Self and Collective Efficacy as Correlates of Group Participation: A Comparison of Structured and Unstructured Computer-Supported Collaborative Learning Conditions

by

Meghann Norina Fior

BSc., Nipissing University, 2004

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF ARTS

in the department of Educational Psychology and Leadership Studies

Self and Collective Efficacy as Correlates of Group Participation: A Comparison of Structured and Unstructured Computer-Supported Collaborative Learning Conditions

by

Meghann Norina Fior

BSc., Nipissing University, 2004

Supervisory Committee

Dr. Allyson Hadwin, Supervisor
(Department of Educational Psychology and Leadership Studies)

Dr. John Anderson, Departmental Member
(Department of Educational Psychology and Leadership Studies)

Dr. John Walsh, Departmental Member
(Department of Educational Psychology and Leadership Studies)

Dr. Richard Schmid, Outside Member
(Department of Education, Concordia University)

Supervisory Committee

Dr. Allyson Hadwin, Supervisor
(Department of Educational Psychology and Leadership Studies)

Dr. John Anderson, Departmental Member
(Department of Educational Psychology and Leadership Studies)

Dr. John Walsh, Departmental Member
(Department of Educational Psychology and Leadership Studies)

Dr. Richard Schmid, Outside Member
(Department of Education, Concordia University)

ABSTRACT

This study examines the relationship between self-efficacy for group work and collective efficacy in terms of participation within a computer supported collaborative environment across two collaborative conditions: (a) structured chat, and (b) unstructured chat. The purpose of this study was (a) to examine the relationship between self and collective efficacy and student participation, and (b) to examine the structure of reciprocal teaching roles, scripts and prompts in moderating the relationship between self-efficacy for group work and collaborative chat participation. Data were collected from 62 grade 10 students assigned to one of the two conditions: (a) structured chat enhanced with specific cognitive roles, scripts and prompts, or (b) unstructured chat enhanced by only a text based chat tool. The participants collaboratively discussed a challenging text in groups of 4 using a text-based chat tool. A relationship was found between self-efficacy and participation where collaborative condition moderated the relationship between efficacy and participation.

Table of Contents

Table of Tables

Table of Figures

Acknowledgments

I wish to acknowledge and thank the wonderful people who contributed to this thesis.

I gratefully acknowledge the invaluable academic and personal support received from my supervisor, Dr. Allyson Hadwin. Her excitement about the topic and the tools was contagious and I am grateful to her for helping me produce a thesis I am proud of.

I would also like to thank my committee, Dr. John Walsh, Dr. John Anderson and Dr. Richard Schmid for their constructive feedback and suggestions for improving the various drafts of this thesis and challenging me to think beyond what I thought possible.

I would also like to give a heartfelt thanks to the Learning Kit research team. Rachel Morris was a wonderful research partner and an amazing support through the process. I would also like to thank Mariel Miller for her hard work making sure the computer kit was perfect and always being there to help whenever needed. I would also like to thank Mika Oshige and Kiku Tupper for helping and providing support. Through this process you all became such great friends.

The computer developer team at Simon Fraser University also deserves a big thank you. Luc Beaudoin and the other developers spent long hours making sure the computer environment was running perfectly for the study.

I would also like to thank the participating schools, SIDES, ILC and Parkland. The teachers shared our excitement for discovering how their students are learning and the students provided me with very interesting chat conversations to code.

My family, Mom, Dad, Michael and Nonna, deserve a heartfelt thank you. Their constant reminders of how proud they are and of timelines kept me in check and gave the support I needed to keep me going. Also thank you to my grandparents, James and Margaret Brown, who taught me to always have a dream and be excited to learn something new. I could not have asked for a better family or better encouragement.

Finally, thank you to my friends for helping where they could. They proved to be great motivating factors by showing excitement for my accomplishments and continually asking “are you done yet?” Well guys, I’m finally done!

My thesis was supported by two grants: (1) SSHRC-INE Collaborative Grant to Dr. Philip Winne (PI) and Dr. Allyson Hadwin (Co-I) (512-2003-1012) and (2) SSHRC Standard Research Grant to Dr. Allyson Hadwin (410-2001-1263).

Chapter 1

Introduction

Bandura's (1997) concept of self-efficacy is that the stronger the efficacy, the more rigorous effort individuals exert to achieve a goal. Since the time of this original theory, researchers have tested this claim. Research shows that students who are less self-efficacious will give up more readily (Schunk & Pajares, 2004). As well, students who perceive themselves to be more self-efficacious for performing learning skills are more likely to engage in learning and expend the effort; therefore, persisting at the task (Schunk & Pajares, 2004). However, students in the education system commonly do not work alone. Self-efficacy for group work and collective efficacy may be important aspects of group functioning that have received little attention in the study of self-efficacy (Paskevich, Brawley, Dorsch & Widmeyer, 1999). Collective efficacy measures a member's appraisal of their group's capability to perform (Alavi & McCormick, in press; Bandura, 2001; Tasa & Whyte, 2002). An important area to be researched is in self-efficacy for group work and collective efficacy for learning with technology in terms of distance education, e-learning, chat rooms and email (Schunk & Pajares, 2004).

Students who perceive themselves as efficacious are more likely to engage, expend effort and persist in tasks (Bandura, 1997). Research show that students with low self-efficacy give up more easily when they are working alone, so how do they respond to working in a collaborative learning context? If self-efficacy has such a profound influence on task engagement when students work alone, then it follows that it may have an influence on their engagement in collaborative tasks.

Furthermore, what kinds of efficacy come into play for collaborative learning tasks? For the purposes of this thesis, task is referred to as a set of discourse interaction steps that students carry out to achieve an academic goal to enhance comprehension on a difficult text that would be hard to do on their own. Collaborative tasks vary greatly in terms of the support that is provided where some are loosely structured while others provide a lot of support; therefore, perhaps the influence of efficacy differs depending upon the amount of situational support that exists.

In the context of collaborative tasks in computer supported collaborative learning (CSCL) environments, two areas of efficacy may come into play: (a) self-efficacy to collaborate, and (b) collective efficacy. Within the literature to date there is no direct support that that these three areas of efficacy comprise CSCL; however, the following literature review will show the proposed intricate links that bind these three areas together in CSCL research.

Computer supported collaborative learning provides support for users collaborating. Many students are not strategic learners and they lack the skills to learn successfully (King, 2003). Collaborative partners or groups can help with the learning process, but as with giving students learning material and expecting them to learn; learners cannot be placed in groups and expect for that alone to help with the learning process (Kester & Paas, 2005; O'Donnell & Dansereau, 2000; Weinberger, Ertl, Fischer, & Mandl, 2005). The CSCL literature suggests that collaborative learning is improved when it becomes more structured because it guides learning (Weinberger, Ertl, Fischer & Mandl, 2005). However, it has been found in online courses that providing information is not adequate for students to learn. Learning is improved through collaborating with

partners or groups, but students often need help with collaborating (Kester & Paas, 2005; O'Donnell & Dansereau, 2000). Research on CSCL suggests that collaborative learning is improved when it is structured, and therefore guides learning tasks more accurately (Weinberger, Ertl, Fischer & Mandl, 2005). Roles, scripts and prompts can create this structure (O'Donnell & King, 1999; Palinscar & Brown, 1984). Therefore, computer supported collaborative learning using reciprocal teaching support with scripts and prompts should be examined to determine how these structures are related to participation rates and what areas of efficacy comprise CSCL.

Purpose of the Study

This study is important because it examines the effectiveness of an intervention designed to support collaborative engagement for participation rates regardless of efficacy for collaboration. The study has the potential to add to a gap in the literature regarding individual and collective efficacy in the context of computer supported collaboration. Therefore, the purpose of study was to compare the effectiveness of computer-supported collaboration using reciprocal teaching structure versus no structure. This was done on a content reading task while measuring self-efficacy for group work and collective efficacy of Saanich School District 63 secondary students in an online collaborative learning activity. Drawing on O'Donnell (1999) and Palinscar and Brown's (1984) use of roles, scripts and prompts to support collaboration, this study guides the collaborative process of how and when to collaborate in reciprocal teaching roles to help all individuals in the group excel on a content reading task.

Specifically, the purpose of this study was twofold. The first purpose was to examine the role of efficacy on participation in computer supported collaborative

learning tasks. The second purpose was to examine whether the effect of efficacy on participation is moderated by providing support for students to collaborate. The research questions that will be answered are: (a) is there a relationship between efficacy and participation rate in a collaborative task? (b) Is the relationship between efficacy and participation rate moderated by collaborative support?

Hypotheses

In order to guide this research, several hypotheses were formulated. These include:

H1. There is a relationship between efficacy and participation in a collaborative task where efficacy is a predictor of participation.

H2. The relationship between efficacy and participation is moderated by collaborative support.

The following literature review will further examine why efficacy in computer supported collaborative learning environments is a logical next step in the CSCL and efficacy research in terms of participation.

Chapter 2

Literature Review

CSCL Socialization

Distance education has been growing in popularity with the use of computers which could be contributing to the popularity of research in computer supported collaborative learning (CSCL). Within a CSCL environment, students can participate in the learning process from varying locations (Makitalo, Weinberger, Hakkinen, Jarvela, & Fischer, 2005). A sense of community can be created with learning on a computer in distance education where it is believed that a sense of community will still exist no matter where the learners are in the world (Rovai, 2002). With CSCL, there is a focus on discourse as a means for collaborating. Along with this comes the fear that perhaps socialization is inhibited due to using a computer (Eastin & LaRose, 2005). Gonzalez, Burke, Santuzzi and Bradley (2003) argue that computer-mediated environments are different from face-to-face group settings in terms of how much and the type of social and emotional information during the interaction. These differences can be seen in social-motivational aspects of performance and perhaps research should examine the effectiveness of groups interacting in a computer-mediated environment (Gonzalez et al., 2003). Social interaction is central for cognitive processes of learning and for socio-emotional processes such as associations and impressions formation that will create social relationships for a sense of cohesiveness and community (Kreijns, Kirschner, Jochems & Van Buuren, 2004). There has been a long standing argument that computers decrease socialization (Eastin & LaRose, 2005); however, the prevalence of chat and email tools indicated that CSCL research should focus attention on socialization factors

within collaboration. However, distance educators commonly forget about socialization factors and take group dynamics for granted (Kreijns, Kirschner, Jochems & Van Buuren, 2004). It is important to remember socialization factors because they promote positive feelings between group members by having more willing individuals as support in their learning (Rovai, 2001). Kreijns, Kirschner, Jochems & Van Buuren's (2004) research focuses on social interaction in distance learning groups (asynchronous) with sociable CSCL environments. They state that sociable CSCL environments have not only educational functionality, but they also add a social functionality in the collaborative process to create group cohesiveness.

Concerned with the claim that computers decrease socialization, Eastin and LaRose (2005) examined the system of social support that might exist within the framework of social cognitive theory by exploring the relationships among online support self-efficacy and outcome expectations as predictors of support-seeking activities, online support reliance, online support network size, and perceptions of general social support in a computer online environment. They believe that individuals with high levels of online support for self-efficacy, and positive expectations for online interactions, should engage more in online support seeking and interactions (Eastin & LaRose, 2005). As well, Lehtinen (2003) outlines the progression in the popularity of using the computer as a learning aid in what he terms "computer-aided instruction". He claims that the use of technology in education started with the solo-learner model that stems from the desire to individualize teaching based on the individual student. However, a worry existed that there would be a threat to social interaction through the use of a computer. He states that the goal now is to provide students with an adequately functioning computer assisted

learning environment, but also to acknowledge that communication and collaboration are also important aspects. As well, Crook (1994) has analyzed computers facilitating collaborative learning in that computers offer what Crook calls "points of shared reference". Computers offer tools to focus a group's attention on mutually shared objects to join them socially in a task. But how is attention mutually focused and are supports needed to guide students in their learning process? These ideas will be examined in the following section.

Computer Supported Collaborative Learning

Computer supported collaborative learning (CSCL) is an emergent area of research comprised of a collection of methodologies, theoretical and operational definitions, and multiple structures (Hadwin, Gress, Page & Ross, 2005). A CSCL environment includes multiple collaborative models of learning based on socio-constructivist perspectives to assist the construction of knowledge acquisition through interactive software tools (Koschmann, 2001; Salovaara & Järvelä, 2003). Collaboration in this context can appear in many differing forms delivered by varying computer technologies. CSCL can be unstructured whereby allowing students to explore learning in their own way, or they can be structured and scripted to aid in collaboration of the students (O'Donnell & King, 1999). One way to structure CSCL is through roles, scripts and prompts. This structure not only helps learners in their own learning process, but also helps the group in the collaborative process.

Roles, Scripts and Prompts

Learning and motivation can be improved when students work together; however, research has shown that just putting these individuals into groups to collaborate is not

enough (Kester & Paas, 2005; Morris, Church, Hadwin, Gress & Winne, 2007; O'Donnell & King, 1999; Weinberger, Ertl, Fischer & Mandl, 2005). Hadwin, Gress, Page and Ross (2005) found that there are a lack of tools to support the collaborative process in the computer supported collaborative learning literature. As well, when learners were provided with chat tools, they were also provided little direction of how to interact with their collaborative peers. To offer a potential solution to this problem, the present study utilizes gChat (a text-based online chat tool) to provide students with built in roles, scripts and prompts needed to further their collaborative experience as these are built into the chat template. The following section will examine the belief that collaborative supports in the gChat collaborative tool will aid in student guidance and participation in the online collaborative learning environment.

Roles

Roles are prescribed functions that guide individual learning behaviour and group collaboration (Slavin, 1999). Roles help guide learning by structuring tasks and collaboration. Roles provide a scaffold of the learning process for students to learn and collaborate in an academic setting with greater ease (O'Donnell, Hmelo & Erkens, 2005). Functional and cognitive roles may be important to the success of collaboration in the classroom and can easily be applied to CSCL.

Roles such as reciprocal teaching and scripted cooperation have the goal of aiding knowledge gained from text (Chinn, O'Donnell & Jinks, 2002; O'Donnell, 1999). This type of structured collaboration engages cognitive elaboration where students take on cognitive roles and scripts in pairs within a structured environment to work on a task

(O'Donnell, 1999). O'Donnell's structure involves cognitive activities and the recognition that scripts may need to be modified for the task.

On the other hand, Palinscar and Brown (1984) have also extensively examined structure in a learning environment through reciprocal teaching. Their cognitive supports have focused on aiding reading comprehension and promoting discourse skills in the learning process. Reciprocal teaching is a model where student's mental processes aid in metacognitive skills and facilitate reading comprehension (Palinscar & Brown, 1984). In reciprocal teaching the roles consist of: a summarizer who is responsible for synthesizing text; a questioner who asks questions to guide comprehension; a predictor who hypothesizes what will happen in the text; a clarifier who tries to clear up a lack of understanding in the text (Palinscar & Brown, 1984). This type of structure lends itself well to the design of CSCL environments. Chou, Lin and Chan (2002) used computational supports for reciprocal teaching by using a computer to fill a collaborative role with another student. The students take turns in the cognitive role of tutor and tutee with the four reciprocal teaching roles. A virtual participant, 'learning companion', was used to scaffold the tutoring. They found that this use of reciprocal teaching was almost as effective as learning with a teacher because the students' comprehension increased. It is hard to say however, what the results would be if the roles came from other children in the media and not a computer tool. In another study, Strijbos, Martens, Jochems & Broers (2004) studied the effect of roles on group efficiency during CSCL. They found that the students in the role condition were more aware of their efficiency and increased in group coordination when compared to groups that were in the non-role condition of the study. Finally, Burton, Brna and Pilkington (2000) examined dialogue and roles associated with

the dialogue. They had a structured situation and free collaboration. The structured role situation appeared to benefit students more than free collaboration. These studies demonstrate that past CSCL research has utilized roles for structured collaboration; however, the impact of different roles needs of more research.

Scripts and Prompts

While roles do help aid in student learning, sometimes students need further structure to feel secure in collaborating on a task. When a task is too demanding, additional scaffold structure may be needed. This can occur in the form of scripts and prompts. A computer can provide scripts and prompts to support the student's role. Scripts are instructions of how group members should collaborate in their role. Scripts can provide a sequence of collaboration through instructions that are an extension of the roles. However, some literature suggests that scripts are perhaps too structured and possibly impede learner's ability to formulate ideas for them selves (Weinberger et al., 2005). More research is needed in this area to draw firm conclusions. An extension of scripts is prompts. Prompts are suggestions that guide carrying out and directing the role. They are sentence openers that facilitate scripts (Weinberger et al., 2005). An example of a prompt would be, "let's discuss…" or "can you tell me more about…"

In the CSCL literature, scripts and prompts are not always clearly defined. Many studies have focused on integrating scripts and prompts into structured collaboration of the CSCL software tools. Beers, Boshuizen, Kirschner and Gijselaer's (2005) study examined the optimal degree of structure in scripts. They used scripts to support complex problem solving in a CSCL environment that created a common learning ground

among collaborators. They found that the higher the coerciveness of the scripts, then the more the participants followed the structure.

Structured and Non Structured Collaboration

Negative social and cognitive processes in a group can take away from the benefits of the interaction. Participants reported feeling social anxiety when asked to work in a group; however, O'Donnell, Dansereau, Hall & Rocklin (1987) showed that unstructured pairs reported higher levels of social anxiety than the structured pairs. When there is no social or cognitive structure provided, participants must organize the collaboration themselves which can lead to negative social processes (O'Donnell et al., 1987).

CSCL Measurement

With the prevalence of the internet and computers in the classroom, computers are increasingly being used to aid student learning and collaborative activities. Computers have the potential to: (a) represent problems more realistically, (b) allow difficult work on problem solving to be displayed in steps, and (c) provide immediate feedback for monitoring and evaluating student progress (Baker & Mayer, 1999; Baker & O'Neil, 2002; Schacter, Herl, Chung, Dennis, & O'Neil, 1999). Not surprisingly, the increased prevalence of computers and their use for collaboration has created new directions for research in the field of educational psychology and beyond (Hadwin, Winne, & Nesbit, 2005). One area in particular is measurement. In collaborative tasks, individual and shared processes and outcomes are often of interest to the teacher and researcher.

A continuing goal in CSCL research is to develop and examine multiple methods of facilitating and supporting individual and co-construction of knowledge. CSCL

research also measures academic product through innovative and interactive software tools that help self and group learning processes and products through cueing, prompting, coaching and providing interactive tools with feedback (Hadwin, Gress, Page & Ross, 2005; Kirschner, Strijbos, Kreijns, & Beers, 2004; Koschmann, 2001; Lehtinen, 2003; Salovaara & Järvelä, 2003). There are challenges in this area of research. The first challenge is a lack of a conventional set of reporting standards and common vocabulary among researchers. Hadwin et al. (2005) identified great disparities in the reporting of collaborative definitions, models, tools, tasks, and measures (Hadwin et al., 2005). Studies often omitted information about learners that was important for: (a) interpreting findings about the effectiveness of CSCL tools and environments and (b) gaining insight into CSCL measurement.

The second challenge is the measurement of collaboration, more specifically, the development of valid and reliable instruments for evaluating the effectiveness of these tools for enhancing individual and group learning processes and outcomes. Areas lacking in measurement of collaboration include: (a) the steps taken in the pre-collaboration process such as readiness to collaborate, (b) the collaborative process in terms of what students are doing and how they are interacting with each other and (c) the product produced by the collaborative process (Gress, Fior, Hadwin, & Winne, in press). There is also a lack of knowing what structure to use and to what degree. Currently, CSCL research is also lacking a well developed approach in examining the process of collaborative learning with respect to groups acting as a whole rather than individuals within a group. Hathorn and Ingram (2002) suggest that there is an over reliance on data that focuses on individual outcomes rather than exploring and examining differences in

the collaborative process. To add to the lack of research data, there is also a scarcity of research instruments that consider individual differences associated with collaborative engagement such as prior knowledge about collaboration, comfort with the technologies, and self-efficacy for collaborative engagement. Future research needs to explore more how the individual functions within the group, rather than because of the group, and focus on how the group functions as a whole unit. Furthermore, literature is lacking in terms of groups larger than two individuals. This is because groups of four are harder to create in research contexts (Oshige & Hadwin, 2006) yet these groups commonly exist in classroom face-to-face educational collaboration.

CSCL Data Collection

CSCL greatly aids studying learning processes in the context of computer supported collaborative learning environments by affording opportunities to collect data about specific features. Two main collaborative features of data collected include: (a) written communication through a conversation history between the group members in the form of chat logs (Lehtinen, 2003), and (b) information about movements made within the computer environment in the form of log files.

A benefit of chat log data is that the process of collaboration can be examined more thoroughly. MacDonald (2003) discussed the importance of process versus product when measuring collaboration with the use of a computer. Using a computer for analyzing data allows the process to be reported more easily because it records the process data at that point in time rather than trying to report the process after the product stage. This is detrimental because the individual may report poorly based on their memory of the process. However, the computer can capture and record the moments and

movements as they progress (MacDonald, 2003). It is important that the collaboration of the CSCL be captured. The way this is done is through the use of chat logs.

Chat logs: CSCL software allows "researchers the opportunity to study detailed aspects of group processes and products, including discourse patterns that facilitate and derail progress, how groups identify and adjust goals, interim products, and many other variables that have previously been difficult to capture and correlate across the time line of group work" (Hadwin, Winne & Nesbit, 2005). This can be obtained through the use of chat logs. Chat logs are the recorded history of written communication between group members. Analyzing chat log data provides information for researching how the individuals are interacting with each other. Chat logs provide rich data such as frequency of postings, idea units formed and use of prompts to lead collaboration that are all signs of collaborative participation (Orvis, Wisher, Bonk & Olsen, 2002; Linn & Slotta, 2006).

Collaborative Participation

An important component of the process of learning is in terms of active participation within the CSCL environment. Participation can reflect the level of engagement between the other members of the group, as well as the degree of engagement of each individual. Individuals and teachers report higher motivation in individuals participating in discussions (Orvis et al., 2002). Decisions that are made for expectations of contributions in the collaborative context can increase the cohesion of a group (Linn & Slotta, 2006). Gonzalez et al., (2003) believe that when distance collaboration groups are involved in tasks that require high interdependence and cohesiveness, they should improve the communication processes.

It is also known that the presence of others can be motivating. When there are others present, then people tend to become more productive which is termed *social facilitation* (Wiley & Bailey, 2006). As well on the other hand, tasks where there is more than one person, there is the risk that not all individuals will participate which is termed *social loafing* (if more than one person is responsible for a task, then they contribute less because they feel less motivated and involved) (Wiley & Bailey, 2006). With this in mind, it is important to look at ways of measuring participation to determine social facilitation and social loafing.

There are many ways of measuring collaborative participation and many factors that comprise a participation measure. A frequency outcome will not show the varying interest of the individual to collaborate. For example, perhaps a student participates frequently in the beginning, loses attention, and then posts less frequently at the end. However, examination of these patterns of participation is lacking in the literature. As well, Strijbos et al. (2004) state that surface level methods of frequency posting provide rough analysis of communication that is occurring. They believe it is important that the communication undergoes content analysis to determine why one student contributes more or is more influential in a group.

More common ways to measure participation in the CSCL literature include number of postings, number of words, number of idea units (on-task quality postings), number of times a prompt was selected, time frequencies (length of time of posts) and number of threads started (Dewlyanti, Brand-Gruwel & Jochems, 2005; Guzdial & Turns, 2000; Kester & Paas, 2005; Rummel & Spada, 2005; Linn & Slotta, 2006). Specifically, quality of contributions can be coded in terms of the quality of comments in the

discussion and the ability of the participants to stay with their assigned role (Linn & Slotta, 2006). Strijbos et al. (2004) state that participation has been measured by the number of messages sent and that the mean number of words in a message can be positively related to the quality of that message's content; however, this is not always the best or most in depth way to measure. Frequency of postings and number of idea units for on-task postings appear to be the most prevalent in the literature due to their ability to offer a comprehensive representation of engagement in the computer collaborative task (Linn & Slotta, 2006). Basic participation in terms of submissions in chat is more commonly measured than quality or depth of chat logs. Quality of chat logs has been measured in terms of on and off task chat (Lazonder, Wilhelm & Ootes, 2003; Orvis et al., 2002; Saab et al., 2005), number of words per posting (Strijbos et al., 2004) and number of idea units (Bernard, 2001). However, recently Sins, Van Joolingen, Savelsbergh and Hout-Wolters (2008) have used cognitive process as a measure for student chat participation. They measured the type of cognitive process reference made by the students during the chat in the categories of evaluate, explain, quantify, inductive reasoning, analyze and off task.

The Link Between Efficacy and Collaborative Learning

It has been argued that students who require confidence in skills that are lacking are less likely to engage in tasks where those skills are required (Schunk & Pajares, 2004). Students may feel that they lack the ability and therefore engage less in the collaborative process of a learning task. As well, students who are high in self-efficacy are believed to participate more readily in a task (Shunk & Pajares, 2004) and engage

more frequently in the learning process. These issues will be further examined in the self and collective efficacy section of this literature review.

Self-efficacy studies have been conducted in many contexts; however, few have studied self-efficacy and group performance (Alavi & McCormick, in press; McClough & Rogelberg, 2003). Self-efficacy for team interaction is an individual's perception of their capabilities to work effectively within a group (Alavi & McCormick, in press; Eby & Dobbins, 1997). Eby and Dobbins (1997) proposed that individuals with high self-efficacy for teamwork would more likely prefer to work with others than alone. Alavi and McCormick (in press) believe that self-efficacy for group work may influence an individual's preference for working in a group. If efficacy influences individual learning where low efficacy results in a lower performance rate, then it would make sense that it would influence participation and performance in a collaborative learning context. In addition, the amount of support might moderate the effects of self-efficacy and participation.

Self-efficacy influences performance in individual learning tasks. Students who perceive themselves as efficacious are more likely to engage, expend effort and persist in tasks. A person may choose not to work with a group in order to avoid failure based on their lack of personal capabilities for the teamwork (Alavi & McCormick, in press). These ideas of efficacy and the group will be further examined in the following sections.

Efficacy

Self-efficacy is an area studied in education due to Bandura and Zimmerman. They have stated that a student's beliefs in their efficacy for self regulated learning influence their perceived self-efficacy for the student's academic achievement. This then

influences the academic goals the individual sets for themselves and for their academic achievement (Zimmerman, Bandura & Martinez-Pons, 1992). As well, with higher levels of self-efficacy, individuals feel more comfortable with their task, become more engaged with the task, and are more willing to continue their task even when there are challenges (Pescosolido, 2003). Group efficacy may have some similar effects upon an individual's participation within the group. It is believe that group efficacy determines what people do in a group, how much effort they will put into it and what they will do if efforts start to fail (Pescosolido, 2003). Self-efficacy and academic performance is that individuals with higher self-efficacy set higher goals for themselves and engage in self-regulation of their own learning to achieve their goals (Zimmerman, Bandura & Martinez-Pons, 1992). These ideas will be further examined in greater detail in the following sections.

Self-Efficacy

As was previously stated, learning via distance education, e-learning and email is becoming more prevalent (Shunk & Pajares, 2004). Shunk and Pajares (2004) suggest that future research should examine the hypothesis that students who do not feel confident about learning in traditional environments may feel less efficacious learning in technology or vice versa. As well, they state that more research is required to explain and clarify how self-efficacy for learning changes as students gain experience with technology, and if self-efficacy for learning using technology can predict motivation and learning in students. Future research should focus on the areas of self-efficacy and collective efficacy in CSCL environments.

Bandura's social learning theory defines self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated

types of performances" (Bandura, 1986). Students with high self-efficacy are believed to be more competent at completing a task, participate more readily and will work longer at a task in order to perform better (Shunk & Pajares, 2004). Bandura proposes that self-efficacy appraisal happens when people judge their personal (past performance), environmental (assessing the environment and task) and behavioural factors (effort and others helping). Self-efficacy research is a part of education because learning is a socially based activity (Englert & Mariage, 2003). Bandura has proposed that groupings in schools can influence self-efficacy because skills develop at differing rates and students may not enjoy the group to which they were assigned (Bandura, 1986). As well, teachers and peers offer influence over the development of self-efficacy where a teacher can provide encouragement in having to obtain certain skills. This could have positive or negative effects on students (Bandura, 1986).

Self-efficacy can be used to asses how well self-efficacy judgments relate to actual performance on a task (calibration). If a person can accurately make a judgment call about their task performance, these individuals are believed to be well calibrated (Pajares & Kranzler, 1995). This corresponds to measuring self-efficacy which has proven to be situationally based in nature (Bandura, 2001) and will be discussed further in a subsequent section.

Collective Efficacy

It has been stated previously that self-efficacy in education is important because humans are social beings and education is a social process. "People do not live their lives in social isolation" (Bandura, 1985, p.449). Self-efficacy can cover the beliefs of an individual's ability to perform in a group, but what about the perceived efficacy of the

group to perform? A group member's appraisal of the group can be highly influenced by their self-efficacy (Alavi & McCormick, in press; Bandura, 1997). Bandura (2006) states that collective efficacy exists in the minds of group members and that social activity is a group of people acting in shared way with common goals or beliefs. Bandura divides his concept of collective efficacy into two constructs for measurement: (a) a collection of individual's appraisals of their group to perform, or (b) a combined collection of members appraisals of their groups ability to perform as a whole (Bandura, 2006). Perceived collective efficacy could also be measured by having the group arrive at one single judgment call of an estimate of efficacy; however, this is problematic because rarely will all individuals agree on the score (Bandura, 2006).

Many studies adapt their own collective efficacy measures as is seen in Gonzalez et al. (2003) where they created an adapted collective efficacy measure from Guzzo, Yost, Campbell, and Shea's (1993) eight-item group potency measure. The authors argue that group potency is relevant because it is considered to be task general and not task specific, so that collective efficacy was measured here with respect to the specific ''group case'' task. This raises two points: 1) collective measures are generally adapted from other measures, and 2) collective efficacy can be found under other titles such as group potency.

Little and Madigan (1997) found that perceived collective efficacy is a strong predictor of group effectiveness. They observed that when members of a group share a sense of collective efficacy, this has a mediating and facilitating effect on the group effectiveness. Goddard, Hoy and Hoy (2004) found a strong correlation between a teacher's sense of personal efficacy and their perceived collective efficacy within their

group of colleagues. Their study showed that the choices teachers make are strongly influenced by their collective efficacy beliefs. Overall, the concept of collective efficacy appears to be useful in explaining individual cognition in group situations, but the extent to which this concept is pertinent to explaining group motivation in collaborative and shared learning settings still needs to be established.

Efficacy Measurement

While efficacy is widely researched, the development of one ”catch-all” tool to measure the construct does not exist. Efficacy is situationally based. Bandura (2006) states that using a ”one-measure-fits-all” approach is limiting because the items may have no relevance to the domain of functioning. Global measures generally have ambiguity about what is being measured, the kind of task and the situation context. When creating efficacy scales, it is important consider: (a) the selected domain of functioning (what is the situation), (b) the level of challenge in the task (who are you targeting), (c) the reading level of the participants (participants must be able to understand the text), and (d) the number of available response points (scales that use a few response points (10 point) because people generally avoid the extremes). As well, assessments that use activity domains, situational context and social aspects reveal a better representation of the individual’s overall efficacy beliefs (Bandura, 2001). In addition, Bandura (2006) provided a list of suggestions for creating efficacy scales including: testing the items and selecting a name for the inventory that does not use the word ”self-efficacy”. As a result of efficacy scales being situational, domain and task dependent, the scales vary widely in their compostion.

Bandura (2006) proposes that being in a social situation means individual's perceptions of personal efficacy are not detached from the other's activities. This implies that self and collective efficacy should be measured prior to the collaboration. As well, Bandura uses many athletic examples. Collective efficacy is based very much in sport pyschology of bonding with your team and the belief that your team can succeed.

Self-Efficacy Scales

There are many self-efficacy scales that have been developed; however, for the purpose of this study, self-efficacy scales measuring an academic task in a group setting are to be used. The pattern of adaptive learning survey (PALS) is based on a 5 point likert scale (1- not true of me, 5- very true of me) that measures student's perceptions of their academic efficacy with a 6 item measure with an internal consistency of .86. Examples of the items include "even if the work in school is hard, I can learn it" and "I'm certain I can figure out how to do the most difficult school work". As well, a scale developed by Bandura and Gardner looks at multiple intelligence in self-efficacy on a 69 item 10 point scale (0- I cannot do, 10- certain I can do). Examples of questions include "Get the main ideas from a text" and "Write with grammatical accuracy". As Bandura states, self-efficacy measurement is largely dependent on the task or situation at hand (Bandura, 2001).

Alavi and McCormick (in press) examined self-efficacy in an academic group setting context where self-efficacy for group work was operationalized as a group member's appraisal of his or her capabilities to participate in a group activity for performing a task. The scale he developed is a 20 question self-efficacy for group work scale. 10 items were chosen for this study that loaded on student's efficacy beliefs in

exchanging, evaluating and integrating ideas and in relation to the collective efficacy items. An 11-point scale ranging from 0 (not confident at all) to 100 (completely confident) was used. The measure was tested on 270 university students. The measurement produced an alpha of .95 (see Appendix D). Examples of efficacy statements included in this measure are "I can give feedback to other group members about my understanding of their ideas" and "I can productively help other group members improve their ideas".

Collective Efficacy Measure

Lent, Schmidt and Schmidt (2006) tested the collective efficacy of students working in teams and related it to team cohesion and personal efficacy. They found that consistent with the social cognitive theory, collective efficacy was a stronger predictor of team performance than each team member's individual self-efficacy. Collective efficacy was measured using 18 items where students rated their confidence in their teams's capabilities on a 10-point scale (0 no confidence, 10 very confident). The items included questions such as, "work well together even in challenging situations" and "adapt to changes in group tasks or goals" (Lent, Schmidt & Schmidt, 2006). A limitation of this scale is that it focuses more on the group as a whole, rather than on the individual's perceptions of the group. Scales on collective efficacy are most frequently found in the sport literature. Paskevich, Brawley, Dorsch and Widmeyer (1999) used a scale to measure collective efficacy of a volleyball team that consisted of ability to: (a) perform, offensively and defensively (b) communicate and (c) remain motivated. Similarly, Short, Sullivan and Feltz (2005) used a 20-item, 10-point scale (0 not confident, 10 confident)

that assessed efficacy to: (a) resolve conflicts, (b) overcome distactions, and (c) maintain effective communication.

Alavi (2005) examined collective efficacy in an academic group setting context. The scale he developed for his dissertation is a 10 question collective efficacy for group work scale. An 11-point scale ranging from 0 (not confident at all) to 100 (completely confident) was used. The measure was tested on 270 university students. The measurement produced an alpha of .94 (see Appendix E). Examples of efficacy ststements included in this measure are "we can constructively discuss addressing the key issues of the group project" and "the group can identify key issues of the group discussion".

Summary

In online courses, many students feel unmotivated to complete their studies. Simply providing information to the students and assuming they are learning is not enough to ensure learning actually occurs. Many students are not strategic learners and lack the skills to learn successfully (King, 2003). Collaborative partners or groups can help with the online learning process, but as with giving students learning material and expecting them to learn, you cannot place learners in groups and expect that to help with the learning process (Kester & Paas, 2005; O'Donnell & Dansereau, 2000; Weinberger, Ertl, Fischer, & Mandl, 2005). The CSCL literature suggests that collaborative learning is improved when it becomes more structured because it guides learning (Weinberger et al., 2005). Outside support has been shown to guide knowledge building activities in learning groups within collaborative settings (Pata, Lehtinen & Sarapuu, 2006) However, little research examines the effectiveness of supports for productive collaboration and

participation in computer supported collaborative environments (Hadwin, Winne & Nesbit, 2005). This study ran a content task while measuring self-efficacy for group work and collective efficacy of students in an online collaborative learning activity. Drawing on O'Donnell's (1999) and Palinscar and Brown's (1984) use of roles, scripts and prompts to support collaboration, this study guides the collaborative process of how and when to collaborate in reciprocal teaching roles to help all individuals in the group excel on a content task. The intervention offers a structured support to provide a possible solution for improving self and collective efficacy in a collaborative learning activity. Using both quantitative and qualitative data will help to extensively examine the effectiveness of the intervention provided to the participants to see if there is an increase in participation rates among the students.

The purpose of the proposed study is twofold: (a) to examine if there is a relationship between efficacy and participation rate in a collaborative task, and (b) to examine if the relationship between efficacy and participation rate is moderated by collaborative support. It is hypothesized that: (a) there is a relationship between efficacy and participation rate in a collaborative task where efficacy is a predictor of participation, and (b) the relationship between efficacy and participation rate is moderated by collaborative support.

The above literature review shaped the research of the preceding sections of this thesis.

Chapter 3

Methods

Overview

This thesis research was conducted in the context of a larger study comprising a SSHRC funded research study and two Masters theses. Data for all three projects were collected simultaneously. In order to ensure that this study can be replicated by other researchers, and also to highlight time and other constraints that existed, the methods section describes all data that was collected across the studies. Instruments that are not part of this thesis study are not described in detail and are clearly marked with [square brackets].

Participants

Participants included 62 grade 10 students (an additional 8 for pilot testing) from one of three high schools in the Saanich School District 63 including: (a) 62 participants from a typical high school (Parkland Secondary), (b) 4 pilot participants from an alternative Individual Learning Centre (ILC), and (c) 4 pilot participants from an alternative distance education high school named South Island Distance Education School (SIDES).

Criteria for inclusion in study. The convenience sample was recruited from three grade 10 classrooms at Parkland High School. All three classes were a Planning 10 course which is a required class for British Columbia students to teach them about real life situations, such as career selection and drug awareness that do not fall into the general academic course load. The Planning 10 course was chosen because the

collaborative learning activity on drug awareness is directly related to the prescribed learning outcomes in the course (see Table 1).

Table 1

Fit Between Prescribed Learning Outcomes and Instructional Tasks

Instructional Task	Prescribed Learning Outcome
Collaborate with peers	Planning 10: students will interact and collaborate with others to explore ideas and to accomplish goals.
Examine crystal meth use	Planning 10: students will analyze strategies for preventing substance misuse.

Note. Prescribed learning outcomes from the Ministry of Education website.

Assignment to instructional conditions. Participants were divided into two instructional conditions: (a) structured chat that provides students with a chat tool enhanced with reciprocal teaching roles, scripts and prompts to structure participation in the text chat, and (b) unstructured chat that provides students with a regular text-based chat tool. Participants who consented to participate were assigned to random groups of four by the researchers. Groups within each classroom were randomly assigned to one of two instructional conditions so that approximately half the groups in each class were assigned to each condition (31 participants per condition). It is important to note that due to an unforeseen drop in attendance for session two, some of the groups were made into group of three (2) and some groups of five (2). During this time for the structured condition, the predictor role was dropped for the groups of three and the questioner role was added to the groups of five.

Research Context

Instructional context. Participants were assigned the task of reading and understanding a challenging text on drug awareness and crystal methamphetamine use. Task instructions for the students can be found in Appendix A (for the structured group)

and Appendix B (for the unstructured group). Participants read and worked through the text first on their own (Session one) and then later in their collaborative groups (Session two).

Instructional value of exercise. In Planning grade 10 a learning outcome is that students collaborate with each other to accomplish learning goals to "collaborate to get things done and to value and support others" (Ministry of Education website). With Planning 10, the subject matter of the experimental article that students read is within the curriculum where "students are to analyze strategies for preventing substance misuse" (Ministry of Education website). Therefore, students in Planning 10 were recruited for this study as part of their school curriculum. The instructional task, reading materials and collaborative activities, were selected in accordance with the Prescribed Learning Outcomes as indicated in Table 1. This adds to the ecological validity of the study because students are working with authentic text and tasks.

Instructional text. The instructional text focused on drug awareness for crystal methamphetamine (also known as crystal meth) use. This text, titled *Crystal Methamphetamine Use*, was created by the members of the research team (Church, Fior and Morris, 2006) based on information gathered from Logan (2002), Weir (2000) and Meredith, Jaffe, Ang-Lee & Saxon (2005). The text was read by a PhD student in the neuropsychology program at the University of Victoria, and the president of the Victoria Crystal Methamphetamine Task force for content accuracy. The text was comprised of five sections including: (a) an introduction, and sections on: (b) neurological effects; (c) the combined effects of crystal meth, alcohol, and other drugs; (d) social issues; (e) and prevention. The length of the text was 3,300 words with 650 to 750 words per section.

The overall difficulty and readability level of the text was found to be at a grade 13 level calculated on each of the five sections of text. This was calculated using the Fry's readability graph (John Wiley & Sons, 2006). This level was determined by graphing the average amount of syllables per 100 words in a section by the average amount of sentences per 100 words in a section. Each section, besides the introduction, is a self-contained unit and therefore can be read in any order. Due to the time constraints of the study, only the introduction and two of the four sections were read. This decision was based on asking the three teachers which sections they would most like to be used in the study to benefit their instruction and students. The introduction served as a demonstration tool for the researchers and a practice for the participants in the gStudy software environment (described in full detail in a following section). The two text sections used in the study were neurological effects and social issues. A copy of the text can be found in Appendix C. As well, due to time constraints during collaboration for session two, only the neurological effects text was used for the collaborative discussion; however the presence of the social text at session one is still important for the larger context of the other studies.

Presentation of Text. Due to the nature of this study, it is important to note that all applications of collaborating and reading the text took place in an electronic software program called gStudy. gStudy is an educational research tool developed by researchers of the Learning Kit Project (Winne, Nesbit, Hadwin, Lajoie, Azevedo, & Perry, 2006). The text was presented in gStudy in much the same way that a textbook passage would be presented on a webpage. gStudy encourages users to interactively engage with the multimedia information in order to learn, apply, or transfer that information. The text

was presented one section at a time (see Figure 1). Access to the other texts was obtained by either clicking on a link at the bottom of each page that took the student to a previous text, or forward to a future text. As well, the student had access to a table of contents along the left side of the screen that allowed them to click on the text topic they wished to access. Students were asked to read the text, and to highlight and label parts of the text as: “important” or “don’t understand” in preparation for their collaborative discussion. [Data about labeling is not part of this study.]

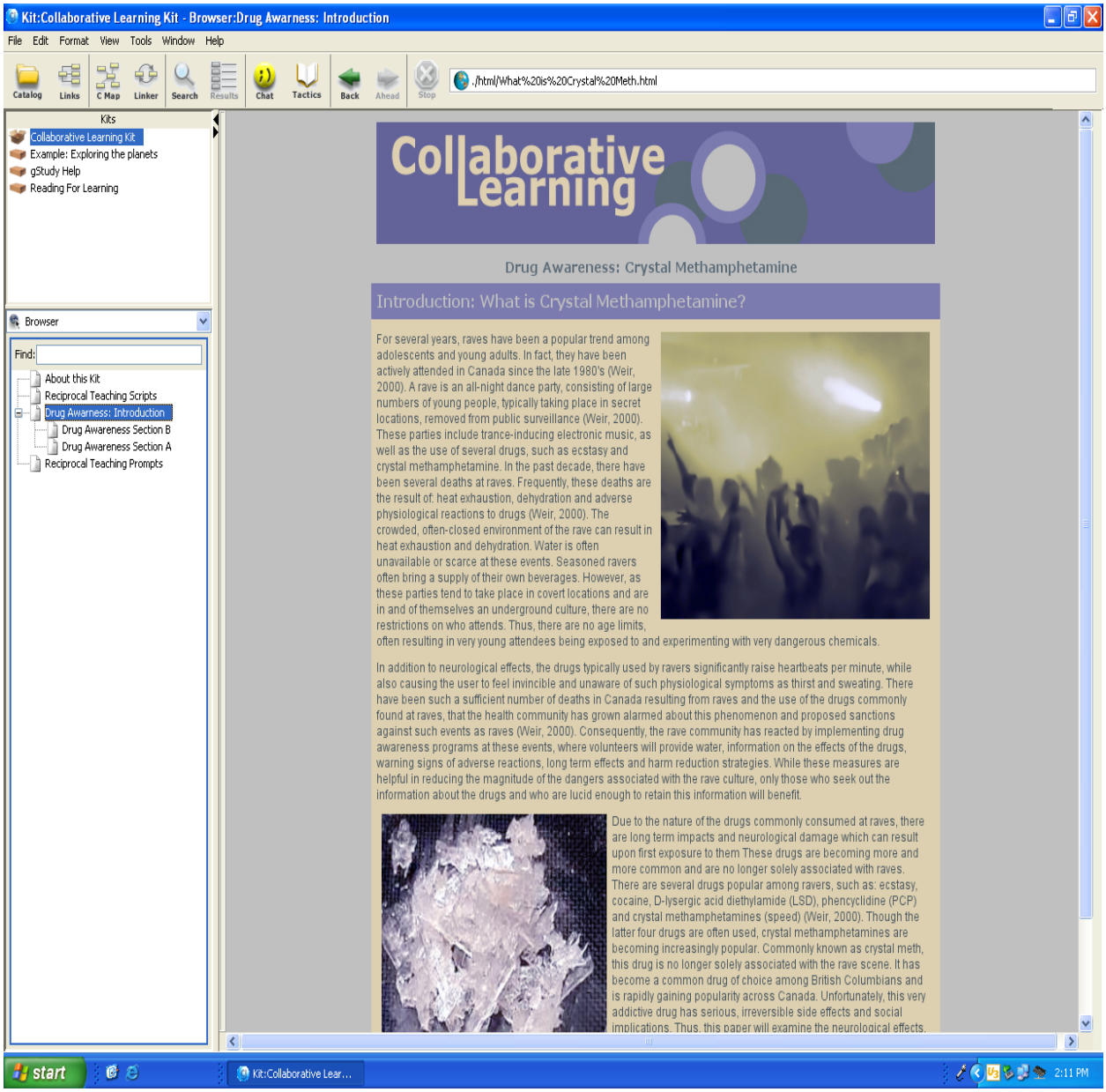


Figure 1. Section of the instructional text embedded in *gStudy.*

Collaborative Software. The participants completed all aspects of this study using a computer. The following section describes the three main computer software tools participants utilized in this study: (a) WebQuestionnaire, (b) gStudy, and (c) gChat.

(a) Web Questionnaire. This web-based software tool is an authoring tool for developing and administering online questionnaires (version 1.0). WebQuestionnaire

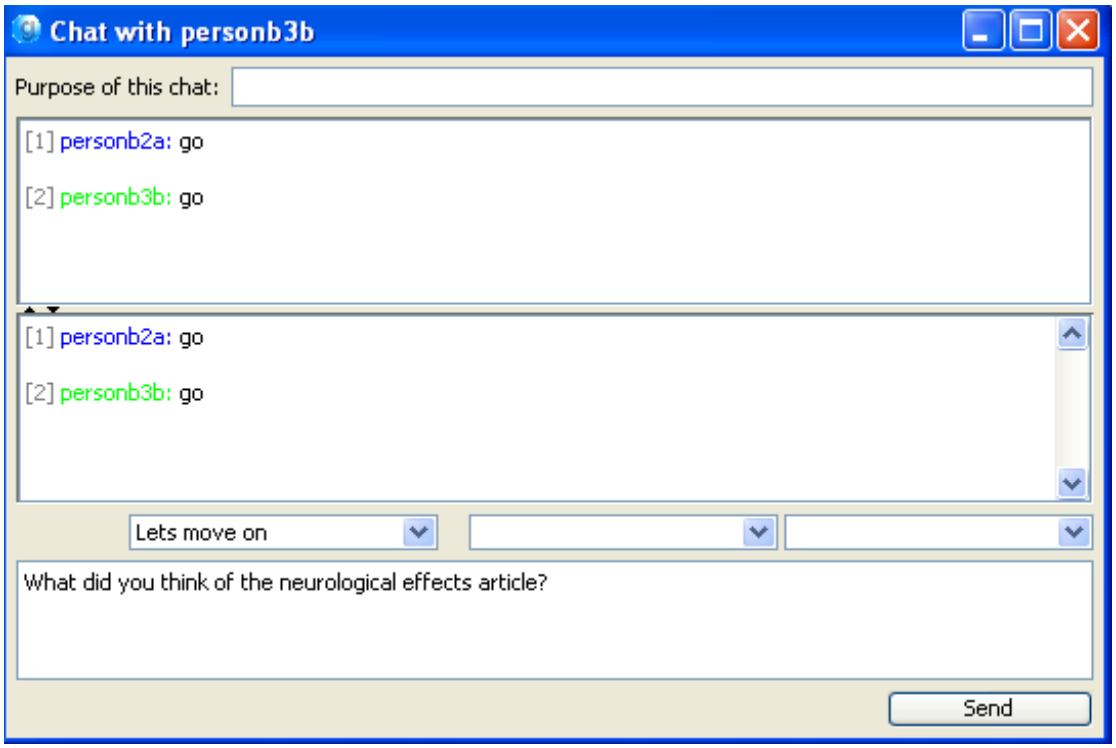
(Hadwin, Winne, Murphy, Walker, & Rather, 2005) that opens in an internet browser with a login page. After logging in, participants access a list of instruments to be completed. Clicking on an instrument opens it along with instructions for completing the instrument. After submitting data through WebQuestionnaire, researchers can access data and download it to an excel spreadsheet.

(b) gStudy. gStudy (Winne, Hadwin, Nesbit, Kumar, & Beaudoin, 2005) is an educational research software tool. gStudy was developed by educators and researchers to help students learn while researching student learning. gStudy supports a learners' interactive engagement in multimedia using the learning kit to learn, apply and transfer that information to new situations (Learning Kit website). gStudy is comprised of an outer software shell (gStudy interface) for presenting multimedia instructional materials (learning kits) and a collection of interactive learning tools such as a tool for highlighting/labeling segments of text, and a chat tool (gChat described below). Other tools such as note taking templates, glossary notes, and concept mapping were not be used in this study. Multimedia information is presented through a browser much like a web page. Students navigate by clicking on hyperlinks and scrolling text.

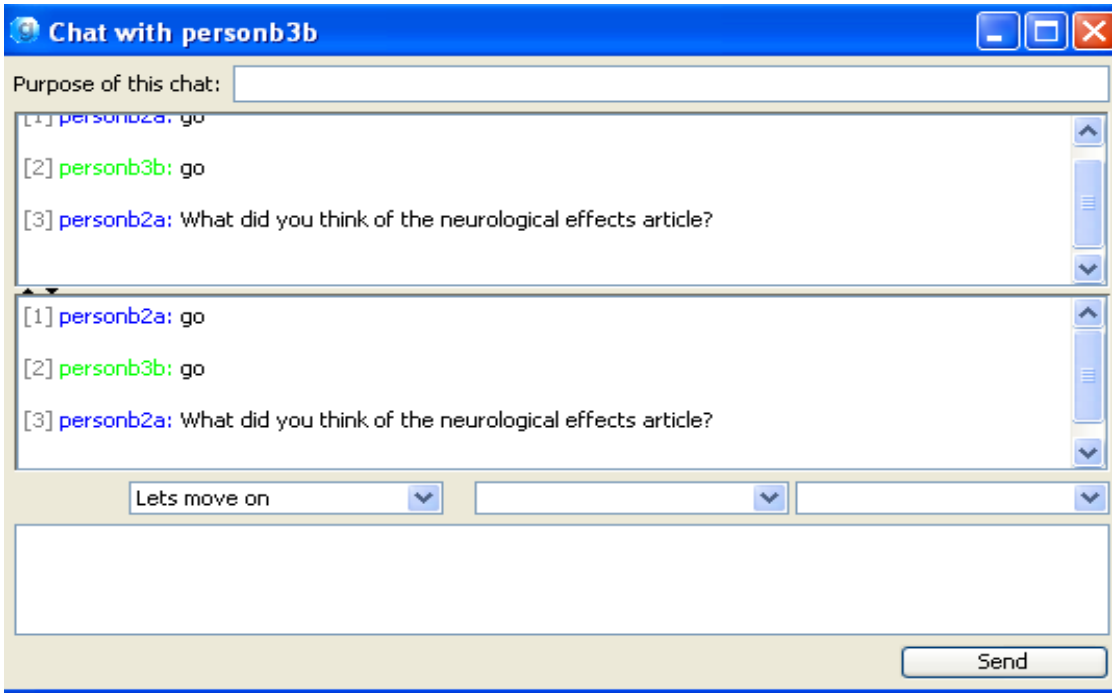
(c) gChat. Embedded within gStudy is a text-based chat tool called gChat (Hadwin, Gress, Winne, & Jordanov, 2006). gChat allows multiple users to chat synchronously or "in real time." Utterances are typed with the keyboard, rather than spoken. gChat works much like other text-based chat tools such as MSN Messenger, AIM or Skype text chat. A participant can click on the gChat icon embedded in the gStudy interface and be instantly connected to friends, and other students, online. The participants can click on a name and select to have a one-on-one chat with that individual, or they can

select the multi-user chat function to chat with a few individuals simultaneously. The basic functions of chat work the same whether chat takes place between two individuals or a number of individuals. Once the participant clicks on their friend's name to talk to their friend, a chat window text box opens. Messages are composed in one area of the split screen (two text boxes) seen by the participant that include: (a) the upper box records an on going record of the chat that occurs between the chatting individuals (see Figure 2a), while (b) the lower box records what is currently being typed to be submitted to the online discussion (see Figure 2b). In addition, the upper text box can be split so that participants can scroll to find previous chat text while watching the text development of the current text chat (see Figure 2c). Thus, participants have a private area to compose their text-based response and a public area to share and view the chat.

a. A gChat text message being input into the lower text-based chat box.



b. The text message input into the upper text-based box.



c. Split screen to preview earlier chats while still chatting.

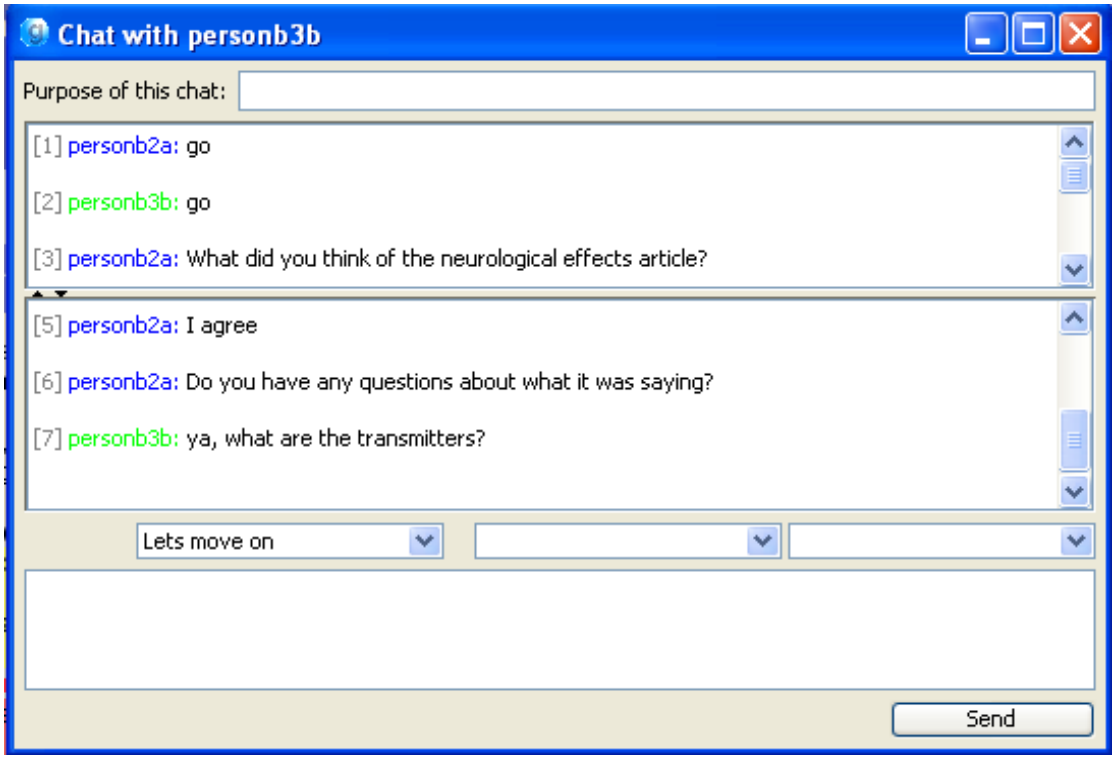


Figure 2. A gChat text message in gStudy input into the lower text-based chat box (a), input into the upper text-based box (b), split screen to preview earlier chats while still chatting (c).

However, gChat also has tools that extend beyond conventional text-based chat tools like AIM or MSN messenger. gChat is augmented with tools to support students in taking different cognitive roles during a chat. In other words, it provides some structure and cues to scaffold collaborative work. In the structured chat condition, participants were asked to select a particular cognitive role (e.g. summarizer) and then gain access to prompts or sentence starters in a drop-down box under the heading of their role in order to help start their sentence in their collaborative role (see Figure 3). The prompts are situated in a drop down menu found within the gChat tool interface in the multi-user chat (see Figure 3a, Figure 3b and Figure 3c). When participants click on these question stems and sentence starters, they automatically populate the text screen so that the participant does not need to type out each word when contributing to the chat. The full list of these roles, scripts and prompts will be listed in a following section; however, following here are examples of prompts for the reciprocal teaching roles that are programmed into gChat.

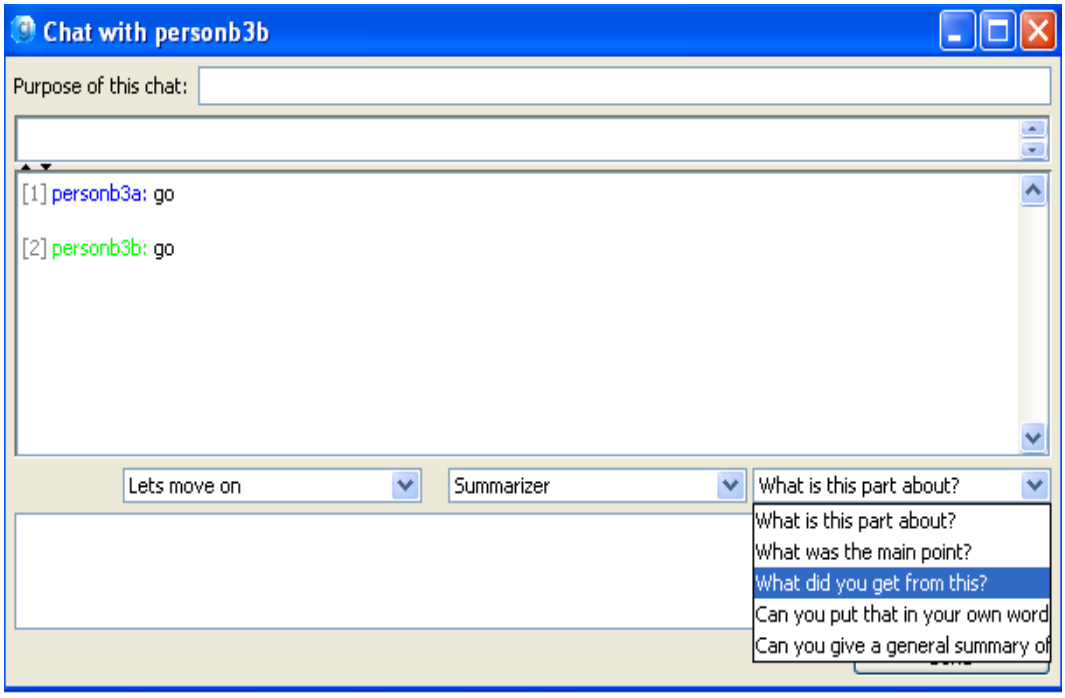
(a) Summarizer: "What was the main idea about…"

(b) Questioner: "Did you have any questions about…"

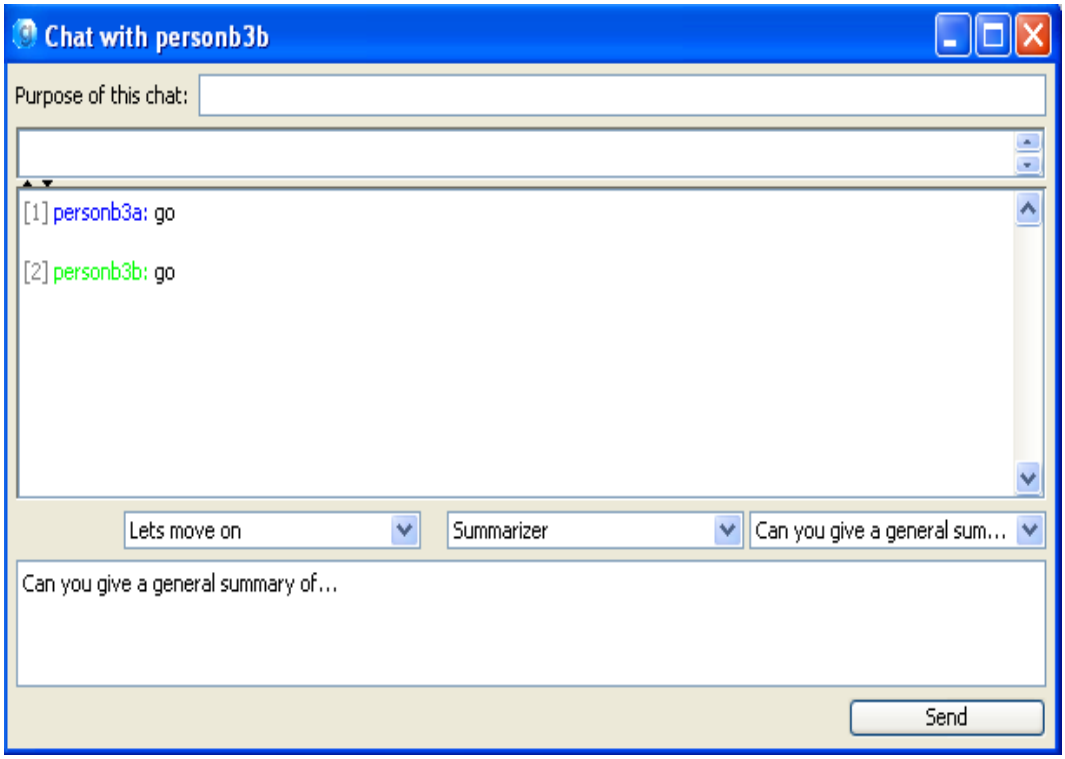
(c) Clarifier: "Can anyone explain..."

(d) Predictor: "Do you predict that…"

a. Example of Summarizer prompts in gChat from a drop-down list.



b. Role and prompt selection from gChat in the lower text box



c. Prompt selection recorded in the upper text box.

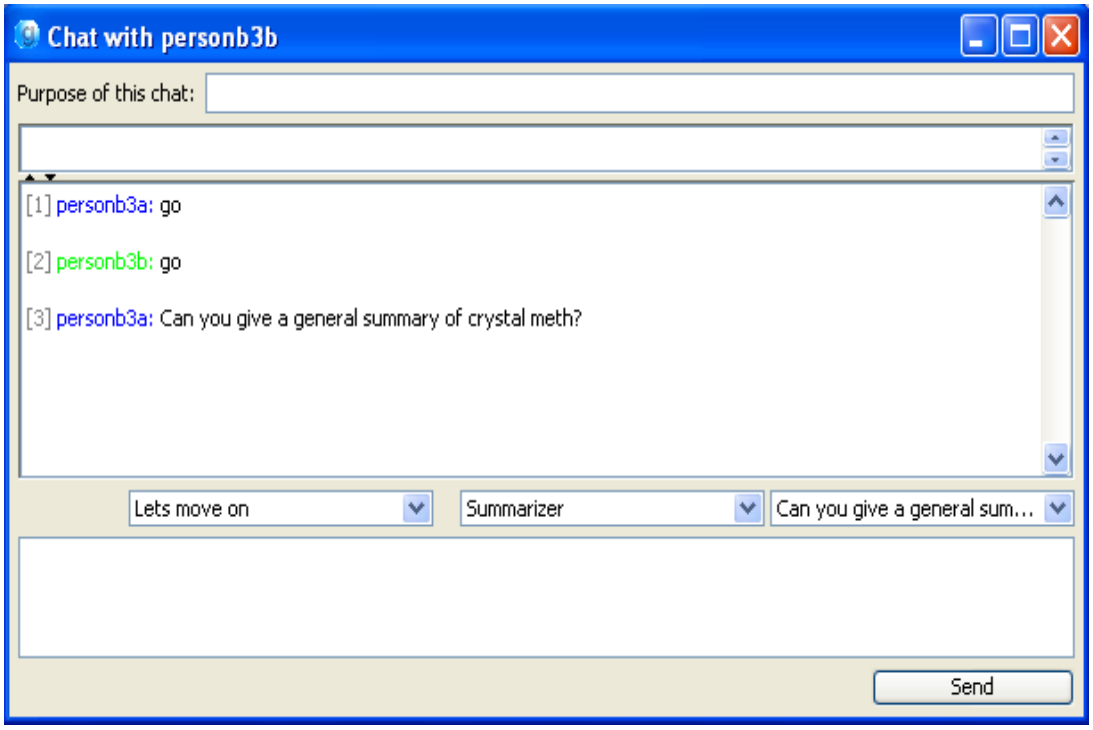


Figure 3. Example of Summarizer prompts in gChat from a drop-down list (a), role and prompt selection from gChat in the lower text box (b), prompt selection recorded in upper text box (c).

Experimental Conditions

In both instructional conditions the participants accessed the *Collaborative Learning Kit* in gStudy that contained: (a) each section of the crystal methamphetamine article, (b) instructions for completing the individual reading task (session one) and (c) instructions for completing the collaborative discussion task (session two). Contents of the collaborative learning kit were developed by the researchers (Fior, Church, Morris & Hadwin, 2006) while the software design was developed by research team members (Miller, Fior & Hadwin, 2006).

Structured peer chat condition. In the structured peer chat condition, participants were provided with specific instructions and tools to structure their collaborative discussion. A collaborative kit described each role and how to carry out a collaborative discussion using each role. In addition, each participant was assigned a role and asked to select that role and its associated prompts in gChat (see Table 2) Each participant in the structured peer chat condition was randomly assigned a role with associated scripts and prompts for discussing the text *Crystal Methamphetamine Use* with their group (see Figure 4). In order to encourage collaborative co-construction of comprehension and participation, these roles were changed to encourage the student to ask questions that prompted other group members to engage in cognitive processing. This altered way ensures individual responsibility for making sure the group engages in a particular type of cognitive processing amongst participants based on O'Donnell (1999) and Palinscar and Brown (1984). The reciprocal teaching roles consisted of summarizer, questioner, clarifier and predictor. These roles are based on Palinscar and Brown's (1984) reciprocal teaching roles because they have been shown to enhance reading comprehension of a text. The summarizer prompted the group to synthesize text information. The questioner guided the group to ask questions regarding the text. The clarifier guided the group to clarify and simplify terms or concepts that were unclear in the text. Finally, the predictor helped the group to hypothesize what would happen next in the text. To help students better understand their roles, they were provided with scripts. Scripts explicitly state the purpose and actions for the assigned role. The participants were able to access information about reciprocal teaching and the scripts that

go along with each of their individual roles by clicking on a page on the left hand side of the gStudy interface under the title, "table of contents".

Regular peer text chat condition. In the unstructured peer text chat condition, the students were presented with a collaborative learning kit that did not include the description of roles to be used when collaborating. The unstructured chat group did not have access to roles or prompts in the gChat interface. Instead, participants had access to the generic sentence starters such as, "I think that…" and "I don't understand".

Table 2

Roles, Scripts and Prompts

Roles	Scripts	Prompts
Predictor	Before you begin to read the selection, have your group look at the main title of your section, and scan the pages to read the major headings. Based on these clues, get your group to try to predict what the article or story is about. Now get your group to read the selection to see whether it turns out as you predicted. Stop at several points during your reading and ask your group how closely the content of the actual article fits your initial prediction. How do the facts and information that you have read change your groups' prediction about what they will find in the rest of the article?	"Do you predict that…" "Based on what we know about…" "What will happen if…" "Do you think that means…" "Do you wonder if…"
Summarizer	Your section can be summarized across sentences, across paragraphs, and across the section as a whole. Stop after each paragraph or smaller section of the passage. Get your group to construct one of two sentences that sum up on the most important idea(s) that appear in the section. Good summary sentences include key concepts or events but leaves out less important details. Get	"What is this part about?" "What was the main point?" "What did you get from this?" "What is the gist of…" "Can you put that in your

	your group to tell you the summary (main idea) sentences and continue reading.	own words?"
Questioner	In your role, you will get your group to make up questions for the section. For the main ideas that you read, get your group to tell you at least one question that the main idea will answer. Good questions should include words like "who, what, where, when and why". For example, if you are reading an article about the extinction of dinosaurs, you might find the following main idea: "Most scientists now believe that the extinction of the dinosaurs was caused by a large meteor striking the earth." Your group could then give you think question: "What event do most scientists now believe caused the mass extinction of the dinosaurs?"	"Did you have any questions about …?" "What are you curious about?" "Ask us a question about…?" "What might your mom or dad ask about this?" "What might your friend ask about this?"
Clarifier	Your role will be to get your group to clarify anything that is unclear. Sometimes in your reading you will run into words, phrases, or whole sentences that really do not make sense. Here are some was that you can get your group to clarify the meaning of the reading before moving on: Unknown words. If your group comes across a word those meaning they do not know, have them read the sentences before and after it to see if it gives them clues to the word's meaning. Ask your group to reread the phrase or sentence carefully and try to understand it.	"Can anyone explain..?" "What do you think that means?" "Any other interpretations?" "Can you think of an example?" "How can we make sense of that?"

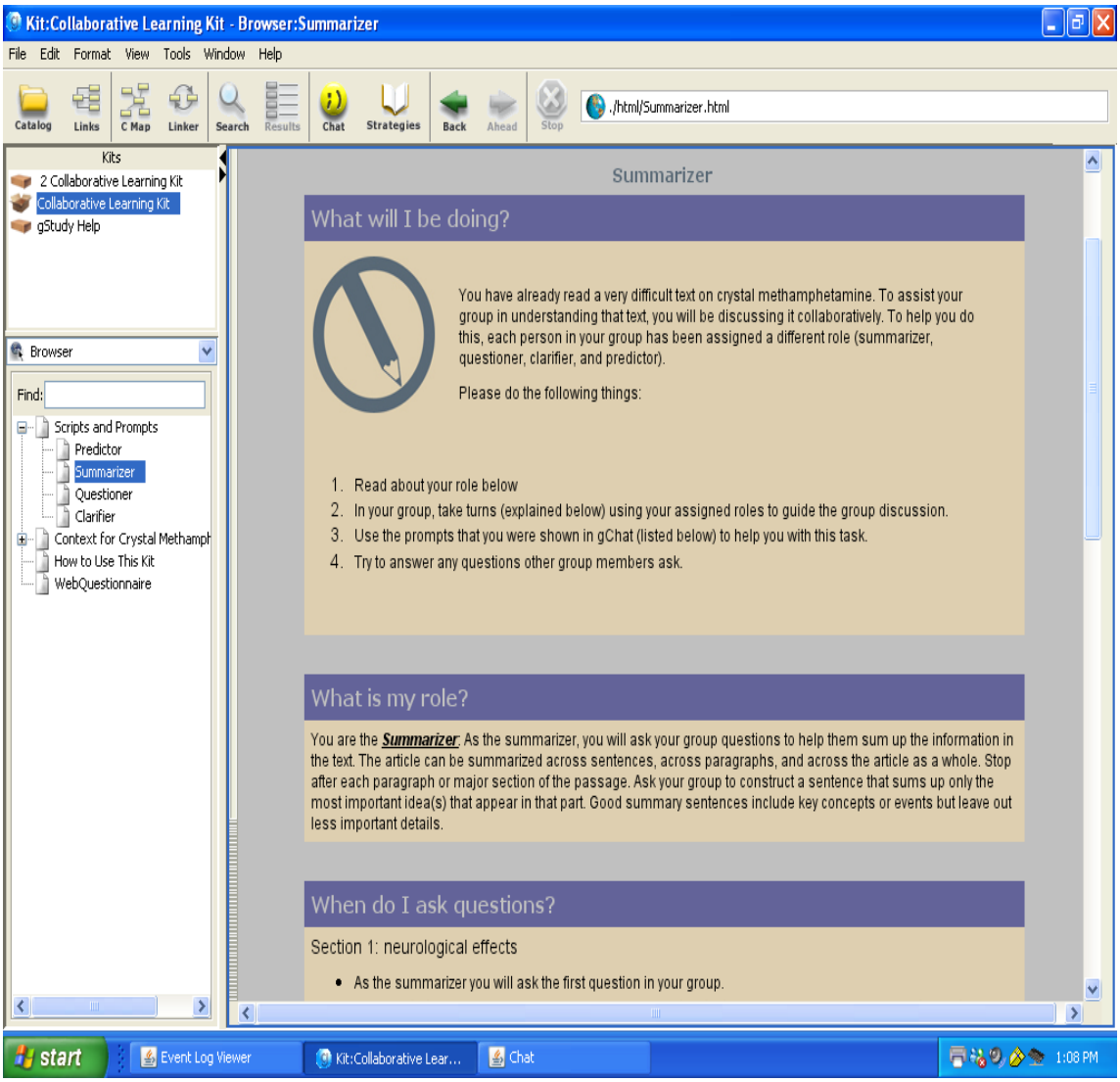


Figure 4. Example of reciprocal teaching scripts in gStudy.

Instruments

As this study was part of a larger research project, a number of instruments were used to collect data. All instruments are listed here, however only described in detail when they are pertinent to this particular study.

(a) Computer Efficacy Survey [Instrument not used in the present study].

A computer efficacy measure was developed by the researcher for this study. Computer efficacy measured students' perceptions of their capabilities to perform

specific computer-related tasks. The ten item scale was adapted in order to fit Bandura's efficacy scale composition to be specific to the task at hand (Bandura, 2001). The psychometric response scale was an 11 point Likert scale ranging from not confident (0) to strongly confident (100) in intervals of 10.

(b) Self-Efficacy for Group Work Measure.

A 10-item self-efficacy for group work scale was used to measure participants' perceptions of their independent capabilities to perform in a group work setting—how well I will do in the group (Alavi & McCormick, in press). Ten of twenty items of this scale were selected that loaded on student's efficacy beliefs in exchanging, evaluating and integrating ideas based on factor analysis. The researcher chose the ten items that most closely reflected the collective efficacy items with strong factor analysis loadings. Response scales for each item are 11 point Likert scales ranging in ten point intervals from not confident at all (0) to very confident (100) continuum. The instrument produces a reliability of alpha .95 with the original 20 questions. A complete listing of the ten questions selected with their factor analysis can be found in Appendix D. The instrument was administered through WebQuestionnaire. There was no time limit for this test. Participant's item scores were amalgamated to receive a composite individual score for self and collective efficacy along the confidence continuum of 0-1000. Since this produced such large scores, each individual score was divided by the number of questions (10) to create a self and collective efficacy average score for each individual to allow for easier analysis (ex. a score of 800/10=80).

(c) Collective Efficacy Measure.

Collective efficacy in the group collaboration environment was measured using the Collective Efficacy for Group Work Scale (Alavi & McCormick, in press). This 10-item scale measures an individual's perceptions of their group's capabilities to perform in a group work setting as a single unit—how well the group will do. Responses are on an 11-point Likert scale ranging in ten point intervals from not confident at all (0) to very confident (100) continuum. The instrument produces a reliability of alpha .95 with its original 10 questions. A complete listing of the ten questions selected with their factor analysis can be found in Appendix E. The instrument was administered using WebQuestionnaire. There was no time limit for this test.

(d) Prior knowledge [instrument not used in the present study]

A 10-item multiple choice test was developed by the researchers to test students' prior knowledge about crystal methamphetamine. It was pilot tested for usability on a sample of eight grade 10 students.

(e) Reading Comprehension Pre test/ Post test [instrument not used in the present study]

The reading comprehension test consisted of nine (eighteen in total) multiple-choice questions administered after reading each section of text (session one) and again after collaboratively discussing each section of the text (Session two).

(g) Test of Reading Comprehension (TORC-3) [instrument not used in the present study]

The TORC-3 (Brown, Hammill, & Wiederholt, 1986) is a standardized measure of reading comprehension. The TORC-3 takes approximately twenty minutes to

administer and involves reading six small paragraphs of text and answering a series of multiple choice questions after each paragraph.

(h) Participation in Collaborative Discussions

gChat records the contents of all chats and saves them as chat logs on a server. Chat logs were accessed by the researcher at the completion of the study through a Kit Management System (KMS). Chat data is first collected as a chat record, and is then opened to reveal the output of the chat log file in XML format decoded by the researcher using the XML conversion program, Excel. Data that were produced by the chat log has a record of the speaker, time and sequence of statements made by the participants. As well, chat data can be viewed directly within gStudy. For the purposes of this study, the students' chat logs were saved and later accessed and decoded by the researcher through the KMS.

Chapter 4

Design and Procedures

Pilot Testing

For the purposes of ensuring that the various areas of this study came together compatibly, extensive pilot testing was conducted on materials, instruments, and software across five main areas: (a) the *Crystal Methamphetamine Use* text, (b) reading comprehension measure, (c) collaborative gChat tool, (d) prior knowledge measure and finally, (e) procedures. The study was conducted with both sessions on a structured group of four grade 10 students from SIDES (South Island Distance Education) and with an unstructured group of four grade 10 students from ILC (Individual Learning Center) high schools from Victoria, British Columbia.

(a) Crystal Methamphetamine Use text. The instructional text was reviewed and verified by two content area experts. Readability and length were tested by having three grade 10 students read the text: one student was a struggling learner, one student was an average reader and another student was a high achiever. The text was administered to these pilot subjects in written form, not on the computer. The text took the students twenty to thirty minutes to read in full. Due to time constraints regarding the amount of instructional time that could be devoted to this intervention, we reduced the number of text sections to two instead of four.

(b) Reading comprehension measure. After these three students completed reading the instructional text, they were asked to complete reading comprehension questions. These were filled out in written form, separate from the computer environment. The

students completed questions across the four reading text sections which took approximately twenty minutes to complete.

(c) Collaborative gChat tool. Extensive pilot testing of the gChat, gStudy, and WebQuestionnaire software tools was conducted. The gChat tool was the newest addition to the gStudy application tools; therefore, in collaboration with the computer developing team at Simon Fraser University (SFU), the researchers tested and refined the functionality of gChat after each new software release. The tool was tested twice a week for eight consecutive weeks to ensure that the chat tool was functioning properly, that the correct roles and prompts were contained in the chat interface and that the data from these pilot testing sessions was being sent to the server at SFU and to the kit management system.

(d) Prior knowledge measure. The prior knowledge measure was tested on three grade 10 students from SIDES for face validity. The students had the marks of 3, 3 and 2 out of 10. The students informed the researchers that they knew a very little about crystal methamphetamine. This measure was deemed by the researchers to be adequate for testing students' prior knowledge of the subject matter.

(e) Efficacy measures. The two efficacy measures (self and collective) were tested on three grade 10 students from SIDES. This pilot testing took place to ensure that participants would be able to understand the questions that were asked and to ensure that the guidelines set by Bandura (2006) were followed. The computer efficacy measure was pilot tested on members of the research team.

(f) Procedures. The procedures of the study had been tested by the research team to ensure that the team had adequately covered the steps of the study and to map out time

constraints. The Masters University level research team mapped out the procedures with keeping the grade 10 students in mind. Then, the study was conducted in full on the aforementioned eight grade 10 students for each collaborative condition.

Procedures

Recruitment of Participants

Participant schools were recruited after receiving ethical approval from the Human Research Ethics Committee at the University of Victoria, and the Saanich School District to conduct research in Saanich School District 63. Emails were sent to the principals of five schools in the district asking if they had teachers at their school who would be interested in participating in the study. If principals expressed interest, they were then asked to forward an email invitation to their English 10 and Planning 10 teachers. Teachers from three schools expressed interest in participating in the study: SIDES (1 classroom), ILC (1 classroom) and Parkland (3 classrooms). Meetings were arranged with each teacher to explain the nature of the study, and to describe how this instructional intervention in the study might supplement the curriculum. Due to lack of participants at SIDES and ILC, these schools were used as a pilot group while the study was run on Parkland students.

Consent was sent to the parents of the children in the classes who agreed to participate (see Appendix F). It clearly explained that their child's participation in this research study is voluntary, meaning that data will only be collected and analyzed if consent is provided; however, students may be asked to participate in the instructional intervention as part of their classroom curriculum activities (without data being collected or made available to the researchers). Through the consent letter, the parents were

informed about the goal of the study, the process and why it is important and applicable to the school curriculum. They were given contact information and informed that they may discontinue from the study at any point in time. From this, they were informed that due to the chat log data and pretest data, the data gathered prior to their child's withdrawal will be kept due to the nature of the software tools. For the students who agreed to participate, they were also informed that they may withdraw at any point. Consent was sent electronically for SIDES and ILC. For Parkland, consent was sent on paper and students were asked to return the forms whether consenting or not to a folder in their classroom so their teacher would not know who did/did not give consent.

Assignment to groups and to text order. For both of the collaborative conditions, the students were asked to read the text individually, highlighting and labeling text as either: "important", or "don't understand". The researcher explained the activity, gStudy and the main goal, as well as step-by-step task instructions (see Appendix A and B). These instructions were also input into gStudy as a backup that the student could refer to while the study was running.

After receiving consent, participants were assigned to groups of four. Students who did not consent to participate in the study were assigned to groups of four with other students who did not consent to participate. Half the groups in each class were randomly assigned to one of two instructional conditions: (a) those collaborating with the structured chat of the reciprocal roles, scripts and prompts, and (b) those collaborating in unstructured chat. This was done before session one and on the basis of asking the teachers to rank the students so the researchers could ensure some degree of academic balance in the groups.

The computer administered testing materials were password protected on a secure server (located at Simon Fraser University) that is part of the Learning Kit Project. The participants were assigned user names. Every participant in the classroom got a login ID; however, only the data from those consenting was collected. Participants were assigned login IDs that are pseudonyms (e.g., PersonA1A) where the first letter represents the school the individual belongs to, the number represents whether they were in a structured chat group or unstructured chat (for easier coding, the structured group had odd numbers while the unstructured had even), and the third letter represents which role the individual was assigned. By coding the participants with these participant logins, the researchers were able to set up user accounts for the participants where half the participants received the structured chat kit and chat tool, and the other half of the participants received the regular chat kit and chat tool. For Parkland, the researchers received a class list from the teachers of the participating classrooms. The researchers grouped those students consenting together and those not consenting together. Due to the nature of collecting data from four individuals simultaneously, it is important that groups be made up of entirely consenting or entirely non-consenting individuals.

This study was administered in two, eighty minute sessions on location at SIDES, ILC and Parkland. Instructional classes of the regular classroom at Parkland are an hour and twenty minutes in length; therefore, this study was molded around this time constraint. As well, it is important to note that all the students worked at their own computer within a classroom set up for either the structured or unstructured condition. Students were collaborating online while sitting in the same classroom at different work stations.

Experimental Session One

For session one, all the activities were individually administered. At the beginning of the first session, the researchers took five minutes to explain the study to the students who were divided into two different classrooms with approximately fifteen students in each. The assumption was that they will already have been made aware of the study by their teachers, and the consent form, thus this would be a verbal review. After this, students completed a paper based *TORC-3*. As explained in the instrument section, students read short paragraphs and answered questions based on these paragraphs. Then, students were instructed to log in to WebQuestionnaire using the individual participant number that was handed to them on paper by the researchers. Students were instructed to open the test link in WebQuestionnaire labeled, *Prior Knowledge* in order to determine students' prior knowledge on the subject of crystal methamphetamine. Unfortunately with the lack of a valid and reliable readiness to collaborate inventory, the researchers had to assume that the students volunteering to take part in the study, and prior experience with collaborative groups, allows them to be ready to collaborate. Finally, the students were asked in WebQuestionnaire to complete the computer efficacy measure. When all students finished these three measures, the researches spent five minutes introducing the gStudy software. Participants logged in with their same participant login they used for WebQuestionnaire. Students participated as a whole class; therefore, participants were split in two separate computer labs so that separate instructions could be delivered for the two instructional conditions.

After the study was explained, participants logged in to gStudy to learn some basic features. Specifically, they were shown the table of contents along the left side that

allows them to open different sections, and how to select and label text as either "important" or "don't understand". Second, students practiced using the labeling tool while reading the introductory section of text. The introductory text contained specific signals such as [LABEL THE NEXT SENTENCE AS IMPORTANT].

Individual reading section. First, participants were given ten minutes to read and label the first section of text (neurological effects). Second, participants answered nine reading comprehension questions as a paper based test. Third, participants read the second section of text in gStudy (social issues). Fourth, participants answered nine more reading comprehension questions based on the second text as a paper based test. In the final ten minutes of this session, participants completed the two efficacy measures (self and collective) in WebQuestionnaire.

Experimental Session Two

Approximately one week later, participants met again at their respective schools in order to complete the second part of the study. For session two, students were assigned ahead of time to work in groups of four to discuss and refine their understandings of text one (neurological effects). Unfortunately due to unforeseen time management issues, the second text was dropped from the study so both instructional conditions read only the neurological effects text. The gChat tool was demonstrated to students and they had five minutes to become familiar with it.

Structured chat condition. The roles, scripts and prompts were introduced during the introduction to gStudy. Each student was assigned a role and given five minutes to practice entering one prompt from the list under their role to use the prompts and scripts. Example of the task instruction for the unstructured group: "As a group, you will be

reading a difficult article. Each of you will work on the same text at the same time. Your task will be to lead your group and help them understand the section of the text. At the end of twenty minutes you will complete a short quiz on what you have read. Then, you will be asked to read and work through the next section as a group". Example of the task instruction for the structured group: "As a group, you will be reading a difficult article. Each of you will work on the same text section at the same time. Your task will be to lead your group and help them understand the section. To help with this process, you will be given a role. The instructions on your role are listed in the table of contents in gStudy. You will also be given some sentence starters (prompts) that will help you with this process. At the end of twenty minutes you will complete a short quiz on what you have read". The participants were then instructed to start with text one (neurological effects) and work through understanding it with their group members. The structured chat group was instructed to use the scripts and prompts that were provided in their kit, while the unstructured chat groups were instructed to work through the text together. After twenty minutes, the researchers asked the participants to stop and fill out the paper based reading comprehension questions on their own.

The teachers chose not to use this study for instructional evaluation. There are pros and cons to this decision. If the students knew they would be receiving a mark on the study then they may have put more effort in; however, since the researchers were interested in measuring participation, this would have had influence over students wanting to participate and may not have shown a true participation score.

Table 3

Procedures for all Data Collection (procedures for other study in italics

	Session 1	Session 2
General Information	All activities are individually administered	Students are in groups reading counter-balanced text sections
	Overall time: 80 minutes	Overall time: 80 minutes
Order of Administration	Explain study to all students (5 minutes)	Discuss procedures for the structured and regular chat collaborative groups (20 minutes)
	Prior knowledge test (5 minutes)	Discuss text 1- Post test 1 (20 minutes)
	Computer Efficacy test (5 minutes)	*Reading comprehension questions text 1 (10 minutes)*
	Administer the TORQ (15 minutes)	Post self-efficacy measure (5 minutes)
	Introduction to gStudy (10 minutes)	Post collective efficacy measure (5 minutes)
	Read text 1- Pre test 1 (10 minutes)	Post computer efficacy measure (5 minutes)
	Reading comprehension questions text 1 (5 minutes)	
	Read text 2- Pre test 2 (10 minutes)	
	Reading comprehension questions text 2 (5 minutes)	
	Self-efficacy measure (5 minutes)	*Individual gStudy log files*
	Collective efficacy (5 minutes)	Chat logs of discussion
Other Data Collected	*Individual gStudy log files*	

Note. Post research/complementary instruction: group brochure based on instructional activity.

Chapter 5

Results

Coding for Participation

Data about participation were obtained from the gStudy chat logs which include participant's name, the date of the discussion, the discussion group they belonged to and the time the entry was made. These chat logs were coded in terms of frequency scores and participation level of postings. The data was an output of chat log data sent to a server at Simon Fraser University as part of the Learning Kit Project. The frequency for 23 event types was initially scored by the researcher including *use of prompts* and evidence of an individual taking a *leadership role* in the discussion. After reviewing chat log records, 23 event types were identified as potentially interesting for examining aspects of participation in the context of this instructional intervention. At stage one, the frequency of all 23 events were recorded. After examining the occurrence and distribution of those 23 event types, three event types were selected as meaningful measures of participation because they: (a) occurred with sufficient frequency and variability to reflect differences in participation and the quality of participation, and (b) were closely aligned with the research questions. The three participation events were: (a) frequency of postings made by each participant, (b) frequency of words per post, and (c) co-constructed discourse in terms of the number of contributions within a collaborative level that the individual participated creating a composite measure developed by the researchers and defined thoroughly in section titled "Coding Levels of co-constructed Discourse".[1]

[1] Note: Conversation level does not refer to depth of process. Rather, it is the degree of exchange built on ideas to contribute to an on-going conversation.

Scoring Total Number of Postings

Each time a student posted an *on track* chat entry to the group, regardless of length of posting, it was counted as one entry. For each participant, we tallied the total number of postings. This measure of participation is consistent with much of the literature regarding participation frequency measures (Guzdial & Turns, 2000; Kester & Paas, 2005; Rummel & Spada, 2005; Dewlyanti, Brand-Gruwel & Jochems, 2005; Linn & Slotta, 2006).

Scoring Total Words

A frequency score for *total words* was derived by totaling the number of *on-task* words each individual wrote within the collaborative discourse.

Co-constructed Discourse

The following section describes how a participation score termed Co-constructed Discourse was created from: (a) coding levels of conversational discourse, and (b) scoring conversational discourse.

Coding Levels of Co-constructed Discourse

On-task discourse included any comments that applied directly to the present study or subject matter of the study. Examples of on-task postings include: "Norepinephrine is something that the brain needs to maintain normal brain functioning I guess", and "is there anything else we might need to know about neurotransmitters?" Off-task comments included any comments that did not apply directly to the present study or subject matter of the study. The researcher considered the content of the entire posting in counting frequencies of occurrence; however, due to the nature of the chat logs, the system of deletion of the off-task postings was to delete the entire entry because there

were no off-task postings that were a mix of on-task and off-task comments. Examples of off-task dialogue included: "what are you doing this weekend?", "I'm bored" and "I'm so excited my nipples are twitching". A consensus was met between two researchers in determining what constituted as an off-task comment.

Coding Participation Levels

First discourse was segmented into blocks of continuous discourse where new postings responded to previous postings. A new segment was started when a posting turned the discourse in a different direction, such as a new question being posted. It is important to note that because the online text chat is not truly synchronous, there can be time delays. Responding to previous postings while someone else already changed the dialogue did occur. Therefore, creating the segments was sensitive to this delay by identifying the segments and including these comments in the previous segment. The segment was then coded according to conversational level or the degree of sophistication responding to and building upon the previous persons' contributions. Replies were coded according to levels of exchange in the discourse. For example, a Level 1 contribution consists of Person A generating a starter statement or question such as "Why are we reading this text?" and Person B responds to that discourse starter with "to learn about crystal meth". In this case, both person A and person B received a score of 1 on a Level 1 discussion; therefore, both the person who initiated the discussion and the person who responded received a score. Level 2 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with two responses. For example, Person A generates a starter statement of question such as "What is crystal meth?" and Person B responds "it's a drug that can

harm you" and Person A then builds on the previous response by asking "what do you mean it's harmful?" After the initial statement, the previous two postings built upon each other to achieve a Level 2. A full listing of Levels up to the highest Level (9) with definitions and examples can be found in Appendix G. The highest conversational level reached by participants was a Level 9 conversation:

A-"I think that the government should make drugs legal because then they could control how safe the drugs are and make sure meth isn't put into everything"

B-"that's a horrible idea"

C-"yeah but that is even worse in a way because then they are promoting drug use"

B-"government don't care"

C-"so even more people will become addicted and our world would be an even more horrible place"

A-"people are just going to do it anyways so why don't they make it safe?"

C-"because that won't happen"

B-"no one can control the amount anyone takes in of anything"

D-"we should get keep drgs on the dl"

B-"everyone has free will and makes their own choices"

As seen above, Person A made the initial statement and the others within that group built on the previous speakers' statements by carrying the first question or theme through their collective dialogue across nine interactive responses (Level 9). Person B contributed 4 times to this Level 9 discussion. Person A contributed twice (both as the

Level 9 statement starter and a contributor), Person C contributed three times and Person D contributed once to this discussion.

Importantly what distinguishes this Level 9 conversation from a series of Level 1 conversations is that each reply builds on the previous without losing track of the original issue, problem or question. In contrast, a series of Level 1 conversations would involve a series of independent replies to the first issue, problem or question with no obvious recognition or integration of a reply to the same questions made by another participant. For example, Person A may say "what do we understand about this text?" Person B answers "it's about crystal meth" and Person C also replies "I don't know". Both of these statements were replies to the initial question and are completely independent from each other. In this example, Person A provided the sentence starter that received two Level 1 points, Person B and Person C each received one Level 1 point.

Scoring Co-constructed Discourse

In order to weight the frequency of contributions by the participation level of conversational discourse, the raw frequency of an individual's contributions was multiplied by the respective conversational discourse level. In the earlier example of a Level 9 discussion: Person B contributed 4 times to a Level 9 discussion which produced a score of raw frequency (4) times the conversational level (9) equaling 36 (=4*9= 36). In the second example of a series of Level 1 contributions, Person B contributed once to the Level 1 conversation, therefore receiving a score of one contribution times Level 1, or 1 in total (=1*1=1). This scoring takes into account both participation level of conversation in terms of co-constructed discourse and the frequency of contributions to conversations at each Level that ensures we account for participation level of a

conversation and not just frequency. Participants who engaged in co-constructed dialogue (represented by a higher level), scored higher than they would contributing with equal frequency to a lower level discussion. This means that a student can be very active in the frequency of contributions to a discussion but not score very high on this composite measure of discourse because all the responses were isolated and independent replies to one question or statement with little regard for the flow or relationship with other participant's responses. For each participant, a total conversation depth score was calculated by summing these composite scores.

Two graduate University of Victoria students served as the raters of the data. To enhance inter-rater reliability, the coders first met together to analyze the content of the discussions. This system produced frequency scores of postings and frequency scores of participation level for participation in the group collaboration. When disagreement occurred, a resolution was achieved when the two raters agreed on a rationale for participation within a specific posting. Coding took place on 25% of the chat log data. The inter-rater consistencies were calculated by the Pearson product moment correlation where the correlations were all over .70 with an average rating of .76. This demonstrated that the scoring was a reliable measure for participation within the groups. There were no revisions made to the coding system prior to this process.

In terms of content analysis, numeric and interpretive data analysis are used to determine a more meaningful analysis of group discussion (Wang & Lin, 2007). This is the reason why this study included quantitative and qualitative analysis.

Data Analysis

SPSS for Windows (Version 16.0) was used for the analyses of the quantitative data. Descriptive statistical data were examined to determine the importance and relevance of items. Independent samples t-tests were run to ensure there were no significant differences between the structured and unstructured conditions prior to collaboration on the self-efficacy and collective efficacy variables. Then correlation analysis and multiple regression analysis were conducted to answer the two main research questions: (a) is there a relationship between efficacy and participation in a collaborative task, and (b) is the relationship between efficacy and participation mediated by collaborative support? It was hypothesized that: (a) there is a relationship between efficacy and participation in a collaborative task, and (b) the relationship between efficacy and participation rate is mediated by collaborative support.

Given the complexity of conducting applied classroom-based research, sample sizes for the study were limited by teacher and student availability within one school district and interest in incorporating the instructional module into the Planning 10 curriculum.

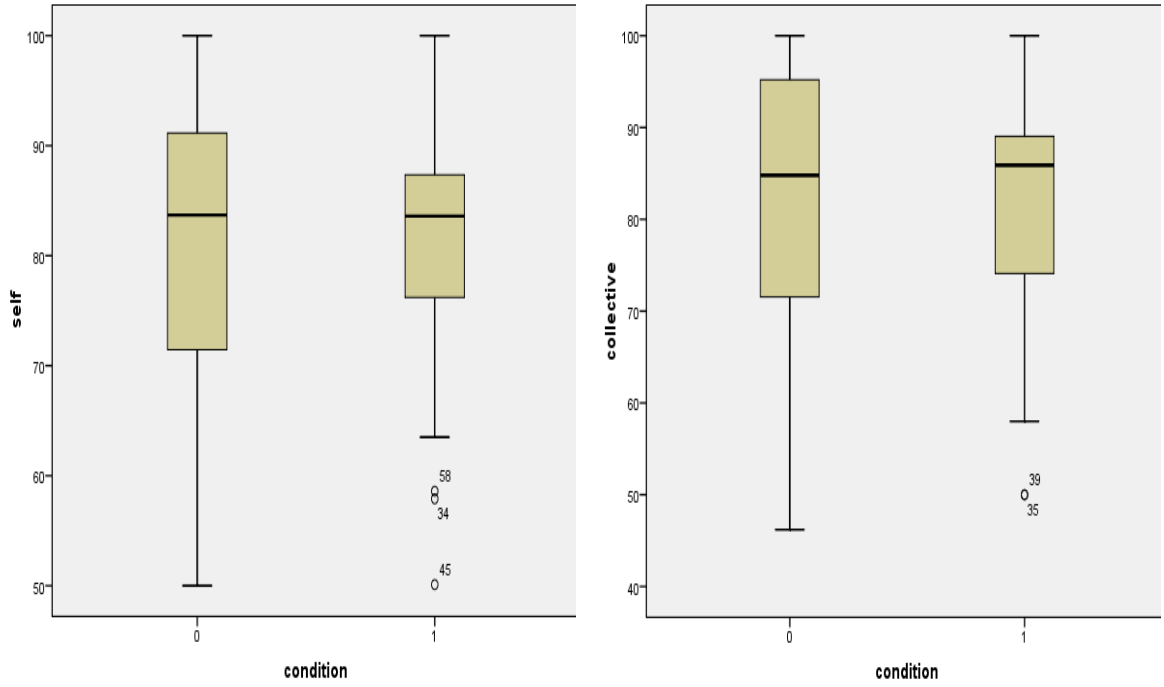
Data Screening and Testing Assumptions

Predictor and outcome variables were screened for accuracy of data entry, missing values, and fit between distributions and assumptions of the multivariate analysis. Predictor variables included Self-efficacy for group work and Collective efficacy. Potential outcome variables included co-constructed discourse, total words, and total number of entries.

The following tests were conducted for each assumption: (a) normality (descriptive statistics, independent t-tests, Pearson product correlation and multivariate regression, (b) equal variances (independent t-tests), (c) independence (independent t-tests), (d) linearity (Pearson product correlation and multivariate regression), (e) homoscedasticity (Pearson product correlation and multivariate regression), and (f) multicollinearity (multivariate regression).

Normality was assessed by examining skewness and kurtosis for self-efficacy (skew= -.714, kurtosis= -.158) and collective efficacy (skew= -.756, kurtosis= 0.49) were slightly negatively skewed but close to 0 indicating a normal distribution (Tabachnick & Fidell, 2001). For the outcome variable of co-constructed discourse (skew=1.69, kurtosis= 2.74), there was a slight deviation from normality due to the nature of frequency data of this type where the distribution was slightly positively skewed. Box plots were also examined for normality (see Figure 5a and Figure 5b).

a. Boxplots of variables self (left) and collective (right) efficacy between the two conditions.



Note: In figures 5a and 5b, condition 0= unstructured, condition 1= structured.

b. Box plots of outcome measures total entries (left), total words (right) and co-constructed discourse (bottom).

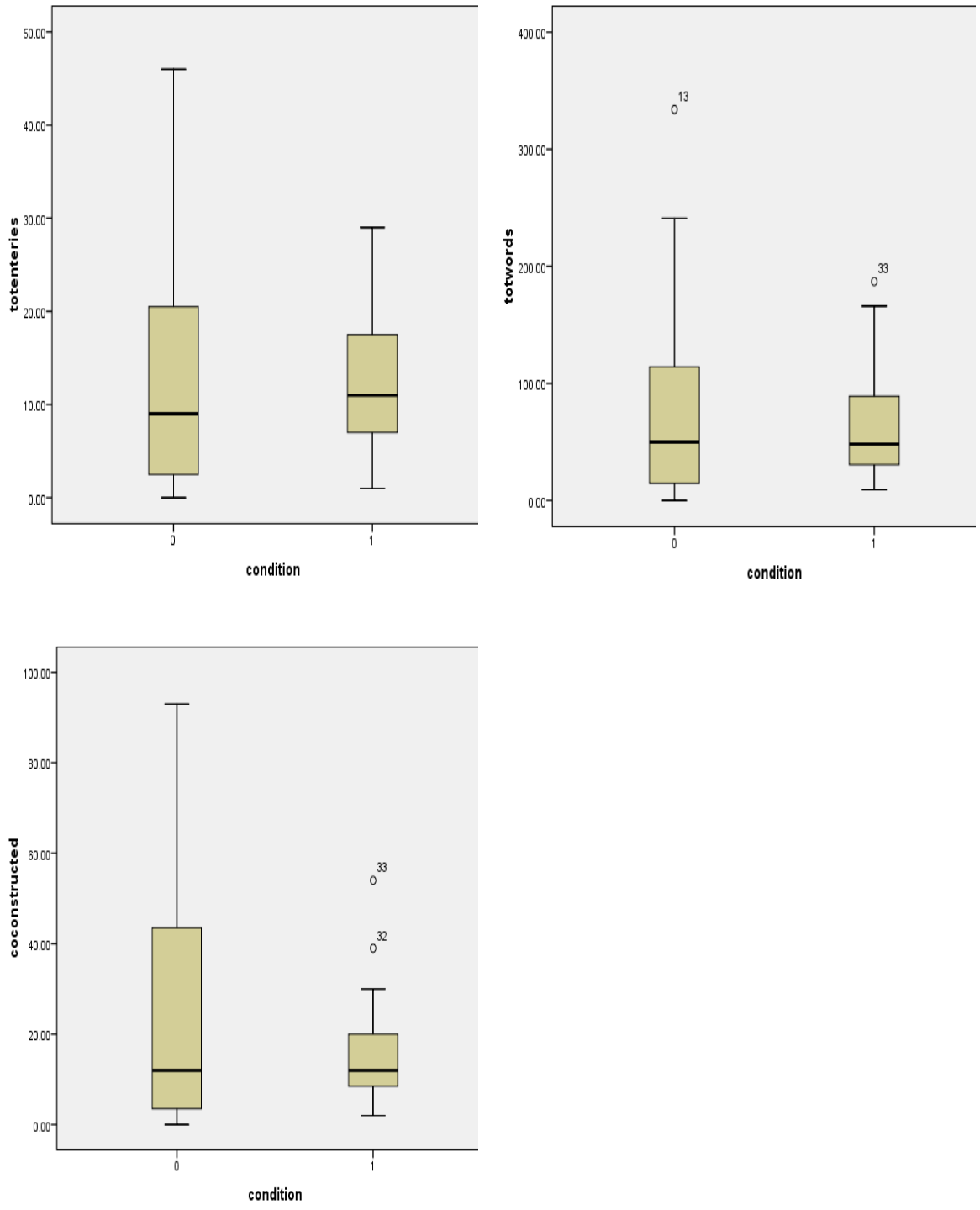


Figure 5. Boxplots of variables self and collective efficacy between the two conditions (a), box plots of the outcome measures (total words, total entries and co-constructed

discourse) (b). *Note:* In figures 5a and 5b, condition 0= unstructured, condition 1= structured.

Linearity is the assumption that there is a straight line relationship between variables. This was met judging the plot of predicted values of the dependent variable against the residuals (see Figure 6) where the distribution is not curved but rectangle in shape. As well, the scores were spread across the top and bottom of the zero line in the residual plot (Tabachnick & Fidell, 2001) displaying the assumption of linearity is met.

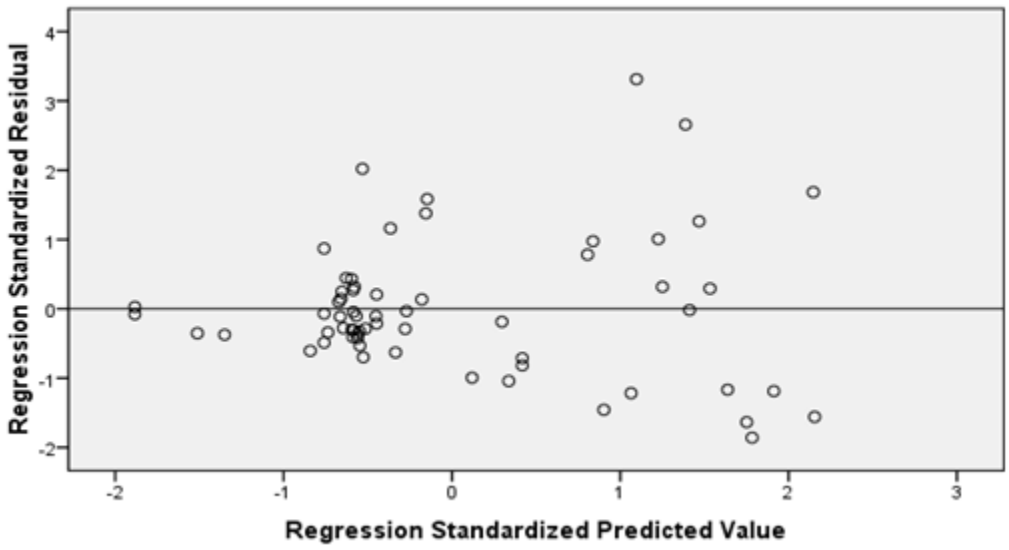


Figure 6. Residual scatter plot.

Homoscedasticity tests that the scores for one continuous variable are roughly the same at all values of another continuous variable. This is related to normality because when the assumption of multivariate normality is met, the relationships between the variables are homoscedastic (Tabachnick & Fidell, 2001). As well, the residuals plot formation does not fan outward (see Figure 6); therefore, homoscedasticity has been met.

Equal variances assume that the variances of two samples are equal. Levene's test for equal variances assesses this assumption. Significance was not obtained for either the self (p=.147) or collective group (p=.460); therefore, equal variances are assumed.

Independence assumes that the scores of one participant are not related to scores of the other participants. The conditions for self and collective efficacy were not matched pairs and there is no reason to believe that one participant's score may have an influence on another. This is a different matter however for the participation outcome measures since the participants were in groups though they retain an individual raw score relative to their condition.

Multicollinearity occurs when variables are too highly correlated. The bivariate correlation analysis of self-efficacy and participation scores did not have a score higher than r=.3 suggesting that this assumption is met. As well, a tolerance score in multiple regression of less than 0.1 indicates a multicollinearity problem.

Descriptive Statistics

Descriptive statistics for the predictor variables (self-efficacy of group work and collective efficacy) and each potential outcome variable (co-constructed discourse, total entries and total words) for all participants and then broken down by collaborative condition, are presented in Table 4a and Table 4b respectively. Co-constructed discourse, total words and total entries were calculated for each individual excluding segments of dialogue that were coded as "off task". Therefore, the mean for total words represents the average number of words across all participants regardless of group membership or group size. Although it was recognized that individual contributions to discussion are shaped by the group, the unit of analysis chosen for this study was the individual.

Table 4a

Summary Table of Descriptive Statistics for Self-Efficacy for Group Work, Collective Efficacy and Participation Measures across both Experimental Conditions

	Mean	Median	SD	Variance	Skewness	Kurtosis
Self-Efficacy	80.75	83.65	13.46	181.11	-.714	-.158
Collective Efficacy	81.65	85.35	14.13	199.55	-.756	-.049
Co-constructed Discourse	19.98	12.00	20.62	425.16	1.69	2.74
Total Words	70.09	49.00	68.59	4704.48	1.60	2.83
Total Entries	12.73	9.50	10.14	102.79	1.10	.97

Note. $N = 62$

Table 4b

Summary Table of Descriptive Statistics of Self-Efficacy for Group Work, Collective Efficacy, and Participation Measures between the two Conditions

	Collaborative Condition			
	Unstructured		Structured	
	Mean	S.D	Mean	SD
Self-Efficacy	80.05	14.67	81.44	12.34
Collective Efficacy	81.90	14.83	81.39	13.63
Co-constructed Discourse	24.74	26.46	15.23	10.84
Total Words	76.58	85.47	65.23	46.84
Total Entries	12.64	12.52	12.81	7.23

Note. $N = 62$, Unstructured ($n = 31$), Structured ($n = 31$)

Comparing Equivalence of the Conditions T-test

The results from the mean scores between the collaborative conditions were similar on both efficacy measures prior to the intervention (see Table 4b). There were no

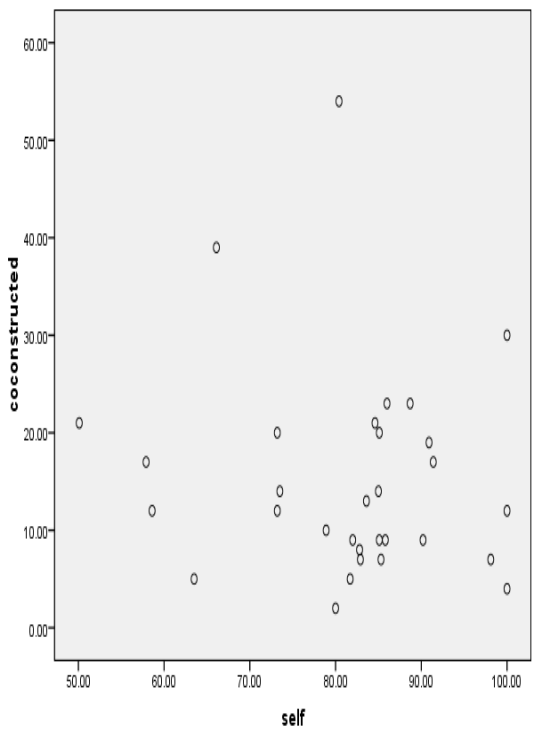
statistically significant differences between conditions for self-efficacy ($t(60)= -.403$, $p>.69$, ns), or for collective efficacy ($t(60)= .141$, $p>.89$, ns).

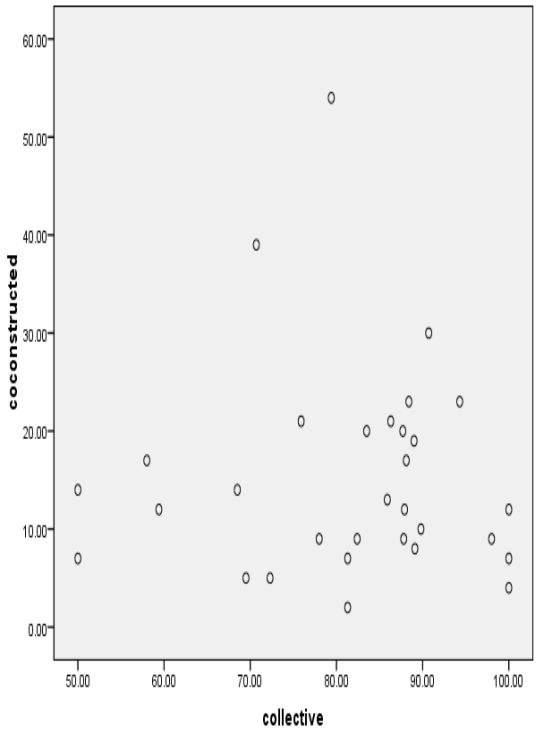
Independent samples t-tests indicated there were no differences in participation between the two collaborative conditions. Based on the Levene's test for equality of variances being significant for all three variables, equal variances not assumed scores were obtained. There were no statistically significant differences between the two conditions in terms of total words ($t(46.53)= .649$, $p>.52$, ns), co-constructed discourse ($t(39.80)=1.853$, $p>.07$, ns) , or total entries ($t(47.99)= -.062$, $p>.95$, ns).

Correlation analyses

One-tailed Pearson product-moment correlations were performed to examine the relationships between self-efficacy, collective efficacy, co-constructed discourse, total entries and total words overall (see Table 5a) and separately for the structured and unstructured conditions (see Tables 6b and 6c). Preliminary analyses revealed no violations of the assumptions of normality, linearity and homoscedasticity. Scatter plots were produced between the two conditions on the variables for a graphical representation of the data (see Figures 7a and 7b).

a. Scatterplots of co-constructed discourse by self and collective efficacy for structured.





b. Scatterplots of co-constructed discourse by self and collective efficacy in unstructured.

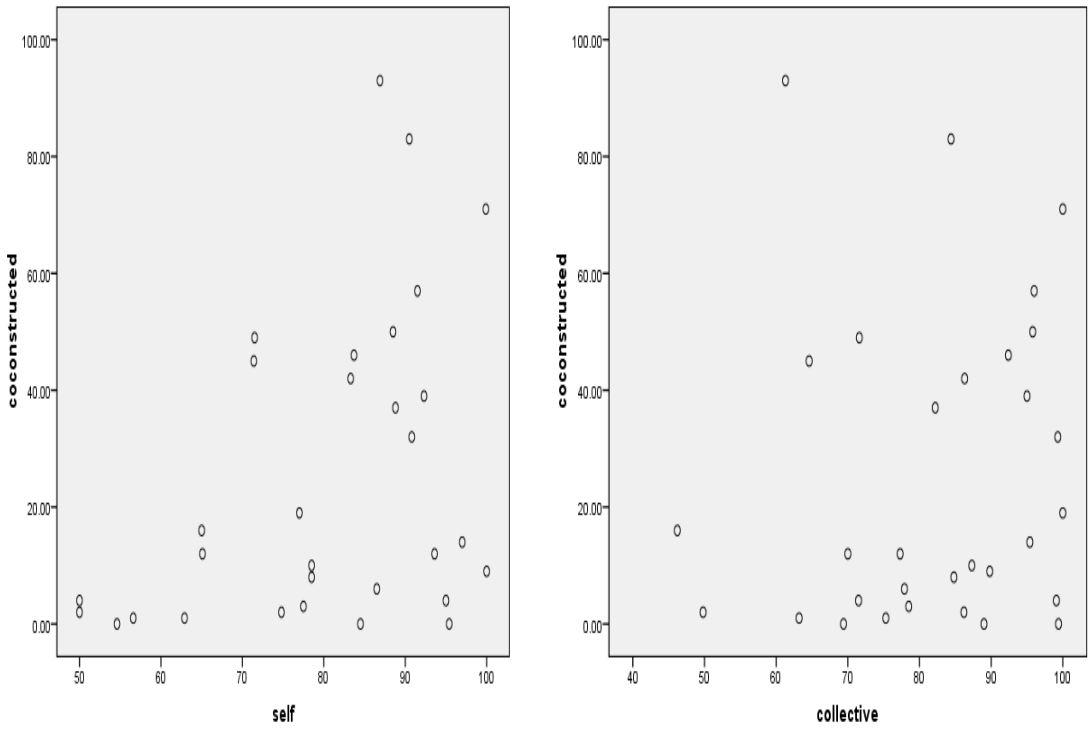


Figure 7. Scatter plots of co-constructed discourse by self and collective efficacy for structured (a), scatter plots of co-constructed discourse by self and collective efficacy for unstructured (b).

Results of the correlation analysis show that the outcome variables were all highly positively correlated to each other (see Table 5a). In addition, the self-efficacy and collective efficacy variables were highly and positively correlated (see Table 5a). However, each of the participation outcome measures was highly and positively correlated with self-efficacy but not collective efficacy (see Table 5a). The outcome measures correlated with self-efficacy in the unstructured group were moderately and

positively correlated for co-constructed discourse (*r*=.392) and total entries (*r*=.381), but not for total words (*r*=.287). There was a weak correlation between self-efficacy and the outcome measures of the structured group (see Table 5c). As well, collective efficacy was non-significant across the collaborative conditions correlated to the outcome measures (see Table 5a, Table 5b and Table 5c).

Table 5a

Bivariate Correlations among the Overall Conditions for the Variables

	Combined				
	Self Efficacy	Collective Efficacy	Co-constructed	Total Words	Total Entries
Self-Efficacy	_	.640*	.230*	.216*	.313*
Collective Efficacy		_	.076	.024	.104
Co-constructed Discourse			_	.804*	.812*
Total Words				_	.916*
Total Entries					_

Note. *N*=62
*$p < .05$

Table 5b

Bivariate Correlations among the Unstructured Conditions for the Variables

	Unstructured				
	Self E	Collective E	Co-constructed	Total Words	Total Entries
Self-Efficacy	_	.692*	.392*	.287	.381*
Collective Efficacy		_	.116	-.016	.035
Co-constructed Discourse			_	.806*	.875*
Total Words				_	.946*
Total Entries					_

Note. *n*=31
*p< .05

Table 5c

Bivariate Correlations among the Structured Conditions for the Variables

	Structured				
	Self E	Collective E	Co-constructed	Total Words	Total Entries
Self-Efficacy	_	.577*	-.116	.094	.187
Collective Efficacy		_	-.019	.101	.241
Co-constructed Discourse			_	.857*	.716*
Total Words				_	.841*
Total Entries					_

Note. *n*=31

*$p < .05$

Pallant (2007) recommends using the following procedure to compare correlation coefficients relating the self and collective efficacy scores to the three participation outcome measures between the two collaborative conditions (structured and unstructured). On this test, evidence of a statistically significant difference in correlation coefficients is indicated by scores that fall outside $-1.96 < z_{obs} > 1.96$. Analyses indicated that correlation coefficients relating self-efficacy and co-constructed discourse ($z_{obs}=2$) as well as self-efficacy and total words ($z_{obs}=2.46$) differed across the collaboration conditions (see Table 6).

Table 6

Comparison of Correlation Coefficients between Unstructured and Structured Conditions

	Co-const Discourse	Total Words	Total Entries
Self-Efficacy	2*	2.46*	0.82
Collective Efficacy	.051	0.43	-.077

Note. Significance is indicated *

Regression Analyses

To test the hypothesis that the relationship between efficacy and participation is mediated by collaborative condition, we conducted a regression analysis examining the contributions of self-efficacy, collaborative conditions, and the interaction between collaborative condition and self-efficacy on variability in participation. Co-constructed discourse (the composite participation score) was chosen as the dependent measure for two reasons. First, this measure is a closer conceptual match to our construct of collaborative participation because it is sensitive to both the frequency of contributions

individuals make to a discussion and the degree to which those contributions interact with and build upon contributions of other group members. Second, our preliminary analyses suggest that self-efficacy shares a different relationship with this measure of participation across collaborative conditions.

Collective efficacy was not included as a predictor variable because after a review of the correlations, it was barely correlated to participation and was highly correlated to self-efficacy. There would not be much gain in the regression analysis from this variable and because of the small sample size, not including this variable adds to the power of the regression. Therefore, the predictors were self-efficacy for group work, collaborative condition and the interaction of self-efficacy and condition, while the criterion variable was the co-constructed discourse measure.

After ensuring the assumptions of normality, linearity, multicollinearity and homoscedacity discussed at the beginning of the chapter were satisfied, an interaction variable for self-efficacy by collaborative condition was constructed. In order to achieve the interaction variable, the unstructured group was dummy coded as 0 so the structured group served as the comparison group and be dummy coded as 1.

Findings indicate that self-efficacy, condition and interaction together account for 18% of the variation in participation (R^2=.18). The regression analysis revealed a statistically significant interaction between collaborative condition and self-efficacy in the prediction of participation, $F(3, 58)=4.25$; $p<.01$.

The results of the multiple regression are presented in Table 7, which indicates the importance of each contributory factor in predicting participation. All the contributory factors, with the exception of condition, were statistically significant at the .05 level of

significance. The interaction predictor showed a slight negative relationship, indicating that as self-efficacy increases then participation decreases for the structured group (see Figure 8). For the unstructured group, as self-efficacy increases, so does participation.

Table 7

Summary of Multiple Regression Results for Variables Predicting Participation

	Unstandardized		Standardized		
	B	Standard error	β	*t* value	*p* value
Model					
Constant	-31.863	19.387		-1.644	.106
Self-Efficacy	0.7070	0.2380	.462	2.967	.004
Conditions	55.378	30.333	1.354	-1.826	.073
Interaction	-0.8090	0.3700	-1.646	-2.185	.033

Note. R^2= .180.

The efficacy-participation interaction across the two collaboration conditions was plotted to assist in interpreting the interaction. Centering was not conducted on the variables because the regression coefficients were easily interpretable; however, when the centering analysis was conducted, it reduced multicollinearity among the variables (Aiken & West, 1996). It is also important to note that the structured condition was plotted with a regression line that should be interpreted with caution. The regression line for this condition is not a good fit because the variables were hardly correlated; however, the line was drawn to help with interpretation. Findings suggest that being in a structured collaboration condition eliminates the relationship between efficacy and participation.

Findings indicate that the relationship between participation and self-efficacy is different across the two collaborative conditions. These results also support the hypothesis that there was mediation between self-efficacy and participation depending on collaborative condition. The structured condition altered the relationship of self-efficacy and participation so that instead of seeing the increase of self-efficacy with the increase

of participation as in the unstructured condition, this pattern was not exhibited for the structured condition; therefore, the structured condition does change the relationship of self-efficacy and participation.

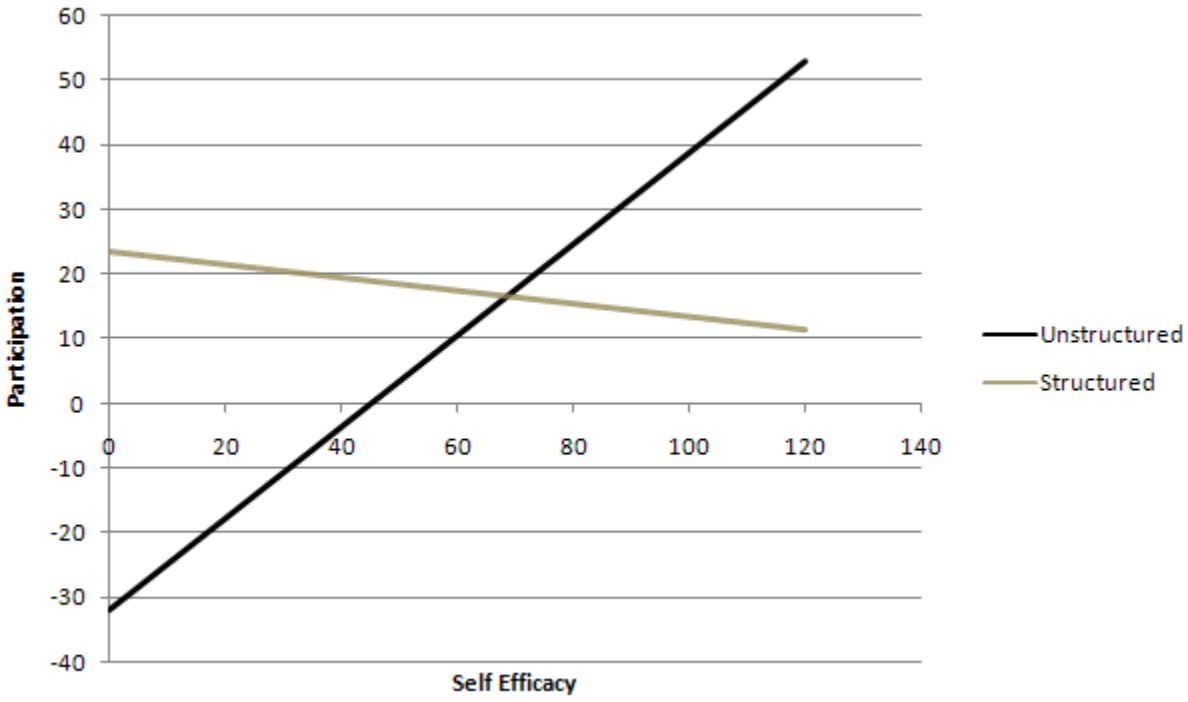


Figure 8. Regression line of the conditions.

Chapter 6

Discussion

The purpose of this study was to examine the role of efficacy on participation in computer supported collaborative learning tasks. The second purpose was to examine whether the effect of efficacy on participation is mediated by providing support for students to collaborate. This study was interested in discovering what makes people engage, or not engage, in collaborative group work and addresses the question of who participates.

Simply providing information to students and assuming they are learning is not enough to ensure learning occurs. Many students are not strategic learners and lack the skills to learn successfully (King, 2003). Collaborative partners or groups can help with the online learning process, but as with giving students learning material and expecting them to learn, you cannot place learners in groups and expect that to help with the learning process (Kester & Paas, 2005; O'Donnell & Dansereau, 2000; Weinberger, Ertl, Fischer, & Mandl, 2005). The CSCL literature suggests that collaborative learning is improved when it becomes more structured because it guides learning (Weinberger et al., 2005). However, little research examines the effectiveness of supports for productive collaboration and participation in computer supported collaborative environments (Hadwin, Winne & Nesbit, 2005).

The present study uses O'Donnell's and Palinscar and Brown's roles, scripts and prompts to support collaboration to guide the collaborative process of how and when to collaborate in reciprocal teaching roles to help individuals in the group excel on a content

task. The intervention offered a structured support to provide a possible solution for improving self and collective efficacy in a collaborative learning activity.

This study extends past research by considering the relationship between efficacy and participation when support is provided. Key findings suggest that collaborative support mediates the relationship of participation and efficacy.

Reflecting on Measures of Efficacy and Participation

Collective and Self-Efficacy

In this study, self-efficacy refers to self-efficacy for group work. This refers to the individual's belief that they can successfully contribute to the group. Collective efficacy refers to an individual's confidence in the group to perform as a single unit to complete the task. The results of the correlation analyses reveal that the two constructs were highly positively correlated within both collaborative conditions. It is also important to note that this thesis study focuses only on efficacy scales prior to the task. The post efficacy measures were collected as part of a larger research study.

The finding that self-efficacy for group work and collective efficacy are highly correlated is consistent with other findings in the literature suggesting that a group member's appraisal of the group can be highly influenced by their self-efficacy for group work (Alavi & McCormick, in press; Bandura, 1997; Wang & Lin, 2007). Bandura's (2001) suggestions for creating efficacy scales are that the items be as closely related as possible to reflect how the individual feels they can perform in the group, and parallel how they believe the group will perform as a single functioning unit. Alavi and McCormick (in press) created the self-efficacy for group work and collective efficacy scales that were adapted for this study. They examined self-efficacy in an academic

group context where self-efficacy for group work was operationalized as a group member's appraisal of his or her capabilities to participate in a group activity for performing a task (Alavi & McCormick, in press). This assures that how an individual believes they can function in a group is related to their belief in the group's collective functioning. The results from the present study indicate that self-efficacy for group work and collective efficacy are highly positively correlated.

Participation Outcomes

Findings indicate the three participation measures (co-constructed discourse, total words and total entries) in this study are highly positively correlated. Participants who posted more frequently to the text-based discussion also used more words and engaged in higher discourse levels of collaborative conversation. Scoring for level of discourse, or co-constructed discourse, is a contribution of this thesis study. A review of the literature on measures of participation indicated that few measures assess anything other than frequency of postings or number of words. Measures are needed that study the effect of group member interaction (Wang & Lin, 2007). While frequency measures of participation are common, there are not many sophisticated measures that capture participation in terms of participation levels.

To address this gap, we developed a composite measure of co-constructed discourse that accounts for the degree to which participants engaged in co-constructed discussions where ideas build upon one another. The strong positive correlation between conventional measures of participation (total words and total entries), and the composite (co-constructed discourse), provide support for the construct validity of co-constructed discourse. However, unlike frequency of postings and number of words that were quite

similar across experimental conditions, our measure of co-constructed discourse seems to be more sensitive to changes in discourse between the two conditions with students demonstrating sophisticated discussion in the structured condition. Findings indicate that our measure of participation captures both frequency and participation level to add to our analysis and understanding of participation in collaborative discussion. While total number of entries and total words are popular and viable ways of measuring participation, our measure seems to be more sensitive to differences in collaborative discourse.

Is There a Relationship between Efficacy and Collaborative Participation?

Findings indicate that there is a strong positive relationship between efficacy and participation; however, this relationship appears to only exist for self-efficacy in the unstructured condition. The results show that while self-efficacy and collective efficacy are highly positively inter-correlated variables, only self-efficacy shares a strong positive correlation with participation in collaborative discussion.

Self-Efficacy and Participation

Within the literature there is a gap concerning self-efficacy and collaborative participation. Results of this study show that overall self-efficacy for group work is highly positively correlated with participation. This makes sense in that students who perceive themselves as efficacious are more likely to engage, expend effort and persist in tasks so this should also apply to collaborative learning tasks in a computer supported collaborative environment. With higher levels of self-efficacy, individuals feel more comfortable with their task, become more engaged with the task, and are more willing to continue their task even when there are challenges (Pescosolido, 2003). In the present study, the relationship between self-efficacy and participation was examined within two

different collaborative conditions. The first condition was an open discussion task focusing on a goal of improving understanding of the text. The second condition was a structured collaborative condition during which students were given roles, scripts and prompts to guide their discussion. Findings indicate that the strong relationship between self-efficacy and participation exists only in open discussions. During structured discussions, the relationship between self-efficacy and participation was eliminated. Therefore, when participants were guided to collaborate through roles, scripts and prompts, the relationship between self-efficacy and participation was weakened. This finding warrants further investigation.

Collective Efficacy and Participation

Self-efficacy for group work accounts for variability in the participation outcomes whereas collective efficacy does not. There are a few possible reasons for this finding. When participants completed the self and collective efficacy scales, the participants did not know anything about their groups. It is possible that collective efficacy is contextualized by other variables such as group size, group membership, and past team performance and experiences that may not influence self-efficacy for group work (Wang & Lin, 2007). Knowing more about the group could possibly influence how an individual perceives their group's future performance. Bandura (2006) recommends that efficacy measures be anchored to specifics of the task; therefore, perhaps when participants are unclear of the specifics about the group and the task, the relationship to participation is changed.

Also, when learners are provided with chat tools, they are commonly provided little direction of how to interact with their collaborative peers. The current study

attempted to provide direction through the intervention conditions; however, the participants may have lacked proper practice with the structured tools. With further training this effect could have been diminished. This is an area that should be examined further. Training could provide greater comfort with the new collaborative learning situation and allowed the participants to effectively utilize the tools given to them.

Another issue is that the participants may have had more prior knowledge and experience informing their ratings of confidence for successfully contributing to group work, than they had to inform ratings of confidence regarding the group's overall performance. Students are used to reflecting on their own performance, but they do not always engage in group activities that allow them to reflect on performance as a single collaborative unit. This unfamiliarity with projecting how the group could collaborate could influence collective efficacy.

A recent study by Wang and Lin (2007) addressed many of these issues. They examined group composition of self-efficacy (low, high, mixed) on collective efficacy, collaborative learning behavior and performance in a computer supported collaborative learning environment. Their results indicated that high self-efficacy groups have higher collective efficacy and that collective efficacy has positive effects on discussion behaviours and group performance. For their study, the collective efficacy scale was administered after collaboration using statements that began "I am confident my group can…". The study was concerned with how the group believed it would be able to perform on a future academic task, not how they would interact as a group (even though they measured computer mediated communication). It is also important to note that they encouraged student discussion by having a teacher evaluate the discussions. This could

alter participant's incentive for engaging in collaborative discussion. Perhaps administering the collective efficacy scale at the completion of the task would eliminate certain factors such as uncertainty of group members; however, the items would not fit in with the format of "My group can…" which is important to capture when measuring the process of collaboration, nor would it determine confidence in the group before collaboration but retrospectively provide a score which is not a true measure of efficacy.

Even though collective efficacy was not found to relate to the participation measures, and rather than ruling out the importance of collective efficacy, findings from this study point to the need to explore both the operationalization of the construct, and the timing/context of administering the measure more thoroughly. Perceived collective efficacy could also be measured by having the group arrive at one single judgment call; however, this is problematic because rarely will all individuals agree on the score which also brings in problems with independence of scores and sample size (Bandura, 2001). Overall, these effects need to be further examined.

Is the Relationship between Efficacy and Collaborative Participation Mediated by Collaborative Support?

Findings from this study indicate that self-efficacy for group work is statistically significantly related to collaborative participation in a computer supported collaborative learning environment. The correlation and regression findings indicate that the relationship between efficacy and participation is different for each condition. For the unstructured condition, as efficacy increases so too does participation. For the structured group this is not the case. Therefore it seems that efficacy is more important to participation if you are in the unstructured collaborative condition than it is when you are

in a structured collaboration. Therefore, the relationship between efficacy and participation is mediated by collaborative support.

Mediating the Relationship between Efficacy and Participation

Findings suggest that collaborative support does mediate the relationship of participation and efficacy. Evidence points to the fact that being in the structured group means that efficacy is not as strongly related to participation. This makes sense because all participants are learning how to participate differently within this structured condition with their role. Having to collaborate this way slows them down which produces fewer words and more mechanical discussions, particularly when they have had little practice using roles, scripts and prompts. The issue of training and practice using roles, scripts and prompts is elaborated further in the limitations section. This finding warrants further investigation of the nature of this relationship whether it is positive or negative. Preliminary results indicate that participants reporting higher self-efficacy could have felt more constrained by the roles, whereas participants reporting lower in efficacy thrived while using them. Examining comprehension with participation might be one indicator of the nature of this relationship. At the completion of the collaborative discussion in this study, a comprehension measure was administered. It may be possible that the lower more pointed discussion of the structured group increases participant comprehension though not their participation. We know from these findings that within the structured condition, the sophistication of collaborative dialogues are not governed by someone's pre-existing efficacy about collaboration, meaning that their collaboration is changing because of the roles, scripts and prompts intervention.

The literature is abundant with studies on efficacy and performance. Findings consistently indicate that students who report higher self-efficacy have higher performance in those tasks (Gist & Mitchell, 1992; Zimmerman, Bandura & Martinez-Pons, 1992) and in turn will likely be more successful. Findings reported in the literature also indicate a connection between participation and performance where increased participation results in better performance outcomes. However, the relationship between self-efficacy and participation has been under examined. This study takes a first step to further examine that relationship.

Roles provide a scaffold of the learning process for students to learn and collaborate in an academic setting with greater ease (O'Donnell, Hmelo & Erkens, 2005). However, some literature suggests that scripts are perhaps too structured and possibly impede a learner's ability to formulate ideas for themselves (Weinberger et al., 2005). Perhaps the participant discussions were overly constrained when roles, scripts and prompts were used in the structured condition leading to a feeling by participants that they could not fully express themselves collaboratively while enacting the guided roles, scripts and prompts. Participants may have found this structure inhibiting in making sure they were using the right role, following the correct script and trying to figure out ways of fitting in the prompts to the conversation. As well, within this study it was found that the prompts were used minimally in the chat logs for both the generic and cognitive prompts. On average, each group used the cognitive prompts 4.3 times in the discourse and the generic prompts were used an average of 2.5 times per discourse. Participants could possibly have felt uncomfortable with using the prompts or did not have enough training with the prompts prior to collaboration. However, this does not mean that they

were not acting within their role or in accordance to the script they were given. It was hoped that prompts would be a way of pulling out if roles were being used, however a deeper level of coding is needed to determine if students were acting in a role with the scripts.

This study also departed slightly from O'Donnell's (1999) and Palinscar and Brown's (1984) use of cognitive roles and prompts. Rather than using the role and prompt to engage in a particular cognitive activity themselves and share that with the group, participants were asked to use that role to provide prompts and supports that would help their group members to engage that cognitive role. For example, in traditional cognitive engagement roles a summarizer would summarize the text. However, in the present study, the summarizer was trying to engage the group to summarize by using prompts such as "What is this part about?" (see Table 2). This shift could have been challenging for participants. Admittedly the predictor role is hard to grasp for many students (especially in the way this study was asking them to utilize the role) and the clarifying role may have naturally produced fewer responses because the chat logs showed evidence that the participants believed the task was "easy" since the subject matter was familiar thus feeling they needed less clarification from the text. However, preliminary results of their reading comprehension scores reveal this may have not been the case but the participant's perception whether true or not would have been a factor.

Finally, the off-task entries were also interesting. Originally it was planned that students would be assigned a pseudonym to diminish extraneous conversation. However, it appeared that the participants then spent a portion of the chat trying to figure out who

they were chatting with. This kind of discussion accounted for approximately 20% of the off task conversation. Overall, the off-task entries overall account for a small percentage of the discourse.

Theoretical Implications

This study contributes to theory in three ways. First, it explores the relationship between efficacy (self-efficacy for group work and collective efficacy) and collaborative participation. While self-efficacy is a construct prevalent in the literature, self-efficacy for group work is less commonly addressed. This study examined self-efficacy for group work in a collaborative engagement setting and found that self-efficacy for group work is related to group participation in an unstructured online text-based discussion. Even more interesting though is the construct of collective efficacy. Since this is a relatively new construct, much less is known about its role in collaboration. This study found that collective efficacy was not an important variable in terms of its relationship with collaborative participation, but future studies should further study this construct.

This study adds to the literature of cognitive supports by examining a structured environment within the computer supported collaborative environment. There is an understanding that these supports should encourage collaboration and efficiency of group dynamics, however the supports did change the relationship though the nature of that change is not known. Optimal levels of structure and training are believed to have been important elements to this study. In addition, the roles were slightly changed from traditional reciprocal teaching roles. Trying to find correct roles to aid in the process of collaboration was an important element in the current study.

Finally, this study adds to the literature for efficacy and participation. The literature is abundant with studies on efficacy and performance and a link between participation and performance. Where the literature is lacking, and this study can add to, is adding to the literature between self-efficacy and participation.

Practical Implications

This study contributes to practice by examining the role of collaborative support on the relationship between efficacy and participation. In this study, support was in the form of cognitive roles, scripts and prompts. Support mediates the relationship between efficacy and participation which is a practical finding for distance education students. Receiving structured in this environment can aid those less efficacious to participate more.

Findings demonstrate that self-efficacy for group work is related to participation. Since self-efficacy appears to be an important element in participation engagement, educators should help support students who do not feel as self-efficacious for working in a group situation. Working to help structure these students could possibly empower those who are reluctant to participate and potentially fail at the task, not due to a lack of knowledge, but a lack of confidence for collaborating in the group setting. On the other side, this study also showed that structure could inhibit those who are high in self-efficacy for group work. Perhaps not structuring students who are efficacious will help them further participate and be successful at tasks.

Research Implications

This study contributes to research by adding to computer supported collaborative learning measurement in terms of the process of learning rather than the product.

Understanding group participation leads to a better understanding of what is actively taking place during the learning process. A large majority of studies on computer supported collaborative learning rely heavily on the end product of collaboration rather than the collaborative process as an outcome or dependent variable (MacDonald, 2003). This study strived to address that problem by comparing three different measures of participation in a text based online discussion. Extending past research that operationalizes participation as frequency scores, this study considered participation levels. The participation composite measure (co-constructed discourse) that was developed for this study managed not only to measure frequency but also participation level of a discussion. This provides a new way of looking at collaborative process to take frequency counts a step further for providing a well rounded picture of collaborative discussion.

This study also adds to research by informing knowledge/use of self and collective efficacy scales for small group work. Self-efficacy for group work and collective efficacy are concepts that are gaining popularity, especially in the CSCL literature, but examination of scales is still needed. The scales used in this study produced results that were closely correlated even though collective efficacy failed to be significantly correlated with participation. Bandura (2006) does state that scales should be based in the context at hand, however testing out pre existing scales and manipulating those then helps research to further pin point what is being measured in terms of both these constructs.

Limitations

It is important to interpret these results keeping in mind that there were seven main limitations within this study.

First, there was a limit on the amount of instructional time allotted in the classroom for this study. Ideally it would have been beneficial to have a third session with some more intensive practice using the software and the roles. While students do commonly collaborate in the classroom and use the reciprocal teaching roles for classroom engagement, replicating this in an online environment was a new experience for the participants. Students reported in a pre-computer efficacy inventory that they felt comfortable using a computer, but they were using a new program that was asking them to exercise skills they are not used to using on a computer.

Second, there was a limit for the amount of text students could read and discuss in 80 minutes. It was originally hoped that the participants would be able to collaborate on two sections of text. However, due to unforeseen circumstances with time preparation, the text to be used in collaborative discussion by the participants was only one thus allowing them only one chance to participate in collaboration. Perhaps with two texts, the novelty of wanting to speak off task could have been diminished once the second text was introduced for collaboration. And again, as mentioned previously, perhaps the extra text could have allowed for a practice before the participants engaged in the second reading.

Third, another limitation is that we considered counterbalancing the text to ensure random sampling; however, the logistics of doing this and maintaining clarity in the instructions and procedures for the participants required that we drop the

counterbalancing. Both for the sections of text and having participants change roles throughout the study. Ideally this would have been desired; however time constraints permitted us from accounting for these factors.

Fourth, another limitation was that while the study's objectives and the text content fit PLOs for Planning 10, the activity and tests did not count toward student's grades. This may have limited the degree to which the students fully engaged or invested in the learning activity. Alternatively, assessment of students would most likely have assessed output from the collaboration, not the collaboration itself. This may have encouraged students to rush through the collaboration as a means to get to the end product which would have been assessed.

Fifth, as with most studies, another limitation of this study was the number of participants creating a small sample size. Ideally more participants were required to provide greater power for the variables in the regression analysis; however, due to the nature of school based research and the lack of teachers wanting to allot the researchers instructional time (especially at the end of the school year), 62 participants were close enough to ideal.

Six, unforeseen to the researchers, the participants displayed great dismay at the topic "crystal meth". As mentioned previously, crystal meth was chosen because it is a topic covered in the Planning 10 PLOs. However, the students had received many talks and assignments on crystal meth awareness and found the topic to be boring and one they already knew well. Perhaps a different topic could have sparked their interest to engage more fully in the collaborative task.

Finally, June is the end of the school year and was most likely not the ideal time to conduct a research study in classrooms. The teachers felt a need to have that instructional time to get caught up on concepts missed before final exams and the students were anxious to finish the year and may have been less inclined to fully invest in a new learning activity. However, most students seemed to enjoy the change of pace and excitement of being able to participate in a research study and the teachers afforded instructional time at the end of term to get caught up but did not need this extra time.

Suggestions for Future Research

Suggestions for future research lie in four areas.

First, training with the tools is a very important element to this study. It was believed that by session two the participants would be feeling more comfortable with the computer program. However, the form of collaboration the study demanded from the participants is new to them. Students may have felt unsure of how to utilize these new tools. Longer training sessions and possibly providing feedback to the structured participants about how they are using the tools could be useful in future research studies.

Second, this study offers a new way of measuring collaborative participation. As mentioned previously, past research lacks attempts to measure the depth of participation. While I do believe the measurement used in this study is novel and offers a new way to measure this variable, it may have also been good to include a cognitive contribution element within the coding of conversations that displays the utilization of roles within the discourse. Cognitive engagement can be calculated to a degree from data collected as part of the larger research study. Unfortunately this was impossible to gain for this study due to the length and the nature of collaborative discussions, but future research may

benefit exploring depth and cognitive engagement to provide a fuller understanding of collaborative learning.

Third, future research may benefit from counter balancing. The researchers were unable to offer different texts to different participants at varying times and were also unable to have students switch roles. This would be good for future research to note to make sure all participants have experience with each of the roles and there is a balance in excelling in a certain role compared to another.

Finally, it may also be interesting for future research to study academic areas other than reading comprehension. As well, topics other than what the participants have already learned. Exposing new areas for the students to learn about could encourage them to participate more in the conversation.

Conclusion

While studies surrounding research on computer supported collaboration learning environments is still a relatively new area of study, there is a lot of fertile research ground to explore in this area. Not only is distance education and the need for collaboration gaining popularity in classrooms, but being able to provide students with supports that help the learning process in collaborative activities is invaluable and is an area that deserves much more research.

Examining student's self and collective efficacy adds to the literature by determining the relationship between these variables and participation with the influence of collaborative conditions. However, due to time constraints, it would have been advantageous to look at computer efficacy, as well as different types of support in terms of cognitive engagement and cognitive scaffolding for interesting comparisons of

efficacy in students for collaborative learning tasks. As well, as the literature shows there is a great need for effective self and collaborative efficacy inventories. Thus, more research needs to be conducted to fully understand the roll of collaborative participation in computer supported collaborative environment.

References

Aiken, L. S., & West, S. G. (Ed.). (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, California: SAGE publications, Inc.

Alavi, S. B. (2005). *A multilevel study of collective efficacy, group members' self-mental models and collective cognition activities.* Unpublished PhD, University of New South Wales.

Alavi, S.B. & McCormick, J. The roles of perceived task interdependence and group members' interdependence in the development of collective efficacy in university student group contexts (accepted). British Journal of Educational Psychology.

Baker, E. L., & Mayer, R. E. (1999). Computer-based assessment of problem solving. *Computers in Human Behavior, 15*(3-4), 269-282.

Baker, E. L., & O'Neil, H. F. J. (2002). Measuring problem solving in computer environments: Current and future states. *Computers in Human Behavior, 18*(6), 609-622.

Bandura, A. (Ed.). (1997). *Self-efficacy: The exercise of control.* (pp. 163-211). New York: Worth Publishers, Inc.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Clinical and Social Psychology, 4*, 359-373.

Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents* (pp. 307-337) Information Age Publishing. Retrieved April.23, 2008, Available online from http://des.emory.edu/mfp/014-BanduraGuide2006.pdf

Beers, P. J., Boshuizen, H. P. A., Kirschner, P. A., & Gijselaers, W. H. (2005). Computer support for knowledge construction in collaborative learning environments. *Computers in Human Behavior, 21*(4), 623-643.

Burton, M., Brna, P., & Pilkington, R. (2000). Clarissa: A laboratory for the modelling of collaboration. *International Journal of Artificial Intelligence in Education, 11*, 79-105.

Cassidy, S., & Eachus, P. (2002). Developing the computer self-efficacy (CSE) scale: Investigating the relationship between CSE, gender and experience with computers. *Journal of Educational Computing Research, 26*(2), 133-153.

Chou, C., Lin, C., & Chan, T. (2002). An approach to developing computational supports for reciprocal tutoring. *Knowledge-Based Systems, 15*(7), 407-412.

Creswell, J. W. (2005). In Benson A. C., Harlan M. (Eds.), *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (Second ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Dewiyanti, S., Brand-Gruwel, S., & Jochems, W. (2005). Applying reflection and moderation in an asynchronous computer-supported collaborative learning

environment in campus-based higher education. *British Journal of Educational Technology, 36*(4), 673-676.

Eastin, M. S., & LaRose, R. (2005). Alt.support: Modeling social support online. *Computers in Human Behavior, 21*(6), 977-992.

Eby, L., & Dobbins, G. (1997). Collectivistic orientation in teams: An individual and group-level analysis. *Journal of Organizational Behaviour, 18*, 275-295.

Englert, C. S., & Marriage, T. (2003). The sociocultural model in special education intervention: Apprenticing students in higher-order thinking. In L. Swanson, K. R. Harris & S. Graham (Eds.), *Handbook of learning disabilities.* ()Guilford Press.

Gist, M. E., & Mitchell, T. R. (1992). Self-eficacy: A theoretical analysis of its determinants and malleability. *Academy of Management Review, 17*(2), 183-211.

Goddard, R. D. (2001). Collective efficacy: A neglected construct in the study of schools and student achievement. *Journal of Educational Psychology, 93*(3), 467-476.

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2004). Collective efficacy beliefs:Theoretical developments, empirical evidence, and future directions. *Educational Reseracher, 33*(3), 3-13.

Gonzalez, M. G., Burke, M. J., Santuzzi, A. M., & Bradley, J. C. (2003). The impact of group process variables on the effectiveness of distance collaboration groups. *Computers in Human Behavior, 19*(5), 629-648.

Gress, C. L. Z., Fior, M. N., Hadwin, A. F., & Winne, P. H. Measurement and assessment in computer-supported collaborative learning (accepted). *Computers in Human Behaviour.*

Guzdial, M., & Turns, J. (2000). Effective discussion through a computer-mediated anchored forum. *Journal of the Learning Sciences, 9*(4), 437-469.

Guzzo, R. A., Yost, P. R., Campbell, R. J., & Shea, G. P. (1993). Potency in groups: Articulating a construct. *British Journal of Social Psychology, 1*, 87-106.

Hadwin, A. F., Winne, P. H., Murphy, C., Walker, J. K., & Rather, N. (2005). WebQuestionnaire: An authoring tool for developing and administering online questionnaires (version 1.0) [computer program].

Hadwin, A.F., Gress, C., Winne, P.H., & Jordanov, M. (2006). *gChat: A chat interface with scaffolds to enhance collaborative effectiveness (version 1.0) [computer program]*.

Hadwin, A. F., Gress, C. L. Z., Page, J., & Ross, S. P. (2005). Computer supported collaborative work: A review of the research 1999-2004. *Poster Presented at the Annual Meeting of the Canadian Society for the Study of Education,* London, ON.

Hadwin, A. F., Winne, P. H., & Nesbit, J. C. (2005). Roles for software technologies in advancing research and theory in educational psychology. *British Journal of Educational Psychology, 75*, 1-24.

Hathorn, L. G., & Ingram, A. L. (2002). Cooperation and collaboration using computer-mediated communication. *Journal of Educational Computing Research, 26*(3), 325.

Jamieson-Noel, D. *Exploring task definition as a facet of self-regulated learning.* Unpublished Doctoral Dissertation, Simon Fraser University, 2004.

Kester, L., & Paas, F. (2005). Instructional interventions to enhance collaboration in powerful learning environments. *Computers in Human Behavior, 21*(4), 689-696.

Kirschner, P., Strijbos, J., Kreijns, K., & Beers, P. J. (2004). Designing electronic collaborative learning environments. *Educational Technology Research & Development, 52*(3), 47-66.

Koschmann, T. (2001). Revisiting the paradigms of instructional technology. In G. Kennedy, M. Keppell, C. McNaught & T. Petrovic (Eds.), *Meeting at the Crossroads.* Proceedings of the 18th Annual Conference of the Australian Society for Computers in Learning in Tertiary Education. (pp. 15 - 22). Melbourne: Biomedical Multimedia Unit, The University of Melbourne. Available online at: http://www.ascilite.org.au/conferences/melbourne01/pdf/papers/koschmannt.pdf

Kreijns, K., Kirschner, P. A., Jochems, W., & van Buuren, H. (2004). Measuring perceived quality of social space in distributed learning groups. *Computers in Human Behavior, 20*(5), 607-632.

Lazonder, A. W., Wilhelm, P., & Ootes, S. A. W. (2003). Using sentence openers to foster student interaction in computer-mediated learning environments. *Computers & Education, 41*(3), 291.

Lent, R. W., Schmidt, J., & Schmidt, L. (2006). Collective efficacy beliefs in student work teams: Relation to self-efficacy, cohesion, and performance. *Journal of Vocational Behavior, 68*(1), 73-84.

Lentinen, E. (2003). Computer-supported collaborative learning: An approach to powerful learning environments. In E. De Corte, L. Verschaffel, N. Entwistle & Van Merrieboer. (Eds.), *Unravelling basic components and dimensions of powerful learning environments.* (pp. 35-53). Amsterdam: Elsevier:

Linn, M. C., & Slotta, J. D. (2006).). Enabling participants in online forums to learn from each other. In A. O'Donnell, C. E. Hemelo-Silver & Erkens G. (Eds.), *Collaborative learning, reasoning, and technology* (pp. 61-98). Mahwah, NJ: Lawrence Erlbaum Associates.

Little, B. L., & Madigan, R. M. (1997). The relationship between collective efficacy and performance in manufacturing work. *Small Group Research, 28*(4), 517-534.

Macdonald, J. (2003). Assessing online collaborative learning: Process and product. *Computers & Education, 40*(4), 377.

Makitalo, K., Weinberger, A., Hakkinen, P., Jarvela, S., & Fischer, F. (2005). Epistemic cooperation scripts in online learning environments: Fostering learning by reducing uncertainty in discourse? *Computers in Human Behavior, 21*(4), 603-622.

Morris, R., Church, H., Hadwin, A. F., Gress, C. L. Z., & Winne, P. H. (May, 2006). *Use of roles, scripts and prompts to support cscl in gStudy.* Paper presented at the meeting of the Canadian Society for the Study of Education, Toronto, ON.

O'Donnell, A. M. (1999). Structuring dyadic interaction through scripted cooperation. In A. M. O'Donnell, & A. King (Eds.), *Cognitive perspectives on peer learning* (pp. 179-196). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

O'Donnell, A. M., & Dansereau, D. F. (2000). Interactive effects of prior knowledge and material format on cooperative teaching. *Journal of Experimental Education, 68*(2), 101.

Orvis, K. L., Wisher, R. A., Bonk, C. J., & Olson, T. M. (2002). Communication patterns during synchronous web-based military training in problem solving. *Computers in Human Behavior, 18*(6), 783-795.

Oshige, M., & Hadwin, A. F. (2006). *Self-regulation, co-regulation and socially shared regulation: Examining the many faces of social models of SRL.* Paper presented at the meeting of the American Educational Research Association, San Francisco, CA.

Pajares, F., & Kranzler, J. (1995). Self-efficacy beliefs and general mental ability in mathematical problem-solving. *Contemporary Educational Psychology, 20*(4)

Pallant, J. SPSS Survival Manual: A step by step guide to data analysis using SPSS for windows. Third Ed. Publisher Allen & Unwin, ebook

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension- fostering and comprehension- monitoring activities. *Cognition and Instruction, 1*(2), 117-175.

Paskevich, D. M., Brawley, L. R., Dorsch, K. D., & Widmeyer, W. N. (1999). Relationship between collective efficacy and team cohesion: Conceptual and measurement issues. *Group Dynamics: Theory, Research and Practice, 3*(3), 210-222.

Pata, K., Lehtinen, E., & Sarapuu, T. (2006). Inter-relations of tutor's and peers' scaffolding and decision-making discourse acts. *Instructional Science, 34*(4), 313-341.

Pescosolido, A. T. (2003). Group efficacy and group effectiveness: The effects of group efficacy over time on group performance and development. *Small Group Research, 34*(1), 20-42.

Puntambekar, S., & Luckin, R. (2003). Documenting collaborative learning: What should be measured and how? *Computers & Education, 41*(4), 309.

Rovai, A. P. (2001). Classroom community at a distance: A comparative analysis of two ALN-based university programs. *Internet and Higher Education, 4*(2), 105-118.

Rovai, A. P. (2002). Development of an instrument to measure classroom community. *Internet and Higher Education, 5*(3), 197-211.

Rozell, E. J., & Gardner, W. L., III. (1999). Computer-related success and failure: A longitudinal field study of the factors influencing computer-related performance. *Computers in Human Behavior, 15*(1), 1-10.

Rummel, N., & Spada, H. (2005). Learning to collaborate: An instructional approach to promoting collaborative problem solving in computer-mediated settings. *Journal of the Learning Sciences, 14*(2), 201-241.

Saab, N., van Joolingen, W. R., & van Hout-Wolters, B. H. A. M. (2005). Communication in collaborative discovery learning. *British Journal of Educational Psychology, 75*(4), 603-621.

Salovaara, H., & Järvelä, S. (2003). Students' strategic actions in computer-supported collaborative learning. *Learning Environments Research, 6*(3), 267.

Schacter, J., Herl, H. E., Chung, G. K. W. K., Dennis, R. A., & O'Neil, H. F.,Jr. (1999). Computer-based performance assessments: A solution to the narrow measurement and reporting of problem-solving. *Computers in Human Behavior, 15*(3-4), 403.

Short, S. E., Sullivan, P., & Feltz, D. L. (2005). Development and preliminary validation of the collective efficacy questionnaire for sports. *Measurement in Physical Education and Exercise Science, 9*(3), 181-202.

Shunk, D. H., & Pajares, F. (2004). Self-efficacy in education revisited: Empirical and applied evidence. In D. M. Mc Inerney, & S. Van Etten (Eds.), *Big theories revisited* (Fourth ed., pp. 115-136)Information Age Publishing, inc.

Sins, P. H. M., Van Joolingen, W. R., Savelsbergh, E. R., & Van Hout-Wolters, B. H. A. M. (2008). Motivation and performance within a collaborative computer-based modeling task: Relations between students' achievement goal orientation, self-efficacy, cognitive processing and achievement. *Contemporary Educational Psychology*, (33), 58-77.

Slavin, R. E. (1999). Comprehensive approaches to cooperative learning. *Theory into Practice, 38*(2), 74.

Strijbos, J., Martens, R. L., Jochems, W. M. G., & Broers, N. J. (2004). The effect of functional roles on group efficiency: Using multilevel modeling and content analysis

to investigate computer- supported collaboration in small groups. *Small Group Research, 35*(2), 195.

Tabachnick, B. G., & Fidell, L. S. (Ed.). (2001). *Using multivariate statistics* (Fourth ed.). Needham Heights, MA: A Pearson Education Company.

Tasa, K., & Whyte, G. (2005). Collective efficacy and vigilant problem solving in group decision making: A non-linear model. *Organizational Behavior & Human Decision Processes, 96*, 119-129.

Wang, S., & Lin, S. S. J. (2007). The effects of group composition of self-efficacy and collective efficacy on computer-supported collaborative learning. *Computers in Human Behavior, 23*, 2256-2268.

Weinberger, A., Ertl, B., Fischer, F., & Mandl, H. (2005). Epistemic and social scripts in computer-supported collaborative learning. *Instructional Science, 33*(1), 1-30.

Wiley, J., & Bailey, J. (2006). Effects of collaboration and argumentation on learning from web pages. In A.M. O'Donnell, C. E. Hmelo-Silver & G. Erkens (Eds.), *Collaborative learning, reasoning, and technology*. Hillsdale, NJ: Erlbaum.

Winne, P. H., Hadwin, A. F., Nesbit, J. C., Kumar, V., & Beaudoin, L. (2005). *gSTUDY: A toolkit for developing computer-supported tutorials and researching learning strategies and instruction* (version 2.0) [computer program].

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal, 29*(3), 663-676.

Appendix A

Structured Directions for the Task

You have currently been asked to take part in a collaborative learning activity as part of your school curriculum in agreement with your teacher. This page will outline what this software is to be used for, your task for this project and any additional frequently asked questions you may have. If at any time during our demonstration, or after reading this introduction section, you do not understand something then please do not hesitate to ask one of us learning assistants.

What is gStudy?

The program you are currently using for this collaborative learning activity is called gStudy. gStudy is a software application that has learning kits embedded that act as a collection of digital learning materials. gStudy supports learners' interactive engagement with multimedia information in the learning kit to learn, apply and transfer that information to new situations (learning kit website).

The Chat Tool

The tool in gStudy you are primarily concerned with is called "gChat". This is the smiley face button in the tool bar labeled chat. When clicking on this button, you will be connected to 3 other chat members. Choosing multiuser chat with these individuals is how the 4 of you will work together to complete this educational task.

The Chat

Within the chat you will be asked to select your role (summarizer, clarifier, predictor, and questioner) from a drop down menu. Once in your role, you will see pre-stocked prompts that you can use to facilitate the chat interaction.

The Main Goal

This is a collaborative learning task. You will be asked to read a piece of challenging text warning against crystal methamphetamine use. At the completion of this, you and 3 other individuals will work together in an online chat tool to figure out the text (what is important and what does not make sense to some of you). You will do this by using the collaborative role (clarifier, questioner, predictor, and summarizer) that you were assigned at the beginning of this session. A detailed outline of what each role is and the accompanying script and prompts are found to the left in the tool bar or can be found at these links here.

You will also be asked to complete a few multiple choice questionnaire questions along with a few comprehension questions on the text. Please note that at all times scientists will be recording your online moves, so please refrain from discussing topics outside of the text material with your partners.

Your Task
Your task for this study is…

Session 1:

Step 1: After our presentation, we will ask you to complete a questionnaire through WebQuestionnaire. We would like you to complete the tests titled "TORC-3" and "Prior knowledge". This link can be found on the page titled "WebQuestionnaire".

Step 2: You will then be asked to read a text warning against the risks of crystal methamphetamine use. This text is meant to be challenging and you will later work with your group to figure it out. After reading each section, please return to WebQuestionnaire to answering reading comprehension questions.

Step 3: You will then be asked to return to WebQuestionnaire and fill out 3 tests of Efficacy. Please answer as honestly as you can.

Session 2:

Step 4: You will now work with your 4 classmates in gChat to try and figure out the text by using your collaborative role. This is challenging text, and it will take the 4 of you talking together about it and using your roles, scripts and prompts. Remember, our scientists are recoding your chat so please try to resist the urge to discuss topics outside of the text material. After you read the test, you will individually answer questions on reading comprehension in WebQuestionnaire.

Appendix B

Unstructured Chat Directions for the Text

You have currently been asked to take part in a collaborative learning activity as part of your school curriculum in agreement with your teacher. This page will outline what this software is to be used for, your task for this project and any additional frequently asked questions you may have. If at any time during our demonstration, or after reading this introduction section, you do not understand something then please do not hesitate to ask one of us learning assistants.

What is gStudy?

The program you are currently using for this collaborative learning activity is called gStudy. gStudy is a software application that has learning kits embedded that act as a collection of digital learning materials. gStudy supports learners' interactive engagement with multimedia information in the learning kit to learn, apply and transfer that information to new situations (learning kit website).

The Chat Tool

The tool in gStudy you are primarily concerned with is called "gChat". This is the smiley face button in the tool bar labeled chat. When clicking on this button, you will be connected to 3 other chat members. Choosing multiuser chat with these individuals is how the 4 of you will work together to complete this educational task.

The Main Goal

This is a collaborative learning task. You will be asked to read a piece of challenging text warning against crystal methamphetamine use. At the completion of this, you and 3 other individuals will work together in an online chat tool to figure out the text (what is important and what does not make sense to some of you).

You will also be asked to complete a few multiple choice questionnaire questions along with a few comprehension questions on the text. Please note that at all times scientists will be recording your online moves, so please refrain from discussing topics outside of the text material with your partners.

Your Task

Your task for this study is…

<u>Session 1:</u>

<u>Step 1:</u> After our presentation, we will ask you to complete a questionnaire through WebQuestionnaire. We would like you to complete the tests titled "TORC-3" and "Prior knowledge". This link can be found on the page titled "WebQuestionnaire".

Step 2: You will then be asked to read a text warning against the risks of crystal methamphetamine use. This text is meant to be challenging and you will later work with your group to figure it out. After reading each section, please return to WebQuestionnaire to answering reading comprehension questions.

Step 3: You will then be asked to return to WebQuestionnaire and fill out 3 tests of Efficacy. Please answer as honestly as you can.

Session 2:

Step 4: You will now work with your 4 classmates in gChat to try and figure out the text by using your collaborative role. This is challenging text, and it will take the 4 of you talking together about it. Remember, our scientists are recoding your chat so please try to resist the urge to discuss topics outside of the text material. After you read the test, you will individually answer questions on reading comprehension in WebQuestionnaire.

Appendix C

Crystal Methamphetamine Use
Heather Church, Meghann Fior & Rachel Morris

Introduction *(To be used when training subjects to use g-study)*

For several years, raves have been a popular trend among adolescents and young adults. In fact, they have been actively attended in Canada since the late 1980's (Weir, 2000). A rave is an all-night dance party, consisting of large numbers of young people, typically taking place in secret locations, removed from public surveillance (Weir, 2000). These parties include trance-inducing electronic music, as well as the use of several drugs, such as ecstasy and crystal methamphetamine. In the past decade, there have been several deaths at raves. Frequently, these deaths are the result of: heat exhaustion, dehydration and adverse physiological reactions to drugs (Weir, 2000). The crowded, often-closed environment of the rave can result in heat exhaustion and dehydration. Water is often unavailable or scarce at these events. Seasoned ravers often bring a supply of their own beverages. However, as these parties tend to take place in covert locations and are in and of themselves an underground culture, there are no restrictions on who attends. Thus, there are no age limits, often resulting in very young attendees being exposed to and experimenting with very dangerous chemicals.

In addition to neurological effects, the drugs typically used by ravers significantly raise heartbeats per minute, while also causing the user to feel invincible and unaware of such physiological symptoms as thirst and sweating. There have been such a sufficient number of deaths in Canada resulting from raves and the use of the drugs commonly found at raves, that the health community has grown alarmed about this phenomenon and

proposed sanctions against such events as raves (Weir, 2000). Consequently, the rave community has reacted by implementing drug awareness programs at these events, where volunteers will provide water, information on the effects of the drugs, warning signs of adverse reactions, long term effects and harm reduction strategies. While these measures are helpful in reducing the magnitude of the dangers associated with the rave culture, only those who seek out the information about the drugs and who are lucid enough to retain this information will benefit.

Due to the nature of the drugs commonly consumed at raves, there are long term impacts and neurological damage which can result upon first exposure to them These drugs are becoming more and more common and are no longer solely associated with raves. There are several drugs popular among ravers, such as: ecstasy, cocaine, D-lysergic acid diethylamide (LSD), phencyclidine (PCP) and crystal methamphetamines (speed) (Weir, 2000). Though the latter four drugs are often used, crystal methamphetamines are becoming increasingly popular.

Commonly known as crystal meth, this drug is no longer solely associated with the rave scene. It has become a common drug of choice among British Columbians and is rapidly gaining popularity across Canada. Unfortunately, this very addictive drug has serious, irreversible side effects and social implications.

Neurological Effects

Crystal meth is a drug which works by interacting with the receptors in the sympathetic nervous system (Logan, 2002), which is responsible for emotions and thought processes. Specifically, its structure resembles neurotransmitters, such as dopamine, norepinephrine and epinephrine, which the brain requires to maintain normal

emotions, thought processes and functioning. Due to the fact that its structure is similar to these neurotransmitters, it interacts with the receptors in the brain to elicit the sensations and 'highs' drug users seek. However, it must first overpower the normal neurotransmitters in order to gain access to the receptors in the brain. In response to failure to detect the neurotransmitters, the body produces higher rates of norepinephrine, which is what causes the high rates of arousal experienced by crystal meth users. The behaviours exhibited by users, such as repetitive movements and twitching, are caused by increased dopamine release, which is a result of the failure of neurotransmitters to connect with the appropriate receptor cells. The higher rate of dopamine production is also responsible for producing the disturbances in perception, as well as psychotic behaviour (Logan, 2002).

Despite the initial increase in production of neurotransmitters, prolonged use of crystal meth causes the body to reduce the levels of neurotransmitters it produces (Logan, 2002). This is not only limited to dopamine, norepinephrine and epinephrine, but to serotonin, as well. Serotonin is the drug responsible for maintaining healthy emotional functioning. Low rates of serotonin production results in depression and other mood disorders. Apparently, crystal meth remains active in the body for 24 hours after administration (Logan, 2002). However, the naturally occurring neurotransmitters reclaim normal functioning only briefly after crystal meth has ceased to be active. Eight days after exposure to the drug, neurotransmitter activity declines, which suggests that neurotoxicity and terminal degeneration. Briefly, neurotoxicity is when the brain has been exposed to a toxin which prevents it from producing the neurotransmitters it needs

to function properly. Terminal degeneration is when the receptor cells in the brain die off as a result of poisoning.

What makes crystal meth use so dangerous to the brain is that each person's metabolism response to the drug is unpredictable. Because it interferes with the ability of neurotransmitters to interact with the brain's receptors and causes an over production of neurotransmitters, varying concentrations of the drugs will have different effects on the same individual, depending upon: a) when he/she last took the drug, b) his/her body's response to the drug, c) the concentration of the initial dose he/she ever took and d) the body's current stage of flushing the drug from the body. As a result of the brain's fluctuating response to the drug, multiple exposures to it can produce symptoms commonly known as 'flashbacks'. This is when the brain produces neurotransmitters in such high concentration, that it produces psychotic sensations in the user. The brain's disrupted ability to produce and receive neurotransmitters results in lowered thresholds, or limits, of neurotransmitter (or in the absence thereof, crystal meth) required to elicit psychotic episodes. This is, in effect, what causes the mental degradation, increased psychosis and stereotyped movements and behaviour (e.g., twitching, incoherent verbalizations, etc.) of regular users of crystal meth.

Social Issues

Production of crystal meth ought to have been made more difficult by controlling access to the chemicals needed to manufacture it (Meredith, Jaffe, Ang-Lee, & Saxon, 2005). However, the chemicals required can be harvested from readily available products such as, battery acid, over the counter cold medications, cleaning products, etc. Consequently, lawmakers have tried to limit the volume of these products people can

have access to. Despite these attempts, illegal crystal meth labs exist across North America (Meredith et. al, 2005). In fact, in the United States (USA), 8 129 labs were seized and shut down in 2002. Furthermore, a total of 1231 children have been found in labs which were seized in the same year. This is of concern because these children are found to have high levels of toxins and by-products of the manufacturing of crystal meth in their bloodstream. Furthermore, in children who live in homes which have such labs, it is common for them to experience significant burn, which are sometimes fatal, as well as inadvertent poisoning. Another way which the manufacturing of crystal meth can impact children who are present in the lab location is through lead poisoning, which can cause, among other things, severe mental retardation, resulting from the use of lead acetate in the production of crystal meth (Meredith et al., 2005). The consequences to children present in crystal meth labs, is only one minor consideration in terms of the impact of crystal meth on society.

There are several side-effects caused by crystal meth which result in violence against others. For instance, the intense cravings users experience can compel them to engage in desperate measures, such as robbery, in order to attain the drug. Paranoia and aggression are also common side-effects, as is suicidal behaviour (Meredith et al., 2005). Finally, users themselves are often the victims of violent crime. In fact, in a study of the deaths associated with crystal meth, Logan, Fligner and Haddix (1998; as cited in Logan, 2002) found that there were a high number of users who had died violent deaths. The authors examined 146 deaths in which crystal meth had been detected in the individual's blood stream during autopsy. Of these deaths, 18 had been suicides, while 40 had been homicides, 31 one of which resulted from gunshot wounds, 7 from stabbing deaths, 1

case of strangulation, while 17 individuals had died as a result of fatal driving. In all cases of fatal car accidents, the crystal meth user had been the driver. The remaining causes of death were undetermined. Because of the fluctuating and unpredictable responses one can have to crystal meth from dose to dose, it is impossible to determine whether overdose is solely to blame for these deaths, though it is quite likely (Logan, 2002). There is also an argument that those who use crystal meth have a tendency to be victimized more often than does the general, non-crystal meth using population.

Interestingly, Logan (2002) suggests that teenager crystal meth users tend to get into fights more often than do their non-using peers, and took more risks which resulted in assault more often than did their non-using peers. For those teenager users who dated other users, there are also higher rates of violence in dating situations. Logan (2002) suggests that part of this predisposition toward violent behaviour may be due to self-esteem issues, anxiety, and depression, which may also have led to the initial use of drugs. Frighteningly, those who tend to use crystal meth are also more likely to use other drugs, and/or combine drug use with alcohol, which can have dire consequences.

Taking into consideration the effects of crystal meth, as well as the social factors associated with it, it becomes apparent that teenagers who are tempted to try and/or use crystal meth are risk both as a physical result of the drug, as well as due to the social implications associated with drug use and risk taking behaviour. It would, therefore, be in the best interests of those attending to raves to ensure they are well informed about the substances they are being exposed to, so that they can make informed decisions about what they choose to ingest, inject or inhale. Furthermore, they need to be aware of the drugs that are out there, so that they can watch out for symptoms and/or reactions in their

friends. In this way, teenagers can equip themselves to make decisions which could affect the rest of their lives, as well as the enjoyment, satisfaction with and quality of their lives.

References

Buffenstein, A., Heaster, J., & Ho, P. (1999). Chronic psychotic illness from Methamphetamine. *American Journal of Psychiatry, 156,* p.662.

Health Canada (2005). Government of Canada increases maximum penalties for Methamphetamine offences. *New Release, 2005-88,* Retrieved from: http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2005/2005_88_e.html on April 11, 2006.

Lemon, S. (2006). Second-hand meth smoke: Local children test positive for the drug as users fill the air with their toxins. *Mail Tribune,* Retrieved from: http://www.mailtribune.com/archive/2006/0212/local/stories/01local.htm on April 11, 2006.

Logan, B. (2002). Methamphetamine – Effects on human performance and behavior. *Forensic Science Review, 14,* 134-151.

Mackenzie, Richard, G., (1997). Methamphetamine. *Pediatrics in Review*, 18, 305-309.

Meredith, C., Jaffe, C., Ang-Lee, K., & Saxon, A. (2005). Implications of chronic methamphetamine use: A literature review. *Harvard Review of Psychiatry, 13,* 141-154.

Ralph, Irene. (2001). *Addictions and Mental Health.* (2nd ed.). Grand Forks, Canada: IGR Publications.

Weir, E. (2000). Raves: A review of the culture, the drugs and the prevention of harm. Canadian Medical Association Journal, 162, 1843-1848.

Appendix D

Self-Efficacy for Group Work Measure

Measurement: Self-efficacy for Group Work Measure
Items: 20 in Self-Efficacy for Group Work, adapted to 10 for thesis
Scale: Likert scale. 11 points with 10 point interval. 0-not confident at all, to 100-very confident.
Reliability: Alpha .95 on the 20
Factor and Item Analysis: In brackets after the questions.

1. I can give feedback to other group members about my understanding of their ideas. (.80)
2. I can combine group members' viewpoints to reach a shared idea. (.79)
3. I can constructively use other group members' evaluations of my idea. (.78)
4. I can productively help other group members improve their ideas. (.76)
5. I can effectively take other group members ideas into account for a group discussion. (.76)
6. I can improve the quality of a discussion. (.75)
7. I can openly explain my opinions to other group members. (.71)
8. I can ask other group members to explain their ideas more clearly when I don't understand their ideas. (.69)
9. I can organize the group to complete the set tasks in the available time. (.69)
10. I can reasonably consider other group members' constructive criticism of my ideas. (.60)

- Adapted from Alavi & McCormick and reproduced with permission from the author. Alavi, S.B. & McCormick, J. The roles of perceived task interdependence and group members' interdependence in the development of collective efficacy in university student group contexts (accepted). British Journal of Educational Psychology.

Appendix E

Collective Efficacy (Individual) Measure

Measurement: Collective Efficacy Individual measure
Items: 11 in Collective Efficacy (individual), adapted to 10 for thesis
Scale: Likert Scale. 11 points with 10 point interval. 0-not confident at all, to 100-very confident.
Reliability: Alpha .94
Factor and Item Analysis: In brackets after the questions.

1. The group can constructively discuss addressing the key issues of the group project. (.84)
2. The group can identify key issues of the group project. (.81)
3. The group can summarize conclusions of a group discussion. (.78)
4. The group can effectively generate sufficient ideas to answer a question. (.78)
5. We can organize the group's activities to complete the set tasks in the available time. (.77)
6. The group can comprehensively put theory into practice. (.77)
7. The group can produce a comprehensive report. (.76)
8. The group can systematically present the results of the group project. (.76)
9. The group can coordinate its activities to perform the task. (.76)
10. The group can develop a plan for the group project. (.71)

- Adapted from Alavi & McCormick and reproduced with permission from the author. Alavi, S.B. & McCormick, J. The roles of perceived task interdependence and group members' interdependence in the development of collective efficacy in university student group contexts (accepted). British Journal of Educational Psychology.

Appendix F

Ethics Form

[Your department letterhead]

Parent Consent Form

Measuring Online Collaboration Quality: Reciprocal Teaching in Learning and Mastering Text

Your son/daughter is invited to participate in a study entitled Measuring Online Collaboration Quality: Reciprocal Teaching in Learning and Mastering Text that is being conducted by Meghann Fior, Rachel Morris, and Dr. Allyson Hadwin.

Meghann Fior, and Rachel Morris are graduate students and Dr. Hadwin is a professor in the department of Educational Psychology and Leadership Studies at the University of Victoria. You may contact them if you have further questions by email: Meghann Fior (mnfior@uvic.ca), Rachel Morris (rmorris@sides.ca), and Allyson Hadwin (hadwin@uvic.ca).

This research is being funded by SSHRC-INE.

Purpose and Objectives
The purpose of this research project is to examine the effectiveness of online group collaboration on reading comprehension and participation rates when students use either: (a) an online chat tool to discuss the text, or (b) an enhanced chat tool that utilize to discuss the text. The enhanced chat will incorporate cognitive roles and prompts. We are also interested in measuring computer, self and collective efficacy (variations of students' beliefs that they can succeed at a task).

Importance of this Research
Research of this type is important because it has potential to uncover ways to assist students in successfully collaborating online. Findings will inform the development of computer software that supports collaboration and learning and inform teachers about instructional techniques for encouraging participation and collaboration of all students. The learning activity used in this research meets prescribed learning outcomes in English 10 and Planning 10.

Participants Selection
Your son/daughter is asked to participate in this study because we contacted his/her teacher requesting participation of interested students in their class/course. Although all students may be asked to participate in the learning activity as part of their course learning activities, only the data from the consenting individuals will be used for research purposes

What is involved
If you allow your son/daughter to voluntarily participate in this research, his/her involvement will consist of being asked to participate in two, weekly sessions of testing lasting approximately 45 minutes to an hour. During the first session, students will receive several short measures to provide information about: (a) prior knowledge of the testing material, (b) confidence in working on a computer and working with a group, and (c) reading comprehension . Students will then

each read a short passage based on awareness of drug use and answer comprehension questions. During the second session, your son/daughter and three other students will engage in a group activity (reading text) with the assistance of a computer program (gStudy). One group will direct their own discussions about the text. This group will be working under normal chat conditions, like they do when they chat about school work and readings in groups. The other group will have a structure for dialoging about the text. They are trying an alternative to chatting in their group that may or may not be more effective. If we find that the structured peer text chat is more effective than the peer text chat, then we will make that information available to students and teachers to make use of in the future. We would also like to assure you that the processes being used by the two groups are part of regular teaching and learning practices, and no student or group of students will be disadvantaged by participating in the research. They will end this session by completing the same comprehension measure and measures of their confidence working in groups and on a computer.

Inconvenience
The unit of instruction that students will be completing for this research experiment follows the BC curriculum. Participating teachers will dedicate 2 hours of instructional time to incorporate this instructional activity/research into their classroom activities. .

Risks
There are no known or anticipated risks to you or your son/daughter by participating in this research.

Benefits and Compensation
The potential benefits of your son/daughter's participation in this research include gaining knowledge and skills to work more efficiently in a group and improve their reading comprehension. Your son/daughter will also receive an instructional package of on strategies for collaborating effectively upon completion of the testing sessions. Students will also have access to the learning material and software for use after the study. If you agree to allow your son/daughter to participate in this study, this form of compensation must not seem coercive. It is unethical to provide undue compensation or inducements to research participants. If you would not allow your son/daughter to participate if the compensation was not offered, then you should decline.

Voluntary Participation
Your son/daughter's participation in this research must be completely voluntary. If you do decide to allow him/her to participate, they may withdraw at any time without any consequences or any explanation. If he/she withdraws from the study, when the researchers access the electronic data at the end of the study, data from each measure and computer traces of studying activities will be destroyed. However, chat log data cannot be destroyed without destroying data and resource materials shared with other participant's data. In this case, researchers will make every attempt to exclude the sole non-participant's data during analysis. Since collaborators will be assigned a pseudonym for their chat discussions (person 1, person 2, etc) all chat logs will be completely anonymous in their electronic form. Participants who withdraw will still receive the collaboration package.

Researcher's Relationship with Participants
One researcher is a teacher at The South Island Distance Education School (SIDES). Participants over whom the researcher has a direct power-over relationship (e.g., her own students) will be excluded from the study. Other researchers will introduce the study, conduct recruitment, and

collect consent forms from the school. Data will not be analyzed by the participating teacher until grades have been submitted. All identifying information will be removed from the data before the teacher works with the data so she will not know the identities of the participants at SIDES.

On-going Consent
To make sure that your son/daughter continues to consent to participate in this research, you will be asked to initially sign for consent for all two sessions. We will take your child's presence and participation in each of the two sessions as your on-going consent after the signing of this form. Your son/daughter is free to withdraw at any time; however, the data from the chat logs up until that point will be saved and used by the researchers.

Anonymity
In terms of protecting your son/daughter's anonymity, he/she will be anonymous in that they will receive a user name for the computer project so that the researchers will not know which data is theirs; however, they may recognize other students in the testing situation as having had other classes with them. Their teacher will have no indication of who is/is not participating in the research study.

Confidentiality
Participants' confidentiality and the confidentiality of the data will be protected by being given a user name and by not signing a name on the testing sheets we administer; however, participants may recognize other students in the same testing situation as them.

Dissemination of Results
It is anticipated that the results of this study will be shared with others in the following ways: directly to the participants, published articles and presentations/papers at scholarly meetings. The data analysis will be used as part of the SSHRC-INE project. Ongoing analysis of the data will be conducted as part of an over-arching, ongoing research study. The data collected from this research study will be presented in the form of theses for two masters' students. Identities of participants will remain anonymous throughout information dissemination.

Commercial Use of Results
This research will not lead to a commercial product or service.

Disposal of Data
Data from this study will be stored on a password protected server as part of a study at Simon Fraser University for a minimum of 5 years to a maximum of 10 years, at which point, it will be deleted from the server. If a student withdraws from the study after it has started, all individual data will be destroyed when researcher access the data files at the end of the study; HOWEVER, data that is part of a collaborative discussion cannot be destroyed because it contains data from all other consenting group members.

Contacts
Individuals that may be contacted regarding this study are listed with contact information at the beginning of this form.

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President, Research at the University of Victoria (250-472-4545).

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Name of Participant (student)	*Signature*	*Date*

Appendix G

Examples of Varying Participation Levels

Level	Definition	Example of Segments
Level 1	Level 1 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with one response.	A-"norepinephrine is what?" B-"something that "causes the high rates of arousal experienced by meth users"
Level2	Level 2 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with two responses.	A-"Did anyone actually read this?" B-"I did but it made me confused." A-"Oh good I'm not the only one"
Level 3	Level 3 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with three responses.	A-"but what are neurotransmitters" B- "neurotransmitters are all of your sences, how you brush your hair, to say hello, everything you DO in your daily life" *A-"ohhh"* A-"see now I get it" B-"just turns to mush and you cant do any pyshical activity and you lose all of your motor skills"
Level 4	Level 4 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with four responses.	A-"What are you curious about?" *C-"that's why you highlight the important parts"* *B-"can you give a general summary of this?"* *C-"no I cannot I am sorry"* B-" I am curious about how badly if affects peoples

		moods, if it will get worse as the years go by" C-"can you find the answer to that thru this article?" D-"it destroys peoples abilities to control their emotions, and as the use increases the problem only gets worse" B-" you can about the mood changes, but it doesn't talk about the future"
Level 5	Level 5 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with five responses.	A-"Kayla, I just can't understand this whole serotonin thing" *A-"do explain"* *B- "well Rod"* B- "let me inform you" A-"please do" B- Seritonin is the drug responsible for maintaining healthy emotions" C- "I don't get it" B- "you need it to feel good pretty much"
Level 6	Level 6 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with six responses.	A-"does anyone know what the terms mean?" B-"which ones?" *A-"like"* A-"neurotransmitters" C-"yeah, what exactly are they?" D-"aren't those like the senses that tell you to be happy, what to think, what to eat, how to do drugs and all that whatnot" *D-"probably not, just a guess"* **C-"ol"** B- "oh! Those are ur nerve cell's transmitters like radio.." **B- "lol"**

		A-“oh! Those are ur nerve cell’s transmitters like radio…” B- “yeah makes sence”
Level 7	Level 7 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons’ contributions with seven responses.	C-“lets move on” D-“okay, I predict it will get alot worse” C-“me to i agree” A-“its going ot affect ages younger and younger yearly” B-“with things like the crystal meth candy” *D-“what might a friend ask about this?”* D-“I think it will soon be the numbe one killer, because youth get curious so everyones going to want to try it” A-“yeah, and even its starting younger then it did for us already” C-“it’ll be like extasy, the new party drug will be crystal meth”
Level 8	Level 8 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons’ contributions with eight responses.	A-“so does anyone actually know what neurotransmitters are” C-“yea..” A-“explain…” **D-“first name”** C-“nerve cell receptors in your brain that tell u what to do” B-“ah” C-“they sorta relay messages” B-“so like, breathing is controlled by them?” **D-“your mom relays messages”** **A-“…”** C-“probs” B-“ic…”

Level 9	Level 9 conversations were defined as conversational level or the degree of sophistication responding to and building upon the previous persons' contributions with nine responses.	A-"I think that the government should make drugs legal because then they could control how safe the drugs are and make sure meth isn't put into everything" **D-"who is person 20B?"** **C-"who is person 12 d?"** B-"that's a horrible idea" **D- "Chelsey, and you are?"** C-"yeah but that is even worse in a way because then they are promoting drug use" **D-"Hannah"** B-"government don't care" C-"so even more people will become addicted and our world would be an even more horrible place" **D- "lol Hannah"** A_"people are just going to do it anyways so why don't they make it safe?" C-"because that won't happen" *D-"lol woooh please don't fight"* B-"no one can control the amount anyone takes in of anything" A-"everyone has free will and makes their own choices" D-"we should get keep drgs on the dl" B-"everyone has free will and makes their own choices"

Note. Conversation was typed in original posting form.
Italic postings show an on-task comment that was not directly part of the conversation segment. Bold postings show an off-task entry within the segment.