Internet Educational Usage by High School Students Around the World

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Abstract

An electronic mail questionnaire was distributed to high schools throughout the world linked to Web66 school's registry on the World Wide Web. A sample of 34 secondary school teachers from eight different regions of the world answered questions about the general educational benefits, skills, management and training in the Internet. Findings revealed that the predominant skills secondary students need are hardware/software skills and information literacy skills. Nearly all the teachers believe Internet usage motivates students in their learning, and nearly half the teachers had changed their teaching techniques since using the Internet.

Introduction

For many people computers have become an essential device in everyday life. However, even though there have been some remarkable advances embracing them, not all secondary schools use computers often. By allowing learning and teaching to take place at any computer terminal at any time of the day, education has the potential to become more responsive to the needs of lifelong learners in the information age (Hunter, 1992). Spring (1995) recommends that to prepare students to participate fully in society, to be successful in the labour market, and in post-secondary educational studies (Goldman and Bradley, 1996, 1997) schools will need to take up the educational use of information technologies and telecommunications.

What is the Internet?

The Internet is the world's largest computer network formed by thousands of digital networks that are joined by a common set of protocols and tools. The common communication protocol that links these networks is called TCP/IP (Transmission Control Protocol/Internet Protocol). Ellsworth (1994: xxi) describes the Internet as:

An amazing, world-wide system of voluntarily interconnected networks with literally millions of documents, resources, and databases, as well as a variety of methods for communicating which has become the best opportunity for improving education since the printing press started placing books in the hands of people.

Access to the Internet is a key part of 'plugging' into the world of networking. A 'network' is a group of computers that communicate electronically. A national network, suggests Carlitz (1991), is not merely a useful tool for schools, but also has the potential to become the foundation on which all educational programs and materials are developed and distributed. A net connection in a school, suggests Polly (1992), is similar to having many foreign exchange students within the classroom. 'Telecommunications' such as the Internet means communicating across distances (Roberts, Blakeslee, Brown and Lenk, 1990) which helps overcome what has been called the tyranny of distance (Polly, 1992).

The Internet in Education in USA

Itzkan (1994-95) notes that the Internet and Information Highways are the infrastructure of America's telecomputing environment. The Information Highways are the future manifestations of technologies like the Internet, and will provide commercial and entertainment services that will be accessed through interactive television. According to Itzkan the installation of microcomputers in schools has grown linearly in the last 10 years, and a linear forecast would suggest 4.3 million personal computers in American schools by the year 2000. Network growth, however, according to Itzkan (1994-95) has been exponential. Usenet and Internet growth rates have been 50 to 100 percent annually. Itzkan expects there to be among 3 to 5 million networking K-12 students in the United States by the end of the 1990s.

Australia and the Education Internet

Rapid technological growth is also occurring in Australia. An Australian Science and Technology Council report (cited in Goggin and Newell, 1994-95) that investigated the future needs for data research networks in Australia, found that in 1980 there were approximately 100 computers connected to the precursor of the Internet. By March 1994 there were 2.2 million computers on the Internet. Since 1990, AARNet (the Australian Academic and Research Network) has provided a research and data computer network in Australia. Marsden (1995: 2) says: 'The huge growth in demand for Internet access both within and outside the academic world has placed increasingly heavy demands on AARNet over the past few years'.

Comparative deficiencies have been observed in other government sectors across the nation (Morrow, 1995). In the 1995-1996 Federal Budget, the Commonwealth Government allocated \$1.5 million in funds for the establishment of an Education Network Australia (EdNA) to link schools, TAFE colleges, universities and other education providers across Australia and internationally (Dillon, 1995). According to the Education Networking Task Force, EdNA (1995) will deliver educational services and products around the nation, containing the costs of accessing interactive information networks. This has implications for schools and other existing users who are eager to know what the cost of access to the Internet will be (Morrow, 1995).

If the Internet is to become part of the school, as envisaged by EdNA, Thomson (1995) suggests it should be located within the overall teaching and learning framework. Burrows (cited in Glorfeld 1994: 26) notes that to bring Australian schools into the Information Age needs a serious, nationally co-ordinated approach, supported by appropriate research, to assist future learning environments and changing pedagogies. Similarly, Morrow (1995) believes that if computing and the information technology are to become integrated into the whole curriculum, technical support will be necessary to assist teachers in recognising computer applications that will add value to the teaching of their subject areas.

Internet in the Classroom

The Internet has only been in schools in the USA since 1990/1991 (Gallo and Horton, 1994) and in a growing number of Australian schools since 1994. However, once students' computers are connected to the Internet, a new avenue of exploration is opened. Pool, Blanchard and Hale (1995) believe that not only can the Internet and the integration of computers assist in education, but the exposure of students to connections over the planet we share can benefit children's understandings of the world.

The Internet is also playing a major role in creating a new model for classrooms across the world. Patrick (1992) believes there is an educational reform movement in the United States, with one of the main ideas being the promise of technology. Many people involved in education are also looking toward the future with technology as a partial solution to the ills of education. Perry (1995: 29) describes the Internet as a network of users who share one commonality, 'they all want to engage in some form of information exchange'. Networking offers administrators, teachers and students the opportunity to share information as never before in our education system. With technology,

computers and computer networking, students are going to be exposed to more and more information which may well include themes of collaborative inquiry in networked communities, making collaborative learning more productive, involvement in world affairs, learning based on common special interests, and learning across ages and institutions (Hunter, 1994). According to Carvin (1995), the Internet has also created electronically a profession fraternity among educators. With the Internet, teachers are provided with the opportunity to contribute to each other's development, to create and exchange experiences and ideas with peers around the world. Furthermore, teachers and administrators have found that the Internet provides a natural framework for support for educational advancement and school restructuring (Hunter, 1994).

Impact on Teaching and Learning

However, while pre-college educators do view computer technology as a powerful tool in education, Allum (1991) suggests that they struggle with the fundamentals of how to integrate the technology into the classroom. Educators are specifically concerned with what networking can mean for learning and teaching. This includes the impact of networking on the institutions of education, school districts and state departments of education. Thornburg (cited in Thomson 1995: 4) states:

Rapid changes on the technological horizon suggest that, unless educators first understand the utility of the devices being brought into their classrooms, the technology risks becoming outdated while the teachers try to figure out how (or why) to use it. Once educators understand both why and how technology helps the educational process, access to this technology needs to be provided - along with sufficient release time for educators to restructure lessons in ways that take advantage of these tools.

Diffusion Theory

Itzkan (1994-95) suggests that the impact of this new technology will pass through three phases. The first is a substitution phase where the technology replicates or automates existing practice, rather than challenging existing paradigms. Second is a transition phase, where new methodologies begin to evolve and old models are challenged. The third is a transformation phase, where new methodologies are implemented. This model is illustrated in the evolution of computers, networking and international networking, notes Itzkan (1994-95). The use of computers when first introduced to schools, was primarily for the purpose of drill and practice and word processing. Following this, new methodologies and instructional materials emerged (eg. Hypercard) and Itzkan believes this is the current situ-

ation in many schools. Computers of tomorrow, he suggests, will introduce artificial intelligence and methodology taken from the cognitive sciences, where computers will work on behalf of their user.

These factors forecast that an era of comprehensive instructional networking is on the way (Itzkan, 1994-95). The benefits this has for education will be in providing an environment where classrooms become living laboratories that are fully connected and interactive with people and resources from around the world. However with increasing use of technology in the home, the whole nature and paradigm associated with present day schooling and classrooms may well be revolutionised, with many students learning from home at any time of the day or night, on any day of the year.

Obstacles

A case study conducted by Gallo and Horton (1994) was used to investigate the effect direct and unrestricted access to the Internet had on a group of high school teachers in the USA. They explored the barriers teachers met when using the Internet, the factors influencing their use of the Internet, and the transitions they experienced in the Internet. Seven secondary teachers from six academic disciplines were observed and interviewed concerning their daily use of the Internet. The findings of the study revealed that high school teachers experienced problems of comprehension related to both the Internet and their computers, technical problems, and time-related problems.

Continued Internet use was influenced by the way teachers viewed the Internet, and Internet usage was governed by teachers' schedules, work loads, and degrees of success using Internet applications. An implication of the findings suggests that teachers require ongoing Internet training, technical support, home Internet access (Goldman and Hocking, 1999) and time in which to learn and incorporate the Internet into their classes. This concurs with Morrow (1995) who suggests that teachers do not become computer literate until they have a computer on their desk and are able to access it daily.

For telecommunications' networks to be productive in education, the following obstacles need to be overcome (Hunter, 1992). The governance and finance of the overall network structure need to be decided and local school and school district communication infrastructures need to be planned. Teachers and students in relatively few schools have full Internet access and functionality as yet, while school curricula and instructional methods are not designed to take advantage of the resources, data bases and software that are accessible through the

Internet. These serious concerns will be addressed during the next few years suggest Eisenberg and Ely (1993) through a number of field and research studies. Some governments, however, are now taking action. For example, US Vice President Al Gore (cited in Jacobson, 1994) said that in 1993 only 14% of America's public schools used educational networks in even one of their classrooms. He has challenged the telecommunications industry to connect all the United States classrooms, libraries and hospitals by the year 2000. Due to such rapid growth in technology in schools, the present study investigates the attitudes globally dispersed secondary school teachers held about the Internet and its use in education.

Method

E-mail Questionnaire

The questions posed included: what skills do students require when accessing the Internet? what are the educational benefits of the Internet in terms of student motivation and student knowledge? do students explore the Internet? who manages student access to the Internet? does your school have a policy on Internet? has using the Internet changed your teaching techniques?

Using remote data collection, a computer survey collected worldwide data about Internet usage directly from secondary school classrooms. The questionnaire consisted of six closed-form questions that called for short responses or yes/no replies, and nine open-form questions. The questionnaire was deliberately kept short to maximise its completion. It was developed using Microsoft Word version 6, saved onto a floppy disk, and then loaded into an opened e-mail file.

Procedure

As the population to be sampled was globally diverse, electronic mail was the most suitable medium for the collection of data. Since the Internet was the focus of the study, the tools of the Internet were also the most appropriate method for obtaining the data.

Sampling Population

Respondents were those connected to the World Wide Web Schools Registry <http://web66.coled.umn.edu/schools.html>. This is constantly being updated and at the commencement of this search there were 319 schools across the globe listed on the registry. Of these high school sites 120 were selected at random. Over a period of two months the schools' home pages were visited via hypertext links from the Web66 schools registry.

Sample

As in Table 1, (*see appendix*) from the 120 introductory e-mail letters sent to the secondary school sites across the globe, 66 replies were received, a return rate of 55%. Seven of the respondents indicated they were unable to participate, because they were just beginning to use the Internet themselves. Three advised that they would accept the questionnaire and pass it on to teachers who were presently using the Internet in the classroom. Two respondents indicated that although the school had a 'home page' on the World Wide Web, they were not yet using the Internet in the classroom. Each of the remaining 54 people who responded to the introductory letter was sent a copy of the questionnaire. Thirty-four of these people (63%) completed the questionnaire.

E-mail Response Time

The time taken for respondents to reply to the survey ranged from one day to four weeks. The delay for some was not surprising, because of the heavy workload for teachers at the end of the school year. The e-mail account was accessed daily over a period of four months.

Confidentiality

Confidentiality may be a cause for concern when conducting an e-mail survey questionnaire due to the open nature of the network unless transmission is encrypted. Respondents were guaranteed that once their messages were received, confidentiality would be assured.

Sample Demographics

Table 2 shows the 34 respondents who completed the questionnaire were from globally diverse locations constituting eight regions. The majority of respondents were male (74%, $n=25$), with 26% ($n=9$) females. High school classroom teachers constituted 94% ($n=32$) of the respondents. The remaining two respondents were a male Information Technologist and a female primary school teacher whose school consisted of early childhood, primary, middle and secondary school sections. Of the teachers surveyed, 18% ($n=6$) had dual roles in their teaching load that consisted of information technology and media specialist duties. However, all respondents were involved with the Internet in high school education. Of the 34 respondents, 68% ($n=23$) teach in the Northern Hemisphere and account had to be taken of the school academic calendar to maximise networking responses.

Age of Teachers

Table 3 indicates that 91 % of the teachers surveyed were between 30 and 59 years, while 79% were between the ages of 30 and 49.

Qualifications

Some 47% (n=16) of respondents had qualifications of a Masters degree and one teacher was completing a PhD. This suggests that the more qualified teachers have an intrinsic desire to improve their knowledge base in education which may well include undertaking courses in technology.

Results

The Skills Students Require

High school teachers were asked about the skills that students require when accessing the Internet, and seven categories were found (see Figure 1). Some 28 % of teachers (n=10) indicated that a knowledge of software/hardware was an important skill for students when accessing the Internet. Twenty-one percent of teachers (n=7) indicated that searching for information and knowing how to access that information was also necessary. In total, almost half the teachers believe hardware/software skills and information search skills are essential for Internet access. The 'other' category included skills of collaboration, determination, responsibility, scepticism, time planning and maturity.

The Perceived Educational Benefits of the Internet

Teachers were asked about the effect the Internet has on High school student motivation and knowledge. Their replies are categorised as follows:

a) Student Motivation

Nearly all teachers, (94%, n=32), believed that the Internet motivates students to learn. One teacher indicated that the Internet was not readily available to students, and another did not reply to this question. An analysis of the results revealed five dominant features relating to increased motivation and knowledge.

Communications. Thirty eight percent of teachers (n=13) indicated that students displayed excitement and interest when communicating with peers in other countries. Being able to publish for an international audience was a motivating factor for students when preparing their work. Students from Texas, USA were proud that people all over the world could read their work. A male teacher from Washington, USA replied that "students take an added interest in preparing materials that will be viewed by someone other than their instructor in the course". Teachers who were using the Internet in computer studies courses said that they could not do without this tool.

Contemporary information. Forty seven percent of teachers (n=16) indicated that students now have access to up-to-date information compared to something that is possibly out of date. Teachers noted that students found it fascinating to be able to access up-to-date information and make use of materials that are not available locally. A male teacher from Canada commented that students studying Earth Science could look at images less than one month old, and gain information on recent earthquakes.

Variety of information. Fifty three percent of teachers (n=18) believe that students now have a different source of information to access other than books and journals. A female teacher from New Jersey, USA suggested that being able to communicate with and receive information from scientists was motivating for students. A male teacher from Kansas, USA stated "it is a much more 'hands on' approach to learning than the traditional 'read the book; write the report' method". In Texas, USA a female teacher stated that students find the Internet more exciting than a book, "using the net my students have always provided more information than you could ever imagine". A male teacher from Germany suggested that the Internet allowed students to view subjects from a variety of views and perspectives. Several teachers also commented that students are amazed at the vast amount of information available.

Transfer of learning to other subjects. A male teacher from Canada noted that several students had used the Internet to research projects for other courses. Consequently students were becoming more aware of the inter-connection between information, knowing that it is not enclosed by boundaries with names such as geography, political science, or others.

Home usage. In Washington USA a male teacher reported that when students are able to access the Internet at home, learning was extended beyond the school curriculum. Similarly, a female teacher from Switzerland stated that many students were obtaining accounts for home use, or using their parents' work accounts to access the Internet for current information for their extended essays.

b) Student Knowledge

The majority of teachers noted that the Internet expanded the opportunity for students to gain knowledge. Students often located information on the WWW which was unavailable in the school library. By using the Internet, teachers found that students learned about strategies for accessing information, problem solving and computers.

As one male teacher from Canada commented, "one [male] student had been learning how to use HTML to update web pages, but he didn't even know this existed".

Access to current research. Another finding was that by using the Internet students gained insight into current research. Being able to access current information was reported to be a benefit for teachers as well as students and it also increases motivation. Teachers found they could expand their knowledge-base by accessing current research reports. It was suggested by a male teacher from Washington USA that by using the Internet, secondary school students could obtain a clearer understanding of the dynamics of knowledge, which may be lost in a text book environment. As one male teacher from Indiana, USA explained "students are acutely aware that biology and information are not static as it once appeared in textbooks".

Other sources of increased knowledge. Examples of how teachers have used the Internet include: accessing data on recently occurring volcanic eruptions from the Smithsonian Institute in Washington', viewing images of less than one month old; obtaining information on recent earthquakes; and accessing photos of sectional slices of the human body from the Visible Human Project.

Clearly defined projects. Teachers also suggested that clearly defined projects and using the net effectively are important aspects for obtaining information. Specific topics proved more effective than general topics.

Mentors. It was reported by several teachers that many students have found mentors on-line who have provided a wealth of background information to them.

c) Other Factors

Teachers indicated that the difficulties encountered in Internet use included explaining correct e-mail address format and allocation of time for students to have computer access. One female teacher from Australia commented that she had to type students' letters at home as the students did not have suitable access to computers at school. Also, a frustration many teachers found with Internet data searches was that information being sought is sometimes not located. A male teacher from Australia raised the concern that "will being unable to find what you want turn users away from the Internet?"

Exploring the Internet

Two teachers from Kansas USA and Canada reported using exploration activity for introducing students to the Internet. This activity has been used by the teachers to allow students to gain familiarity with the information available on the Internet. Students in Kansas are provided with time to explore the Internet through visiting sites, FTPing information and using e-mail. Students in Canada were provided with a list of topics and questions to complete. Students were then required to use the Internet to find the answers and report back to the group. Benefits of the activity included gaining familiarity with the Net, and acquiring greater knowledge. The difficulties encountered by teachers for these activities included gaining physical access to the computers, finding the time and effort to stay ahead of students, students having to wait their turn, and students using the Net for more than downloading games.

Management of Internet Access

Eighty three percent of respondents (n=28) reported that high school students' access is managed by teacher supervision. Other methods cited for managing Internet access included teacher logging on and entering password for students, students signing AUP (acceptable use policy), trust and a watchful eye by teachers, and students use of the Internet during free periods or lunch breaks.

School Policy on Internet access.

Teachers were asked whether their school had an Internet policy. Table 4 shows that 56% of teachers (n=19) indicated that they had a policy or were working on one for student access to the Internet. A male teacher from Oregon USA stated that "an AUP is a must". A female secondary teacher from Australia stated "no, no-one else on the staff even knows how to use it".

Change in Teaching Techniques

Table 5 shows that 47% (n=16) of teachers commented that their teaching techniques had changed with the use of the Internet in their subject area. Reasons included more collaboration between teachers and students, more emphasis in getting first hand information rather than relying on books (sic), a more facilitating and flexible approach being adopted, and having students work on individual projects.

However, 29% of teachers (n=9) indicated that their teaching techniques had not changed. Reasons included that the Internet was not being incorporated into regular teaching classes, but used only with small groups. Nine percent of teachers (n=3) indicated that their

teaching techniques had not yet changed, but suggested that once greater Internet access was available their teaching techniques may change.

Summary

The skills required by high school students in using the Internet at school include knowledge of hardware and software. The educational benefits include increasing student motivation, with a sizeable proportion of teachers believing students exhibit excitement and interest. The Internet provides up-to-date information, is a different source of information other than books and journals, can motivate students to use Internet for other subjects, and there is transfer of learning to other subjects. The Internet extends learning beyond the school curriculum, and extends learning to the home computer so learning can take place at any time.

Concerning student knowledge, a majority of teachers say the Internet expands the opportunity for students to gain knowledge. It provides access to current research and dynamics of knowledge. The changing nature of knowledge and its inter-relationship between all subjects becomes more evident for students. Clearly defined projects and effective Internet usage are important, and students are able to find mentors. Negative factors include student difficulties using accurate e-mail address formats, and being unable to locate information. Exploring the Internet also aids in increasing familiarity with the Internet and acquiring greater knowledge. Management of Internet access is predominantly teacher-directed, and use of the Internet had also led to reported changes in teaching techniques. About half of these high schools have an AUP (acceptable use policy).

Discussion

The Internet is a relatively new phenomenon in secondary school classrooms. Teachers who use it believe the Internet to be a powerful motivating tool for students as well as having the potential to expand students' learning and knowledge. They commented that the Internet allows them and their students to obtain current information, to learn about other people and places, and to increase research skills. Task sharing, cooperation, and the development of critical thinking skills were benefits teachers believed Internet activities provided. A female teacher from Texas stated that "we finally have a tool that is more exciting than Nintendo".

The results suggest that the Internet has the potential to extend opportunities for collaboration and communication, both among

teachers and among students, creating a new kind of learning environment. Many teachers reported that they are using the Internet to communicate and coordinate projects with schools in other states or countries. LaQuey Parker (1994) suggests that the Internet can enhance classroom activities by creating global awareness, providing access to the latest information and enabling communication on a wide scale.

However, Cuban (1993) argues, that schooling is less vulnerable to electronic technologies for two reasons. First, there are certain cultural beliefs about what teaching is, how learning occurs, and what knowledge is proper in schools. Second is the age-graded settings found in our education system, where students are graded according to age, and not academic ability. Findings from this study conflict with these principles suggesting that at least some secondary teachers are willing to challenge them and incorporate electronic technologies into their teaching techniques.

Educators' Perceptions of the Benefits of the Internet

Networks can provide an infrastructure for cooperative and interdisciplinary projects, providing access to new and exciting resources for classrooms. The data collected here, where 94% (n=32) of teachers believe the Internet to be a motivating factor in education, suggest that this tool has the potential to contribute significantly to the education of secondary school students. The potential benefits the Internet has for increasing student knowledge was also supported by teachers.

However, there is no single model for the successful implementation of the Internet into the secondary school classroom. The diversity of the Internet and the resources available allow educators the flexibility and creativity to implement those activities which they believe will benefit the students in their classrooms. Gardner (1993) suggests that the computer can be an indispensable facilitator in the process of instruction, and can assist students to arrange sequences at their preferred pace by using a variety of educational techniques. Creating genuine products and projects, which Gardner (1993) believes should be the outcome of education, can also be achieved through appropriate use and planning of Internet activities.

The Internet is a tool which has the capacity to offer students of all ages a way to participate in culturally meaningful activities. It can complement and enhance the educational outcomes of all students in all subject areas and can build upon students' skills, communication

and information, and provide a 'global audience' for their work. Educators now have the opportunity to develop activities and projects using the Internet that may assist students to develop their intelligence. The degree to which individual intelligence is developed using the Internet will depend upon the specific projects students are involved in.

Educators' Use of the Internet

Pool, Blanchard and Hale (1995) reported that, on the whole, computers were not well integrated into courses, but provided a resource waiting to be tapped. However, they agreed that those who had daily involvement with the Internet did use it for a variety of applications. In this study, activities had been undertaken to not only have students search for and retrieve information, but also to provide them with the opportunity to gain access to experts and mentors in their areas of interest. Gardner (1987) believes that students should be matched to learning opportunities in the wider community through apprenticeships, mentorships, individuals and organisations. He believes this would enable students to experience different kinds of vocational and avocational roles in society. Results from the present study suggest that the Internet can aid in reaching this goal. Similarly, Patrick (1992) notes that high schools in the United States will use the Internet for electronic citizenship projects.

Access to the Internet

While teachers report a willingness to use the Internet in the classroom, a concern raised by several teachers was the time taken to access information. Teachers reported frustration when connections were busy or information could not be retrieved. Perry (1995) found a similar complaint in his survey concerning the lack of speed when moving through the network. These issues could prove to be a negative factor in the implementation of Internet activities within the classroom. However, implementing planned activities for students could help overcome this concern. Teachers would be required to complete initial searches to seek suitable sources of information. Such a suggestion is supported by Gardner (cited in Siegel and Shaughnessy, 1994) who believes that it is necessary to choose topics with great care, and allow students to spend sufficient time on them.

Conclusion

The use of the Internet in motivating students to learn cannot be overstated. Motivated students are more likely to take responsibility for their own learning and seek answers to their questions. The introduction of the Internet in the secondary classroom supports Gardner's

belief that students should be active learners who create knowledge which is meaningful to themselves. The Internet also provides a wealth of knowledge and information to be accessed. No longer must students be limited to nonfunctional knowledge which is incongruous to their life. Through using the Internet students have the capacity to obtain information that is up-to-date and comes from a wider source of experts. They can communicate with peers, mentors, university professors and other experts in the field.

While the Internet has the potential to influence educational change, such change will not occur if teachers cannot or will not use this new technology. Fortunately, this study received reflective and insightful responses from educators worldwide, and the evidence shows that there are self-motivated educators within secondary schools who are implementing planned activities for students on the Internet. Such a trend may be the result of massive technological changes in the workplace throughout the last decade, with school reformers turning to computers in schools as a solution for inefficient teaching with textbooks to whole classes (Cuban, 1993). However, for successful integration into the secondary school curriculum, educators will require access to this new technology. Consequently, State and government authorities will be an important part of the process in providing equitable access to all students.

Furthermore, if educators are to be successful in incorporating the Internet into the classroom, policy makers, administrators and educators who influence teacher training and reform activities need to have a clear understanding of what being connected to the Internet means for education. Cuban (1993) suggests that the marginal use of computers and telecommunications in schools and classrooms is not due to inadequate funds, unprepared teachers, and indifferent administrators, but to the dominant cultural beliefs about what teaching, learning, and proper knowledge are, and how schools are organised. However, according to Itzkan (1994-1995) three phases of substitution, transition and transformation, it appears High Schools are currently scattered across the substitution and transition phases with the technologically creative teachers moving through phases one and two, but with very few approaching the phase of transformation. More schools need to move into phase three if students are to receive the full educational benefits that the Internet can provide.

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Table 1: Response rate from e-mail users

Correspondence	Number Sent	Number of Responses	Response Rate %
Introductory Letter	120	66	55
Questionnaire	54	34	63

Table 2: Demographics of Respondents

Continent/Country	State/Region	Gender	
Australia	New South Wales	Male(2)	Female
	Northern Territory	Male	
	South Australia		Female
Asia	Japan/Kobe	Male	
Canada	Winnipeg-Manitoba	Male(2)	
	Nova Scotia	Male	
Europe	Austria/Graz	Male	
	Germany/Stuttgart	Male	
	Switzerland/Geneva		Female
United Kingdom	Cambridgeshire	Male	
	Essex	Male	
	Leeds	Male	
New Zealand	New Zealand		Female
South America	Argentina/Buenos Aires	Male	
USA	Arkansas	Male	

	California	Male	
	Delaware	Male	
	Hawaii	Male	
	Indiana	Male	
	Iowa	Male	
	Kansas		Female
	New Jersey		Female
	New Mexico	Male (2)	
	Northern Carolina	Male	
	Oregon	Male	Female
	Pennsylvania	Male (2)	
	Texas		Female (2)
Total 8	127	Male (25)	Female (9)

Table 3: Age of Respondents

Age group	Number of respondents	Percentage of total
20-29	2	5.9%
30-39	11	32.4%
40-49	16	47.0%
50-59	4	11.8%
No response	1	2.9%
Total	34	100.0%

Table 4: Internet Policy in Schools

Internet Policy	Responses (%)	
yes	32.3	(11)
working on one	23.5	(8)
not yet	20.6	(7)
no	11.8	(4)
no reply	11.8	(4)
Total	100	(34)

Table 5: Change in teaching techniques

Change in teaching techniques	Number of responses (%)	
yes	47%	(16)
no	29%	(10)
not yet	9%	(3)
no reply	15%	(5)
Total	100%	(34)

Figure 1: Teachers' Identification of skills required by students when using the Internet