On-line Learning: Secondary Students' First Experience

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The development of on-line schooling may significantly affect the lives of both students and teachers. This study, conducted in a Canadian on-line secondary school, showed that students were generally satisfied with their first on-line learning experience, although they noted some serious deficiencies such as lack of training for the on-line class and ineffective use of key communication tools. We noted a contradiction between students' appreciation of the flexibility and autonomy afforded them in the on-line environment and their struggle to manage that autonomy effectively.

Un type de restructuration scolaire qui pourrait avoir un impact important sur la vie des élèves et des enseignants est le développement d'écoles en ligne. L'étude, qui a porté sur une école secondaire canadienne en ligne, révèle que les élèves étaient en règle générale satisfaits de leur expérience d'apprentissage en ligne bien qu'ils fassent état de graves lacunes, comme le manque de formation pour les cours en ligne et l'utilisation inefficace d'outils de communication clés. Les auteurs notent une contradiction entre le fait que les élèves aiment la latitude et l'autonomie que leur donne l'apprentissage en ligne et leur difficulté de gérer efficacement leur autonomie.

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Much of the hype in educational literature argues that educators are not current in their thinking. Such critics advocate a wholesale restructuring of education to reflect contemporary economic and social conditions. Much of this literature suggests that schools transmit short-term knowledge in an environment that encourages and, perhaps, requires students to be passive and uncritical recipients: a stance that does not fit with changing cultural and societal realities. Gardner (2000), for example, observed, "A human being miraculously transported from 1900 to our time would recognise much of what goes on in today's classroom – the prevalent lecturing, the emphasis on drill, the decontextualised materials and activities" (p. 30). At the heart of these arguments is the notion that current and future Information Age employment opportunities require students

to become not only active participants in their own learning in school but also active life-long learners. Teachers apparently have shirked their duties by not developing these abilities in their students.

We do not share this view of education: teachers are providing students with excellent educational experiences, often under difficult circumstances. In this article, we present our recent research in an on-line or virtual school. Lankshear, Peters, and Noble (2001) suggested that the development of virtual schools may have a significant impact on the lives of both students and teachers because they are a form of school improvement and innovation that confronts many of the short-comings of education.

THEORETICAL FRAMEWORK

A virtual school provides educational opportunities for students via the Internet. Tuttle (1998) viewed the virtual school as "one of a new breed of schools that uses email, online chats, internet resources, and archived resources to teach courses. No classrooms. No lectures. No surprise quizzes. No buses. No buildings" (p. 46). Johnson and Mitchell (2000) have extended this vision with their observation that "in a virtual school . . . the classroom is always open . . . the opportunity to learn is available 24 hours a day, 7 days a week" (p. 52). Rutkowsk (1999) hyas defined virtual schools:

Places of learning that do not have a geographic building, [in other words] they serve the educational needs and interests of a geographically dispersed rather than geographically determined community of learners . . . using primarily broadcast or networking technologies, or a combination thereof. (p. 74)

Joinson and Buchanan (2001) theorized that the Internet, and consequently the virtual school or cyberschool, may be just the environment to develop in students the skills and attitudes that other writers describe as necessary in contemporary society.

There is the possibility that the Internet does not simply enhance students' learning, but it might introduce new ways of learning [as well]. For example, Internet technology in learning will change the traditional balance of students' educational experience, with less emphasis (and time) on reading, and more on practicing and doing. (p. 238)

Reyna, Brainerd, Effken, Bootzin, and Lloyd (2001) point to new complexities that occur with virtual schools: "an obvious common-sense hypothesis is that with [Internet-based] technology, factors such as learners' computer skills, availability of computers for learners' use, and learners' access to the Internet, the Web, e-mail, and related resources will be

predictors of learning outcomes" (p. 30). Although these assertions are interesting, they have not been widely examined and they add considerable fuel to the confusion in the professional literature.

The virtual school may have a great deal of potential to meet the needs of students in the global context. Diversity, flexibility, anonymity (race, colour, and physical impediments become non-issues or, at least, lesser issues), and other aspects of the Internet make it possible for school systems to provide relevant education using current technologies. However, questions arise. To what extent are these possibilities realized in current virtual school initiatives? What structures of the virtual school make learning on-line appealing to students? Who are these students in virtual schools and why do they enroll?

PURPOSE

In this study, we examined the experiences of early on-line learners (EOLLs) in their first on-line high-school class to explore their perceptions of program delivery and effectiveness. For the purposes of this study, EOLLs were those students who were enrolled in Web-based courses for the first time.

The following research questions guided this study:
- What were the demographic characteristics of the EOLLs enrolled in a virtual high school?
- What did EOLLs perceive to be the benefits and challenges of learning in a virtual school setting?

METHOD

We collected data for this study at the end of the second term (May–June) of the second full year of operation (2002) of Central Cyberschool (CC),[1] a virtual high school in a mid-sized Canadian city. Embedded within a conventional school system, CC had been created primarily as an alternative learning environment for the students of Great Canadian School Division (GCSD), its host school system. At the time of study, CC provided academic courses to 126 individual students via the Internet (school enrolment was listed at 142; however, 16 students were enroled in more than one course). The specific courses offered at the time of study were grade-9 mathematics, grade-10 information processing, grades-11 and -12 chemistry and physics, and two separate grade-12 English language arts courses.

The majority of the students enrolled in CC lived in the school district;

all were part-time on-line students. Approximately 85% of these students were taking one or two on-line courses as well as courses at one of the traditional high schools operated by GCSD. Approximately 10% of the students were recent high-school graduates who were either repeating courses to improve their grades or taking an additional course to fulfill post-secondary entrance requirements. The remaining 5% were either foreign students living in Hong Kong, the United Arab Emirates, El Salvador, or Hawaii, or rural students living in one of several communities in CC's home province.

The teaching staff at CC worked on-line part-time. In addition to teaching on-line, each teacher taught conventional classes in one of GCSD's high schools. The division's administration had recruited teachers for this project because of their expertise with the particular courses they were teaching rather than for their facility with technology. In fact, some of the teachers had never used the Internet when they began to work on their courses. Nevertheless, because GCSD favoured a course development model in which teachers developed empathy for students' frustrations as they worked on-line, each teacher was required to develop both the content and the technological aspects of his course (all were males).

Sample/Instrument

In this study, we made secondary use of data collected by the school as part of its on-going quality control program. In its Tri-Council guidelines for ethical research involving humans, the Government of Canada (1998) indicates that secondary use of data refers to "the use in research of data contained in records collected for a purpose other than the research itself" (p. 3.4). In this case, CC's staff gathered data using an on-line exit survey as part of its ongoing quality control program. However, this survey was developed in consultation with us, as researchers. The school administered this survey via its WebCT course platform. It consisted of 14 items – 9 defined response items and 5 open-ended questions (a copy of the survey is included in the appendix). With the approval of the school system and the university's research ethics board, the school administrator forwarded the raw data from the exit-survey to us with all identifying information removed to ensure students' anonymity.

The response rate for this study was rather low, perhaps a function of the timing for data collection (semester end). Fifty (40 %) of the 126 potential respondents completed the survey. The sample consisted of 30 females and 20 males of whom 47 were enroled in a single course and three were enrolled in two courses. We used two main methods to analyze the data:

descriptive statistics, including frequency counts and cross-tabulation, for the defined-response items using SPSS; and content analysis of the open-ended questions.

RESULTS

Student Characteristics

A breakdown of respondents by course included: 25 (50%) students enroled in grade-9 math, 11 students in information processing, 1 student in chemistry, 6 students in physics, and 7 students in English language arts. Nearly all the grade-9 math students (92%) were grade-8 students taking the course a year early. This fact could be seen in at least two ways. On one hand, GCSD may have been forward-looking and progressive because it provided students with an opportunity to enrich their educational programs by accelerating their study of math. On the other hand, it may have been short-sighted because it created a course that appealed primarily to students other than those for whom the course had been originally designed. A determination of the actual intentions of GCSD for the creation of grade-9 math would require more study; however, the creation of this course did have implications for both the teacher and for GCSD.

Because many of these students were in grade 8, at least in comparison to students attending conventional schools in the same school system, theywere younger than the originally intended participants in the course. Thus, some of the assumptions that the teacher made about the potential students of the course as it was being developed — such as maturity level, experience of particular teaching strategies, and integration of relevant material from other grade-9 courses — were erroneous. These assumptions led to student frustration with their on-line tasks and, in some cases, to low success levels because the course required an independence that was common at the grade-9 level but was relatively unfamiliar to the students in grade 8. In addition, the course assumed a facility with computers that many of the students did not have. Further, since CC did not offer grade-10 math on-line, these accelerated students would not have an appropriate math course available to them in their conventional schools next year because of timetable restrictions and local school expectations. In other words, because GCSD did not allow timetable flexibility for its grade-9 students, these students may have to take their grade-9 math course again, this time in a conventional classroom.[2]

CC required all students enroled in on-line courses to complete an on-line preparation course on the technical aspects of using WebCT. As well, the preparation introduced students to the social aspects of their courses by requiring them to use the various communication tools available to them. Although students were not asked to evaluate the usefulness or quality of specific aspects of the preparation course, they were asked about the overall usefulness of this course in helping them to cope with their on-line learning experiences in this school. In response to this question, 16 students (32%) found the preparation course either somewhat useful or very useful and 14 students (28%) saw the preparation course as not very useful or a waste of time. The remaining 19 students (38%) were neutral about the usefulness of the preparation course.

A thorough evaluation of the preparation course in this school was beyond the scope of this study; however, because all students enrolled in this on-line school were EOLLs, one would reasonably expect that they would find a training course of some sort quite useful. Because only 32% of the students saw the training program as being at least somewhat useful, the preparation program did not appear to meet the needs of EOLLs.

Finally, students were asked to identify the reasons that they had chosen to pursue on-line learning. The survey allowed for choices including:
- for convenience/for the flexible schedule,
- to get an extra class (in addition to a full load of classes at their home school),
- to boost marks for post-secondary entrance (upgrade class),
- to take a course not available in their home school,
- to avoid conflicts with teachers at the home school,
- because they like working with computers, and
- other reasons.

The most popular response was the "other" category. While they were not asked to elaborate with respect to their choice of "other," most students who chose this option were the grade-8 students, taking the course to accelerate their educational programs. Ten students took the on-line course as an extra course in addition to a full academic load at their home school. Seven took the course because they liked working with computers; another seven said that they appreciated the convenience afforded them as on-line learners.

Communication Tools

The communication tools, e-mail, bulletin board, and a chat room received mixed reviews. Most students saw them as important, but many felt that using them was more of a necessary evil than a priority as they completed their course work.

E-mail. A majority of CC's students identified e-mail as the most useful tool, viewing it as a bridge between the conventional school in which they had personal, face-to-face contact with a teacher and a virtual school with little or no personal, face-to-face contact. Students typically stated that they used e-mail to talk to their teacher. One student wrote, "The communication tool that was of most use to me was e-mail; it was very helpful in getting questions to [the teacher]." Another stated, "Only the e-mail to the teacher was helpful [the other communication tools were not]."

The primary use of e-mail was more pragmatic than simply talking to the teacher. Rather, these students saw e-mail as a way to address questions and problems in a direct way, for example to prompt their teachers for answers that allowed them to complete their work. These comments were representative of the students' views:

I found the e-mail the most convenient because that was my easiest way to contact my teacher about any problems I was having. (grade-12 student)

E-mail: used lots, helpful to talk to teacher directly. (grade-10 student)

I used the e-mail every now and then to get help with an assignment that I was having trouble with. (grade-12 student)

Students valued e-mail for other reasons. They felt that e-mail provided a private means of communication between them and their teachers. As one student commented, "When it comes to questions, private e-mail was my most helpful resource." Students also saw e-mail as a useful means to communicate with other students: "I found the e-mail section the most beneficial to me, because I knew some of the other people in the class and was able to ask them questions." A few students saw e-mail as a means for meeting people who might become new friends, as this comment illustrates: "I used e-mail to find out who they were and what they were like, then I switched to ICQ's [Internet chat rooms] with those I felt I could get along with and could talk to in real time instead of always having to check my e-mail!"

Bulletin board. In contrast to their use of e-mail, students saw the bulletin board more as a means of socialization than as a means of getting information or having questions answered. For students, the bulletin board was fun to use; through it, they got to know each other.

It was really nice because you could really get to know all of the other students really well — it was a nice break from doing math. (grade-8 student)

[I liked] the bulletin board because everyone talks and you get to know people and ask them questions. (grade-8 student)

The bulletin board was the funnest of the communications tools because you got to talk with other cyberschool people about anything. (grade-8 student)

The bulletin board also provided students with a way to help each other. Although they identified e-mail as the primary means of communication with the teacher, they saw the bulletin board as their domain.

I used the bulletin board to talk with the other students and answer the discussion questions. (grade-11 student)

[The bulletin board] helped me get quick answers for the questions I had. (grade-8 student)

I found the discussion posting rather helpful and fun to read and use. (grade 8 student)

The use of the bulletin board had an interesting effect on the attitude of the students. It became an empowering activity that gave them a new role in their class: a teacher. "The bulletin board helped cler [clear] a lot of things up along with letting me help others with problems we all had."

Chat room. The students frequently suggested that the chat room was an interesting possibility that did not live up to its potential. Most students said that they rarely used the chat room unless they planned in advance to meet there. However, many believed that an active chat room would be a positive addition to their cyberschool experience. One student's response was particularly poignant: "I never got to use the chat rooms, I wish I could have but no one was ever in there when I went in!" EOLLs believed that the chat room would fulfill an important need but that it would probably take teacher intervention to guarantee its effective use.

General comments. In summary, students were satisfied with the level of communication in CC. In fact, one student stated that the communication tools were the best thing about being an EOLL and another stated that the tools were the *only* good thing about being an EOLL. Some students found

the sheer volume of communications overwhelming. One student commented, "For the first little while, I did use the communication tools a lot, as they are very useful. However, after a while there were so many discussion board entries that I didn't have time to read them all." Others felt that regular communication using these tools was not only too much bother but also overwhelming. For example, one student stated, "Yes, I found these tools useful to get in touch with your classmates but that [was] about all, I kept written notes in a binder for this course and didn't even bother after a while to type them into my journal."

Many students observed that, while they recognized the value of the communication tools and of communication in an on-line course, they did not choose to use them much. In fact, many students stated that, upon reflection, they should have made an effort to communicate more with each other and that perhaps they had missed something in choosing not to get involved.

THE VALUE OF ON-LINE COURSES

Participants in this study as EOLLs answered five open-ended questions to comment on the value of various aspects of CC's on-line courses.
- To what extent did you use the communication tools in this course? Which ones (e-mail, bulletin board, chat room, etc.) did you find the most useful/helpful? Why?
- What are the positives/benefits of taking a cyberschool course?
- What are the barriers/challenges of taking a cyberschool course?
- What did you like the most about your cyberschool experience? Why?
- What did you like least about your cyberschool experiences? Why?

Benefits of On-Line Learning

In general, students believed that there were a large number of benefits to being an EOLL.

Autonomy/freedom. The most common student response to the question of benefits of a virtual school course was their appreciation of the autonomy and freedom. Although most students identified the teacher as the ultimate source of information, many students enjoyed the opportunity to work on their own and to figure out things for themselves without having to wait for their teacher to tell them what to do. A grade-8 student wrote, "You can challenge yourself, and get a real taste of what high school is going to be like . . . you can see how well you can do without a teacher to always turn to." Another student put a slightly different spin

on this theme: "You don't get into trouble for doing nothing, you don't have to long [log] on every day." These students felt empowered and in control of their own learning and they appreciated the opportunity to make decisions about when, where, and for how long they worked on their cyberschool tasks. This student statement encapsulates this sub-theme. "I got to choose when I wanted to do parts of the course, like if I was sick I could leave or come back and do more later. I could also do more at a time instead of having to quit when the bell rings. I didn't feel as rushed."

Work ahead. A more pragmatic sub-theme also emerged from students' responses: students were happy to get a class out of the way. Many of the grade-8 students, in particular, stated that the cyberschool allowed them to finish their math class ahead of their traditional school classmates. At the same time, they believed that it opened up their high school schedules because they completed a compulsory grade-nine course while they were still in elementary school. This was an efficacy issue as well. These students indicated that they felt more mature.

Several students raised a similar pragmatic issue: they appreciated being able to work ahead and not wait for other students in the class. The following comment illustrates the general theme that students raised: "Personally, I think the advantages of it are that you get to work at your own pace. You don't have people [who don't understand it] in your class slowing you down either. It also helps your independent learning skills."

Flexibility. Flexibility in a variety of forms was also an often-identified positive of the on-line school. Students were able to work at home, to get extra credits that did not fit into the regular school day, and/or to take a course that was not offered at their home school, particularly for the grade-8 students.

You can get ahead in math and have a flexible schedule so you can work at home. (grade-8 student)

I like being able to have a flexible schedule. I took my grade-nine math and grade-ten information processing in cyberschool [in grade 8]. That will allow me to take grade-10 math next year and have openings in my timetable to take classes in high school that I wouldn't be able to take otherwise. (grade-8 student)

I think that by taking the cyber-courses we can free up extra credits in the future of our high school lives. By doing this we have more leeway on extra credits, time, etc. (grade-8 student)

Development of new skills. Many students also identified learning and developing new skills as a key benefit to taking an on-line course. They

related some of the new skills to technology. Comments such as "I get to use computers in ways I never knew" were common.

Several students believed that they had learned to be independent learners because of their on-line school experiences. One student wrote that he "could see how well [he] could do without a teacher to always turn to." Another said, "You get taught lessons, such as organizing your time that you wouldn't receive at an in-school class." Finally, a grade-12 student observed, "Cyberschool was good practice for university for independent work and practice going out of your way to get help."

Interpersonal issues. The last of the sub-themes to emerge from students' responses about benefits was related to interpersonal issues. Students reported that they felt more confident about their abilities to learn material while working together. One student observed that she had more sources for help on-line than in her conventional classroom. Many grade-8 students observed that cyberschool provided them with an opportunity to meet people. Two students felt that cyberschool was the answer to many of the interpersonal problems that they experienced in regular schools. For example, one said that she was too shy to interact with the other students in face-to-face situations, but she felt that she could contribute on-line. Another student, one who had already graduated but was taking the course again to improve his mark, stated that because he did not see teachers and other students face-to-face, he was able to stay out of trouble and finish his courses.

You don't get IN TROBBLE [trouble] for just sitting in class doing nothing! Oh yea, the last thing is I get to graduate without having to sit in a Grade-10 class and feel like an idiot ... I never got bored or lost in the class for I could skip to other parts and do them then come back and do what I felt I should do. . . . There was no leaving it to the last minute (like I did in regular school) for you could see all that had to be done from the start and when you were finished you were actually done. (grade-10 student)

Concerns with On-Line Learning

Many students stated that, in some ways, the benefits associated with taking part in an on-line school, such as freedom and autonomy, were also barriers to their success.

Time-management. Although students saw working at their own pace as a benefit of the on-line school, they struggled with procrastination because their teachers did not set deadlines for their cyberschool projects, making it easy to put them off. Older students in particular mentioned this problem. A grade-12 student's statement illustrates this opinion: "[It

was hard] having to make yourself work after a hard day of school! [I don't have the] motivation to do the work."

Technology. The technology issues followed two main themes: hardware problems with the school's server and Internet bandwidth issues that prevented students from uploading their assignment files easily. One student also stated that he preferred the drop box method to e-mail attachments for submitting assignments.

I found that attaching files to e-mail was a set back. I liked the drop box option that was offered in the other 3 classes I have taken better. By having the drop box, I was able to upload parts of assignments and have them already there on the server, rather than uploading all at once. [It allowed me] to access my work from anywhere, instead of just my own computer. (grade-12 student)

Autonomy. Although acknowledging the value of learning at their own pace, students missed the instant feedback typical in face-to-face classrooms. Some students stated that they were impressed with the speed of their cyberschool teachers' responses to questions; however, they still preferred the opportunity to go to the front of the class to get instant feedback when they had a question. Other students, particularly the older ones, found that the teachers' physical presence in a conventional class played an important role to motivate them to finish their school work. Because cyberschool provided no such presence, they when no one told them to do so. One grade-12 student said, "The main challenge of doing cyberschool is the fact that no one is pushing you to stay up with the class. If you fall behind you are behind until you decide to catch up with the class."

Lack of face-to-face communication. Some younger students expressed regret that they were not able to be in math class with their peers. Although they found the pacing of the conventional class frustrating because it often moved too slowly, they missed the opportunity to interact with their home-school peers. Many older students recognized the challenges of conveying complex concepts using only text. For example, one student wrote, "Things are not explained as clearly as I would have liked, and the meaning of your [my] questions or [the teacher's] statements can be lost in the text." Another student expressed frustration over making herself understood: "The challenge in cyberschool is trying to explain to your teacher what you don't understand when he can't see what you're trying to understand. Then, if you get behind like I did then you have to work extra hard."

Comparisons to regular courses. Some students felt that their on-line course work was more difficult than the work their peers were doing in the same courses off-line. Others said that they felt that their cyberschool

courses took more time than their did regular courses. One also attributed a drop in his math mark from the mark he received in a regular course the previous year to his involvement in the on-line school.

What EOLLs Liked Best

A majority of the EOLLs in this study (29 out of 50) said that the thing they liked best was working at their own pace. Many thought that cyberschool was more engaging or interesting than conventional school. One student said, "I had to use my brain. I couldn't count on the teacher to tell me everything." Some students felt empowered by their on-line school experience. "It made me feel mature"; "I now know that I can handle [high-school]." Some students also liked the feeling of community that developed in their on-line course. They appreciated the opportunity to "meet new people even though it was only on paper." They liked working with other capable students, avoiding having to "wait for the other students in a noisy classroom."

What EOLLs Liked Least

EOLLs did not like autonomous, self-directed learning. Twenty-one (40%) of these students did not like taking responsibility for their own learning tasks. Some preferred to have a teacher to explain tasks verbally; others did not like to work things out on their own. One student found it difficult to manage the sequence of his learning tasks. "Without the teacher, I skipped ahead because I thought I knew it – I didn't always do so well" (grade-10 student).

Many students were frustrated with various technological issues from server stability to problems with their own computers. In addition, several students felt that the technology sometimes got in the way and made certain things hard to understand. Finally, some students perceived that cyberschool courses were either more difficult or more time consuming than their friends' regular courses had been and some felt that their grades were lower than they would have been in a regular course.

CONCLUSION

A major conclusion of this study is that CC's students were generally satisfied with their on-line learning environment and experiences. Although a few students indicated that they did not like learning on-line, most were relatively complimentary about their cyberschool experiences, a point that

coheres well with the existing educational literature in the area (e.g., Barker & Wendel, 2001).

However, this study highlights some key challenges that on-line schools in general may wish to address to better facilitate student learning. First, the nature of support provided to students as they become acclimatized to on-line learning is a major issue. While it is true that students typically have greater facility with information and communication technologies (ICTs) as compared to that of their teachers (Moursand, 1997), on-line schools cannot assume that students will readily make the transition to learning in the on-line context without support. The support available to EOLLs in CC was inadequate. For example, the preparation course that CC used did not meet the needs of the students. Although it would require further study to determine exactly what the students believe is necessary and what would be possible or realistic, the fact that a majority of EOLLs in this study found the preparation course of little use suggests that the staff of the school had not met the needs of their students. Staff members may wish to ask their students about those activities or pieces of information that they would find useful or necessary for a preparation course and design future preparation courses with student recommendations in mind.

In the absence of face-to-face interaction between teachers and students, effective communication becomes a critical component of student success in the on-line school. Although some of CC's students identified the communication tools as the only good thing about an on-line school, these tools fell short of their potential. A great deal of interaction between the teachers and their students occurred; however, the interaction among students was uneven. Pedagogical thrusts in recent years have encouraged the use of educational activities that foster student collaboration, perhaps, in part, as a response to the new economic trend that sees information age workers as private contractors who provide key specialized services to corporations — often as part of a team, usually across significant distances (Thornburg, 2002). Yet the students in CC appeared to have little experience with collaborative activities. Although some students saw their classmates as potential collaborators to assist with their course material, these collaborations did not appear to be common. Far more commonly, students worked essentially on their own with relatively little contact with their teacher and virtually no contact with their classmates.

Educational literature speaks of new skills necessary for success in the new economy, skills that schools ought to address (e.g., Britt & Gabrys, 2001; McNair, 2001; Thornburg, 2002; Tyner, 1998). A key aspect of these skills is that the students must develop the ability to be self-directed learners

who have "learned how to learn" (Dolence & Norris, 1995). The students in CC were uncomfortable with this role. Although the teachers provided some opportunities for personal growth in this area, many students preferred to have their teachers answer all their questions, rather than explore the Internet's vast store of knowledge to address those questions for themselves. This reaction may simply be an issue of a lack of time. Because all of the students were on-line part-time, they tended to see their cyberschool activities as external to their regular educational programs. Consequently, many students were less willing to spend the time necessary to work things out for themselves and had difficulty fitting their on-line school responsibilities into their already busy lives. However, given the importance of self-directed learning in the new economy (Cortada, 2001), educators will be challenged to explore ways to ease this tension.

In this study, we have also highlighted the challenge of creating a truly innovative educational alternative within the context of a conventional school structure. Fullan (2001) observed, "[W]e have become so accustomed to the presence of change that we rarely stop to think what change really means – the crux of change is how individuals come to grips with this reality" (p. 29). This study challenges not only individuals but also organizations to cope with change. In the case of the grade-8 students taking grade-9 math a year early, the system had provided the students with a vehicle to challenge themselves and accelerate their study of math but had not altered the school-system structures to accommodate these students in the subsequent year. In this new on-line school environment, educators can find ways to assist students to reconceptualize their visions of their own learning and give them support structures to ease their transition from teacher-led, face-to-face instruction to student-centered, on-line learning. These EOLLs appeared to be at an intermediate step between the more traditional, teacher-led classroom and the autonomous, student-directed, on-line classroom. They appreciated the autonomy of working at their own pace but wanted instant access to a teacher. This area requires further study. What would be necessary to ease this transition for EOLLs? Will these students change their views after taking more on-line courses? Perhaps the EOLLs' frustrations were simply a function of being first-time on-line learners.

It is too early in the evolution of on-line schools to evaluate their effectiveness conclusively. Nevertheless, CC provided students with an opportunity to learn Information Age skills. In particular, the virtual school had a positive impact on students' perceptions of their own abilities to learn and encouraged them to take responsibility for their own learning.

NOTES

1 Pseudonyms have been used for the names of the school and district.

2 At the time of this study, the school system had not yet formulated a plan to address the challenges associated with the grade-8 students in accelerated math. The situation had arisen because the system had an extended learning opportunities (ELO) program for gifted students until grade 8 and all of the accelerated students in CC had been participants of this program. In the absence of an on-line course for grade-10 math, it was likely that the accelerated students would be permitted to enrol in grade-10 math courses in their conventional high schools. However, no systematic procedure for ensuring this in all schools had yet been developed.

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