# SchoolNet's On-line Connectivity Survey Report SchoolNet Advisory Board <br> May 8-9, 2000 

Final Report

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## Context

On November 1, 1999, School'Net along with its provincial/territorial partners launched a connectivity survey to probe the level of Intemet connectivity in Canadian K-12 public schools. What follows is a survey report consisting of two parts. First, the report presents the survey's findings that identifies the number of Internet capable and connected computers, the locatoon of these connected computers and the access methods schools use to connect to the Intemet. The second part of this report presents the conclusions and recommendations of the Connectivity Survey Review Panel that developed the survey

## Part 1 - Survey Results

## Highlights

$>68 \%$ national response rate representing $72 \%$ of K-12 public schools and $69 \%$ of students;

- 425,234 Internet connected computers;
$>55 \%$ of connected computers are located in designated areas such as computer labs while $34 \%$ are located in classrooms:
$>8: 1$ national ratio of students per Intemet connected computer, and
Dr $79 \%$ of schools connect via a dedicated access line


## SchoolNet Phase II

SchoolNet's Phase II goal was to "extend connectivity from the schools to the classroom resulting in 250,000 connected computers, an equivalent of one connected computer per classroom, by March 31, 2001." The connectivity survey shows that this target has been exceeded almost a full year ahead of schedule. Based on the $68 \%$ national response rate, respondents indicate that there are 425,234 Intemet connected computers already in Canadian public K-12 schools. Moreover, this is the equivalent of more than one Internet connected computer per classroom.

## Measuring Connectivity

SchoulNet's survey enabled school boards/districts/divisions across Canada to report on the level of Intemet connectivity within their schools and classmoms. The objectives of the survey were to:

T collect initial base-line data on the number of Internet connected computers in K-12 public schools;
T obtain data on these Internet connections; and
T provide national benchmarks regarding schools' Intemet connectivity level.

## Survey Methodology

SchoolNet's online connectivity survey was conducted between November 1999 au. ' 2000. Initially, 479 school boards/districts/divisions were mailed an information package and encouraged to complete the questionnaire online. Over the course of the survey, SchoolNet and its partners also contacted school boards over the phone and received numerous responses via fax and e-mail. Identical separate surveys were also conducted via a third party in both Ontario and Quebec. Their results were incorporated into this report. along with those of the other provinces and territories.

A total of 328 school boards responded to the survey, which translates into a national response rate of $68 \%$. In addition, the 328 responses represent $72 \%$ of schools and $69 \%$ of students. The majority, $64 \%$, of school boards/districts who responded have 25 schools or less followed by $22 \%$ with 25 to 50 schools, $10 \%$ with 51 to 100 schools and $4 \%$ with 100 or more schonls. Table I below breaks down these response rates for each province and territory.

Table 1 - Provincial Breakdown of Response Rates


## Results and Analysis

SchoolNet's online survey probed the following three areas of connectivity in Canadian public K-12 schools:

- Number of Internet capable and connected computers;
- Location of the Intermet connected computers in schools; and
> Schools' access methods to the Internet.


## Number of Internet capable and connected computers

According to the survey results, responding school boards report that there are currently 484.24i computers capable of accessing the Internet in their schools.' The breakdown for this number is 272,047 in primary/intermediate schools while 211,199 are located in secondary schools? Of the number of capable computers, $425,234,88 \%$, are connected to the Intemet. The breakdown for these connected computers is 236,413 in primary/ir'ermediate schools and 188,821 in secondary schools classrooms. ${ }^{3}$

SchoolNet calculates that one of the more important indicators currently being used to measure the level of Internet connectivity in schools, the national ratio of students per connected computer, is 10.1 in primary schools and 6.1 in secondary schools for an overail average of 8.1 . Table 2 presents these ratios for students in primary schools, secondary schools and finally for all grades for each province and territory. Whule these ratios may look impressive at first glance, more research is required to determine whether these computers are capable of performing demanding instructional or pedagogical tasks, whether they have enough bandwitth to work with when using the Intemet and whether they are being used to their full potential by teachers and students alike.

Table 2-SchoolNet's Ratios of Students per Internet Connected Computer

| Alberta | 6 | $\Varangle$ | 5 |
| :---: | :---: | :---: | :---: |
| British Columbis | 11 | 8 | 9 |
| Manisoba | 9 | 4 | 7 |
| New Brunswick | 8 | 5 | 7 |
| Newfoundiand and Labrador | 17 | 6 | 11 |
| Nova Scotia | 18 | 5 | 9 |
| Northwest Terntones | 4 | 3 | 4 |
| Nunavut | 21 | 5 | 11 |
| Ontario | 10 | 7 | 9 |
| Prince Edward Island | 13 | 7 | 11 |
| Quebec | 10 | 10 | 10 |
| Saskatchewan | 13 | 8 | 10 |
| Yukon | 40 | 8 | 15 |
|  |  |  |  |

[^0]SchoolNet's national ratics reflect those obtained from the Second International Technology in Education Study, SITES ${ }^{4}$ At the time of SITES, the national ratios of students per Internet connected computer were $9: 1$ at the elementary level, $8: 1$ at the intermediate level and 7:1 at the secondary level. A similar survey ${ }^{5}$ published in February 2000 by the National Centre for Educational Statistics (NCES) in the United States shows the American ratios as $11: 1$ at the elementary level ani $7: 1$ at the secondary level. Graph I shows the Canadian ratios to be slightly better at $10: 1$ and $6: 1$ respectively.

Graph 1 - Comparison Between Canadian and American Ratios of Students per


## Internet Connected Computer

## Location of Internet Connecied Computers in Schools

The second area that the SchoolNet survey probed relates to the location of the Internet connected computers. ${ }^{6}$ Graph 2 shows that schools tend to locate more of their Internet connected computers in designated areas such as "computer labs" than in classrooms.

Graph 2 - Location of Internet Connected Computers


[^1]These results differ from those observed in the United States. A 1998 survey conducted by The Center for Research on Information Technology and Organizations (CRITO) indicates that, in the United States, more of their Intemet connected computers are located in classrooms. Table 3 highlights this difference between Canada and the United States.

Table 3-Comparison between Canada and United States Regarding Internet Connected Computer Location

| counin |  |  |  |
| :---: | :---: | :---: | :---: |
| Canada* | 55\% | 34\% | 11\% |
| United States** | 43\% | 48\% | 9\% |

* Canadian percentages obtained from SchoolNet's online connectivity survey
** United States percentages obtained from CRITO's survey


## Types of schools' access to the Internet

SchoolNet's online survey probed the different types of access methods used by schools to connect to the Intemet. ${ }^{8}$ As alluded to earlier, it is this section of the survey that school boards had the most difficulty in providing accurate responses partly because of the complexity of our questions. However, the results enabled SchoolNet to identify three methods of connecting to the Intemet. The most prevalent method of access is via a dedicated access line with speeds ranging from $64 \mathrm{Kbps}, 128 \mathrm{Kbps}$ or 1 Mbps or faster. These lines are usually connected to the school board's 'Vide Area Network, WAN, or directly to the provincial network. The second most popular method of accessing the Intemet is via a dial-up modem with speeds ranging between 28 $56 \mathrm{Kbps}$. The third method is via a DirecPC with an average available access speed per schocl of 10 Kbps . Graph 3 shows the percentage of schools using each of these three methods.

[^2]Graph 3-Schools' Access Methods to the Internet


The survey results only provide a general indication of the types of connection used by schools. More research is required to determine with more accuracy their capability to deliver adequate bandwidth and speed to support instructional and administrative needs of individual schools. The Connectivity Working Group Report of 1999 , for example, states that a minimum of 128 Kbps per desktop is required to support multimedia and distance learning applications. While the survey points to most schools being connected to their school board or district via a 'dedicated' line, there is considerable evidence that existing network facilities are still far from being able to deliver that level of bandwidth to each connected computer in the schools.

## Summary

In conclusion, the survey provides a useful picture of current levels of Internet connectivity in schools and classrooms across Canada. There are probably more than half a million Internet capable and Internet connected computers in Canadian K-12 schools, the equivalent of almost two per classroom. However, these results don't tell us whether public schools are equally well served in terms of the quality and effectiveness of their Information Communication Technology (ICT) and supporting infrastructure. This question should be further explored and monitored in future surveys.

## Pare ll - Survey Review

This part of the report provides a synopsis of the discussions of the Connectivity Survey Review Panel, which were held in three consecutive teleconferences between March and April 2000. The panel comprised representatives from all provinces and territories and was co-chaired by Nancy Parsons-Heath (Director, STFM~Net, NF.) and Dan Kerr, (Chief Operating Officer, MERLIN, MB.) The panel's round table $\iota$ sussions focussed on identifying useful lessons learned based on three areas: the survey's method and approach; the survey's results and the respondents' feedback.

## Survey's Method and Approach

- Demonstrate to school boards the usefulness of the information: There was agreement that in order to secure school boards' cooperation in the future, the value of the information collected must be demonstrated to school boards. In addition, school boards must be ensured access to this information on an ongoing basis as wei' as the ability to update their information.
- ${ }^{\text {ens }}$. dealing with "connectivity options" was more complicated, caused some confusion and led to incomplete answers. The question will require careful attention if used again in future surveys. For example, some school boards indicated using connectivity options that were in fact not available to them.
- Target appropriate individual: Future connectivity surveys should continue to be directed to ICT managers within school boards. ICT managers need data on connecivity, know hi,w to get it and can ensure minimum quality control over incoming data.
- Determine the best time to conduct survey: Timing for future surveys is a critical issue that must be better addressed in the future. Given the numerous surveys being sent to school boards, it was agreed that future surveys should be better coordinated and timed with piovincial data gathering processes in order to minimize administrative burden on respondents and obtain better results.
- Prenare school boards/divisions for the survey: Adequate preparation time to develop the questionnaire and methodology, appropriate timing and early briefing of school boards were seen as critical conditions of success. It was felt that selected school boards should participate in the development of the questionnaire. In addition, it was suggested that adequate preparation work would help reduce confusion and misunderstandings regarding the questions and thus increase the validity and reliability of the results.
- Secure educational authorities' support: Provincial and Territorial authorities should be the first point of contact for future surveys. Some provincial/territorial authorities felt that they should act as the principal data collectors within their respective jurisdiction.
- Provide respondents with a choice of response methods: Although the group agreed that the online approach should be included in future surveys, there was also agrement that multiple input methods were required for school boards to complete the survey. One option discussed was the idea of asking multiple choice questions instead of exact numbers.


## Survey's Resulfs

- Timeframe: The data gathering timeline for the survey was too long thus
in reasing the risk cf distorting the results, especially between those collected early and those collected at the end of the four-month period
- Interpretation: Participants indicated that some of their school boards had difficulties interpreting certain questions and answering them accordingly. This problem was most common with questions on connectivity options.
- Classifications: The classifications of primary/intermediate and secondary schools vary significantly amongst provinces and territories. For SchoolNet's national survey, primary/intermediate schools were defined as those whose majority of students are between kindergarten and grades seven or eight while serondary schools are those whose majority of students are between grades eight or nine and twelve or thirteen.
- Representation: Although the survey produced very positive response rates, the fact that some of the bigger school boards did not respond to every question alters slightly he accuracy of the provincial statistics.


## Respondents' Feedback

- Information to be gathered in future surveys: Respondents identified the following areas as those that should be probed in future surveys: resource availability, funding levels, profiles of ICT users and the level, number and availability of Intemet connectivity options.
- Increased flexibility in the categories and choices: Many respondents had difficulty with the questionnaire's classification of school boards/divisions and K-12 schools. In addition, respondents would have liked to have seen more response choices, particularly in regard to the question on connectivity options.
- Time consuming task Several school boards reported that they do not have accurate records on connectivity and therefore their collecting the data and completing the survey was a burden.
- Accuracy and/or usefulness of the survey: Some school boards did not have exact numbers and provided their best istimates to some of the survey's questions. Although many respondents and provincial parners believe these estimates to be accurate, concems could be raised as to the reliability of answers to certain questions.
- Clarification: As mentioned above, respondents indicated that there were some questions that required further clarification.
- Conflicting goals: Because the goals and interests of school boards differ from those of SchoolNet, individual school boaids probably have limited use for the aggregated data on connectivity. Instead, these numbers were identified as more likely to be useful to the Ministries of Education for planning and budgeting purposes.


## Conclusions and Recommendations

The Panel's discussions resulted in the consensus that there is a need for both SchoolNet
and the provinces and territories to continue to work cooperatively to collect more data relating to connectivity. As a means to achieving this goal, the panel felt that a framework was required for an ongoing national/provincial/territorial data gathering mechanism and repository on connectivity and related subjects. In addition, because most provinces and tertitories already collect data on connectivity, it was agreed that future data gathering initiatives should focus increasingly on the qualitative aspects of connectivity. The Panel thus recommends that:

- SchoolNet along with the $\{$ rovincesterritories jointly develop a framework for an online data collection mechanism and repository.
- Future research on connectivity $f \cdots r$ on the qualitative aspects of schools' ICT resources, including the $\varsigma \quad$ Ind uses of connectivity.


## Appendix 1

Table 4 -Provincial Breakdown of Number of Capable and Connected Computers


## Appendix 2

Table 5 - Provinclal Breakdown of Internet Connected Computers' Locatlon

| Alberta | 22,386 | 8,078 | 2,820 |
| :--- | :---: | :---: | :---: |
| British Columbla | 18,972 | 6,484 | 2,914 |
| Manitoba | 11,151 | 4,963 | 1,697 |
| New Brunswick | 6,706 | 6,829 | 679 |
| Newfoundland-Labrador | 6,211 | 985 | $66 \prime 2$ |
| Northwest Territories | 106 | 984 | 72 |
| Nova Scotia | 7,335 | 8,460 | 898 |
| Nunavit | 315 | 105 | 20 |
| Ontario | 83,078 | 62,899 | $23.4 ? 8$ |
| Prince Edward Island | 1,671 | 285 | 214 |
| Quebec | 23,411 | 13,813 | 2,027 |
| Saskatchewan | 7,294 | 2,312 | 1,366 |
| Yukon | 272 | 60 | 58 |

## Appendix 3

Table 6 - Provinclal Breakdown of School's Access Methods to the Internet

| Alberta | 197 | 1.031 | 95 |
| :---: | :---: | :---: | :---: |
| Britigh Columbia | 55 | 858 | 24 |
| Mantoba | 146 | 265 | 84 |
| New Brunswick | 66 | 289 | 0 |
| Newfoundland and L.abrador | 141 | 81 | 119 |
| Northwest Temtories | 7 | 18 | 5 |
| Nova Scota | 271 | 162 | 3 |
| Nunavur | 1 | 32 | 0 |
| Ontario | 213 | 3.721 | 50 |
| Prince Edward Island | 0 | 66 | 0 |
| Quebec | 188 | 930 | 5 |
| Saskatehewan | 201 | 216 | 6.4 |
| Yukon | 22 | 6 | 0 |

## Appendix 4

## How Connected are Canadlan Primaryllntermediate and Secondary Schools to the Information Highway?

On November 1, 1999, SchoolNet launched its first on-line connectivity survey. Although we are encouraged by our $20 \%$ response rate, a higher responie mate is essential to identify existing and future connectivity requirements across all schoul boards. Your participation will assist SchoolNet and its partners implement the federal government's commitment to move all school to high-speed multimedia service capability by 2004. To make it easier for school boards to participate in the survey, SchoolNet and its provinciaVterritorial partners have taken the following steps:
2. The number of compulsory questions has been cut down from 21 to 11

- Respondents have the option of completing the questionnaire on-line or sending it by fax.

Please take some time to complete the attached shorten questionnaire. If you want to fax it to us, the number is:
(613) 941-1296

SchoolNet and its provincia/territoral partners would like to thank you for your participation. If you have any questions, please do not hesitate to contact (ireg Sweet at (613) 952-0579 or
1.1 Please fill in the generic information about your School Board/District/Division:

School Board Distric/Division: $\qquad$
Province/Territory:
City/Town:
Contact Person. $\qquad$
Responsibility $\qquad$
E-mail:

Telephone Number:
2.1 How many schools are in your School Board/District/Division?

Number of Schools
$\qquad$ Prirnary / Intermediate
Secondary
K-12
2.3 How many students are presently enrolled in your schools?
$\qquad$ Primary / Intermediate
Secondary
2.5 How many computers in your schools are capable of running current Internet browsers (e.g. 486, Power Mac)?

Computers in K-12 schools should be allotted between the two categories below.
Primary / Intermediate
Secondary
2.6 Of the total number of computers in your schools that are capable of running current Internet browsers, how many are connected to the Internet?

Computers in K- 12 should be alloted between the two categories below.
$\qquad$ Primary / Intermediate
Secondary
2.9 Connected computers can be clustered in many designated locations. The name of these locations may vary between School Boards / Districts / Divisions. Please indicate in the list below the number of connected computers that are located in each area which comes closest to your definition.
$\qquad$ Computer labs or equivalent
Libraries
3.2 There are various network configurations for how schools access the internet. Please indicate the number of schools associated with each option below.
Via direct access (e.g. dial-up connection using a standard modem)
Via the School Board's/District's/Division's high speed network
(e.g. WAN)
Vie the provincial education network
(e.g. one connection for all schools in the province)
Via a satellite connection (e.g. Direct PC)
4.1 If you are unable to answer any or all questions, please Indicate the reason(s) from the list below.

Do not have the resources nor the time
Not a priority of the School Board/Distric/Division
Lack of adequate information from the schools
No one has responsibility to gather this type of information
Other, please specify
4.2 If a follow-up survey was planned, when should it be conducted?
$\qquad$ In six months
$\qquad$ In twelve months
$\qquad$ In eighteen months
4.3 If a follow-up survey was planned, how likely would you particlpate?

Very likely
Likely
Unlikely
Very unlikely
Don't know
4.4. Are there other types of information you would like to see gathered in future surveys?


[^0]:    'Internet apable computers as those 486, Power Mac or higher
    ${ }^{2}$ Primary/intermediate schools were defined as those whose majority of students are between kindergarten and grades seven or eight while secondary schools are those whose majority of students are between grades eight or nine and twelve or thirteen
    'Please consult Appendix I for a detailed breakdown of the number of capable and connected computers for each provinceterntory. The percentage in the last column identifies what percentage of a jurisdictions' capable computers are connected

[^1]:    ${ }^{4}$ SITES was a randum sample covering 4,000 Canadian schools, each of which received two questionnaires: one completed by the principal and the second by the individual responsible for technology in the schools. Data for SITES was collected during January and February 1999.
    'Since 1994. NCES has surveyed nationally representative samples of approximately 1.000 public schools in the fall of each academic year on Internet access and, since 1996, on the types of Internet connections used. ${ }^{6}$ Please consult Appendix 2 for a breakdown of how many Internet connected computers are located in designated computer labs, classrooms and libraries for each province and territory.

[^2]:    'CRITO's survey related to Information Communication Technologies in 655 American schools in the spring of 1999. Its 1998-1999 survey derived a national probability sample of elementary and secondary principals and technology coordinators in United States public and private schools.
    ${ }^{8}$ Please refer to Appendix 3 for a breakdown of how schools in each province and territory access the Internet.

