

# **Online Collaborative Learning for High School Students**

## **Using a Blended Approach for the Promotion of Self-Monitoring Skills**

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This researcher posed the questions: Could participation in a Computer-Supported Collaborative Learning (CSCL) environment be designed in such a way as to increase self-monitoring skills of the students? Would the use of the online learning environment ultimately lead to better student grasp of the course content, and consequently, better academic performance? Self-monitoring skills have been related to better overall academic performance (Ley & Young, 2001). The hypothesis was that, if designed effectively, the online learning environment would indeed benefit all the learners.

### Literature Review

This study began as an exploration of using a CSCL environment as a tool to promote self-monitoring skills and other course content as part of the overall course presentation. It was decided that the Action Research model was the best method suited to this study. The design of the instructional unit incorporated both face-to-face instruction and asynchronous online instruction. Twenty-eight grade nine students agreed to participate in the study which took place over a period of about six months as part of the curricula in biology and introduction to technology. By using class time to present the instructional unit and providing adequate scaffolding the students were able to carry out the requirements of the unit (McLoughlin & Marshall, 2000).

Self-monitoring skills, which is a type of self-regulation, have shown to be a characteristic of academic success for elementary and high school students. In spite of the widespread recognition of the importance of self-monitoring skills, the mandatory Ministère de l'Éducation, des Sports et des Loisirs (MELS) curricula did not promote or require its instruction in secondary education at the time of this study. Results from a pre-unit

questionnaire and journal reflections by the students indicated a need for the instruction of self-monitoring skills and an interest in those skills by the students.

A number of studies have been carried out over the years in the area of self-monitoring (Butler, 1995; Lan, 1998; McManus 2000; Ley and Young, 2001; Loomis, 2000). While some have focused on the self-monitoring skills in online environments, none have yet focused on self-monitoring skills for high school students in a blended environment. Indeed, apart from anecdotal evidence in conversations or on the Internet, no research in the area of blended environments for high school students could be found to date. A recent M.A. thesis from Concordia University (McEwen, 2002) was completed in the area of online communication in a conference system somewhat similar to the system used for this study. In her conclusion, McEwen recommended that better self-monitoring skills on the part of the subjects, who were adult learners in this case, might have improved the outcomes of the learners' performance (147). In fact, she hypothesized that these skills would be better if taught even earlier to learners. This provided the teacher with an impetus to attempt to instruct the younger high school students to practice self-monitoring skills as they engage in online collaboration and course of study.

Self-monitoring skills are the abilities and strategies used by learners to self-record and self-observe their own progress and make appropriate self-reflective changes. These skills fall under the broader umbrella of self-regulation, which in many cases, have been correlated with academic success (Butler, 1995; Lan, 1998; Zimmerman, 1998). Ley and Young state four guiding principles for embedding self-regulation into instructional practice (2001). First, guide learners into developing a successful study environment, and then organize activities to have students engage metacognitively. Thirdly, use instructional goals and feedback, and lastly, provide learners with continuous evaluation information. They also promoted the idea that self-regulation skills could be instructed in an online format. The online format encourages students to journal or record their thoughts and reflections as they examine their own study skills or as they study.

Boekaerts (1997) distinguishes between metacognitive knowledge, which includes the subset of self-monitoring skills, and motivational beliefs about a knowledge domain. That is, she acknowledges the essential role of motivation in self-referenced cognition and how it affects a learner's judgment when describing how the learner believes they exert control and sets goals in a learning situation. Boekaerts makes a variety of design recommendations for teachers which include the creation of a powerful learning environment which promotes self-regulation. As well, she suggests the use of interactive learning groups particularly to form a social learning environment which will promote motivational self-regulation amongst the students (1997). These recommendations motivated part of the design of the learning environment that was eventually created. In particular, the students were very deliberately

put into smaller groups to collaborate.

While research in the area of computer-supported collaborative learning has been well explored for higher education, distance education, and adult learners, little research has yet been done on its effects and impact on children and adolescents, particularly in the blended environments of traditional classroom teaching and asynchronous online conference systems. While there is a good deal of anecdotal evidence that blended environments are being utilized by teachers around the world, few have taken the time to document their experiences or carry out quantitative or qualitative research about it. What follows, therefore, is a literature review on CSCL which reflects research performed mostly in higher education contexts.

While research in CSCL has proliferated in the last fifteen or so years, much of the early research on computer-assisted learning focused on individual instruction from a behaviourist perspective. Drill-and-practice skills and other repetitive exercises were emphasized; however, these kinds of activities were limited by providing only low-order thinking skills (McLoughlin, 1998). Discovery and experiential learning were explored by a few researchers, including Papert and his LOGO environments, but again these were limited to individual knowledge gains (Jonassen, 1998; McLoughlin, 1998). While discovery and experiential learning were constructivist in approach, they did not acknowledge the broader classroom environment and the influence of social interactions where language, dialogue, discourse and communication play important roles. Interest in Vygotsky's socio-cultural model of learning led many researchers to examine the role of the social context in the promotion of higher order learning (Nastasi and Clements, 1993; Crook, 1994).

One study that blended computer-supported learning with face-to-face instruction in a K-12 setting was the study of a computer-supported intentional learning environments (CSILE) created originally by Bereiter and Scardamalia (Hewitt, 2001). The study was limited to a local-area network without a connection to the Internet and, thus, limited to school hours. However, the CSILE environment provided a discourse medium similar to the online learning environment that was used for this study. Collaborative construction of knowledge was encouraged in a public course area that preserved all the interactions of the students for later review. This environment also provided equal opportunities for students to have a voice within the class.

Salmon (2000) outlines a five stage model of computer-mediated communication (CMC) participant behaviour. Each stage requires participants to master certain skills. The first stage is access and motivation; the second is online socialization and the third stage is information exchange. The two final stages are knowledge construction and development

which are demonstrated through the participant's abilities to reflect, articulate, and evaluate one's own thinking.

This five stage model probably well represents the average distance learner. A blended learning environment, however, probably greatly accelerates the rate at which these stages occur. In fact, the first two steps are skipped almost altogether because access is already possible and the fact that most adolescent learners have positive attitudes about technology. Because the classroom socialization has already taken place, online socialization was easily by-passed. In fact, because of the amount of time that some of these students spend online chatting with their friends, the challenge was to get the students out of superficial "chat" mode and into an asynchronous approach to communication which reflected deeper thinking.

### Design

The Action Research method of educational research was deemed most suitable because of its focus on the attempt of the researcher to find a solution to a problematic situation within an educational context. The researcher is a participant who is able to systematically study the problem and produce an intervention based on data collected in situ and theoretical considerations.

Fundamentally, Action Research is a practice of researcher participation and self-reflection and is recognized as a type of qualitative research. However, there remains considerable controversy about whether Action Research is merely a procedure or template for action rather than an authentic research methodology (McTaggart, 1996).

Usually, Action Research has four stages to its methodology: planning, action, observing/data collection, and reflection.

Action Research has been identified as a form of Design Research (Hoadley, 2002). It has been pointed out that most research methodology does not support innovation in design, while a central defining feature of Design Research is sustained innovation in education (Bell, 2002; Bereiter, 2002). In Design Research, which is cyclical and recursive in nature, the initial task of the researcher(s) is to immerse themselves in the educational context of the situation and identify the need for intervention. Then the researcher will develop a plan of action, followed by an implementation stage when data is collected and artifacts are analyzed. This completes the first cycle of Action Research. The analysis and interpretation then inform the researcher to make corrections and alterations for the second cycle of action research. The second cycle repeats the first and so on. The data may be collected and analyzed using a variety of methodologies. For this study, quantitative data (questionnaire responses) were analyzed using descriptive statistics. Responses to a focus interview and a

qualitative examination of students' comments in their online assignments were also utilized.

### Procedure

A pre-unit questionnaire, which measured self-monitoring skills, attitude, motivation levels and levels of computer usage, was distributed before the students were introduced to the Online Learning Environment. Computer lab time was made available so that students could have access to the online course area and to online resources during class time. Online resources were made available on the class webpage and some independent online resources selected by the teacher were linked on that webpage and in the course area. The students were required to submit some of their assignments in hard copy form. A few of the assignments were emailed to the teacher for evaluation. Some of the submitted assignments were posted in the online conference course area. One of the assignments was a collaborative group project that was later presented orally to the class.

Use of the OLE took place in early December 2003 for the first Cycle of Action Research. Comments, dialogue, and other forms of interactive participation in the OLE were recorded and kept for later analysis. About three weeks later, after the winter break, the students were directed to use an online virtual quiz that helped them identify their learning style. Students were later divided into small groups of 5 or 6 members to comment on their learning styles as well as provide study tips and strategies to the other group members. Students were also required to respond to at least two of their group members' comments and tips.

In the second cycle a few months later, the students reviewed their study strategies in the online learning environment, responded to others' posts, and reflectively shared how they would apply what they had learned in the biology course. A similar follow-up questionnaire about the use of the OLE was distributed to measure the students' perceptions of the effectiveness of the online portion of the coursework. Similar questions were taken from the first survey as well as such questions as, "Being aware of my learning style has helped me improve my study habits" and "I believe I can learn as much in the online component of a course than in a classroom". Several students took part in a focus-group interview as a final set of data. In the interview process, the students were asked to comment on their perceptions of the ease of use of the online environment and the perceived drawbacks on the use of an online learning environment for academic purposes.

Evaluation and assessment are necessary and fundamental exercises in traditional classroom teaching for K-12 learners. Although the evaluation procedure is not part of the current study, a rubric was needed to assess the amount and quality of student online

participation.

The rubric measured the quality and number of contributions, whether the contributions included the required criteria, grammar and spelling, and the good citizenship exhibited by the student in the conference area. The rubric was handed out in hard copy form to the student as well as posted in the conference area.

The identities of the students have been altered to protect their identities from those outside the class. Permission from the administration of the school and the parents for the study had been solicited and granted.

The Nicenet Internet Classroom Assistant was chosen because of its built-in safety features to protect potential students from online predators and hackers. It provides this by allowing teachers to create a course area that is accessed only by a class key. Students must also create a unique username and password in order to gain access to the environment. The students were reminded not to disclose their passwords for the sake of privacy and preventing identity theft.

### Discussion of Findings

The initial hypothesis of this study was that the use of an online learning environment to promote self-monitoring skills for high school students would lead to better student grasp of the course content, and consequently, better academic performance. The online learning environment included conference areas where students could post and respond asynchronously to each other about ideas and questions the teacher had posed. It also provided areas where students could access resources, such as webpages and uploaded documents which contained information pertinent to the course. The students were also required to upload their collaborative group documents as a way of sharing their products with the rest of the class. In the students' responses of the post-unit questionnaire, online conference area, and focus-group interview, most agreed that the online unit about self-monitoring skills did indeed have an influence on their academic performance. However, there was marked divide between the perceptions of the higher academic achieving students and the average achievers.

The higher academic achievers entered into the unit already cognizant of good study strategies and their abilities. Also, they were less inclined to perceive a need to improve their study habits with the response to the question "I think I need to improve my study habits" agreeing even less with the post-unit questionnaire than the pre-unit questionnaire (from 3.6 to 3.8 on the Likert scale of 1 to 5). On the other hand, the average achievers

reported an even greater agreement with the same question on the post-unit questionnaire (from 2.8 to 2.3). This may demonstrate that the unit in self-monitoring skills further heightened the awareness of the need to employ better study strategies for these students. However, they do later report that this group of average academic achievers perceived their grades had improved due to their enhanced study skills, so this is an interesting and somewhat dichotomous result.

The higher academic achieving students also reported less enjoyment and desire to participate in online learning units in the future. The results to this are somewhat misleading; while a few were very enthusiastic in their support of online learning, half reported the least satisfaction and enjoyment of all twenty-eight students. It is difficult to determine from these results if their lack of enjoyment was related directly to using an online environment or because of the topics which were being studied. It is also difficult to determine if they were objecting to communication in an asynchronous versus synchronous manner, or collaboration within groups rather than individual performance, or the layout and design of the online learning environment itself. This warrants further study in future research.

Another notable result that shows the differences in responses between the two groups is the response to question #7 of the post-unit questionnaire, "I frequently play on the computer or chat with my friends during the time I am studying or working on my homework". Higher academic achievers reported less inclination to these activities than their initial responses of the pre-unit questionnaire while the average achievers reported a much greater tendency to do these activities. At the same time, these students also reported academic gains in the second questionnaire. It is possible that the sociability and collaboration encouraged in the online unit may have fostered this tendency to be engaged socially while studying and may have actually benefited the students in their studies. Other researchers have pointed out the advantages of sociability in online learning environments (Kreijns & Kirschner, 2004; Shank, 2004; Lou, Abrami, & d'Apollonia, 2001). Higher achieving students may not have to rely on the help of their peers or may perceive less need to do so while average achievers may perceive a greater need to collaborate and cooperate with their peers as they study. This need for collaboration and cooperation promotes social interaction and may even make the study experience more enjoyable and effective for these students (Kreijns & Kirschner, 2004; Shank 2004).

The later responses from the focus-group interview revealed further attitudes and perceptions of the students about the online learning unit. When the students who participated in the focus group interview were asked what the most significant thing was that they recalled about the online environment, one of the students immediately stated that it was the discussions that they were able to have with each other. A second student

agreed with that and added that it was “really great, really fun to read the posts” that someone would add to his own post. The same student also enjoyed being able to add his own html code to his messages so that it took on a personal flavour. When then asked if the students found it easier or more difficult to respond in the online environment than in class, all three participants agreed that it was easier to respond in the online conference area. They also stated that they found it easier because there were no interruptions, they could take the time to read or not and they had the freedom to choose to whom and to what to respond.

Two of the students reported that they liked the fact that it was a “paperless” part of the class and were relieved not to hand in an assignment in hard-copy form. When asked about the moderator’s feedback during the second cycle, two of the students stated that they greatly appreciated the feedback from the teacher. One of the students stated that she “felt like an important person was commenting on it [her work]”. While this is the only evidence that the role of feedback from the moderator is important, this is an area which has been identified as very important to a unit in online instruction and communication (Salmon, 2000).

The students who participated in the focus-group interview were also asked if starting course work online as early as in high school was a useful activity. Each of the students agreed that it was. One student commented that it was a “fun way to do the work” and he now believed he was better prepared to experience online learning when he went to college.

As well, the issue of appropriate language for an online learning environment became a focal point for discussion in the focus-group interview. One of the students pointed out that many of the students were using instant-messaging type responses with the emphasis on the word “instant”. Instant messages are meant to be short, in-the-moment type responses. He pointed out the inappropriateness of this type of usage because the online environment is meant to provide an area where one can thoughtfully respond with longer messages.

Analysis of the results of the data also indicate that high school students must be approached with a different set of expectations if one is proposing to use an asynchronous online environment as a mode of teaching and learning. Many students initially gave very brief, instant-messaging style responses to their peers and to the questions posed to them. Students of that age group appear to be more accustomed to the language habits of instant messaging (e.g., MSN Messenger) and may well need to be carefully instructed on how to respond in an asynchronous forum in an academic context. An example by an academically average student illustrates this tendency:

yo man good study skills, I always listen to music when I study it relaxes me.. but not

too much. Anyways talk to ya later in class or something, peeeeeeeeeeeeeeeace .x0x.  
...Joan..

It became apparent early on in the first cycle that communication skills for an asynchronous OLE had to be instructed and modeled if better crafted responses were to be expected from the students (Salmon, 2000). Hewitt's (2001) experience with the Computer-Supported Intentional Learning Environments (CSILE) documented the need for the teacher to often encourage students to respond substantively as they communicated and collaborated in the learning environment. Students also required frequent reminders that they needed to demonstrate understanding in their posts as well. In the case of this study, it did not take long for many of them to sense this and change their style of responses. Students who modeled longer more reflective posts earlier in the conference area provided examples for those later to follow.

Most of the students had never participated in an asynchronous online discussion before, so would need considerable coaxing to not leave the task until the very last minute and assurances that this would be a part of their overall evaluation record. Also, good netiquette practice had to be stressed and included in the evaluation.

Great care was taken to provide students with opportunity initially during class time in the computer lab to begin or finish their assignment so that any problems with login or comprehension of the task could be addressed. Also, the students were assured that their ideas, reflections, thoughts and responses would not be ridiculed by the other students in the forum.

Therefore, relationships built on trust are essential to this endeavor. A blended approach of regular face-to-face contact as well as online contact provides a rich opportunity to establish trust and confidence between teacher and students. (Driscoll, 2002).

At least half of the high academically successful students stated that they never enjoyed the online collaboration and that they would not like to use it again. Perhaps because they are already academically successful, they may either be aware of the self-monitoring techniques covered, or already employ those techniques, or they feel that they are not necessary (Boekarts, 1997). A high number of students also stated that study skills, such as what were offered in the online component, should be offered regularly to high school students.

Typically, the more academically successful students of each group were the first to pose an initial response in the given period of several days, wrote longer responses and were the first to respond to others' posts. Often these students were the most encouraging and

supportive in their responses and frequently embellished their posts with little jokes and playfulness. They appeared to be enjoying the activity and having fun as they communicated back and forth. In order to illustrate this, the following is a response from one academically successful student to another:

Hey Joe, great studying ideas, i should probably use them to get better marks in math, heh heh, but you didn't say how much time you spend studying... or is it just me? And, i think you should take some breaks at LEAST every 30 minutes or so. But the studying right before going to bed, and just shoving your books aside, turning off the light, and just fallin asleep is great, i'll remember to use that quick form of studying! haha, seeyha joe!  
~ann~

The student above, "Ann", successfully responded to "Joe's" post, poses a question, provides some advice for him, and then commends him on one of his tips in a playful manner. "Joe" responded in return just a few minutes later:

There are evenings that I study more than others. I can easily study for 30 min when it comes to a medium or big test for Bio. For french, I sometimes study just less then five minutes! (And then be the only person with a ten on ten.)

And, just to tell all of you, I indend to take breaks when I work a lot in a row... that's the change I want to do the most in my habits. (And I probably need that one, for I easily spend the whole evening doing work and studying without looking at the TV!)

A few hours later in the same day, a third student, also an academically successful student, responded to both of the previous students:

Yes! It's true that you should take some breaks when you study Joe because you got to let your brain relax. It may sound dumb but it does work for me. You have to get your mind off the studying because your poor brain has too much to deal with, not to talk about the noise that disturbs you. So, that's just my personal point of view but I think you should try it and listen to Ann and I. We're always right! Well now, I got to leave you but I was glad to help you and have a nice time studying.

### Implications for Practice

As the digital divide closes and technology becomes more accessible and more stable, more teachers will be challenged to explore online communication as an alternative learning environment to supplement and augment the classroom experience. Some schools are already moving to a blended learning model as a cost-saving measure. As more schools are

moving to a one-to-one laptop approach, it may be soon that many teachers will be expected to use this model. Facilitation and guidance will be needed by those teaching pioneers who are now making the move to blended learning and experimenting so that they can share practices that are safe, effective and engaging for the students.

High school students are a different breed than the adult learner and these differences will have to be highlighted and noted so that the instructional design of a blended approach may be optimized. Clear presentation must be made of the expectations of good netiquette practices and appropriate use of language at the outset of an online learning unit. The teacher should establish a clear presence in the online unit by offering encouragement and prompting to the students' posts (Salmon, 2000). While feedback about this aspect of the online environment was minimal, it could very well be a very important element to the success of the use of an online environment.

Students will need to know that the online environment is a safe, sheltered area where they may share their ideas and opinions without fear of flaming, bullying or visibility by online predators. Sociality between the students should be fostered and promoted unless the students are tending toward off-topics responses (Kirschner, 2004; Shank, 2004). Teachers need to be aware of the quality of relationships within the classroom context to better prepare for how that may transfer over to the online learning environment.

With the rapid expansion of the use of social computing tools such as blogs, wikis and open-source learning management systems by K-12 schools, there is a great need for documented studies of what contributes to the academic effectiveness of such web-based environments. These online shared spaces provide affordances (Kirschner, Martens, & Strijbos, 2004) that take learning outside of the time and space of the classroom. In these environments, students have an opportunity to have an equal voice within the class and teachers have an opportunity to foster community-building and collaboration between students (Hewitt, 2001).

School administrators and teachers endorse the development and promotion of self-regulation and metacognitive skills yet rarely seem to provide concrete learning units in which to apply them. Online learning environments may just be the area in which these skills may be developed because of their ability to record and store data over large periods of time so that they can be accessed and used as artifacts of reflection and development of skills over time.

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