Student Access to Information Technology and Perceptions of Future Opportunities in Two Small Labrador Communities

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Résumé

The potential of information technology is increasingly being recognized for the access it provides to educational and vocational opportunities. In Canada, many small schools in rural communities have taken advantage of information technologies to help overcome geographic isolation for students. This article is about students in two small and geographically isolated Labrador communities. Twenty senior students were found to have varying degrees of access to information technologies. Differences were found in their perceptions of the benefits of information technology for their educational and vocational futures.

Abstract

Le potentiel de l’informatique est de plus en plus reconnu, en particulier pour l’accès qu’il offre à de nouvelles possibilités pédagogiques et professionnelles. Au Canada, de nombreuses petites écoles de communautés rurales ont profité de l’informatique pour surmonter l’isolement géographique des étudiants. Cet article concerne des étudiants de deux petites communautés géographiquement isolées du Labrador. Il a été constaté que vingt étudiants de cycle supérieur du secondaire avaient un degré d’accès à l’informatique différent. Des divergences ont également été constatées quant à leur perception des avantages de l’informatique pour leur avenir scolaire et professionnel.

Introduction

The equitable provision of educational and vocational opportunities is a widely accepted policy goal in Canada (Department of Education, 1990; Department of Education, 1991) and in other parts of the world (Gaines, Johnson and King, 1996). For those Canadians who are educated in rural and remote parts of the country, the
provision of educational and vocational opportunities is increasingly being provided through technologically-enhanced schools. Information technology - a combination of telephones, computers, software, modems, the Internet, E-mail, CD-Roms, television and radio - has the potential to revolutionize ways in which education is provided. Technological developments have particular significance for educational communication in rural areas of Canada where they can reduce the impact of location and school size and provide new ways for students to consider the non-local world.

For an increasing number of rural families in developed societies, telecommunications technologies provide an opportunity to maintain viable schools in their communities. In Canada, Australia, New Zealand and the Nordic countries, small schools in rural communities are increasingly taking advantage of information technologies to enhance teaching and learning (Stevens, 1997) in their efforts to remain viable with low student enrolments. Today many small rural schools in these societies are at the forefront of the telecommunications revolution in education (Stevens, 1995). The urgency that has encouraged the integration of information technology into the curriculum in many small schools in rural areas of developed countries has also promoted Internet access and networked educational opportunities for senior students.

In rural communities where there are few employment opportunities, students often have to leave home at the conclusion of a high school education. Many senior rural students are therefore obliged to pay particular attention to the relationship between the curriculum and their post-secondary educational and vocational opportunities, most of which are likely to be in other places (Stevens, 1995). In technologically-enhanced rural schools, information technology has the potential to mediate educational and vocational opportunities for students from other, sometimes distant, places (Stevens and Kynaslahti, 1996). The ways in which senior high school students perceive information technology in the process of considering their educational and vocational futures is not well known. However, several studies (Barker and Hall, 1993; Barker et al, 1995; Hill, 1992; Lundin, 1990; Nevens, 1995) indicate that students benefit from access to information technology and are quick to realize its potential for accessing learning opportunities.

This study focussed on two small, remote Canadian communities, in each of which students had access to a range of information technologies and, through them, to potential post-school opportunities. Students in the two communities were found to have different perceptions of how information technologies could assist them in their personal, educational and vocational futures. Although all students in the study were geographically isolated by the location of their homes and schools, some were less isolated than others because of the ways in which they perceived and used those information technologies that were available to them.

**The Context of the Study**

Within the province of Newfoundland and Labrador, most of the population of approximately 500,000 people live on the island of Newfoundland which has an area of 110,638 square kilometres. Labrador is considerably larger with an area of 395,428 square kilometres although its population is only approximately 30,000 people, most of whom live in three urban areas. Labrador is therefore one of the most geographically-isolated and sparsely populated regions of Canada.

The two small and isolated Labrador communities that were the subject of this study were identified by the pseudonyms 'North Community' and 'South Community' respectively. North Community has a population of approximately 1100 people who are predominately Inuit. South Community has a population of approximately
500 people who are mainly of British descent. Fishing has been the basis of the local economy in both centres. The school in each community has access to STEM~Net, a provincial electronic school network for teachers.

The all-grade school at North Community has an enrolment of approximately 400 students and a staff of thirty teachers. Instruction is provided in both English and the local language, Inuktitut. Enrolment has remained stable in recent years. The school has a computer room that provides 15 microcomputer systems on a Novell Lite network. Most of these systems are outdated even though they are capable of running Windows software. The most common uses of the computer in North Community School are for word-processing, mathematics `drill-and-practice' using programs such as `Math-Blaster' and keyboarding practice with such programs as `Typing Tutor.' Students have some introductory computer courses available to them within the school and limited access to the Internet. Computers are available in many of the regular classrooms although these cannot be used for Internet access.

The school library has a computer system that is used to access the Internet and which is available for both school and community use. The library is open four nights a week to give community members and students an opportunity to access the reading collection and to access the Internet. Two or three distance education courses are offered each year within the school for senior students for whom there is no local teacher in a particular subject (e.g. Advanced Chemistry and Advanced Mathematics).

The school at South Community serves students from two other surrounding communities. This school has a population of approximately 200 students and a teaching staff of thirteen. Enrolment has been decreasing in recent years. The South Community school has a computer laboratory that has 16 computers, also on a Novell Lite network. The laboratory is used to teach introductory courses in computing. Computers are not available in regular classrooms and there are no scheduled times for students to access them after school hours. Two or three distance education courses are offered each year at South Community school in subjects in which there is no local teacher. Within the school, teachers are not normally available to supervise or help students with the distance education courses. Teachers, but not students, have limited access to the Internet at this school although there have been many technical difficulties in getting `on line'.

**Methodology**

Twenty-two participants were purposively selected for this study which included 20 Level Two and Level Three students and one school administrator from each of the two sites. (Level Three students are those who are in their final year of secondary education while Level Two students are those who are in their second to last year). The administrator from each school was asked to assist in the selection of the subjects for the study and to advise on the categorization of each student as `high' or `low' in terms of his or her access to information technology. Ten high access students and ten low access students were, accordingly, selected.

Three criteria were used to identify students as having high or low access to information technology:

- A student who had access to distance education courses, as opposed to one who did not have access to distance education courses, was considered to have high access to information technology.
A student who had access to the Internet as opposed to one who did not have access or who had very limited access, was considered to have high access to information technology.

A student who had unlimited access to a computer as compared to one who could only access a computer at school in specific time periods, was considered to have high access to information technology.

The researcher contacted the administrators by telephone and then by a letter. Each administrator was asked to forward lists of students to the researcher. The names of all students were placed in two boxes: one box contained the names of those students who had access to current technology while the second box contained the names of those with less access to current technology. The students were then randomly selected by drawing the names of ten participants from each box (N=20).

Each of the students selected was contacted by telephone or in person and asked to participate in the research. After the nature and purpose of the research was explained to each of the selected students, all of whom agreed to participate in the study, an agreement was signed that contained assurances of confidentiality.

Because of the large geographic area of the study, a field worker was employed. The field worker who was selected had recently completed a higher degree by qualitative research and was familiar with this methodology. Each questionnaire was administered at the school attended by each participant in the study.

Both questionnaires and interviews were used to collect data. According to Glesne and Peshkin (1992) and Morse (1994), qualitative analysis explores and seeks to understand the participants' perspectives. Research questions were developed with the assistance of advice from vice-principals and academics and were designed to be open-ended and broadly-stated in order to obtain a diverse range of viewpoints. The questionnaires elicited values, ideas and concerns of students in isolated communities on current technologies in schools. This instrument allowed the researcher to perceive any divisions between students who had greater access to current technologies, compared to those who had less access. Interview questions were validated by a senior academic with extensive field-research experience in rural communities. The questionnaires were administered to all students participating in the study at the same time.

Interviews were conducted at the school in each community with the same twenty students who were asked to complete questionnaires. However, the field worker in North Community discovered that the students there did not wish to be interviewed. A total of 12 students in the study agreed to be interviewed. By probing and following unexpected leads the interviewer was able to explore participants' perspectives in more depth than was possible using the questionnaire. Participants were asked to begin by describing the technology that was available in their schools and this was followed by questions about accessibility of technology. Each interview was audio-taped and then transcribed.

The interviews were analyzed by the researcher by reading and re-reading the transcripts to develop an intimate understanding of the data. Data from the transcripts were compared to the audio tapes to confirm their accuracy. In this process the researcher became aware of emergent themes and ideas. Following analysis of the interview transcripts, a similar study was made of the questionnaires. The two sets of data were then compared. Answers were processed according to their literal meaning. This required recording key words and phrases and
then organizing them on the basis of their similarities and differences. The credibility of developing questions were tested by evaluating them against the interview transcripts and the questionnaires. The researcher searched the data for negative instances of emerging patterns to determine plausibility.

Table 1 indicates that most students in each group felt that some aspects of information technology in the education system were valuable to them.

Table 1.
Perceived Value of Information Technology

| Students                        | Number of students who emphasized the value of tele-conference courses | Number of students who emphasized the value of the Internet service | Number of students who emphasized the value of basic computer usage |
|--------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| Students who had low access to technology | 2                                                                      | 2                                                                 | 5                                                                 |
| Students who had high access to technology | 7                                                                      | 5                                                                 | 5                                                                 |

High and Low Access Students' Perceptions of Information Technology

Information technology was valued in different ways by high and low access students. Both groups agreed that information technology was vital in the functioning of their schools. However, respondents from both groups acknowledged that only a few students actually benefited from the information technology in their schools. It was emphasized that those students who had low access to information technology were at a particular disadvantage. Students who had low access were able to identify few positive impacts of information technology on their education. They indicated that the information technology program:

- Familiarized students with current technology;
- Taught students the basics of computers: how to create files, develop typing skills and use a scanner;
- Was a lot of fun to use in class.

The answers given by this group were all very brief. Most low access participants had only one positive observation to make, whereas students who had high access were able to list several positive features of information technology. Students who had high access to information technology placed a higher value on the Internet and tele-conference courses than did their peers who had low access. Those who had low access to information technology emphasized the value of basic computer usage. Table 2 indicates differences in high and low access students in terms of the value they placed on information technology: Table 2. Value of Particular Aspects of Information Technology in Education
In this study the group of students who had high access to information technology placed more value on it than those who had low access. Barker et al. (1995), Webster and Connolly (1993) and Willie (1989) suggest that all students should benefit from advanced learning technologies. This does not appear to be the case in the two small, isolated communities of Labrador. Those students who had high access to information technologies discovered many more positive aspects of the current technology program in their education. Both groups of participants agreed that there were negative aspects of the current information technology program. With few exceptions, participants agreed that students in these small isolated communities were not exposed to enough information technology. They pointed out that most students had limited access to the Internet and many were aware that students in larger centres of the province enjoyed greater access to on-line services. Several of the respondents also discussed the fact that certain students within the school had greater access to the Internet than others because their parents were teachers who had Internet accounts. Some students, it was reported, did not have access to computer-based distance education because of the nature of their program of study or their grade averages. Only students with high grade averages were permitted to enroll in academically-oriented distance education courses. There were no opportunities in either school for students who had low grade averages to enroll in courses that were taught at a distance. It was widely noted by participants in this study that there was, accordingly, disparity of access to current technology amongst students within the two schools. The group of students with high access to information technology placed more emphasis on the significance of distance education to the learning environment of the school. These students were all grateful to have access to advanced courses via distance education. Fewer of the participants with low access to information technology noted the importance of distance education. Respondents from both groups indicated that there was a problem in not all students having access to appropriate distance education courses, and, therefore, not all having the use of information technology. One high access student remarked: This technology is limited to certain students. For example, distance education courses are only accessible by those who do advanced courses such as Chemistry 3202. Another high access student noted that: Not everybody has equal access to the Internet so therefore some people are learning a lot more while others who would like to learn it just do not have the opportunity to go on the Internet. A low access respondent commented that technology was only valuable to certain students within the school: Technology does not have a great purpose or impact in our school because not everybody gets to use technology such as distance education or the Internet. For the students who get to use these programs, technology is having a great impact on their education. Another low access student remarked: Some students cannot, through one reason or another, gain access to school computers or networks or even distance education courses. As well, due to the limited number of computers and Internet facilities very few students can gain access to the Internet and "surf the web." Also, some students do not gain access to the technological program because of the course of study of that particular student. Some may not have high enough grades to enroll in distance education courses whereas others may not feel that these opportunities can benefit them. But no matter what the case, students should be given equal opportunity. Many students noted that computers in schools better prepared them for their future endeavors. As well, some students realized that

| Students who had low access to technology | Number of students who felt that information technology in the education system was valuable to them | Number of students who felt that information technology in the education system was not valuable to them |
|-----------------------------------------|-------------------------------------------------|-------------------------------------------------|
| 6                                       | 4                                               |
| Students who had high access to technology | 10                                              | 0                                               |
information technology was a key to obtaining information from the outside world. Students who had high access to technology outlined numerous positive aspects of information technology while their peers who had low access listed very few positive aspects. One high access student commented: The positive aspects of the current technology program towards education is that it brings forward opportunities that wouldn't exist in an isolated town such as this one. Another high access student maintained: We can do more courses through distance learning and we have better access to the world through the Internet. For example: This year I am taking a 3rd level chemistry course that is not usually offered at my school. Another high access student remarked that information technology has allowed him to communicate with other students: I can do courses through distance education that I would otherwise not be able to do. Also, I can communicate with other students and pass on valuable information. In addition, with Internet access I obtain information that would not be available to me, under regular circumstances. Students who had low access to information technology valued the computer in pragmatic ways: as a tool for preparing them for workplaces in which they expected to use computers and, more immediately, for assisting in the preparation of school assignments. One low access student remarked: In computer classes, students are taught how to use and apply computers for different tasks. Students are more prepared to enter the workforce where computers are becoming more widely used. Another low access student noted, "It is a way for us students to type up assignments." Students who had high access to information technology placed more emphasis on the opportunities they provided for learning at a distance. Furthermore, high access students identified computers with connections to the Internet and the 'Information Highway' for extending and enriching their studies rather than as simply a means of preparing assignments and answering teacher-prepared tests. A high access student commented: This year I am in third level Chemistry at my school. This course would not normally be offered but it is through distance learning. Now I will have a better opportunity to succeed at Chemistry while pursuing a secondary education. Another high access student pointed out that, "This computer system in my school enabled me to get access to information that I would not be able to receive otherwise."

**Conclusion**

In geographical terms, all students in this study were very isolated. However, access to information technology meant that some students in this study felt less isolated from the world beyond Labrador than others, particularly when they considered their post school educational and vocational options. Students with high access to information technology felt they had opportunities to consider the non-local world. A high access student acknowledged that:

Current technology in this education system is valuable to me. With the Internet open to me, research becomes a lot easier. Also the Advanced Math 2201 class I'm taking through distance education has created new opportunities for me and others.

Another high access student noted:

The introduction to computer courses has opened up a new world for me. It has given me the opportunity of perhaps pursuing a post secondary education in this field.
A fellow high access student remarked:

Current technology in the education system is valuable to me. I do third level chemistry through distance education. If distance education wasn't available to this school, I wouldn't be able to do this course because there is no teacher available with the qualifications to teach this course effectively. Distance Education means a lot to me in this sense because I'm really interested in studying chemistry after high school.

Students with high access to information technology felt that they were equal to their peers in larger, usually urban schools in other parts of the province. A high access student commented, "Distance education courses allow students to compete with other students from all over the province."

Another high access student explained:

It gives us a chance to compete with students in larger centres. Due to our location, for many years, people felt that because we were not from a larger centre our education system was inferior. With the advancements in technology, people who felt this way are beginning to realize that students in isolated places, such as South Community, have the opportunity to receive just as good an education as others.

Students with low access to information technology did not express as much optimism about competing with students in schools in larger centres as did their peers who had high access. Webster and Connolly (1993) argue that equality of access to new technology is of the utmost importance for students in the late twentieth century. While schools cannot correct all personal and social inequalities (Newell, 1986), they should be in a position to offer equality of educational opportunity to young people to pursue their goals. An important first step for young rural Canadians, is equality of access to information technologies.

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ISSN: 1499-6677