell, Thompson, & Burr, 2000). According to Bandura (1997), collective efficacy is defined as a group's shared beliefs in its conjoint capabilities to execute the courses of action required to achieve designated goals. In other words, collective efficacy is concerned with the performance capability of the group as a whole. Research shows that collective efficacy has a significant effect on group functioning, especially level of effort, persistence, and achievement (Bandura, 1997, 2000; Durham, Knight, & Locke, 1997). It is thus reasonable to expect that collective efficacy will have similar positive effects on computer-supported collaborative learning.

Research suggests that collective efficacy can be influenced by group size, past team performance, leadership, and self-efficacy (Watson, Chemers, & Preiser, 2001). Several studies have specifically shown that individuals' self-efficacy contributes significantly to their sense of collective efficacy (Fernández-Ballesteros, Díez-Nicolás, Caprara, Barbaranelli, & Bandura, 2002). However, no research has been undertaken on the relationship between individual self-efficacy and collective efficacy at the group level. Therefore, in addition to examine the effects of collective efficacy on collaborative learning, this study also examines the grouping effects of individual efficacy beliefs on collective efficacy.

Computer-supported collaborative learning has gained a great deal of attention in educational circles: it not only provides students with a more flexible means of acquiring information, but also allows students to work collaboratively with their peers beyond the constraints of time and distance (Palmieri, 1997). In particular, CMC (computer-mediated communication) has been promoted as an effective means to this end (Ahern & El-Hindi, 2000). Since there has been few studies on the content conveyed or strategies applied while using CMC, this study analyzes the cognitive levels of dialogue used in CMC along with its effects on collaborative learning.

Therefore, this study investigates the following research questions:

1. Which self-efficacy groupings lead to effective computer-supported collaborative learning? Among groups with high self-efficacy, low self-efficacy, and mixed self-efficacy students, which grouping demonstrates better collective efficacy, more use of cognitive skills in group discussion, and better group performance in a computer-supported collaborative learning environment?
2. Do students' collective efficacy beliefs affect their discussion behaviors in CMC, as well as group performance?
3. Do students' discussion behaviors influence their academic achievement?

2. Method

2.1. Participants

Seventy-two participants were college students enrolled in introductory level educational psychology courses in a Taiwan research university's teacher education program.

The program welcomes students from a variety of academic departments, and 23 different majors, including mathematics, chemistry, language arts, and music, are represented in this study. All students have declared their intention to embark on careers as secondary school teachers. Most students were not acquainted with each other at the outset of the study, hence they were more inclined to discuss their group assignments via the Web-based environment.

2.2. Group composition

All participants were asked to fill out the “self-efficacy” questionnaire on the networked system at the beginning of the semester. Three clusters of students (high, low, and mixed) were differentiated by their scores on the self-efficacy questionnaire. The high self-efficacy cluster was comprised of students whose self-efficacy scores were in the top 40%, and the low self-efficacy cluster consisted of students whose self-efficacy scores were in the bottom 40%. A *t*-test indicated a significant difference between the high self-efficacy and low self-efficacy clusters. The mixed self-efficacy cluster was composed of the students in the middle 20%, along with eight students randomly selected from the high self-efficacy cluster, and eight students randomly chosen from the low self-efficacy cluster. As a result, 24 students were assigned to each of the three clusters. Each efficacy cluster was further divided into eight groups of three students each. As the result, the high and low self-efficacy groups consisted of three students with all high or all low self-efficacy, while the mixed self-efficacy groups consisted of three students with high, low, and middle self-efficacy.

2.3. Measures

2.3.1. Questionnaire

A “self-efficacy” questionnaire and a “collective efficacy” questionnaire, each using a seven-point Likert scale ranging from (1) “not at all true of me” to (7) “very true of me,” were administered at different times.

Self-efficacy: The self-efficacy scale consisted of eight items (for example, “I am confident I can do an excellent job on the assignments and tests in this course”) derived from the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia, and McKeachie (1991). Since Mandarin Chinese is the official language of Taiwan, a Chinese translation of the questionnaire was necessary. This study utilized Wang and Lin’s (2000) Chinese version of the MSLQ, which has been proven reliable with α of .91 and an adequate factor structure.

Collective efficacy: The “collective efficacy” scale was revised from a self-efficacy scale developed by the first author. As Bandura (1997) suggested, collective efficacy is concerned with the performance capability of the group as a whole. Thus, self-efficacy items were changed from the individual to the group level. For example, the item “I am confident I can do an excellent job on the assignments and tests in this course” was modified as “I am confident my group can do an excellent job on the assignments and tests in this course.”

2.3.2. The networked system

This study used the networked portfolio system (NetPorts, see Fig. 1) designed by the second author and her colleagues. This system has proven both reliable and feasible (Liu,

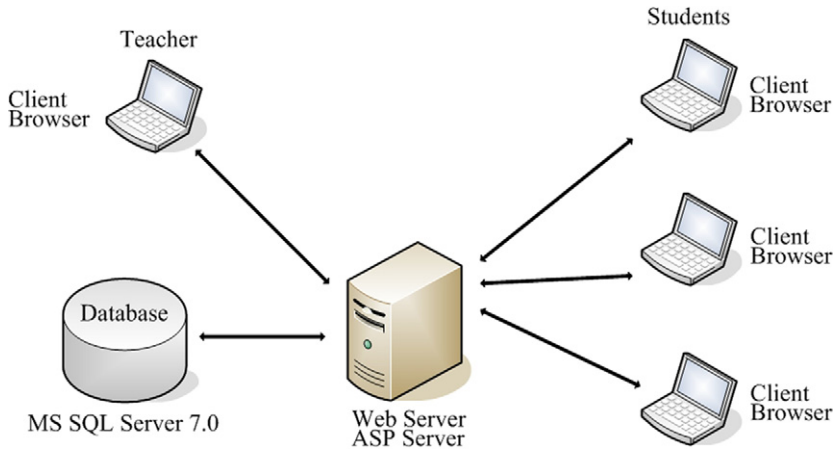


Fig. 1. Netports configuration.

Lin, & Yuan, 2001). The system server uses Windows 2000 as its operating system and SQL Server 7.0 as its database. Students are able to upload homework, process peer assessments, and view records of self-reflection and peer feedback. Furthermore, NetPorts has an online questionnaire module that allows collection of student data, as well as an online chat room that allows for student discussion of group assignments.

In the initial stage of system development, the designers consulted with teachers planning to use this system in order to incorporate the functionality they require. Drawing on their input, the system was designed with a system management module which allows teachers to easily monitor student progress. For example, teachers can easily keep track of and modify assignment due dates, as well as monitor student homework, feedback (if applicable), and peer discussion. Teachers further have the convenient option of contacting students via electronic bulletin board, email, and chat-room.

2.4. Collaborative task

One of the primary objectives of the course was to introduce students to theoretical and practical issues in educational psychology, which create the foundation for understanding advanced instructional techniques and classroom management skills. The groups of students were therefore asked to read a field report made by a math teacher after 11 weeks of instruction. This report details the oral presentations of five sixth grade students who described their math problem solving processes. The five sixth grade students had selected problems they were interested in or capable of solving and answer peer questions in order to pass the examination. The author described each student's personality, motivation, and math learning history, along with the question-and-answer process, in detail sufficient to create a realistic case study for preservice teachers to become familiar with authentic classroom context.

The participating groups were required to discuss and prepare a final report on this case study on Netports. All group members were asked to select either one episode or person in the case study and associate it with at least three major educational theories they had just learned (e.g. behaviorism, the attribution theory of motivation, and Piaget's cognitive

development theory). The goal of this collaborative task was to encourage beginning level preservice teachers to integrate and apply theory to actual classroom activities. This open-ended task with a large problem space served as the sort of ill-structured task that Cohen (1994) has suggested is suitable in enhancing group interdependence. For example, groups had to incorporate multiple perspectives both in the initial selection of the episode or person for analysis as well as during the application of theoretical concepts.

2.5. Procedures

In the ninth week of the semester, participants filled out the self-efficacy questionnaire on NetPorts, and group composition, based on student self-efficacy scores, was processed within two weeks. In the 12th week, students were informed of their groups and team members, but not which efficacy cluster they belonged to. From three weeks (until the 15th week of the semester), they were then asked to discuss and construct group projects on the system. In order to encourage networked student discussion, the instructor evaluated their discussions, which were assessed as 15% of the final grade. Finally, in the 16th week, all students filled out the collective efficacy questionnaire and use the system to upload their group projects.

2.6. Data analysis

This study used both quantitative and qualitative methods of data analysis.

Quantitative methods: Several statistical methods were used to analyze the data. An item analysis was conducted to determine item reliability in the questionnaires, and correlation analysis was used to test inter-rater reliability. Moreover, Oneway ANOVA was used to examine the grouping effects of differing efficacy beliefs on students' collective efficacy, group discussion, and group performance. Finally, regression analysis was used to examine the effects of students' collective efficacy and cognitive level of computer-mediated discussion on their group performance.

Qualitative methods: Content analysis was used to analyze CMC discourse. Three graduate students majoring in Education Psychology served as raters. In order to enhance inter-rater reliability, the raters first jointly analyzed six teams' group discussions. Three raters analyzed the content of CMC based on students' discussion paragraphs stored in the NetPorts system. Each paragraph could consist of one or more ideas, and each idea served as a unit for analysis: where one paragraph consisted of two ideas, two separate analytical units were counted; where two continuous paragraphs expressed the same idea, they were counted as a single analytical unit. Every idea unit was evaluated and categorized according to Bloom's (1956) taxonomy of educational objectives.

The taxonomy of educational objectives was used as the coding system for categorizing the cognitive levels evidenced in the contents of group discussion. The taxonomy consists of six cognitive levels, ranging from knowledge, comprehension, and application, to the higher levels of analysis, synthesis, and evaluation. Research holds that knowledge, comprehension, and application are low-level cognitive skills, whereas analysis, synthesis, and evaluation are high-level of cognitive skills (Brown, 2001). Therefore, in this study, student group discussion ideas categorized as knowledge, comprehension, and application were coded as low-level cognitive skill, whereas ideas comprising analysis, synthesis and evaluation were coded as high-level cognitive skills. The inter-rater consistencies were calculated

by the Pearson product moment correlation and correlations were all over 0.80. This demonstrates that content analysis is a reliable measure for cognitive ideas generated from group discussion.

Research has suggested that content analysis can involve both numeric and interpretive data analysis (Hara, Bonk, & Angeli, 2000). Hence, this study includes quantitative analysis in order to yield a more meaningful analysis of group discussion.

3. Results

First of all, tests of internal consistency of the scales of self-efficacy and collective efficacy were performed. The results of the reliability test indicate that these two scales are very reliable with the alpha of 0.909 for self-efficacy, and 0.926 for collective efficacy in the current sample. In order to determine validity, a principle component analysis with varimax rotation was conducted. The principle component analysis indicates that all items loaded on the expected factors, and these loadings were all over 0.60.

Descriptive statistics for the scales of self-efficacy and collective efficacy is shown in Table 1, while statistical analysis for idea units presented in the group discussion is shown in Table 2. The results indicate that high self-efficacy groups have higher numbers across all measures. High self-efficacy groups have higher self-efficacy than mixed and low self-efficacy groups, and also higher collective efficacy than low efficacy groups. In addition, taking the average of scores from the three raters, high self-efficacy groups generated approximately thirty-two idea units, accounting for 54% of total idea units; 13 high-level cognitive ideas, accounting for 64% of total high-level cognitive ideas; and 19 low-level cognitive ideas, accounting for 48% of total low-level cognitive ideas. The test of significance is addressed below.

The results allow us to answer the study's research questions as follows:

1. Which self-efficacy groupings lead to effective computer-supported collaborative learning? Among groups with high self-efficacy, low self-efficacy, and mixed self-efficacy students, which grouping demonstrates better collective efficacy, more use of cognitive skills in group discussion, and better group performance in a computer-supported collaborative learning environment?

Table 1
Summary table of descriptive statistics of scales of self-efficacy, collective efficacy, and test of significance

	Individuals (<i>n</i> = 72)	All groups (<i>n</i> = 24)	LSE groups (<i>n</i> = 8)	MSE groups (<i>n</i> = 8)	HSE groups (<i>n</i> = 8)	<i>F</i> (df)	Post hoc test
Self-efficacy							
<i>M</i>	5.20	5.20	4.40	5.24	5.98	89.18**	HSE > MSE > LSE
SD	0.84	0.70	0.24	0.28	0.18	(21, 2)	
Collective efficacy							
<i>M</i>	4.88	4.88	4.27	4.82	5.54	9.611*	HSE > LSE
SD	1.04	0.77	0.65	0.58	0.51	(21, 2)	HSE = MSE

LSE, low self-efficacy groups; MSE, mixed self-efficacy groups; HSE, high self-efficacy groups.

* $p < 0.05$.

** $p < 0.01$.

Table 2

Summary table of descriptive statistics, and tests of significance of CMC content categorized by low-level cognitive idea units, and high-level cognitive idea units, and total idea units

	Individuals (<i>n</i> = 72)	All groups (<i>n</i> = 24)	LSE groups (<i>n</i> = 8)	MSE groups (<i>n</i> = 8)	HSE groups (<i>n</i> = 8)	<i>F</i> (df)	Post hoc test
Low-level cognitive ideas							
<i>M</i>	5.87	13.21	11.83 (30%)	8.67 (22%)	19.13 (48%)	2.106	
SD	4.62	10.94	6.54	6.40	15.62	n.s. (21, 2)	–
High-level cognitive ideas							
<i>M</i>	1.37	6.88	1.88 (9%)	5.63 (27%)	13.13 (64%)	4.550*	HSE = MSE
SD	1.91	8.69	2.23	4.78	12.05	(21, 2)	HSE > LSE
Total idea units							
<i>M</i>	7.23	20.08	13.71 (22%)	14.29 (24%)	32.25 (54%)	4.00*	
SD	5.49	16.74	8.24	7.59	23.27	(21, 2)	–

LSE, low self-efficacy groups; MSE, mixed self-efficacy groups; HSE, high self-efficacy groups.

* $p < .05$.

For the grouping effects on collective efficacy, the result of a oneway ANOVA indicates a significant difference between the high self-efficacy, low self-efficacy, and mixed self-efficacy groups ($F = 9.611$, $p < 0.05$). The Scheffe method of post hoc comparison indicates that high self-efficacy groups have higher collective efficacy than low self-efficacy groups, but there is no significant difference between high and mixed self-efficacy groups or low and mixed self-efficacy groups.

For the grouping effects on group discussion, although the results show that there is no significant difference in the use of low-level cognitive skills ($F = 2.106$, $p > 0.05$), there is a significant difference in the use of high-level cognitive skills among these three groups ($F = 4.550$, $p < 0.05$). The Scheffe post hoc comparison reveals that high self-efficacy groups expressed more high-level cognitive ideas than low self-efficacy groups, but that there is no significant difference between the high and mixed self-efficacy groups or low and mixed self-efficacy groups. In addition, the result of a oneway ANOVA suggests that there is a significant difference among the three groups in the total idea units expressed, however, the Scheffe post hoc comparison reveals no difference among these three groups.

For the grouping effects on group performance, the results indicate that there is no difference among high, low, and mixed self-efficacy groups ($F = .942$, $p > 0.05$).

- Do students' collective efficacy beliefs affect their discussion behaviors in CMC, as well as group performance?

For the effects of collective efficacy on discussion behavior, the regression analysis indicated that students' collective efficacy has significant effects on their uses of high-level of cognitive skills on CMC ($\beta = 0.499$, $T = 2.702$, $p < 0.05$). In other words, the higher the students' collective efficacy, the more the high-level cognitive skills they used in group discussion.

Regression analysis shows no effect of collective efficacy on students' group performance ($\beta = 0.112$, $t = .530$, $p < 0.05$). However, the t -test indicates that there is a significant difference between the groups at the top 30% and bottom 30% of group performance ($t(14) = 2.528$, $p < 0.05$). In other words, groups demonstrating better performance have higher collective efficacy than groups with lower achievement.

3. Do students' discussion behaviors influence their academic achievement?

Regression analysis demonstrates that students' use of high-level cognitive skills in group discussion affects their academic performance ($\beta = 0.485$, $t = 2.604$, $p < 0.05$). In other words, the more high-level cognitive skills students use in group discussion, the better their academic performance.

4. Conclusion and discussion

This study demonstrates that self-efficacy has a significant effect on collective efficacy and discussion behaviors in the computer-supported collaborative learning environment. The results show that high self-efficacy groups have higher collective efficacy beliefs than low self-efficacy groups. In addition, high self-efficacy groups use more high-level cognitive skills in group discussion than the low self-efficacy groups, although there is no significant difference in usage of low-level cognitive skills among the three groups. It is possible that most students are able to use low-level cognitive skills, thus making it difficult to determine differences among groups. Moreover, this study also shows that collective efficacy has positive effects on discussion behaviors in group discussion and group performance. Students with higher collective efficacy use more high level cognitive skills in their group discussions and demonstrate better academic performance in the computer-supported collaborative learning environment. Furthermore, the results indicate that students' use of high-level of cognitive skills in group discussion have positive effects on their group performance.

The results indicate that motivation plays a significant role in group composition for computer-supported collaborative learning. Specifically, the results indicate that high self-efficacy groups have higher collective efficacy and demonstrate greater use of high-level cognitive skills than low self-efficacy groups. Our study, however, finds no difference in collective efficacy and the use of cognitive skills between high and mixed self-efficacy groups. We conclude that when forming the three-student groups on the base of individual self-efficacy, teachers may need to place at least one high self-efficacy student in each group in order to promote collective efficacy and the use of high-level cognitive strategies. Indeed, as [Bandura \(1986\)](#) suggests, observation of similar others performing well or with efficacy beliefs convey a strong sense of efficacy, which in turn influences their behaviors. In other words, students with high efficacy beliefs not only have modeling effects on other group members, but are also more likely to transmit their efficacy beliefs through interactions with others. However, whether the effects of the high efficacy students on groups' collective efficacy and use of cognitive strategies apply for a larger group size needs to be further examined.

Furthermore, our research indicates that collective efficacy has significant effects on student uses of cognitive strategies in computer-supported collaborative learning, and that students with better achievement have stronger collective efficacy than students with lower achievement. Therefore, the promotion of collective efficacy beliefs will help facilitate collaborative learning. Collective efficacy is a relatively new concept, finding its origins in the

theory of self-efficacy. As Bandura (1997) suggests, collective efficacy refers to the self-efficacy of a group, team, or larger social system or entity. In other words, self and collective efficacy are similar constructs; they differ only inasmuch as the former is based on the individual, whereas the latter is based on group dynamics. Thus, approaches in raising self-efficacy will also likely help to promote collective efficacy. Pintrich and Schunk (2002), for example, have suggested that the goal properties of proximity, specificity, and difficulty impact self-efficacy. According to Schunk (1991), proximal (close-at-hand) goals raise self-efficacy and motivation more effectively than distant goals, because progress is easier to judge. In other words, distant goals are more difficult to measure, learners receive less clear information about their progress even if they are doing well (Schunk, 1991). In addition, specific goals are also more effective than general goals (such as “Do your best”) in raising self-efficacy, since specific performance standards are explicit and easier to gauge. Specific goals improve task performance through clear specification of the effort required to succeed and the expected self-satisfaction when the goals are attained (Schunk, 1991). Goals incorporating moderate difficulty, which are challenging but attainable, are more effective for raising efficacy, because it conveys clear information about students’ capability. This study suggests that since goal setting is effective in raising self-efficacy, it will produce similar effects vis-à-vis collective efficacy; teachers wishing to maximize collective efficacy will therefore do well to set proximal, specific, and moderate difficulty goals for groups. Accordingly, since research suggests that self-efficacy has positive effects on students’ learning behaviors and achievement, teachers wishing to promote individual’s learning can also apply these above strategies to raise students’ self-efficacy, which may have indirect effects on group learning.

In order to better understand the role of motivation in group composition for collaborative learning, further research on motivational variables, such as task value, is strongly recommended. Additionally, although group composition of self-efficacy has been shown to have a significant effect on collective efficacy in this study, the potential effect of group member interaction was not assessed in the study. Future research might thus be focused on the role of interaction, thereby enabling an even fuller understanding of collaborative learning.

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