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Connected schools: student reading motivation and computer mediated communication

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**Connected Schools: Student reading motivation and
computer mediated communication**

by

Denise Lorraine Lindstrom

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
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Signatures have been redacted for privacy

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ABSTRACT

Improving children's attitudes and motivation to read are top priorities for Elementary school teachers. Self-determination theory suggests that classroom contexts that allow children to be autonomous, feel competent, and experience a sense of relatedness during reading activities may improve reading motivation.

Two fifth grade classrooms in contrasting communities used Internet-based discussion boards and chat rooms to choose, read and discuss books. The Motivation to Read Profile (MPR) was used to measure change in students' motivation to read as a result of their participation in CMC supported reading activities. Observations of student behavior during CMC supported reading activities, analysis of students' online communications, and student interviews were used to examine the extent to which CMC supported or hindered student motivation to read.

Results indicated that student motivation to read was hindered when students did not receive the appropriate amount of social interaction during the CMC based reading activities. Further, students' preferred the use of chat rooms over the use of discussion boards because it increased their amount of social interaction between students. However, discussions during chat room sessions tended to be off topic, and students spent little time having meaningful discussions of literature. If CMC is to meet its potential in improving student motivation to read, the proper scaffolding needs to be in place to increase the likelihood that all students will feel included in CMC activities and will have purposeful discussions of literature.

CHAPTER I. INTRODUCTION

Children who read recreationally tend to perform better in school (Guthrie, Alao & Rinehart, 1997; Wigfield & Guthrie, 1997). The amount of time children spend reading is directly linked to development of reading skills (Anderson, Wilson & Fielding, 1988). Children who read in their free time tend to score higher on comprehension and vocabulary tests and have greater knowledge of the world in general (Cipielewski & Stanovich, 1992; Stanovich & Cunningham, 1992, 1993). Children who read for pleasure tend to become life long readers (Smith, 1990), which has been linked to heightened occupational status and ability to participate in society as adults (Guthrie, Schafer & Hutchinson, 1991). Unfortunately, evidence of children's reading habits suggests that the vast majority of children spend little time reading.

Reading consistently ranks lower than other types of activities in which children chose to engage. Listening to music, playing video games, and watching television consistently ranked higher than reading. A recent survey on how children spend their time reported that children only spend an average 5 to 15 minutes a day reading at home (Hoffereth & Sanberg, 2000). This finding is troubling given that children spend an average of 180 minutes a day watching television, and 20 to 32 minutes a day playing video games (Hoffereth & Sanberg, 2000; Kaiser Family Foundation, 2002). Further, as children got older they tended to spend less of their free time reading and more time in structured activities like sports or music (Barnett & Irwin, 1994; Guthrie & Greaney, 1991; Kush & Watkins, 1996).

While there are many benefits to participating in these activities, they compete for time children might otherwise spend reading (Anderson, Tollefson & Gilbert, 1985; Martin, 1984) and may contribute to increasingly negative attitudes toward reading. This trend is

apparent in both good and poor readers and is more pronounced in boys than girls (Askov & Fishback, 1973; Martin, 1984; McKenna, Kear & Ellsworth, 1995; Walberg & Tsai, 1985). Therefore, creating reading experiences that motivate and help all children establish positive associations with reading is a major concern for K-12 teachers (O'Flahavan, Gambrell, Guthrie, Stahl, Baumann, & Alverman, 1992).

So what are the characteristics of highly motivated readers? Children with positive attitudes toward reading choose to read more often, for longer periods of time and with greater intensity. This deeper engagement has translated into superior reading achievement (Anderson et al., 1988; Kush & Watkins, 1996; McKenna et al., 1995). Educators must find ways that encourage students to develop these characteristics to improve their attitudes toward reading.

Numerous studies have concluded that teachers have influence over how much time children spend reading outside-of-school and that some instructional techniques have been successful in improving student attitudes toward reading (Anderson et al., 1988; Herrold, Stanchfield, & Serabian, 1989; Jagacinski & Nicholls, 1987; Marrow, 1983; Payne & Manning, 1992; Watkins & Edwards, 1993). Key features of many such instructional techniques include allowing students to be socially interactive and self-directed during reading activities (Marrow, 1993; Sweet, Ng, & Guthrie, 1998; Wentzel & Wigfield, 1998). Reading Buddies and Literature Circles are examples of reading activities that take advantage of these instructional techniques.

Reading Buddies consist of pairing more experienced readers with younger students to read books of the younger students' choosing. This activity is simple, yet incorporates the instructional techniques of collaboration to promote social interaction, and allowing the

younger children to choose their own reading material to promote self-direction. It is encouraging that students who have participated in Reading Buddies have reported that it was one of the most exciting parts of their school days (Barnett & Irwin, 1994).

Likewise, Literature Circles incorporate similar instructional techniques by having several students who have selected the same book come together to have student-led discussions about the book. Teachers who have conducted Literature Circles as part of their reading curriculum report promising evidence that they have improved their students' attitudes toward reading and have contributed to students' improved reading achievement scores (Daniels, 2002). While Reading Buddies and Literature Circles have been successful in improving student attitudes toward reading in and of themselves, advances in information and communication technologies (ICT) can help teachers add new and exciting dimensions to these kinds of activities.

Students can use ICT to conduct computer-mediated communication (CMC) with applications like e-mail, chat rooms, discussion boards, instant messaging and video conferencing. These applications allow students to converse with other students in different locations to share information, and receive feedback in a more equitable and timely fashion than was previously experienced in traditional classrooms (Bracewell, Breuleux, Laferriere, Benoit & Abdous, 1998; Roschelle, Pea, Hoadley, Gordin & Means, 2000). For example, *AT&T Learning Circles* used CMC applications to connect students from different countries around the world to produce newsletters (Riel, 1992). Teachers and researchers reported that students had increased motivation to participate in the act of writing and the quality of their writing improved. Other projects that used CMC have reported similar results which include greater student interest in the subject matter, improved attitudes toward school in general and

increased student performance (Bracewell et al., 1998; OTA, 1995; Roschelle et al., 2000; Schofield & Davidson, 2002).

Teachers recognize that improving children's attitudes toward reading can positively impact their overall performance in school and it has important implications for students' lives as adults. Reading research has demonstrated that children tend to have positive attitudes towards activities that allow them to be socially interactive and autonomous during reading activities. Teachers who have integrated CMC into their classroom activities, and the researchers who have studied them have reported that the use of CMC increased the level to which students were social interactive and autonomous. Therefore, it is reasonable to assume that integrating CMC into classroom reading activities can be instrumental in establishing or improving positive student attitudes toward reading. More studies are needed to address how CMC can help teachers reach specific pedagogical goals like improving student attitudes toward reading (Kamil & Lane, 1998). Examining the impact of CMC on student interest, attitudes and motivation to read may have important implications on how CMC applications are used with students in the future (Miller & Olsen, 1998).

Background Information and Motivation for the Study

In 2000, a former colleague and I began exploring uses of an online classroom to increase student motivation to read independently. My colleague obtained the use of an online classroom housed by blackboard.com as the result of a literacy challenge grant offered through her school district. She enrolled her fifth grade students from a major city on the West Coast and I enrolled fifth grade students from a rural town near the Midwestern university I was attending as a graduate student. We named our project *Connected Schools*.

The key features of Connected Schools were that children read books and used CMC to discussed them and interact with peers in diverse geographic locations.

We had students use an online classroom to create personal student web pages. These web pages included a short biography, a description of their favorite book and a picture of their favorite book cover. Students read each other's web pages and then posted questions and comments about the web pages on electronic discussion boards to get to know each other and begin a dialogue. Students then used the web pages and discussion boards to form reading groups and discuss the books they read.

From our experience we identified several positive outcomes as a result of student participation in CMC related reading activities. Classroom teachers observed that students were more motivated to read during silent reading time, during free time and at home. Students tended to finish the books they read during the Connected Schools project faster, and actively sought out new books to read. Also, lower ability students engaged in reading books that were more grade level appropriate. Our observations and interviews with students during the pilot study indicated that students were motivated to use the web pages and discussion boards to interact socially. They enjoyed making new friends and discovering the personal, social, and cultural similarities and differences between them.

These experiences led to the development of the present study. There are high expectations for the potential of technology to transform literacy instruction (Reinking & Watkins, 2000) and there is a clear need to improve student attitude and motivation to read. To date, there is little research on the impact CMC can have on literacy learning (Kamil & Lane, 1998). As a field we need to explore how technology can help teachers attain this instructional goal.

Purpose of the Research

- 1) To examine changes in fifth grade students' attitudes toward reading as a result of integrating computer-mediated communication into reading activities.
- 2) To identify factors that either hindered or facilitated the implementation of CMC to improve students' motivation to read.

CHAPTER II. REVIEW OF THE LITERATURE

The literature suggests that the classroom context has influence over student attitudes and motivation to read. Contextual characteristics of a classroom include student activities, texts, teacher actions, interpersonal relationships or school policies (Guthrie & Alao, 1997). Classroom contexts that promote social interaction, and allow students to act autonomously during reading instruction, may contribute to the development of positive attitudes toward reading. CMC-based activities can support social interaction and autonomous student behavior. However, there are limited examples of how CMC can be used effectively with K-12 students to improve motivation and attitudes toward reading.

In this review I will begin with an examination of the reading research to identify a theoretical perspective on reading, and a framework for examining motivation and attitudes. Next, I will examine several examples of CMC in K-12 classrooms contexts to determine the potential CMC might have in establishing positive student attitudes toward reading. Finally, research on the use of CMC in reading instruction will be presented to identify a gap in the literature that forms the basis for this study.

Reading Instruction, Attitudes and Motivation

Positive attitudes toward reading have been defined by Smith (1990) “as a state of mind accompanied by feelings and emotions, that make reading more or less probable” (p. 215). This is why a child’s motivation to read is an indication of a child’s attitude toward reading (Mathewson, 1994). Reading recreationally, for pleasure outside the school setting, is an indication that a child has positive attitudes to read (Henk & Melnick, 1998; Kush & Watkins 1996; McKenna et al., 1995; Wigfield, & Guthrie, 1997). Children’s behaviors include finding books, keeping them in special places, reducing distractions when they read

and finding friends with whom to share books (Guthrie, & Alao, 1997). To help children improve their attitudes toward reading and engage in the behaviors of highly motivated readers, it is important to understand how children's motivation to reading is acquired and sustained.

Highly motivated readers tend to be intrinsically motivated (Mathewson, 1994; Wigfield & Guthrie, 1997). Intrinsic motivation is recognized in children who are freely engaging in an activity for no other reason than personal interest (Deci, 1992). Children, who are intrinsically motivated, choose to read for personal reasons such as curiosity, involvement, social interchange and emotional satisfaction (Gambrell, Palmer & Codling, 1996). This concept is important because a common practice in classrooms today is to offer extrinsic incentives like grades, praise and prizes to improve student motivation to read. However, using these kinds of extrinsic incentives tends to make children feel manipulated and controlled, and does not always guarantee that they will persist in reading once the extrinsic incentives are removed (Lepper & Hodell, 1989). In fact, Wigfield and Guthrie (1997) found that intrinsic motivation was a good predictor of future engagement in reading and that intrinsically motivated readers read for longer periods of time and had a broader range of reading experiences. Two aspects of motivation that can be measured to indicate intrinsic motivation are self-efficacy and task-value (Gambrell et al., 1996; Guthrie & Alao, 1997; Wigfield & Asher, 1984).

Self-efficacy

Intrinsically motivated readers tend to have positive self-perceptions of their reading abilities (Wigfield & Asher, 1984). Bandura (1977) proposed that children's beliefs about their ability to perform a task is a strong determinant in whether or not they will choose to

engage in a particular task. There are many factors that influence a child's perception of his or her reading ability. They include both personal and contextual variables (Henk & Melnick, 1995).

A central personal variable is students' reading performance. Reading ability has been closely associated with children's attitudes toward reading. Students' decoding skills and reading comprehension abilities play an important role in the development of students' attitudes toward reading. McKenna and his colleagues (1995) found that children who have higher reading abilities tend to have more positive attitudes toward reading. Further, while all children's attitudes toward reading tended to decline as they progressed through their elementary school years, attitudes of children with higher reading ability declined significantly less. However, these findings do not explain why some poor readers can maintain positive attitudes toward reading despite limited ability (Russ, 1989). Therefore, contextual factors need to be considered when examining how children develop positive self-perceptions toward reading.

Contextual factors play an important role in shaping students' self-perceptions of their reading ability (Henk & Melnick, 1995). For example, classroom environments that focus on social comparison and competition can contribute to students developing negative self-perceptions (Ames & Archer, 1988). However, in classrooms where students are encouraged to collaborate during reading activities, and formal grades are not awarded, students tended to develop more positive self-perceptions (Oldfather & Dahl, 1994). Therefore instructional strategies that encourage collaboration instead of competition and social comparison may help create a context in which students are motivated to read.

Task-Value

A second key personal variable is task-value. Highly motivated readers tend to perceive reading as valuable and important and find personally relevant reasons for doing it (Guthrie & Alao, 1997). However, consistent findings in the literature suggest that as children get older, their attitudes toward reading tend to decline, and that boys have more negative attitudes than girls (Askov & Fishback, 1973; McKenna et al., 1995; Kush & Watkins, 1996; Walberg & Tsai, 1985) and that even gifted readers can develop negative attitudes toward reading (Anderson et al., 1985; Martin, 1984). These trends can be attributed to a decline in children's value for reading (Kush & Watkins, 1996). McKenna and his colleagues (1995) theorize that older children may have more leisure options and may find these options are more pleasurable than reading. Further, boys may have more negative attitudes than girls as a result of gender norms and differences in how society views reading as an appropriate way for girls and boys to spend their time (McKenna et al., 1995). Classroom contexts that allow students to experience literacy as an activity that is relevant to their personal lives may be able to reverse these trends and increase the value children place on reading (Oldfather & Dahl, 1994).

Classroom Context and Motivation

There are many perspectives on how motivation is cultivated and enhanced in children. This study takes a social constructivist view of motivation, which focuses on classroom factors that influence students' beliefs and perceptions about learning (Dembo & Eaton, 1997; Oldfather & Dahl, 1994; Turner, 1995). Social constructivist theories are grounded in the work of Vygotsky (1978) and are based on the assumption that literacy is a

social phenomenon. Social constructivists suggest that the classroom culture plays a major role in how literacy is defined, taught, and evaluated (Turner, 1995).

How literacy is defined, developed and evaluated will impact how students experience motivation to read (Oldfather & Dahl, 1994). When literacy is defined as sets of skills children develop to receive a grade, reward or prize, students will develop an extrinsic motivational orientation (Lepper & Hodell, 1989). However, if literacy building is defined as a process "...in which students find their passions, discover what they care about, create their own learning agendas and, most importantly, connect who they are to what they do in school" (Oldfather & Dahl, 1994, p. 142) students may develop intrinsic motivation to read.

Therefore, social constructivists theorize that to improve student attitudes and motivation to engage in literacy learning, classrooms need to define literacy as a social process by providing students with instructional activities that allow them to be socially interactive, self-expressive and self-regulatory (Guthrie, 2001; Wigfield & Asher, 1984). Social constructivists' beliefs about motivation for literacy learning are consistent with self-determination theory.

Self-Determination Theory and Reading Instruction

Self-determination theory contends that development of interest and intrinsic motivation is dependent on the environmental factors of social context (Deci, 1992). According to self-determination theory, a social context can cultivate intrinsic motivation to the extent that it allows for the fulfillment of some basic human psychological needs that include competence, autonomy and relatedness (Deci, 1992). From a social constructivist perspective, social interaction during reading activities can facilitate the fulfillment of these three psychological needs.

Competence

Reading instruction that encourages productive social interaction between students, and students and teachers, can facilitate the development of a child's sense of self-competence in literacy. When children receive feedback that let them know that their ideas, opinions and judgments are heard and valued by others they begin to develop a sense of "intellectual agency" (Oldfather & Dahl, 1994). This can result in improving children's self-concept as literate persons as they develop confidence in their abilities to comprehend and interpret literature (Guthrie & Alao, 1997). This concept is important because children who view themselves as competent readers will more likely chose to read over other types of activities (Askov & Fishback, 1973; Martin, 1984; Walberg & Tsai, 1985; Watkins & Edwards, 1993).

Autonomy

Autonomy in reading instruction is supported by teachers who allow students to have a choice in the material they read, and the types of instructional activities in which they chose to engage in (Guthrie & Alao, 1997). It has been demonstrated that when children were given a choice in selecting the material they read, their engagement in independent reading activities increased (Marrow, 1983). Similarly, it has been observed that when children were given a choice in not only which story to read but whether they would write or draw as an activity to demonstrate their comprehension of the reading, their intrinsic motivation to participate in the reading activities increased (Turner, 1995). However, self-direction is not the only way to promote autonomy in the classroom. The amount of social interaction in a classroom can also influence the extent to which a child experiences a sense of autonomy.

A study conducted by (Oldfather & Dahl, 1994) found that as children grew older, there was a decrease in classroom instructional strategies that allowed students to be self-expressive. For example, as children progressed through elementary school, they were provided with fewer opportunities to make judgments, form opinions and synthesize ideas that were heard by others. Self-expression supports autonomy because it allows students to know that not only do they have a choice, but they also have a voice in the shaping of their learning agenda. Perhaps this is why experts in reading research include self-expression as well as self-direction as important components in frameworks and models designed to help teachers create motivating contexts for reading (Guthrie & Alao, 1997).

Relatedness

The importance of relatedness in reading motivation is demonstrated through the behaviors of highly motivated readers. Highly motivated readers tend to seek out friends to share books, talk with family members at home about reading and read for the sake of social interchange (Gambrell et al., 1996; Guthrie & Alao, 1997). These children view reading as a way of developing interpersonal relationships. Relatedness is associated with the development of interpersonal relationships (Deci, 1992). Teachers who provide students with opportunities to be socially interactive and autonomous during reading instruction promote the formation of interpersonal relationships around reading (Ng, Guthrie, McCann, Van Meter, & Alao, 1996). Social interaction and autonomy give students the opportunity to develop personal interest in reading, which they can then share with friends and family members (Guthrie, Schaffer, Wang & Afflerbach, 1995). In classrooms where social collaboration and self-expression are part of normal reading activities, students tended to be more highly active readers (Guthrie et al., 1995). This is important because children who

read more tend to have more positive attitudes toward reading, which may result in greater reading achievement (McKenna et al., 1995; Wigfield & Guthrie, 1997).

According to the social-constructivist perspective, social interaction is necessary to promote student engagement in literacy learning (Oldfather & Dahl, 1994). Because reading is a fundamental aspect of literacy, allowing children to be socially active during reading instruction may improve their levels of engagement, thus signifying improved motivation and attitudes. Computer-mediated communication (CMC) can be an intensely socially interactive activity (Garner & Gillingham, 1996). Thus, CMC-based reading activities may help teachers provide students with socially interactive reading instruction.

Computer Mediated Communication

CMC in educational settings allows students and teachers to use networked computers for communication, interaction and the exchange of information (Berg & Collins, 1995). The potential of CMC to support social interaction between students is an important consideration because social interaction is directly related to the development of positive attitudes toward reading activity (Guthrie et al., 1995; Gambrell et al., 1996; Oldfather & Dahl, 1994; Ng et al., 1996).

CMC has two forms, synchronous and asynchronous (Romiszowski & Mason, 1996). Synchronous communication allows students and teachers to communicate at the same time regardless of their geographical location. Examples of synchronous communication include chat rooms and video conferencing. The benefits of this type of CMC include allowing students to become active readers and writers as they send and receive messages (Beach & Lundell, 1998). Further, live interactions promote a sense of immediacy that students find

compelling, and it can contribute to increased levels of motivation to participate in CMC related activities (Jonassen, 2000).

Asynchronous communication allows students and teachers to communicate regardless of time and location. Examples of asynchronous communication are e-mail, bulletin boards and news groups. These types of CMC tools allow students to take time to reflect on their responses as they compose messages, which can be beneficial when attempting to improve students' critical thinking skills and other cognitive processes associated with literacy development (Berg & Collins, 1995; Wade, Niederhauser, Cannon & Long, 2001).

These forms of CMC can help students and teachers break through the isolation of the classroom, and time constraints of the school day, to engage in social activity, both inside and outside their communities, that otherwise would not be possible (Salomon & Perkins, 1996). Research on the use of CMC in K-12 settings over the past decade has reported that it has a positive impact on general student attitudes and motivation to participate in school related activities (Berg & Collins, 1995; Garner & Gillingham; 1996; Schofield & Davidson, 2002). In the following section I will examine cases of CMC in K-12 classrooms to determine its potential to create classroom contexts that may promote intrinsic motivation to read.

Examples of CMC

CMC has been used in K-12 classrooms to create learning environments that support social interaction between students, teachers and experts. The following examples vary in their design, implementation and purpose, however, they were all successful in improving student motivation and attitudes to participate in CMC related activities.

Global Learning and Observation to Benefit the Environment (GLOBE)

Global Learning and Observation to Benefit the Environment (GLOBE) used CMC to connect children in K-12 classrooms from 34 countries. These children used on-line databases to share information about their local environments with each other and real scientists over the course of a school year. The scientists used e-mail and chat rooms to mentor the students and teachers in how to analyze the environmental data. Students used e-mail and chat rooms to discuss ways to address environmental problems. The implementation of this project was very structured. Teachers were provided with training to use the technology and a curriculum that clearly laid out the goals and procedures for implementing the activities into their classrooms. Embedded assessments were provided to help teachers evaluate student progress and achievement.

A comparative study between students who had participated in GLOBE and those who had not indicated that students who participated in GLOBE had increased motivation to learn science concepts as evidenced by obtaining higher scores on embedded assessments than students who did not participate in the project (Means, Coleman, Lewis, Quellmalz, Marder & Valdes, 1997). Student surveys indicated that GLOBE participants had a greater appreciation of what it means to be a scientist and more students indicated they were interested in pursuing a career in science than students who did not participate. Thus, the GLOBE project was successful in improving students' attitudes and motivation toward a specific content area.

Computer Supported Intentional Learning Environment (CSILE)

CSILE is a CMC learning environment that allows students to interact with other students and experts to solve problems of personal interest in content areas including science,

social studies and math. CSILE provided students with tools to model their thinking and allowed others to give them feedback on their thought processes as they solved problems and developed problem-solving skills. This project did not focus on a specific content area but on cognitive processes that were encouraged through collaborative learning. In CSILE there was not a set curriculum for teachers to follow. Instead, students used the tools to engage in open-ended problem solving activities that are constructed by the students (Scardamalia, Bereiter, and Lamon, 1994).

A study of two fifth and sixth grade classes that used CSILE for eight months showed increased engagement in problem solving for those students that participated in CSILE (Scardamalia, Bereiter, McLean, Swallow & Woodruff, 1989). Participants showed a willingness to tackle difficult problems and an ability to provide deeper levels of explanations for solutions and elaborate on their confusions when compared to students in the control group. Further, student motivation to use CSILE did not diminish even after the novelty of the learning environment wore off. This finding was contrary to the classroom teachers' expectations. Students returning the next year reported that they missed being involved in the program.

KIDCAFE

CMC has improved student's motivation and attitudes in applications that are much less structured than either GLOBE or CSILE. KIDCAFE is an e-mail list serve that allows children ages 10 through 14 to engage in social interaction with others as they pursue their own interests. Adult presence in this CMC supported learning environment served only to check for inappropriate language or overly hostile interaction. In the study, a seventh grade teacher of students from an economically depressed working class community enrolled her

students in KIDCAFE. Many students had negative attitudes toward school, low motivation to attend school and were under achievers. Many students dropped out of school as early as the ninth grade. A case study on this classroom described these typically unmotivated students as being able to make powerful arguments for their opinions, and engaging in discussions on important topics like euthanizing unwanted dogs, evolution, and gays in the military (Garner & Gillingham, 1996, p. 223). The teacher reported that improved students motivation and attitudes toward school were evidenced in the fact that they not only came to school to log on to KIDCAFE, but they came early and stayed late to do so.

The results of these studies demonstrate that CMC can have a positive impact on student motivation and attitudes. Specifically, they demonstrate that CMC can have a positive impact on students' attitudes toward a particular content area like science as in GLOBE. They demonstrate that CMC can have a positive impact on typically low motivated students as demonstrated by CSILE and KIDCAFE. They all demonstrate that elementary and middle school students can use CMC tools successful to communicate with others outside their classrooms. Self-determination theory will now be used to examine these CMC-based activities to determine their potential to motivate students to read.

Self Determination Theory and CMC

When CMC is used to facilitate communication between students and others outside their classrooms, it engages them in intensely social activity (Garner & Gillingham, 1996). Further, it changes classroom discourse that is traditionally teacher directed and dominated to one that is more student-centered (Berg & Collins, 1995). CMC supported social activity requires a "release of agency" by the teacher (Bracewell et al., 1998). Therefore, when students engage in CMC-based activity, they must be socially interactive and autonomous as

they use dialogue to be self-expressive and collaborative to become part of the community (Gallini, 2001; Roschelle et al., 2000).

CMC-based activities are socially interactive and autonomous and these characteristics are of fundamental importance to this study. These are the characteristic that will enable teachers to create classroom contexts in which students can be self-determined during reading activity and potentially improve student motivation to read (Gambrell et al., 1996; Guthrie et al., 1995; Ng et al.1996; Oldfather & Dahl, 1994).

Self-determination theory was proposed as a framework to demonstrate how student attitudes and motivation to read can be improved. Now the components of self-determination theory will be used to show how CMC can be used to create motivating contexts for reading.

Competence

CMC in these projects addresses competence by providing students with an opportunity to know that their work has value outside the artificial environment of the classroom (Roschelle et al., 2000; Salomon & Perkins, 1996). In project GLOBE, actual scientists used student-collected data for analysis to solve real environmental problems. For example, one environmental studies high school class helped a scientist collect data on UV radiation. Throughout the school year students monitored UV radiation by collecting data on local cloud type and local cloud coverage and compared their results with those found in Washington, DC. The scientist used e-mail to describe the procedures and methods of interpreting their data. He also took time to respond to student inquiries about the data collection and implications of their research.

CISLE also provided students with competence-promoting feedback when experts outside the classroom interacted with students to validate their ideas during collaborative

problem solving processes (Scardamalia & Bereiter, 1996). The following excerpt is an example of the type of competence-promoting dialogue that took place in the CISLE environment. The letters [ET] and [BW] are the codes for the student participants:

[I need to understand] Why does a fish stay around the coral? [ET]

[My Theory] I think that the fish stay around the coral because the fish need a place to hide. [ET]

[New Theory] Yesterday, we watched a film on the Great Barrier Reef. I found out a lot. The reef provides food, shelter, and hunting grounds. Fish called Remoras help out big manta rays by cleaning them. There are also small fish called Cleaner fish. They clean fish off small particles. [BW]

[Comment] BW, I agree that the fish stay by the reef for protection and food. I guess I really didn't think about that. When you were talking about the fish that eat parasites and how they keep them clean I was very interested. Could you give me some information on where I can find some more information about that? [ET].

(Williams, Burgess, Bray, Bransford & Goldman, 1998, p. 107)

Thus, this student was provided with information that someone outside the classroom considered his ideas as insightful and his knowledge of a subject area was valued.

KIDCAFE

KIDCAFE promoted competence because students received responses from other students that let them know their voices, ideas, opinions were heard and respected by others (Garner & Gillingham, 1996). For example, in an exchange on euthanizing dogs, students found support for their opinions by others. To maintain the authenticity of the students' exchanges, their exact words are used in the replication of the dialogue. One student posted a

message that read: “I don’t like the idea of killing animals but we can’t let them over populate. If we are gonna kill them it should be in a humane way because they are living things too” (Garner & Gillingham, 1996, p. 78). Another student posted a message that validated this opinion: “I agree with you, I think killing dogs cruel. Most people just want them while they’re puppies. But when they get older they don’t want them anymore so they let them loose. If anyone ever gets a puppy or dog they should keep it!” (Garner & Gillingham, 1996, p. 78). These exchanges were typical of the kind that took place in KIDCAFE. These exchanges were unprompted by adults and reinforced feelings of competence in students as they express their ideas and received feedback that let them know their opinions were listened to by others.

Autonomy

In CMC supported learning environments the locus of control resides with the user (Berg & Collins, 1995). Students experience autonomy during CMC supported interaction because they must use dialogue to be self-expressive and collaborative. The interaction between students without the interruption of adults in KIDCAFE empowered students to engage in meaningful discussions about topics they deemed important (Garner & Gillingham, 1996). Autonomy was supported in CSILE because students chose their own topics of interest, asking their own questions, and chose whose opinions and advice to listen to as they solved their own problems (Roschelle et al., 2000). Further, autonomy was supported through self-expression and collaboration during GLOBE activities as students posed questions to real scientists as they engaged in collaborative scientific inquiry.

Relatedness

Relatedness refers to interpersonal involvement (Deci, 1992). Establishing and maintaining social relationships is an important goal for adolescents (Allen, 1986; Ford, 1982). In fact, social needs are often a child's motivation for learning (Wentzel & Wigfield, 1998). A child's identity is in part formed by their participation in a community or by becoming a member of a group (Allen, 1986; Ford, 1982). Relatedness is demonstrated in GLOBE, CISLE and KIDCAFE through the interpersonal relationships that were formed by students with those outside the classroom as they used CMC to form learning communities (Roschelle et al., 2000). In GLOBE students formed a professional relationship with a scientist. In CSILE students formed academic relationships with others and experts outside the classroom to solve problems in content areas they found personally interesting. KIDCAFE allowed students to form important personal relationships with their peers.

This literature review shows that classroom contexts that support competence, autonomy and relatedness can improve student attitudes toward reading. Using self-determination theory as a framework, the literature has demonstrated how CMC-based activities can facilitate competence, autonomy and relatedness. However, there is a lack of research on the use of CMC in the content area of reading (Kamil & Lane, 1998). To date, little systematic research has been conducted on the impact CMC has on student motivation to read (Schofield & Davidson, 2002). To identify the gap in the literature on CMC and reading motivation, the review will provide examples of the types of research studies that have been conducted on CMC in the content area of reading.

Thomas and Hofmeister (2002) conducted a study on Virtual Literature Circles in which students used electronic messages boards to carry out discussions of books they read

in small groups. The study was designed to measure the cognitive flexibility of the students in their written responses related to literature. Observations during the study indicated that students had positive attitudes towards using the discussion boards, however, the study did not report any attitudinal or motivational changes toward reading.

Tao and Boulware (2002) conducted a study with second graders and e-mail. In this study second graders used e-mail to correspond with the researchers about books. They were encouraged to talk about their favorite books and share their favorite sections with the researchers. Data collected during the study included class observations by the researchers, and archived student e-mail. Using a constant comparative methodology, the researchers determined that the second graders were enthusiastic about using e-mail. The students were eager to use e-mail during their free time and several of the students continued to e-mail the researchers long after the project had ended. While this evidence is promising in terms of using CMC as a way to engage student in literacy activities, no evidence collected in this study could help determine whether the use of e-mail caused a change in the students' attitudes toward reading.

In 1990 a teacher in Florida used e-mail with her seventh grade middle school students to interact with students in England (Potter, 1992). These students read two books, one by an American author and one by an English author. They formed collaborative groups within their own classrooms to write reviews of the books. They used e-mail to share their thoughts ideas and opinions about the books. There were two main goals of the project. First, to examine whether students' cultural awareness would increase and whether their perceptions would be positive. Second, to examine whether participation in these activities

would improve their understanding and appreciation of literature and would improve their abilities to analyze literature.

On cultural awareness post tests the American students revealed increased knowledge of English people and a slightly more positive view of them. But it could not be confirmed whether these students had improved understanding and appreciation of literature compared to students who did not participate in the project. However, it was observed that low motivated students demonstrated an increase in motivation and interest to read books (Potter, 1992).

Teachers who have used e-mail with their students have reported an improvement in reading achievement for their students at both the elementary and secondary level (Garner & Gillingham, 2002). Because improvement in reading skills is related to reading engagement (McKenna et al., 1995), it is not difficult to attribute the improvement of these student's reading skills directly to their participation in CMC (Potter, 1992). However, no systematic evidence was collected. Systematic research that examines the effect CMC has on student motivation to read is needed.

Summary

Intrinsically motivated readers have positive attitudes toward reading. Intrinsic motivation can be enhanced in classroom contexts that allow students to be socially interactive to promote competence, autonomy and relatedness. Research on the use of CMC in K-12 classrooms has reported improved student attitudes and motivation as evidenced by deeper engagement in activities that involve CMC, improved academic performance and improved interest in school. An analysis of CMC supported instruction has demonstrated that

CMC does provide students with contexts that support intrinsic motivation. However, the effect CMC may have on student motivation to read has not been systematically addressed.

The present study was an examination of change in reading motivation for fifth grade boys and girls as a result of engaging in CMC supported reading activities. To determine if a change in motivation had occurred, a survey instrument that measured change in self-perception and task-value for reading was administered to students. Then, using self-determination theory as a framework, this study also examined the implementation process of the CMC supported reading activities to determine the extent to which CMC either supported or hindered students' experiences of relatedness, autonomy and competence.

CHAPTER III. METHODOLOGY

The purpose of this study was twofold. First, to examine the change in fifth grade students' motivation to read as a result of participation in CMC-based reading activities. Second, to examine the process of implementing CMC into K-12 classrooms. Researchers have suggested that quantitative measures alone are not enough to understand the potential influence of technology in classrooms. Quantitative data may be useful in informing stakeholders about the impact CMC might have on student achievement (Labbo & Rienking, 1999). However, qualitative data that describes the process of implementing CMC into classroom contexts may be more useful for practitioners (Venezky, 1983). To address this dilemma, Labbo and Rienking (1999) have suggested that future research can make a more valuable contribution to the field by informing instructional practice more directly by using both quantitative and qualitative methods. In this way, the barriers to implementing new technologies into classroom instruction, as well as the instructional techniques that may facilitate their positive effect on classroom learning may be more clearly understood. Therefore, both qualitative and quantitative methods of data collection and analysis were used to examine the experiences of fifth grade students as they engaged in CMC-based activities to improve their attitudes and motivation to read.

Context for the Research

According to Yin (1994) one purpose for conducting research is to describe an intervention in a real-life context. In this study the intervention is using CMC to improve students' attitudes and motivation to read. The real-life context is the classroom. A fundamental problem in any research is to define the unit of analysis, or what the case "is" (Yin, 1994, p. 21). This step is necessary to limit the data collection and analysis that can be

overwhelming when attempting to provide a rich description of the case. Because the literature demonstrated that low motivated students seem to benefit the most from CMC-based activities (Garner & Gillingham, 1996; Scardamalia & Bereiter, 1996; Schofield & Davidson, 2002), the unit of analysis chosen for this research were six students, judged to have the lowest reading motivation at the onset of the study. Thus, the use of CMC to improve attitudes and motivation of low motivated readers is the basis for this study.

Two fifth grade classes interacted in an online classroom using both asynchronous and synchronous forms of CMC to participate in reading groups over the course of a school year. This activity was referred to as the Connected Schools project by the researcher, classroom teachers, and students. Activities directed students to use web pages, electronic bulletin boards and chat rooms to form groups and choose and discuss books.

The Classrooms

A diverse group of students, teachers and classrooms were involved in the Connected Schools project. The students had remarkably different backgrounds and came from contrasting communities. The schools, Buffalo Hills and Gold Creek,¹ varied in terms of computer hardware, software, the location of resources and Internet access. The teachers differed in their years of teaching experience and technological expertise. These variables can significantly impact the implementation of any type of technology including CMC (Schofield & Davidson, 2002; Berg & Collins, 1995). Therefore, the context for this research includes a description of the classrooms.

Buffalo Hills. The primary focus for data collection was a small homogenous mid-western rural school named Buffalo Hills. Approximately 270 students attended this K-6

¹ Pseudonyms were used for all schools and participants in the study.

school. Most students were of western European decent; one student was African-American. All students spoke English as their primary language. Thirty-five percent of the students received free and reduced priced meals. Twenty-two students, eleven boys and eleven girls in a fifth grade class returned their informed consent documents for participation in the study (see Appendix A).

The teacher in this classroom was a veteran with 20 years of teaching experience. Although she described herself as “not being technology savvy,” she possessed average to above average technology skills. She used e-mail and word processing regularly in her personal activities. She had participated in the Connected Schools pilot and had become quite familiar with aspects of the online classroom and could trouble-shoot technical difficulties with students.

The technology available to these fifth grade students was primarily located in a computer lab with a full time technical support person. The lab had 26, four-year-old computers. All had high speed Internet access. The students also had two six-year-old computers in the classroom with Internet access and ten wireless mobile computers that could be reserved and brought into the classroom as needed. Compared to the Gold Creek school, students at this school had more adequate access.

Gold Creek. The fifth grade classroom that participated in the Connected Schools project with the Buffalo Hills students will also be described to help set the context for this study. This is important because the involvement of this particular classroom affected the results of this study. The classroom was located in a west coast inner-city school district. The Gold Creek school is large and ethnically diverse. Approximately 700 students attended this K-5 school. The largest ethnic group was African-American (36%), followed by Hispanic

(34%), Asian (19%), Caucasian (5%), and Filipino, Native American and Pacific Islander (all less than 5%). Forty-nine percent of the students were classified as having a language besides English as their primary language and 82% of the students receive free or reduced price meals. The ethnicity of the class was representative of the larger student population. Twenty-four students, twelve boys and twelve girls, from this class returned informed consent documents to participate in the study.

The teacher in this fifth grade classroom was also a veteran teacher with 13 years of teaching experience. She was an expert technology user and regularly used technology with her students to create desktop publishing and multimedia projects. She was identified as an exemplary technology-using teacher and helped other teachers integrate CMC activities into their classrooms.

The technology available to Gold Coast students was primarily located in the classroom, as the school had no computer lab. The classroom had two ten-year-old computers, four four-year-old computers, and four two-year-old computers. The four newer machines were the only ones able to run the chat room software used for the CMC activities in the study. While all the computers had high speed Internet access, the heavy Internet traffic in this large district, and the age of some of the computers, meant that it often took as long as fifteen minutes to load the CMC tools that were necessary to participate in activities with the Buffalo Hills students. There was no technology support staff assigned to the school site although technical support could be solicited from the district office. Thus, Gold Creek students' access was more limited and unreliable than Buffalo Hills. Access to up-to-date technology and at a low computer to student ratio is still rare in many schools, though more common in smaller and wealthier school districts (Fowler & Wheeler, 1995; NSBF, 2002;

Schofield & Davidson, 2002). Outdated hardware, slow Internet connections, and lack of technical support are not uncommon in many K-12 classroom especially those in larger and poorer districts (Fowler & Wheeler, 1995; NSBF, 2002; Schofield & Davidson, 2002).

Participants

Participants were six students from the Buffalo Hills school who were selected based on teacher recommendation and low initial scores on a motivation to read measure. Three of the subjects were girls and the remaining three were boys. All were of European American descent.

Data Sources

This study used both quantitative and qualitative data sources. The quantitative data was used to examine the first research question pertaining to change in student motivation to read as a result of participation in CMC activities. Qualitative data was used to examine the nature of that change.

Motivation to Read Profile (MRP)

The MPR (see Appendix B) was used to collect data describing the students' motivation to read. The MPR is a self-report survey that is read aloud to students to measure their self-concept as a reader and to determine the value they place on reading.

The survey consists of 20 items and uses a four-point response scale. Ten items focus on the students' self-concept as readers. For example, the teacher reads the following statement, "My friends think I am a: very good reader, a good reader, an OK reader, or a poor reader" and students mark the appropriate response. The other ten items focus on the value each student places on reading. For example, the teacher reads the statement, "Reading is something I like to do: never, not very often, sometimes, or often." The response that is the

most positive receives a point value of (4) while the least positive response receives a point value of (1). Scores for each component are tallied and added together to determine students' reading motivation.

The MRP has a high degree of validity and reliability (Gambrell et al., 1996). It was field tested with 330 third and fifth grade students in 27 classrooms in four school districts in an eastern U.S. state. To determine whether the traits measured by the Reading Survey corresponded to the two subscales, factor analyses were conducted using the unweighted least squares method and a varimax rotation. Only items that loaded cleanly on the two traits were included in the final instrument. In assessing the internal consistency of the Reading Survey, Cronbach's alpha revealed a moderately high reliability for both subscales (self-concept = .75; value = .82). Further, pre- and posttest reliability coefficients calculated for the subscales (self-concept=.68; value=.70) confirmed the moderately high reliability of the instrument. This survey was administered to the students once at the beginning of the Connected Schools project and again at the end of the project.

Participant Observation

According to Yin (1994) participant observers assume a role that goes beyond passive observer including active participation in the activities under study. The researcher in this study assumed a participant observer role because she had a functional role in the Buffalo Hills' classroom. The researcher trained students to use CMC tools, developed activities for the use of CMC, and served as facilitator while students participated in Connected Schools. As a participant observer, the researcher was able to obtain an "insider" point of view that is invaluable in providing an accurate portrayal of a particular phenomenon (Yin, 1994).

As a participant observer, the researcher documented observations, reflections and artifacts from the Connected Schools project. Observation and reflections included in the journal focused on the degree to which the Buffalo Hills students demonstrated the volitional behaviors of highly motivated readers as they interacted in the CMC reading activities. The types of behaviors included:

- Student engagement in independent reading activities.
- Student engagement in CMC discussions with other students about books.
- Students seeking out and finding books to read
- Benefits and drawbacks of students using discussion boards vs. chat rooms.

Further, artifacts created by student participation in CMC activities included transcripts of discussion board postings and chat room interactions.

Open-ended Interview

Additional data was collected for this study through open-ended interviews (see Appendix C). Open-ended interviews can provide researchers with important insights into a situation. They allow participants to provide facts of a matter as well as opinions about particular events (Yin, 1994). Questions for this interview that were developed to obtain factual information included: “How many books have you read since Christmas?” and “What are some of the titles of those books?” Questions to obtain students’ opinions on what facilitated or hindered their motivation included; “What did you like best about the Connected Schools project?” and “If I was to do this again next year what should I do differently to make it more fun for students?” These questions were developed to illicit information about the effectiveness of the Connected Schools project in influencing student motivation to read. These questions were field tested with two Buffalo Hills’ students that were identified by the classroom teacher as average in terms of reading motivation and were

not included as participants in this study. Half-hour long interviews were conducted with these two students to help the researcher clarify the wording of the questions that might be confusing to students, and to develop effective probing questions.

Procedures and Data Collection

At the beginning of the school year parents and students signed informed consent documents that assured confidentiality and addressed the concerns of parents about children using the Internet (Schofield & Davidson, 2002). All students in both classes who returned the Informed Consent document were enrolled in the Connected Schools project.

The researcher was responsible for the implementation of Connected Schools at the Buffalo Hills site, the primary research site in this study. The researcher was the primary facilitator during the 45 minute period each week that the students met in the computer lab to participate in Connected Schools. During this time, the researcher helped students log on to the site, make postings, find books to read and ensured that student interaction with CMC was appropriate. The researcher made field notes, collected artifacts that included discussion board postings and chat room transcripts, and documented her reflections immediately after each session. The classroom teacher provided the researcher with support for general classroom protocol and technical assistance.

Connected Schools Activities

The activities were designed by the researcher to create an environment in which students could experience relatedness, competence and autonomy. The following activities allowed students to choose books to read, with whom they would read with, topics for discussion and discussion partners. Thus students had to be self-directed, self-expressive and socially interactive to complete the activities.

MRP and Subject Selection

Soon after the Connected Schools project started, students were given the MRP survey. Students completed the MRP in their regular classroom. The classroom teachers read each question out loud and students recorded their responses on then form. The six lowest motivated readers were identified based on MRP scores. Consistent with the MRP protocol, classroom teachers looked at the scores to verify the results. The Buffalo Hills teacher agreed with the test results on all but one student. Although a low motivated reader, this student would not have been included as one of the six participants in the study based on MRP score alone. The decision was made to include this student as one of the participants due to the recommendation of the classroom teacher. Six students (three boys and three girls) from the Buffalo Hills school were identified as the subjects for this study.

Ice Breaker and Discussion Boards

The first Connected Schools activity involved the creation of a personal page using the template provided in the online classroom. The web page included a short student biography and a description of his or her favorite book. To encourage students to get to know each other and facilitate the formation of groups, students read the web pages and posted messages to other students who shared common interests. Students were taught to compose their messages using Microsoft Word so they could spell check, and then copy and paste into the discussion board before posting.

Students often have difficulty creating and following discussion threads (Jonassen, 2000). Therefore, students were shown how to begin a new discussion thread and to reply to another student's posting. To facilitate successful future social interaction, students practiced

using the discussion boards by posting messages about movies, music, books, friends, current events and hobbies.

Group Formation

Students read each other's web pages and posted messages into a forum named "I saw your web page." Students made comments on things they had in common or found interesting based on the personal information and book reviews posted on the web pages. Students were then directed to seek out other students and form a group with those students whom read books they found interesting.

Using CMC in Connected Schools

Once the groups were formed, each group was given a private forum in which to begin the book selection process. Asynchronous forms of communication can make consensus forming tasks difficult and time consuming (Jonassen, 2000). Therefore, students were shown how to use the chat rooms and white boards to help them decide on books to read. For the rest of the school year students used the discussion boards, chat rooms, and whiteboards to read and discuss books of their choosing. The Gold Creek students participated in Connected Schools during their "free time" after they had completed their other assigned activities at the end of each school day. Thus, it was anticipated that most students in this classroom would participate in the project for at least fifteen minutes a week. The Buffalo Hills students participated in the computer lab once a week for 45 minutes.

MRP Posttest

At the end of the school year classroom teachers re-administered the MRP survey. Procedures were the same as those used in the initial administration.

Open-ended Interviews

Open-ended interviews were conducted with the six students who were chosen as the participants in the study. The interview protocol was used to guide the interview process. Students were interviewed in a separate room during the regular school day. Interviews were tape recorded and transcribed for analysis.

Overview of the Analysis

Data for the study included survey, observation, transcripts and interviews. The opportunity to use multiple sources of evidence (Denzin, 1970; Yin, 1994) is a major strength of this study. Validity is addressed through a process of triangulation to corroborate the findings from any one source and reliability can be developed through maintaining a chain of evidence (Yin, 1994).

MRP

To address the first research question for this study, which was if CMC-based reading activities would improve student motivation to read, t-tests were used to examine whether a change in motivation had occurred. A t-test was performed to analyze data from the entire class and an additional t-test was used to examine just the data on the six low-motivated readers who were the focus of this study.

Participant Observation

Field Notes. The field notes and reflections helped the researcher explain the results of the MRP. These data were used to help the researcher to determine how student participation and interaction in CMC-based reading activities affected their motivation to read. Using constant comparative analysis methods categories were identified and developed to determine how CMC activities facilitated or hindered student motivation to read.

Artifacts. Transcripts of student interaction on discussion boards and chat rooms were printed out and served as raw data sources for analysis. These data were examined holistically to identify trends and patterns. Further analyses included *Message Act* analysis (Levin, Kim, & Riel, 1990) to examine the amount and nature of interaction patterns among students and *Content Analysis* (Lipponen, Rahikainen, Hakkarainen, and Palonen, 2002) to examine the focus of students' messages during their interaction in CMC activities. The qualitative data would provide insights into the relationship between MRP and student behavior in the CMC environment. Thus, validity was being constructed through the converging lines of evidence.

Open-ended Interviews

The open-ended interviews provided the researcher with a third source of data to establish validity through triangulation. The interviews allowed the researcher to directly question the participants to gain insight into students' experiences with CMC-based reading activities. Further, the interviews were used to corroborate the evidence of student participation and interaction during CMC related reading activities as observed by the researcher and to validate the categories developed with constant comparative analysis of the field notes. Thus, the results of the MRP surveys are linked to the researcher and participants' points of views to further establish a reliable chain of evidence.

CHAPTER IV. RESULTS AND DISCUSSION

The major assertion of this study is that CMC-based activities can provide students with the social contexts that are needed to improve their motivation and attitudes toward reading. Further, CMC-based activities will have a greater positive impact on lower performing students. Analysis and results will address the two purposes of the study; first, to determine if student participation in CMC-based reading activities improved their motivation to read, and second, to identify the factors that either promoted or hindered the effectiveness of CMC to provide students with a sense of relatedness, autonomy and competence during CMC-based reading activities. The expected findings were that students who have low motivation to read would experience an increase in motivation to read as a result of participation in CMC reading activities.

To address the first purpose of this study, the Motivation to Read Profile (MRP) was used to determine whether an increase in student motivation had occurred.

Motivation to Read Profile

A two-tailed paired T-test was used to examine whether CMC-based reading activities had an effect on student motivation to read as determined by changes in scores on the MRP. Results indicated no statistical significant difference between the MRP scores for the whole class pretest ($M = 66.9$, $SD = 8.23$) and posttest ($M = 65.18$, $SD = 8.04$), $t(21) = 1.246$, $t = .28$ (two-tailed) or for the targeted group of low motivated readers (pretest $M = 57.00$, $SD = 6.13$, posttest $M = 56.17$, $SD = 6.27$), $t(s) = .31$, $p = .77$ (two-tailed).

Surprisingly, these results did not support the hypothesis that CMC-based activities would positively influence student motivation to read. Therefore, the initial findings were contrary to much of the literature prompting a closer look at the multiple data sources

collected for this study. The data collections focused on the six participants chosen for the study. Observations of their behaviors during the CMC activities were recorded in field notes. Archives of their messages posted on the discussion board and chat sessions were printed out and served as raw data for analysis. Open-ended interviews were conducted with the six participants. Based on the analysis of this data, the reporting of results will begin with a brief description of the participants and their actions during the CMC-based reading activities.

Participant Profiles

The focus of this study was on the six least motivated readers in the class. Before proceeding with the full explanation of the findings, a brief description of each of the participants and an overview of their experiences with CMC-based reading activities will provide a context for understanding and evaluating the findings.

Charles

Charles scored 46/80 on the pre-MRP, the lowest score in the class. However, he had the most improved score on the post-MRP 52/80, a difference of (+6) (see Table 1). Charles was very active in the Connected Schools project. He posted 29 messages, the most of any participant. He also received more responses from the Gold Creek students than any other participant. My field notes indicate that I saw him as a leader in both the group formation and book selection process. He searched for books and read book reviews on Amazon.com. Once, he found a book he wanted to read, he put the book review in a message² posted to the Gold Creek students to convince them to join his group and to read that book.

² The exact words as written by students were used in excerpts reproduced for the purpose of reporting data. No corrections in spelling or grammar were made by the researcher.

We want to read *Dirt Bike Racer*. Here is a book review:

My recommendation for this novel is if you are a type of kid that likes dirt bikes, enjoy having fun and going scuba diving then this is a book for you because it has both. Mike and Tony spend all afternoon working on the dirt bike. This is a book for you because that is that type of book it is there is a YZ 80 in this book. "Let me take it to my garage because we have a bigger area and we can start getting to work on right away." Also there is scuba diving in this book." Didn't you have your depth gauge with you yes or no." "Yes." This book is good for ages 10 and older. The novel is *Dirt Bike Racer* By Matt Christopher. (Discussion Thread Archives: January 15, 2003)

Charles was successful in his endeavor and a group was formed to read *Dirt Bike Racer*.

Table 1

Summary of Change in Participants' Scores

Name	Pre-Test	Post Test	Difference
Charles	46	52	+6
Allison	59	62	+3
Katie	60	62	+2
Amy	55	52	+1
Teddy	64	59	-5
John	58	46	-12

Amy

Amy had the second lowest score on the pre MRP, 55/80, and her post MRP score only went up to 56/80 (+1) (see Table 1). Amy posted the least number of messages of all the participants (9) and only received 6 responses. Amy reported that not receiving responses to the messages she posted as frustrating, and kept her from posting more messages. The following excerpt from her interview about the Connected Schools project demonstrates her frustration:

Interviewer: Did you ever not post messages on the discussion boards during the week or did you always post messages?

Amy: I tried to, but like I'd read the messages and I'd type one up and then no one ever replied back. So it was hard. (Interview: May 25, 2003)

Amy read one book with the Connected Schools project: *Mary Kate and Ashley: So Little Time #7- Girl Talk*.

John

John started the Connected Schools project as one of the most enthusiastic participants. He eagerly posted messages. He was one of the few students that would log on at home to read and post messages. He was the first student to get and read his book. In fact, he finished his book before most other students had even gotten theirs. Unfortunately, he ended the project as one of the least enthusiastic participants and had the greatest decrease in motivation as measured by the MRP; pre MPR (58), post MRP (46). This decrease was of 12 points (see Table 1) and caused him to end the year as the lowest motivated reader in the class. When asked what would make Connected Schools better, he suggested:

I think you should have longer periods, like start, if you're going to do Connected Schools, start at the beginning of the year so you could read more books and talk more. Because we only got a chance to read one and a half books. (Interview: May 25, 2003)

John was in the same reading group as Charles and read *Dirt Bike Racer* by Matt Christopher.

Allison

Allison had the second highest improvement in motivation to read. Her pre MRP score was 59/80 and her post MRP was 62/80. She ended up as the participant with the highest motivation to read increase (+3) in her score (see Table 1). She was also the second most involved participant, posting 28 messages throughout the duration of the project. She was in a very active reading group and this group was the only group to read more than one book. When I asked her she how she got involved in the group she said "... so I decided to be in a group with them because they are the ones that like to read". Being in a group "with the ones who like to read" may have contributed to Allison's improvement in motivation to read because peers can be influential in children's development of attitudes and motivation to read (Wigfield & Asher, 1984). Allison read two books with her group, *Scared Stiff* and *Megan's Island* by Willo Davis Roberts.

Katie

Katie had a difficult time getting involved with a reading group. She was not interested in the books the groups were reading and she was unable to get a group formed around a book she wanted to read. She continued to switch groups during the project claiming that she just wasn't interested in the books they reading. When I asked if she read a

book with Connected Schools she said yes, but was unable to remember the title of it or what it was about. She did read other books however, and was able to go into great detail about them during our interview. Katie posted 17 times on the discussion boards. Most of her interaction with the Gold Coast students came during the chat room activities. Katie was very good at keyboarding and her group always gave her control of the keyboard during those times. Her pre MRP score was 60/80 and improved to 62/80 (+2) (see Table 1) by the end of the project. An excerpt from her interview demonstrates that even though Katie was not interested in the books being read by the groups, she did see value in the project and, not surprisingly, felt that the project would be improved with more chatting:

Interviewer: Did you learn anything new about books?

Katie: That its better to go with books, well its better to read books in groups because then you can, you can see the book from their point of view instead of just yours.

Interviewer: That's interesting. How many books did you read through Connected Schools?

Katie: One, because we didn't have time to start the other book.

Interviewer: if we could do this again next year, how could Connected Schools help you read more books?

Katie: Probably by chatting to other people that weren't in our group, like if we could switch groups and we chose like a book they wanted to read so that it would be mixed up. (Interview: May 25, 2003)

The book that Katie's group read was *The Forests of Silence: Deltora Quest: #1* by Emily Rodda.

Teddy

Teddy started the Connected Schools project as the highest motivated reader in the low motivated reader group with a score of 64/80. He was recommended by the classroom teacher to be one of the participants and was selected by the researcher because his score on the MRP indicated that he was a low motivated reader. Teddy had a decrease in motivation (-5) as indicated by his post MRP score, which was 59/80. Teddy posted 13 times on the discussion boards. Most of his messages consisted of sending the Gold Coast students pictures of dirt bikes he found on the Internet. In our interview Teddy indicated that he enjoyed the Connected Schools project and felt it could help him read more books:

Interviewer: Were there some things that frustrated you or that you didn't like?

Teddy: No.

Interviewer: If you could do this again next year do you think it would help you read more books?

Teddy: Yes.

Interviewer: Why?

Teddy: Because it forces you, kind of. (Interview May 25, 2002)

Teddy was in the same group as John and Charles and read the book *Dirt Bike Racer* by Matt Christopher.

The scores of the individual participants in the study indicate that the CMC-based activities may have had differential effects on students' experiences during the Connected Schools project. An examination of these experiences may provide helpful explanations as to why student participation in CMC-based activities did not have a significant positive effect on student motivation to read.

General Findings

Constant comparative method was used to code and analyze data to develop categories (Glaser & Strauss, 1967). I began the qualitative data analysis during the data collection phase. According to Yin (1994) good data collection comes from asking good questions about why events appear to be occurring. My questions included:

1. What difficulties are students having as they use CMC?
2. What aspects of online communication seem to motivate students?
3. Are students excited about participation in the CMC activities?
4. What aspects of CMC frustrate students? (Field Notes: October 2, 2002)

As a result, two primary themes emerged: a lack of social interaction and problems associated with technical difficulties.

To build an explanation for a phenomenon, the researcher must uncover causal links (Yin, 1994). After data collection was complete, I reviewed my field notes and examined the artifacts generated from CMC-based activities, which consisted of archived discussion boards messages and chat room transcripts. I then conducted a message act analysis (Levin et al., 1990), which helps to identify frequency of student participation and interaction during CMC activity. I conducted a content analysis of student messages based on a procedure developed by Lipponen and his colleagues (2002). I was then able to establish causal links between frequency of student participation and quality of student interaction and the results of the MRP. This helped refine my themes to explain why CMC did not have the anticipated effect on student motivation to read.

Finally I reviewed the student interviews. I grouped student responses to the interview questions in broad categories that had emerged from my field notes. These

categories included: what did students enjoy, dislike, find frustrating and would have changed about the CMC activities in which they participated. Student responses help to corroborate the causal links between the MRP and the participant observer's records of the CMC activities. As a result, my themes were refined to include message exchange, synchronicity, and message focus.

General findings are based on the participants' reports that they had not read more books than usual as a result of their participation in the Connected Schools project. However, most students felt that future participation in the Connected Schools project would help them read more if there were improvements in its implementation. Many students cited lack of communication by the Gold Creek students as a major shortcoming in the CMC process. Students preferred the use of chat rooms and felt that increased use of synchronous communication would improve the quality of interaction. Finally, most students suggested that greater access to technology might have facilitated reading more books.

The artifacts generated from student participation in CMC activities corroborated the students' perceptions that there was a lack of communication from the Gold Creek students. Over the course of the project, the Buffalo Hills students posted 647 messages while Gold Creek students posted 318. The inequality in the number of messages posted resulted in many of the Buffalo Hills students feeling that they were not receiving enough responses and contributed to a general sense of disappointment. The lack of interaction from the Gold Creek students was one of my major concerns about the success of the project and is the first theme to be discussed here.

Message Exchange

Receiving messages from others outside the classroom can be a positive experience for children involved in CMC-based activities (Berg & Collins, 1998; Garner & Gillingham, 1996; Potter, 1992). Quick responses to messages tend to be significant to students and they tend to be disappointed when their messages do not receive a prompt response (Beach & Lundell, 1998). Message exchange refers to the frequency of responses received from other students during the Connected Schools Project. Because social interaction is the driving force behind the student experience of relatedness, autonomy and competence, students who did not receive the appropriate amount of social interaction may not have benefited fully from the CMC-based activities. An examination of two students' experiences, Charles (who had the highest increase on the MRP (+6)) and John (who had the lowest increase on the MRP (-12)), provides insight as to how CMC-based activities affected their motivation to read.

Charles's score on the MRP (+6) indicates that CMC may have positively impacted his motivation and attitudes toward reading. At the beginning of the project Charles was ranked as the least motivated reader his class. However, examination of Charles' interview at the end of the project indicated that he not only enjoyed the Connected Schools project, but that he also recognized that his participation in the project had a positive effect on his motivation to read.

Evidence of this was found in open-ended interviews. Students were asked, "If you could do this (Connected Schools) again next year, do you think it will help you read more books?" Charles response was positive, "Yeah. Because I don't read, well I read some, but books that are interesting to me, but I'd probably read more because I get to read with other people and we all get to share" (May 23, 2003). Charles's acknowledgment that Connected

Schools could motivate him to read by “sharing” and “reading with other people” are consistent with the major assumption of this study. CMC can help create contexts that promote social interaction, a behavior trait of intrinsically motivated readers.

In contrast, John, who was initially ranked as the third least motivated reader in the class, ended the project as the least motivated reader by a large margin (6 points). His response to the question about future participation in Connected Schools and its effect on his motivation to read was less enthusiastic than Charles’. He responded, “...um, sort of. I read my regular amount of books is probably five or ten or around there, but when we were doing this (Connected Schools) I was reading more than ten. I was reading like eleven” (May 23, 2003). Even though John and Charles were in the same reading group and their group only managed to read one book during the Connected Schools project, John’s answer indicates that his participation in CMC related activities did not have a major impact on the amount of reading he engaged in. His response, “sort of” to the question on whether Connected Schools could motivate him to read more books was hesitant as opposed to Charles’ definite “Yeah.” Further, he indicates that he only read one more book than usual as a result of his anticipation in Connected Schools. The differences in John and Charles’ perceptions and experiences during Connected Schools are indicated in the answers to several other interview questions.

Another major difference was their perception of what caused them frustration during the CMC activities. When asked “What frustrates you about using the computer?” Charles replied, “I don’t know.” When probed, he mentioned a technical difficulty, “Well, the laptop is hard to move the little pad,” referring to having to use his fingers to navigate instead of a mouse as his only frustration. So Charles’ level of thinking about what frustrated him was fairly superficial and not related to the social interaction components of Connected Schools.

In contrast, John was anxious to mention his frustration with the lack of communication from the Gold Coast students.

John: ...It's sort of what I didn't like about it because some people never got replied back to.

Interviewer: Right. That was frustrating to people.

John: Like everyone else in the group would get replied back but you.

Interviewer: Oh, okay. Did that happen to you sometimes? A lot?

John: Yes. (Interview: May 23, 2003)

John's frustration with the lack of social interaction may have contributed to a decrease in his motivation to read as indicated by the MRP. Without social interaction, he was unable to experience a sense of relatedness or receive competence-promoting feedback. Despite his attempts to engage in self-expression, which promotes autonomy, there was no indication that his voice was heard or respected by others in the group.

I attempted to understand why John and Charles seemed to have had very different experiences with CMC. The question prompted me to compare the amount and type of social interaction in which they engaged with the Gold Coast students. I examined their discussion board postings according to the number and type of postings that they made during the critical first three months of the project.

The first CMC-based activity encouraged students to get to know each other by posting messages in six different discussion forums. Topics for each of these forums were books, news, friends, sports, music and movies. A total of 452 messages were posted in these forums. The forums began on October 2, 2002 and ended on December 18, 2002. Gold Creek students posted only 164 messages while Buffalo Hills students posted 288. During that

period, John posted 14 times and Charles made 11 posts. This difference is important because it demonstrates that John's perceived lack of communication from Gold Coast students cannot be attributed to any lack of effort on his part.

A message act analysis based on the work of Levin, Kim, and Riel (1990) was used to examine the types of interactions that Charles and John engaged in while using the discussion board. Transcripts of the communication during the first three months of the project were used to view the messages in a linear sequence. Transcripts included the name of the sender of the message and the date and time the message was sent as a header. Thus, the researcher could not only view who sent the message, but whether the message received a response in a timely fashion. Each message served as the unit of analysis. Based on the categories developed by Levin and his colleagues, I coded each messages as either; Initiated, Received Response, Responded or Reply.

Student messages were coded as "Initiated" when the message began a new discussion thread. "Received Response" indicated that the student received a response to their posting. Messages were coded as "Responded" if a prior posting prompted their posting, and if that student received a reply to his or her response then the message was coded as "Reply."

Charles posted 11 messages and received 16 messages back. John, who posted even more messages than Charles (14), received only two messages back (see Table 2). From the message act analysis, it can be determined that the two students not only experienced differing levels of interaction from the Gold Coast students, but also that their modes of interaction varied. Charles typically initiated interaction with Gold Coast students while John

Table 2

Summary of Postings

Name	Initiated	Received Response	Responded	Reply	Total Messages Posted	Total Messages Received
Charles	5	15	6	1	11	16
John	2	1	12	1	14	2

tended to respond to specific Gold Coast student messages. This may have influenced the amount of social interaction that each received for several reasons.

One reason may be that when students post a message that initiates interaction, they stand a greater chance of receiving more responses because more than one student may respond to the original message. However, when a student responds to a posting, it is directed to a particular student, therefore, only one response is usually received.

For example, on October 2, Charles “initiated” a discussion thread in the “Sports” forum that generated 6 responses between October 2 and October 28. On October 3, Charles “initiated” another discussion thread that generated 8 responses. However, John received only one response to one of the two messages that he “initiated.” Further, he appeared to make a greater effort to engage other students by posting 12 responses to other student messages; he only received one reply from the Gold Coast students.

Lipponen et al. (2002) refer to unequal social interaction during CMC activities as “centrality” (p. 370). For reasons that are difficult to explain, some students develop a central role during CMC communication and others become isolated. In this case, Charles had a central role and John was isolated. Perhaps John’s decision to respond directly to other

students rather than initiating topics for discussion may have reduced the likelihood for multiple responses. This phenomenon is problematic for teachers who are trying to promote social interaction among students using CMC. As demonstrated by John's post MRP scores, becoming isolated during CMC activities may have had a negative effect on his motivation to read. Thus, teachers need to find ways to involve isolated students in the CMC activities.

Without social interaction, the contexts for promoting intrinsic motivation to read through relatedness, competence and autonomy do not exist. Instead of experiencing relatedness students feel excluded. When student messages are not reacted to or acknowledged, they tend to feel excluded from the group (Beach & Lundell, 1998). In John's statement, "like everyone else in the group would get replied back but you" clearly conveys his feelings of exclusion. Further, instead of receiving competence-promoting feedback to improve his motivation to read, his sense of intellectual authority may have been undermined as a result of his attempts at self-expression being ignored. Thus, the potential of CMC to improve student motivation to read can have the opposite effect, and may contribute to a decline in student motivation to read when students do not receive the appropriate amount of social interaction.

Interviews with the participants indicated that social interaction might be improved by using a different mode of communication. Most students indicated that they preferred chat rooms to the discussion boards. In fact, students suggested that synchronous forms of communication increased the extent to which they experienced relatedness and autonomy. An examination of the differences between synchronous and asynchronous communication to promote student motivation to read became the second theme in which to organize the analysis.

Synchronicity

The Connected Schools project began by using only asynchronous communication in the form of discussion boards. Students used the discussion boards to get to know each other with Ice Breaker activities and to form groups to decide which books to read. However, synchronous communication was adopted during the second half of the project to address some of the communication issues that had arisen. First, I will examine student experiences with asynchronous communication to demonstrate how it may have played a role in diminishing the desired effect of CMC on student motivation to read. Then, student experience with synchronous communication will be examined to demonstrate how it may improve the effect of CMC on student motivation to read.

Discussion Boards

Jonassen (2000) describes the advantages and disadvantages of asynchronous communication. One advantage of asynchronous communication is that it gives students time to compose and reflect on their messages before posting. This, on the other hand, may cause significant delays in responses to messages, which can negatively impact the relevancy and immediacy of the message. For example, students were expected to get to know each other by reading each other's web pages and posting messages to students they found interesting or had things in common with. Unfortunately, responses to the Buffalo Hills web pages (which can be considered an act of asynchronous communication) came nearly six weeks after they posted their web pages. Further, complications with lab scheduling and technical difficulties caused the Buffalo Hills students to be unable to read those responses for another two weeks. Thus it was two months from their initial attempts at self-expression until they received the competence-promoting feedback that could improve their motivation to read.

Throughout the project the Buffalo Hills students continually pointed to the lack of participation and lengthy time gaps between message postings on the discussion boards. This became an ongoing source of frustration for students. The frustration began soon after the Ice Breaker activities began on October 2. Between October 2 and October 9, Gold Creek posted 44 messages and Buffalo Hills posted 48. The message exchange was nearly equal and students were receiving responses at least once a week. However, between October 9 and November 20, Gold Creek students posted only 8 messages to the 83 posted by the Buffalo Hills students. My concern about the lack of message posting by the Gold Creek students was recorded in my field notes on October 23. I made a note of my intention to e-mail the Gold Creek teacher and find out what the problem was. She replied that she was having difficulty finding time during the day to get students on the Internet.

Due to limited access (no computer lab), Gold Coast students could not all get on at the same time and post messages. Therefore, she tried to get students online as they finished their other class work at the end of the school day. Unfortunately, few students were finishing up in time to post messages.

To address this issue, the Gold Coast teacher decided to set aside three days to make message posting a priority for her students. On November 20, 21 and 22, the Gold Coast students posted 70 messages. The messages were all in response to the Buffalo Hills student web pages that gave information about their personal lives and the types of books they liked reading. These postings were addressed to specific students in the Buffalo Hills class and had potential to be competence promoting and to foster relatedness as students attempted to establish relationships with each other. The following excerpt is an example of one of these postings:

Hi Charles- I read your page- I like to fix cars and things too. I have a bike that I ride in the dirt but it isn't a motor dirt bike - is yours? I want a dog too but I can't have one until we move out of an apartment- they don't allow dogs there. I brought one home once because a freind gave me a puppy but the owner of the apartment took it away. I really want to read that book - it sounds good! (Discussion board archives: November 20, 2002)

Clearly, this message is an example of how students may begin to establish relationships as they discover commonalities and differences among themselves as a result of participation in CMC. Further, the comment “I really want to read that book – it sounds good!” is a small example of how students can develop a sense of “intellectual agency” or competence by having their opinions acknowledged.

Unfortunately, these messages were posted just before Thanksgiving Break. Most Buffalo Hills students did not have an opportunity to read these messages until December 6. Further, on December 6, another delay occurred. The Internet was down at the Buffalo Hills schools and students were unable to log on to the Connected Schools site. It was two weeks later before the Buffalo Hills students were able to read the messages. By then, the project’s focus had switched from Ice Breaker activities to Group Formation activities. Many of the messages posted by the Gold Creek students did not receive responses by the Buffalo Hills students. In fact, John, who had received little response to his messages in the past, received five messages from the Gold Creek students concerning his web page. However, he uncharacteristically responded to none of them.

On December 6, the day the Internet was down at the Buffalo Hills school site, I took the opportunity to hold a class discussion to collect student perspectives on the project. In my field notes I recorded:

The Internet connection was down today. Instead we held a class discussion to find out what students liked about the project and what they were finding frustrating. Students reported liking the opportunity to communicate with the Gold Coast students. They find it interesting that even though they live in a different place they have many things in common. They also like learning about the different types of music they listen to and learning about different people. They are frustrated when their questions are not answered by other students, and when they do not get responses to their messages. (Field notes: December 6, 2002)

Difficulties in asynchronous communication between the two classes intensified as they attempted to form groups. Students had difficulties using the discussion boards to respond to each other's messages. They often responded by initiating a new thread instead of replying directly to a message that invited them to be in a group. Several Gold Creek students had agreed to be in more than one group. This created confusion and frustration for the Buffalo Hills students. Further, there were continuing problems with access for both schools. At the Gold Creek site, the network had gone down and it was nearly two weeks before they were able to get online again. Further, the computer lab at the Buffalo Hills school site was unavailable due to an oversight on scheduling. We had spent almost a month trying to get groups formed and many students had still not committed to a single group.

To help facilitate the group formation process, individual forums for the emerging groups were created based on conversation with the Buffalo Hills and the discussion board

activity. Students who had not committed to a group were told that they had to join one of the existing groups. This expedited the process and by February 5, almost six weeks after the group formation process started, most students had committed to a group.

Limited class time, computer access and reliable networks are not uncommon barriers to successful implementation of CMC-based activities. Other case studies on K-12 classroom applications of CMC report similar struggles. Aside from training, teachers report time and access to technology as the top barriers to more ubiquitous use of CMC applications in their classroom activities (Beach & Lundell, 1998; Berg & Collins, 1995; Garner & Gillingham, 1996; Schofield & Davidson, 2002). These difficulties prohibited students from experiencing CMC as an intensely “social activity” described by its proponents.

To improve the amount of social interaction between students we adopted synchronous communication in the form of chat rooms. It was hoped that the immediacy of synchronous communication could improve the extent to which students could be self-expressive, receive competence-promoting feedback and develop relationships with each other around reading activity.

Chat Rooms

Jonassen (2000) claims the advantages to synchronous communication include its ability to facilitate consensus building and its immediacy tends to be more motivating for students. However, the social nature of synchronous communication, which students enjoy, tends to contribute to discussion becoming less on task. On February 12, the students were introduced to chat rooms. Due to older hardware and software, the Gold Creek students only had one computer that could run the chat room software. In addition, software issues at Buffalo Hills prevented the chat rooms from running on any of the computers in the lab.

Fortunately, the laptop computers were usable. One laptop computer was brought into the computer lab and each group took turns using the laptop to chat. The Gold Creek teacher and the researcher allowed each group ten minute sessions for students to experience communication with other groups in a chat room. Because the amount of time it took for the computers to load the chat room software was lengthy at both sites, the Gold Creek teacher and I logged with our own user names and passwords and let the students chat under our names. The following excerpt from the first chat session serves to demonstrate the effectiveness of synchronous communication in facilitating social interaction between students. Students were able to get to know each other better as well as make some important decisions concerning the books that they would read in their groups.

Buffalo Hills > Group one!

Gold Creek > This is (student name) in group one (ms stoermer is typing) - how are you doing, is it raining there - it is raining here today

Buffalo Hills > hi it very cold and sunny

Gold Creek > have you guys started reading dirt bike racer?

Buffalo Hills > no but we have two

(Students play a game of tic tac toe on the electronic whiteboard)

Buffalo Hills > you are good

Gold Creek > (student name) told us where to put it , he says he can beat everyone in our class!

Buffalo Hills > one more game

(Students play another game of tic tac toe)

Gold Creek > we all saw the picture of the dirt bike 0 it was cool and the cover of the book is cool too

... (another group gets on)

Gold Creek > Hi what are you guys doing?

Buffalo Hills > (student name) is not here today

Gold Creek > did you decide which book you wanted to read?

Buffalo Hills > We don't care. Which one do you want to read?

Gold Creek > we want to read sweet sixteen, my best friends' boyfriend- sounds like it will be good - we like romance

Buffalo Hills > Thats OK with us. (Chat room transcript: February 12, 2003)

From this chat room archive it is apparent that students were able to quickly decide on which book to read. This is in contrast to the activity that was taking place on the discussion boards in which many student attempts to make a decision on a book were not responded to. Also, during this first chat session the Gold Creek teacher and the researcher demonstrated the whiteboard drawing tools by showing them how to play a game of tic-tac-toe. Thus they were able to enjoy some social activity as well as attend to the business of deciding on which books to read. Eventually, this became a problem. It will be addressed in the third section of this chapter.

Between February 12 and May 15 students took part in 19 chat sessions. The chat sessions were held during the time that the Buffalo Hills students were in the computer lab. The Gold Creek students logged on from their classroom. There was enough time for three groups to participate in a chat session each week. The other groups were encouraged to post messages on the discussion boards. The discussion boards were transformed to include a

private discussion board for each group. Each group had its own discussion board in which they could post messages about the books, and continue discussions on other topics of interest. However, interaction on the discussion boards continued to decline as students preferred to use the chat room to interact. Further, disproportionate interaction on the discussion board continued to rise between the two schools. Between February 12 and May 12, the Buffalo Hills students posted 244 messages and the Gold Coast students posted 92. With so many messages left unanswered, the Buffalo Hills students typically only used the discussion boards to post the obligatory message required by the classroom teacher. Thus, the majority of exchanges transferred from the discussion boards to the chat rooms.

The above excerpt demonstrates the effectiveness of synchronous communication to form consensus and the immediacy of synchronous communication to increase the amount of social interaction between students (Jonassen, 2000). In his interview, Teddy expresses his preference for synchronous communication over asynchronous. When asked whether he prefers chat rooms or discussion boards he replies, "Chat room. You get to know them better. Because when you are posting messages you are not really talking back and forth. And you kind of lose interest" (May 23, 2003). Clearly, his preference for synchronous communications centers on his perception that it allowed the students to get to know each other better which appealed to his sense of relatedness.

In addition, the chat sessions facilitated autonomy and competence. Students had to be self-expressive to convince other students to read the books that they wanted. The chat sessions required students to engage in self-expressive activity to participate. Following is an example of how students expressed their thoughts ideas and opinions about books:

Buffalo Hills > lets read Midnight for Charlie Bone

Gold Creek > what is it about

Buffalo Hills > nobody else wants to read it

Gold Creek > ok it sounds boring

Buffalo Hills > but I already read it and it was really good what other books do you
want to read

Gold Creek > then why do you want to read it again

Buffalo Hills > because it was good

Buffalo Hills > i thought it sounded boring until I read the back

Buffalo Hills > as the saying goes... don't judge a book by its cover. (March 6, 2003)

Students were equally capable of being self-expressive on the discussion boards but chat rooms provided students with more feedback, which is fundamental to promoting competence (Deci, 1992). However, further analysis indicated that students did not spend much time discussing books or things related to reading. In fact, most of the discourse focused on how many pages they had read and which book to read next. Students rarely expressed their opinions about the stories they were reading. Further, students preferred to play tic-tac-toe or other games they invented during their chat sessions rather than discuss anything about reading or books.

However, because results from the MRP indicated that there was no significant change in students' motivation to read, a closer look at the type of interaction occurring between students was needed to explain why CMC-based activities did not improve student motivation to read. The first two themes focused on the importance of creating more interaction between students. Message exchange pointed toward teacher responsibility in facilitating equally distributed interaction among students. Synchronicity demonstrates the

importance of knowing the capabilities of the different CMC tools to accomplish specific tasks. However, the power of Connected Schools to improve student motivation to read lies in the quality of student communication. The third and final theme is Message Focus and is used to explain the failure of these CMC-based activities to provide students with contexts that could improve their motivation to read.

Message Focus

Another factor that may have contributed to the insignificant change in the MRP scores is the lack of focus of the student interactions. Simply engaging students in CMC activities is not enough to change student attitudes and motivation. Quality discourse is essential for students to have successful learning experiences with CMC (Lipponen et al., 2002). A content analysis on the nature of student interaction during the chat room activities revealed that students spent little time discussing books and reading.

Chat room transcripts were printed out and served as raw data for analysis. A content analysis based on the work of Lipponen et al. (2002) and colleagues was used to examine data. Each student comment served as the unit of analysis. The codes were not predetermined, but developed through interaction with the data. The initial coding pass served to categorize whether comments were “on topic” or “off topic.” The second pass was an examination of the “on topic” comments. If the “on topic” comments were intended to facilitate the reading and selection of books they were coded as “logistics.” The following excerpt from a chat room session is an “on-topic logistics” interaction:

Gold Creek > ok do want to talk about the book

Buffalo Hills > Sure, did you get it

Gold Creek > yes

Buffalo Hills > Have you started it yet?

Gold Creek > i read three chapter. (Chat room transcript: May 14, 2003)

If the comments indicated the students were sharing opinions about reading and books they were coded as “on topic opinion.” The following excerpt is an example of three “on topic opinion” comments:

Gold Creek > so how is the book

Buffalo Hills > I like the book so ar

Buffalo Hill > so does Austa. (Chat room transcript: May 14, 2003)

Groups of students participated in chat room discussions because of the limited amount of computers that were capable of running the chat room software. Each group of students gathered around one computer and took turns typing and discussing. Therefore, analysis of the quality of discourse took place relative to the membership of a group at a given time. A total of nineteen chat sessions took place between February 12 and May 15.

Results indicated that students spent very little time talking about books or reading. There were 742 total comments. Only 272 (35%) of those comments were in any way related to books or reading. Further, 470 (79%) of on topic comments were only logistical in nature indicating students spent the majority of their chat time on superficial topics including what book to read next, when they should begin reading, or what chapter they were on and playing games on the whiteboard. Only 57 (21%) of the comments related to students’ opinions about books or reading.

A typical example of student exchanges that quickly diverted from discussions of reading and books to games, is demonstrated in the following excerpt:

Gold Creek > DID you finish the book

Buffalo Hills > YES

Gold Creek > I looked at the suggestion and I want to read you go on

Buffalo Hills > what was your favorite part of the book ?

Gold Creek > When he fell in the mud pit

Buffalo Hills > what was yours?

Gold Creek > HELLO!!!!!!

Buffalo Hills > when he turned into a data

Gold Creek > I have a friend right now and his name is Carl

Buffalo Hills > I liked that too. want to play tic-tac-toe

Gold Creek > you go

Buffalo Hills > You go First

Gold Creek > Finish your X

Buffalo Hills > Are you there

Gold Creek > MY TEACHER SAID THAT WE CANT PLAY TIC-TAC-TOE until we
finished talking about the book

Buffalo Hills > yes

Gold Creek > Mrs. L said we can

Buffalo Hills > but we have to talk about the book'

Gold Creek > We did!!!!!!

Buffalo Hills > okay

Gold Creek > your turn. (Chat room transcript: April 23, 2003)

It cannot be expected that CMC could improve student motivation to read books if students are not using CMC to actively engage in discourse about reading and books.

Students recognized the lack of reading activity as one of the things that could be improved in the Connected School project. John suggested, "...start it at the beginning of the year so you could read more books..." (May 23, 2003). Charles agreed, "...have it more than once a week. Because you get to talk to them more and maybe read more than one book" (May 23, 2003). Although, these are good suggestions, unless an intervention occurred to redirect students to discuss literature instead of playing games, more time participating in CMC activities may have only led to more time "off task."

Autonomy is crucial in providing students with highly motivating contexts for reading. However, allowing students too much autonomy may have contributed to students spending the majority of their time "off task" during these CMC activities. Teachers need to find a middle ground so that students are still empowered by the autonomous nature of CMC, but still attend to the pedagogical goal (Bracewell et al., 1998). Prior studies have found that scaffolding CMC activities is critical in improving the quality of student discourse in CMC environments (Lipponen et al., 2002). For example, students could have been given a prompt, such as "what character in the book you are reading do you relate the most to?" Then given time to write down a few thoughts before participating in chat room sessions. Providing students with proper scaffolding may not only have provided better autonomy support for self expression, but focused students on reading activity and may have also supported their sense of "intellectual agency" as students received more competence promoting feedback as a result of increased self-expression about books and reading.

Study Findings

The results of MRP indicated that there was not a significant change in student motivation to read as a class or in the group of low motivated readers. A closer look at the

qualitative data for this study helped to pinpoint some factors that may have inhibited CMC in providing students with a context that would improve their motivation to read.

The first factor identified, message exchange, indicated that there was an unequal distribution of social interaction during the CMC activities. Without social interaction contexts that support autonomy, relatedness and competence could not be created. In fact, not receiving the appropriate amount of social interaction may have contributed to a decrease in some students' motivation to read.

Synchronicity is the second factor that may have hindered the effectiveness of CMC to improve student motivation to read. Synchronicity pointed to the effectiveness of synchronous communication over asynchronous communication in providing students with appropriate and timely amounts of social interaction, especially when access to technology is limited. Synchronous communication may be better suited in providing students with contexts that increase the extent to which they experience relatedness, autonomy and competence. Further, synchronous communication is more effective for tasks that require consensus building.

Finally, message focus appeared to be another factor that prohibited students from experiencing a change in their motivation to read. If students were not engaging in social interaction focused on reading and books, a change in their motivation to read could not be expected. For CMC to be successful in obtaining a particular pedagogical goal, teachers need to scaffold activities properly so that students attend to that goal as they participate in CMC activities.

CHAPTER V. CONCLUSION

It was hypothesized that student motivation to read would be improved after participation in CMC-based reading activities; however, this was not the case. It appears that integrating CMC into classroom reading activities involves a complex set of issues and simply using students with CMC is not enough to improve student motivation to read.

The overarching conclusion that can be drawn from this study is that appropriate pedagogy should be in place before implementing CMC-based activities. First, pedagogy needs to address student access to technology. Inadequate access to technology for the Gold Coast classroom was a major barrier to creating highly motivating contexts for reading. Limited and unreliable access to technology is typical of classrooms today. A recent study reported that even though 90% of schools have Internet access in their schools only 31% of teachers reported having access to technology in their classrooms and only 28% of teachers reported having high-speed access (Ronkvist, Dexter, & Anderson, 2000).

Although high-speed access is not necessary for CMC activities, slow Internet services can be a barrier for teachers who are often pressed for time (Schofield & Davidson, 2002). Teacher creativity and flexibility can address some of the issues. For example, having a student start up the computers and get the necessary software loaded before it is actually needed by students can help save time. However, in some cases, access issues may be too limited and unreliable to overcome. Thus, access to technology is an important consideration for teachers who may attempt to integrate CMC into classroom activities.

Second, pedagogy needs to provide students with properly scaffolded CMC activities to insure high quality and equitable interaction among students. Scaffolding refers to structuring activities to support student activity as they learn new skills and then gradually

removing the support so that the student can eventually perform the task autonomously (Vygotsky, 1978). The Connected Schools activities were structured to give students a great deal of autonomy. They were allowed to choose any book they wanted to read, to read with whomever they wanted, and were given little direction on how to discuss literature. Although self-determination theory encourages student autonomy, too much autonomy may negatively affect students' literacy learning experiences (Guthrie & Alao, 1997). It may be more beneficial for students to have a limited number of books to choose from and then form groups around those book choices. This may have sped up the group formation process and given students the opportunity to read more books, thereby increasing their level of engagement with literature.

Further, students had difficulty staying on task during their CMC supported chat sessions. This is not an uncommon occurrence. Discussions during CMC activities are difficult to sustain, tend to be "off-topic" and shallow, and not all students participate in or experience social interaction equally (Beach & Lundell, 1998; Lipponen et al., 2002). Quality discourse in CMC activity is described as "density" (Wasserman & Faust, 1994). Density is created through increasing both the quantity and quality of interaction between students. The more numerous connections students have with each other the more "dense" the discourse. Density is further improved when students interact meaningfully with each other by exchanging knowledge, opinions, advice and feedback. If discourse is dense during CMC reading activities, students may experience a greater sense of relatedness, autonomy and competence. Thus, their motivation to engage in reading activity may be increased. To ensure that discourse is dense teachers need to scaffold activities so that students know how to include everyone in messages exchanges and focus their messages on literature discussions.

However, properly scaffolding CMC-based activities is very difficult (Lipponen et al. 2002). First, teachers need knowledge of which modes of communication work to accomplish different types of activities. For example, the Connected Schools project relied on asynchronous communication to allow students to get to know each other and form groups. This became a time consuming and convoluted process. Instead, synchronous communication may have expedited the process while improving students' sense of relatedness as the immediacy of the communication allowed them to get to know each other better. Conversely, the nature of asynchronous communications allows students time to develop and expand on ideas. Using the discussion boards instead of chat rooms to discuss their thoughts, ideas and opinions about literature may have improved their ability to be self-expressive concerning literature, and thus promoted meaningful feedback to improve autonomy and competence, and ultimately have a positive impact on their motivation to read.

Further, Lipponen and his colleagues (2002) suggest that scaffolding is a situated and context dependent activity; therefore, scaffolding procedures need to be rebuilt in new situations. Factors to consider for scaffolding include students, technology available, teachers' resources and the school culture. As of yet, there are not general rules for scaffolding CMC activities. Studies that focus on teacher behavior and activity while integrating CMC into their classroom are needed to help teachers integrate CMC into their classroom activities successfully. Future research that provides insight on how teachers successfully scaffold CMC activities will make an important contribution to the field (Lipponen, 2002).

Judy Harris (1998) has begun to address some of these issues with the concept of activity structures for CMC learning activities. Activity structures are flexible so that

teachers in different grade levels and content areas can capture what is most powerful about a particular CMC activity and create their own CMC-based activity to meet the needs in their particular classroom context. However, Harris (1998) raises another important issue involved in integrating CMC into classroom activities. Specifically this issue points to the question, “Is it worth it?” As demonstrated, CMC-based activities add a level of complexity to an already complex situation. In the introduction to this study I mentioned the success Literature Circles and Reading Buddies were having on improving student motivation to read in classrooms. If they are already successful activities, what is the purpose of integrate CMC into them? The answer to this question goes beyond the scope of this study but indicates an important direction for future research.

This study has important implications given that many stakeholders in education believe that at least one in five students will be using CMC to receive a substantial portion of their schooling (NSBF, 2002). According to the National School Board Foundation survey conducted, many technology decision makers feel that the majority of their teachers were unprepared to make sophisticated uses of the Internet that include CMC applications. Less than five percent of teachers in the districts surveyed used the Internet to engage in interactive learning, communication or collaboration. The lack of more sophisticated use of the Internet was linked to teacher expertise. Forty-three percent of the districts surveyed rank the technical ability of new teachers to integrate the Internet into their classroom activities as only average. Only thirty-six percent of new teachers were ranked as being expertly prepared. For students to benefit from the motivating characteristic of CMC, teachers need training and technical support to use CMC successfully to meet pedagogical goals like

improving motivation to read (Bracewell et al., 1998; Roschelle et al., 2000; Schofield & Davidson, 2002).

This study pinpointed some of the factors that prohibited CMC from having a significant effect on improving student motivation to read. To realize the potential CMC may have in motivating students to read, educators need to be pedagogically prepared to overcome the complexities involved in integrating CMC into classroom activities.

APPENDIX A. INFORMED CONSENT DOCUMENT

Title of Study: Connected Schools

Investigator: Denise Lindstrom, Graduate Student

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to increase student motivation to read independently through the use of on-line collaborative technologies. Your child is being invited to participate in this study because your child will be participating in an on-line classroom with other fifth grade students to have book discussions as a regular part of their classroom curriculum.

DESCRIPTION OF PROCEDURES

If you agree to participate in this study, your participation will last for one school year. During the study you may expect the following study procedures to be followed. Your child will take a survey on attitudes toward reading. Your child may choose to skip any question that they may not wish to answer or makes them feel uncomfortable. Your child may be chosen to participate in two audio taped interviews about their experiences with the on-line collaborative technologies. The audiotapes will be erased one year after completion of the study, approximately on 06/30/04.

RISKS

While participating in this study you may experience the following risks:
There are no known foreseeable risks at this time from participating in this study.

BENEFITS

If you decide to participate in this study there may be no direct benefit to you. It is hoped that the information gained in this study will benefit society by understanding how on-line collaborative technologies can improve teaching and learning

COSTS AND COMPENSATION

You will not have any costs from participating in this study. You will not be compensated for participating in this study.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken

Subjects will be assigned a unique code and will be used on forms instead of their name. Only the researcher will have access to the data. The data will be kept secure in locked drawer in a locked office. The data will be retained from 10/23/02 until 06/30/04 and then erased. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study. For further information about the study contact Denise Lindstrom at (515) 294-1694 or at dllb@iastate.edu. You may also contact Dr. Dale Niederhauser at (515) 294-6842 or at dsn@iastate.edu. If you have any questions about the rights of research subjects or research-related injury, please contact the Human Subjects Research Office, 2810 Beardshear Hall, (515) 294-4566; meldrem@iastate.edu or the Research Compliance Officer, Office of Research Compliance, 2810 Beardshear Hall, (515) 294-3115; dament@iastate.edu

SUBJECT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document and that your questions have been satisfactorily answered. You will receive a copy of the signed and dated written informed consent prior to your participation in the study.

Subject's Name (printed) _____

(Subject's Signature)

(Date)

(Signature of Parent/Guardian or
Legally Authorized Representative)

(Date)

INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

(Signature of Person Obtaining
Informed Consent)

(Date)

APPENDIX B. MOTIVATION TO READ PROFILE

Name _____ Date _____

1. I am a _____.

Boy

Girl

2. My friends think I am _____.

A very good reader

A good reader

An OK reader

A poor reader

3. Reading a book is something I like to do _____.

Never

Not very often

Sometimes

Often

4. I read _____.

Not as well as my friends

About the same as my friends

A little better than my friends

A lot better than my friends

5. My best friends think reading is _____.

Really fun

Fun

OK to do

No fun at all

6. When I come to a word I don't know, I can _____.

Almost always figure it out

Sometimes figure it out

Almost never figure it out

Never figure it out

7. I tell my friends about good books I read.

I never do this

I almost never do this

I do this some of the time

I do this a lot.

8. When I am reading by myself, I understand _____.
- Almost everything I read
 - Some of what I read
 - Almost none of what I read
 - None of what I read
9. People who read a lot are _____.
- Very interesting
 - Interesting
 - Not very interesting
 - Boring
10. I am _____.
- A poor reader
 - An Ok reader
 - A good reader
 - A very good reader
11. I think libraries are _____.
- A great place to spend time
 - An interesting place to spend time
 - An OK place to spend time
 - A boring place to spend time
12. I worry about what other kids think about my reading _____.
- Every day
 - Almost every day
 - Once in a while
 - Never
13. Knowing how to read well is _____.
- Not very important
 - Sort of important
 - Important
 - Very important
14. When my teacher asks me a question about what I have a read, I _____.
- Can never think of an answer
 - Have trouble thinking of an answer
 - Sometimes think of an answer
 - Always think of an answer

15. I think reading is _____.
- A boring way to spend time
 - An OK way to spend time
 - An interesting way to spend time
 - A great way to spend time
16. Reading is _____.
- Very easy for me
 - Kind of easy for me
 - Kind of hard for me
 - Very hard for me
17. When I grow up I will spend _____.
- None of my time reading
 - Very little of my time reading
 - Some of my time reading
 - A lot of my time reading
18. When I am in a group talking about stories, I _____.
- Almost never talk about my ideas
 - Sometimes talk about my ideas
 - Almost always talk about my ideas
 - Always talk about my ideas
19. I would like for my teacher to read books out loud to the class _____.
- Every day
 - Almost everyday
 - Once in a while
 - Never
20. When I read out loud I am a _____.
- Poor reader
 - OK reader
 - Good reader
 - Very good reader
21. When someone gives me a book for a present, I feel _____.
- Very happy
 - Sort of happy
 - Sort of unhappy
 - Unhappy

APPENDIX C. PARTICIPANT INTERVIEW GUIDE

Reading Behavior: (Can CMC increase student motivation to read independently?)

1. How many books did you read this semester? (Increase in Motivation)
2. Tell me some of the titles of the books you read this semester? (Confirm reading)
3. Is this the normal amount of books you read each semester? (Increase in Motivation)
4. Tell me about the most interesting book you read this year? (Impact of CS on Motivation)
5. How did you find out about this book? (Impact of CS on Motivation)
6. Is this how you usually decide on a book to read? (Impact of CS on Motivation)
7. How do you usually decide to read a book? (Impact of CS on Motivation)
8. Do you know of any books right now that you would like to read? Tell me about them. (Impact of CS on Motivation)
9. How did you find out about these books? (Impact of CS on Motivation)
10. What are some things that get you excited about reading books? (Increase in Motivation)

Connected Schools Activities: (What are student perceptions of the effectiveness of CMC on their motivation to read?)

1. What did you like best about the Connected Schools Project? (Competence, Control, Social Interactions)
2. What would you change to make the project more fun? (Competence, Control, Social Interaction)
3. If you could do this again next year do you think you would read more books than you usually do? (Motivation)
4. Tell me about how you got involved with the group you read books with? (Control, Competence, Social Interaction)
5. Did you like the group you like the group you chose to read with? (Control, Social Interaction)
6. Tell me how your group decided on a book to read? (Control)
7. Did you like the books your group chose to read? Why? (Control)

Use of Technology (What are the obstacles in implementing CMC with fifth grade students?)

1. What did you like better about Connected Schools, posting messages on the discussion boards or using the chat rooms? Why? (Competence, Control, Social Interaction)
2. What stopped you from posting messages or being in the chat rooms? (Competence, Control)
3. What frustrates you about using the computer? (Competence, Control)
4. What do you like about using the computer? (Competence, Control, Social Interaction)

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