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Student's attitude to using the internet at school after limited classroom exposure

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**STUDENTS' ATTITUDE TO USING THE
INTERNET AT SCHOOL AFTER LIMITED
CLASSROOM EXPOSURE**

By

Anna Hu Dip. Teach.

**A Thesis Submitted in Partial Fulfilment of the
Requirements for the Award of**

Bachelor of Education with Honours

at the Faculty of Education, Edith Cowan University

Date of Submission: November 20, 1996

Abstract

This study focused on student's attitude to using the Internet at school. A questionnaire (the School Internet Attitude questionnaire) measuring student attitude to using the Internet at school incorporating three dimensions (cognitive, behavioural and affective) was administered twice to a sample of 64 Year 12 students from a Perth Metropolitan Independent school. The questionnaire was administered before and after a six lesson 'exposure' (the limited classroom exposure) to the Internet. Pre and post test attitude measures of all students were compared using dependent sample t test to determine if there were significant differences in student's attitude after the limited classroom exposure to using the Internet at school and for each of the three dimensions of the School Internet Attitude questionnaire.

Within the sample, the attitudes of current regular users of the Internet (students who use the Internet at least a few times a week) and current non-regular users of the Internet (students who have never used the Internet or use the Internet less than a few times a week) were compared before and again after the limited classroom exposure. A MANOVA design was used to measure the student's attitude to using

the Internet at school, the dependent variables were the cognitive, behavioural and affective dimensions of the School Internet Attitude questionnaire, with repeated measures on the independent variable, level of current use of the Internet.

The study found that the limited classroom exposure caused no significant change in the student's attitude to using the Internet at school from the pretest to the post test nor was there a significant change in attitude in any of the three dimensions, cognitive, behavioural and affective of the School Internet Attitude questionnaire.

However, there was a significant difference in the attitude to using the Internet at school of regular and non-regular Internet users in the pretest with the cognitive and affective dimension showing significant differences and in the post test with the cognitive, behavioural and affective dimensions showing significant differences. Regular Internet users showed a more positive attitude than non-regular Internet users to using the Internet at school in both the pretest and the post test and for all three of the dependent variables the cognitive, behavioural and affective dimensions of the School Internet Attitude questionnaire.

Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Acknowledgements

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CHAPTER 1

Introduction

Background to the Study

In 1995 the Australian Federal Government approved the intent of the Educational Network Australia (EdNA), a network that will link all schools, TAFE's, Universities and other education and training providers across the Nation. The key aim of EdNA is to ensure that Australian students and teachers are able to participate effectively in the electronic age by providing a service which utilizes the Internet, focused specifically at Australian education and training (Crean, 1995a). As part of this innovation for education the Australian Federal Government promised that every school in Australia will have access to Internet resources by 1999 (Crean, 1995b).

"By the year 2000, between 2 million and 20 million K-12 [school children, World Wide] will use Internet worked resources and tools via their own accounts, from home or school" (Itzkan, 1993, cited in Harris, 1995, p. 57). This 'Internet Revolution' has become possible because of advances in computer technology and sophistication of software that makes the Internet easy to use (Bull, Bull & Sigmon,

1995). Despite the wealth of resources available on the Internet, many schools in Australia do not possess computers that can support full Internet access, nor do they have viable access for multiple students (Jones, 1995). "With only one computer [on-line], it is not accurate to say that a school is connected to the Internet" (Sherry quoted in Ingvarson, 1995d, p. 14).

The Internet is an environment, rich in resources, and within the school environment has many possible applications and uses. These include;

- searching for information on the World Wide Web (WWW),
- sending electronic mail (e-mail) anywhere around the world,
- joining listservs of interest,
- communication on-line using inter-relay chat (IRC) software, and
- the development and maintenance of web sites which may include student Home Pages.

Upper secondary schools are complex environments characterized by very rigorous management of time with students electing custom subjects they wish to study.

There are also many demands made on students and schools by external authorities regarding both content and assessment. The Western Australian Year 12 Applied Computing course is no exception. The aim of the course as stated in the Secondary Education Authority (SEA) Guidelines (1996, p. 61) is to give students "a broad understanding of the operation of computers, skills in the main applications of computers and experience with the collection, manipulation and presentation of

information.” This course covers four main topic areas with approximately 110 hours of time available for teaching. Within this, the Communications topic is weighted at 15%-20% of the total course assessment mark, representing 16.5 to 22 hours of class time to teach the Communications topic. The use and discussion of on-line services comprises three of the 11 objectives for the topic. In practical terms, this equates to four and a half to six hours to study the Internet as the on-line service mentioned in the SEA objectives for Year 12 Applied Computing. This translates to between four and six 55 minute lessons [Figure 1. page 3].

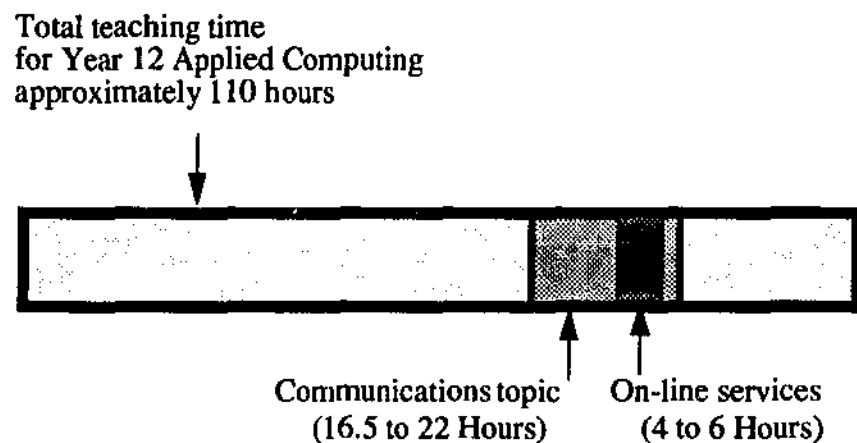


Figure 1. Time allocation for the instruction of on-line services

Factors affecting Attitude

Prior to any classroom exposure student's attitude to using the Internet at school may be influenced by the extensive positive media publicity associated with the Internet. These include but are not limited to;

- Internet television shows, for example the ABC's "http",
- use of e-mail addresses to compliment traditional use of postal address and phone information, for example Triple M and Triple J radio stations,
- promotional incentives from manufactures, for example the "Twisties Cyberspace Competition Prize",
- 'popular culture' movies such as "The Net", and
- the current State Government endorsement of on-line access for all schools.

Student's attitude may also be influenced by discussions with peers who have used the Internet to:

- find information that is of interest such as favourite bands,
- download computer programmes and games, and
- 'talk' to people in different countries using the inter-relay chat lines.

However, student's attitude to using the Internet at school may become negative following the classroom exposure due to;

- the limited Internet access time, during the six 55 minute lessons students were accessing the Internet for a very small portion of time. A more accurate estimation would be 80 minutes distributed across the last five lessons. This limited access time may not allow mastery of the large amount of skills required to use the Internet effectively, such as learning how to use the Netscape® browser and sending e-mail,
- the teacher directed instruction time, reduces the time students can explore and learn on their own for their own purpose, and
- the possible slower speed of information transfer during the school day due to network traffic.

Factors outside the control of the school and the constraints placed upon the school by external authorities when teaching students to use the Internet as part of the Year 12 Applied Computing Course may have an adverse affect on student's attitude to using the Internet at school. Woodrow professes that "it is important that computer training courses not diminish student's attitude to computers" (1994, p. 309). This statement should also hold true for Internet training courses.

Purpose of the Study

The purpose of this study was to determine student attitudes to using the Internet at school and the affect that the limited classroom exposure had on the attitudes of students who are non-regular Internet users as well as regular Internet users. The value of this data will be as an aid in the planning of positive educational experiences when using the Internet at school.

Definition of Terms

Attitude Scale:

"Attitude scales attempt to determine what an individual believes, perceives or feels." (Gay, 1992, p. 173).

Likert Scale:

An attitude scale which "asks an individual to respond to a series of statements by indicating whether she or he strongly agrees...[to] strongly disagrees [on a 5 point or longer scale] with each statement" (Gay, 1992, p. 173).

Internet:

"A network of [worldwide] networks based on the Transmission control protocol/Internet protocol [TCP/IP] protocols" (FYI on "What is the Internet?", 1996, p. 1).

World Wide Web (WWW):

“is a distributed hypermedia document delivery system operating on the Internet... it provides a means by which information may be organised, linked and accessed via a client-server protocol” (Oliver & Omari, 1996, p. 3).

Web Browser (WWW Browser):

“a client application which provides access to the WWW and increasingly, other Internet information and communication system” (Oliver & Omari, 1996, p. 3).

Home Page:

a page or site (written using HyperText Markup Language) that can be viewed on the WWW using a Web Browser.

Modem:

“A device which permits telephone communication between two computers by converting computer language to audiotones” (Gay, 1992, p. 590).

Significance of the Study

With the reported positive uses and benefits for schools, teachers and students of using the Internet (Carlitz, 1995; Doyle, 1995; Eurich-Fulcher & Schofield, 1995; Ingvarson, 1995a,b,c,d; Jacobson, 1995; Johnson, 1995; Kellogg & Viehland, 1995;

Moont, 1996; Real, 1995; Schrum, 1995; Stahl, Sumner & Owen, 1995; Szakacs, 1995; Vedantham & Breeden, 1995) studies measuring student's attitude to using the Internet at school and the effect of the current classroom exposure on these attitudes need to be conducted. Griswold (cited in Woodrow, 1994) noted that "negative attitudes promotes resistance to learning and influences the acceptance and use of technology" (p. 310).

Limitations of the Study

The School Internet Attitude questionnaire used in this study has been modelled on the Computer Attitude Measure (CAM) developed by Kay (1993). The CAM was evaluated using a group of 383 third year education university students. The CAM was developed to assess attitudes towards computers to predict computer related behaviour and was chosen because it encompasses the three dimensions, cognitive, behavioural and affective, which make up the construct of attitude as described in the Theoretical Framework [page 14]. The School Internet Attitude questionnaire requires extensive further testing on a large population to validate the measure and determine its reliability and validity, including principal component factor analysis to determine construct validity for the cognitive, behavioural and affective dimension, the three subscales of the School Internet Attitude questionnaire. Extensive testing was unable to be performed due to time constraints and the scope of this study.

The research sample group may not be representative of all Year 12 Applied Computing students. The study school had only one stand alone machine connected to the Internet situated in the library prior to the study. The study school went 'on-line' (connected to the Internet) in the Applied Computing laboratory and five computers in the library in June 1996. Students who have access to the Internet on a regular basis for all their subjects, may not exhibit the same attitude changes after the limited classroom exposure as students, such as the study school students, who did not have access to the Internet for all their subjects.

The classroom exposure may not be the same for all Year 12 Applied Computing students in Western Australia. The teaching method and amount of access time used at the study school may be different to other schools. Schools also differ with respect to instructional objectives.

The computer attitude of the research study students may be different to students who have no computer or network experience. The research study students' limited classroom exposure to the Internet was in term three after they had all been using networked computers for approximately 20 weeks. Students with no computer or network experience may display negative computer related attitudes. These negative computer related attitudes may negatively influence their attitude to using the Internet at school, which requires a computer to access.

CHAPTER 2

Literature Review

Introduction

Research on attitudes towards using the Internet is practically non-existent.

Research that describes the Internet and its possible use within schools and relevant research on Computer Attitudes has been used to illustrate pertinent areas within this study.

The Internet at School

In the ideal situation the Internet, which has been defined by Yacci (1995) as an information rich learning environment (IRLE), would allow users to access a variety of resources and make decisions about the direction of learning. "An IRLE is a construct that describes any number of loosely constructed systems in which the learners select information resources from which to learn" (Yacci, 1994, p. 328). Carroll (cited in Yacki, 1994, p. 330) asserts that "Learners have idiosyncratic methods for approaching learning, and if given a choice, will attempt to weave their

own paths through information for their own reasons” and that learners enter an information rich environment so that they can select resources for the purpose of learning (Yacci, 1994) [Figure 2. page 11].

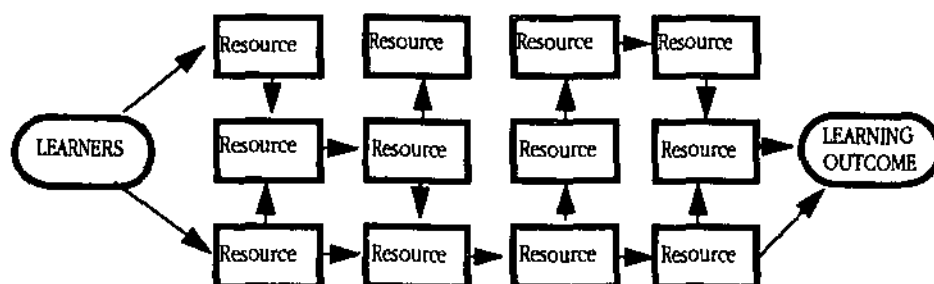


Figure 2. Graphical Representation of an Information Rich Environment

School Structural and Organisational Norms

However, in schools “pupils still gather in classrooms for scheduled lessons that proceed according to a set curriculum” (Jones, 1995, p. 26). Nikas (1995) states that “the current constraints of teaching (timetables, class size, set curriculum, exams, isolated subjects, isolated teachers) have hampered many of the innovations which could improve students’ learning” (p. 70). Jones suggests that “the Internet could be the catalyst for an overhaul of the entire way our pupils are taught” (1995, p. 26). Ingvarson (1995b) agrees that the Internet has the potential to be used in Secondary High Schools but states that “the curriculum would need to be developed with integration between subjects rather than the strict subject based learning presently

employed” (p. 62). Sherry quoted in Ingvarson (1995d) states that “teachers who have used the Internet to teach in non-computing subject areas have reported very positive results” (p. 14). Woodrow (1994) asserts that “skills taught in isolation tend to remain in isolation...technology must be fully implemented across the curriculum and the students must perceive their use of technology...as part of the normal procedures in the classroom” (p. 335).

Access Time and Technical & Logistical Issues

The Internet is full of information and learning resources and has the potential to be used in a variety of ways in schools. It would appear that reliability, ease of use and access are some of the factors preventing the positive adoption of Internet resources. Jones (1995) states that “the Internet requires a fairly modern personal computer with multimedia support, as well as a fast modem” (p. 26).

Eurich-Fulcer and Schofield explain that “ease of use is vital...and both hardware and software components of the system [need to] be reliable” (1995, p. 212). If the server, the main computer that all other computers in a network are connected to, does not work, there is no access to the Internet. If there is a lot of network traffic, when a large number of Internet users try to access the same site, they may receive a message denying them connection to that specific data source. If the modem doesn't work or if the software isn't functioning properly, Internet access is

affected. Futoran, Schofield and Eurich-Fulcer (1995) explain that “connecting to the Internet during school hours can be extremely slow and inefficient process since heavy [network] traffic slows access” (p. 231). Any of these problems have the potential to affect reliability, ease of use and access, and consequently influence student’s attitude to their Internet experience.

Using the range of resources that are available on the Internet, currently requires the user to be familiar with a variety of applications and software packages. These require extensive time and skill to master and do not fit easily into the current school curriculum, (Eurich-Fulcer & Schofield, 1995; Nikas, 1995; Ingvarson, 1995(a); Schrum, 1995).

Eurich-Fulcer and Schofield (1995) relate that;

“Users must have the time necessary to engage in networking activities. Many activities using WAN [Wide area network, the Internet], e.g. research, are fairly time consuming. The amount of information available via the Internet is immense and researching a particular topic takes time, skill and patience. Even with high speed connection, results of a search can take several minutes to appear. Similarly, choosing to subscribe to a mailing list often creates enough incoming electronic mail that just managing it becomes a potentially time-consuming activity” (p. 214).

A number of studies (Woodrow, 1994; Levin & Gordon, 1989; Chen, 1986) have found that high access and computer ownership correlates with positive attitude to computers. High access, out of class to computers, allows students to “gain competence through private experimentation, free of evaluation and competition” (McInerney, McInerney & Sinclair, 1994, p. 46).

Theoretical Framework

Construct of Attitude

Attitude encompasses affective, cognitive and behavioural dimensions (Fishbein and Ajzen (1975) cited in Gardner, Dukes and Discenza (1993)). Gage and Berliner (1984) define the affective dimension as being a person’s interest and values; the cognitive dimension as what a person knows and understands and the way a person interacts as the behavioural dimension. Attitude as described by Gage and Berliner (1984) are feelings or emotions about a cognitive element which has an effect on behaviour [Figure 3. page 15].

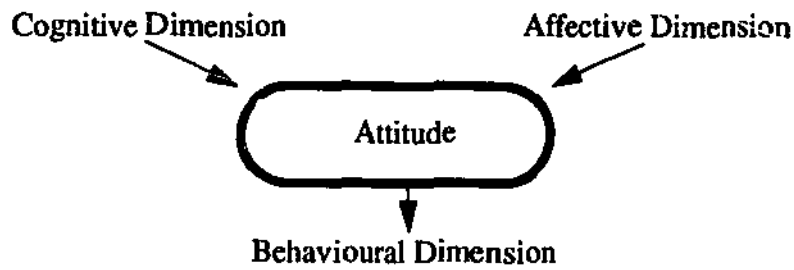


Figure 3. Construction of Attitude

Conceptual Framework

Internet Attitude

At present, in the structure of the high school environment, there is not the flexibility to allow students to learn what they want, when they want. The school structural and organisational norms as well as the time constraints, commonly confine the students to a very teacher directed learning experience with most subjects. Learning to use the Internet is no exception. With limited time and lots of skills to learn before the Internet can be used efficiently, it may be that students exhibit a negative change in attitude after only a limited classroom exposure. Also, the classroom exposure will not be the sole influence on regular Internet users attitude to using the Internet at school. The classroom exposure may not affect the attitude of these students in the same way as non-regular users

[Figure 4. page 16].

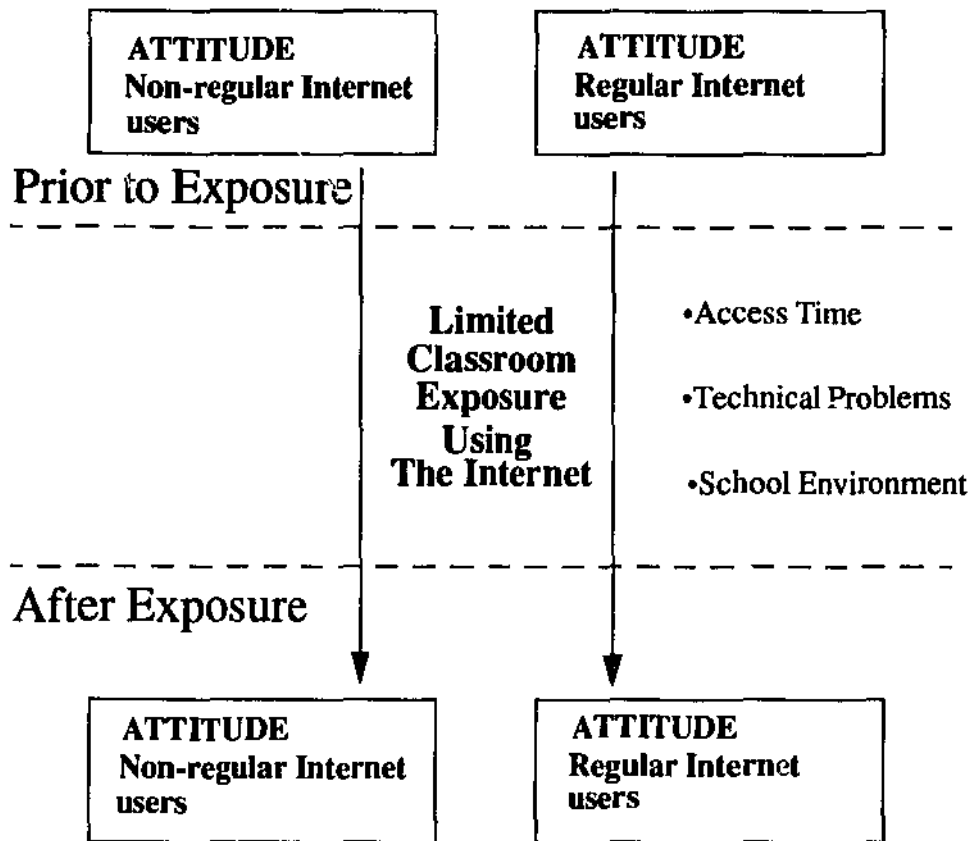


Figure 4. Model of the attitude measurement points before and after the limited classroom exposure to the Internet as used in this study

CHAPTER 3

Research Questions

Introduction

The literature reports that positive attitudes towards computers are linked with use and the amount of use is linked with attitude (Woodrow, 1994; Levin & Gordon, 1989; Chen, 1986). This study's research questions aim to examine some of these relationships in relation to the use of the Internet at school, in addition to others.

The study questions address the relationship between student's attitude to using the Internet at school and the frequency of use of the Internet. They also address the affect the limited classroom exposure has on student's attitude to using the Internet at school for both non-regular Internet users and regular Internet users.

General Research Question

The general research question which the study investigates is:

What is the attitude of students (including non-regular and regular Internet users) to using the Internet at school before and after the limited classroom exposure to the Internet?

Three specific study questions were developed to explore the general research question and are presented in the following section.

Specific Study Questions

1. Is there a difference in attitude between non-regular users and regular Internet users to using the Internet at school prior to the limited classroom exposure?
2. Is there a differential change in student's attitude to using the Internet at school after a limited classroom exposure?

3. Is there a difference in attitude between non-regular users and regular Internet users to using the Internet at school after the limited classroom exposure?

Null Hypotheses

1. Prior to a limited classroom exposure, students who use the Internet regularly will not have a significantly different attitude to using the Internet at school than non-regular Internet users.
2. After a limited classroom exposure, students will not show a significant change in attitude to using the Internet at school.
3. After a limited classroom exposure, students who use the Internet regularly will not have a significantly different attitude to using the Internet at school than non-regular Internet users.

CHAPTER 4

The Experimental Design

Introduction

This chapter presents the methodology of the study. It describes the sample and procedures, and explains how the instrument, the School Internet Attitude questionnaire, was developed. It also includes an explanation of how the School Internet Attitude questionnaire research study data was analysed.

The Design of the Research Study

A Causal-Comparative Quantitative Research Method (Gay, 1992) was employed using a pretest and a post test questionnaire to determine a difference in attitude prior to the limited classroom exposure, a difference in attitude after the limited classroom exposure and a differential change in attitude from the pretest to the post test.

Sample

The sample consisted of 64 students from a Perth Metropolitan Independent school. The students in the study were all enrolled in the Year 12 Applied Computing Course, a Secondary Education Authority subject. The study students were in 3 mixed gender classes (20, 21 and 23 students). The ratio of males to females was almost 2:1. The classes all had the same total time allocation and the same teacher so the delivery method of the limited classroom exposure did not differ significantly between classes, allowing the sample to be considered as one group. The sample was not randomly selected. Even though this was not statistically ideal the ability to gather information was the overriding consideration in selecting the sample. Of the 64 students included in the research study, 59 students completed the School Internet Attitude pretest questionnaire resulting in a return rate of 92%. The School Internet Attitude post test questionnaire was completed by 58 of the original 59 pretest students resulting in a 98% return rate.

Instrument

The School Internet Attitude questionnaire was modelled on the Computer Attitude Measure (CAM), (Kay, 1993). The CAM was originally used on 383 undergraduate student teachers in their third year of study. The CAM questionnaire was developed to assess attitudes towards computers to predict computer related

behaviour. This questionnaire was used because it encompasses the three dimensions, cognitive, affective and behavioural, which make up the construct of attitude as described in the Theoretical Framework [page 14]. The CAM alpha coefficients (α) for the cognitive, behavioural and affective subscales were .87, .94 and .89 respectively. The internal reliability coefficient for the total questionnaire was .94 (Kay, 1993, p. 374).

School Internet Attitude Questionnaire Design

The preliminary version of the School Internet Attitude questionnaire used in the research study was pilot tested on 19, Year 12 students enrolled in Applied Computing at the study school. These students were not included in the research study group because they have a different teacher.

The School Internet Attitude questionnaire was modified slightly after the pilot study, in accordance with the feedback received by the students both verbally and in written form who participated in the pilot study. These modifications are discussed under the heading of Procedure [page 24]. The modified version of the School Internet Attitude questionnaire was then used in the research study and will now be described.

Questions in the School Internet Attitude questionnaire were designed to measure student's attitude towards using the Internet at school. The research study School Internet Attitude pretest questionnaire contained 30 questions, divided into two main types. Questions 1-5 were closed questions and dealt with demographic data only. Questions 6-30 were also closed questions, and dealt with student's attitude to using the Internet at school. These questions use a seven point Likert scale as follows: strongly disagree, disagree, slightly disagree, neutral, slightly agree, agree, strongly agree which were adapted directly from the CAM. Questions 6-30 also had a place following each question for a student comment. Also, an open comment section was included at the end of the questionnaire allowing students to add any explanation for their attitudes towards using the Internet at school or any general comments about using the Internet at school.

More specifically the School Internet Attitude questionnaire was divided into four sections;

1. Questions 1-5 deal with demographic data and is important in gaining an overall picture of the sample group. Question 4 deals with the student's current level of use of the Internet and was used to determine the independent variable, non-regular and regular users of the Internet,

2. Questions 6-14 measure student's attitude to using the Internet at school in the cognitive dimension,
e.g. 'The Internet would help me improve my school work',
3. Questions 15-22 measure student's attitude to using the Internet at school in the behavioural dimension. Items in the behavioural dimension of the questionnaire required the students to state their intended behaviour rather than actual experience as this may be nonexistent,
e.g. 'I would like to use the Internet to research topics for school' and,
4. Questions 23-30 measures student's attitude to using the Internet at school in the affective dimension,
e.g. 'I feel good about using the Internet at school'.

Procedure

The Pilot Study

The pilot study was undertaken in order to test the useability of the questionnaire with the intended target age group, establish the reliability of the questionnaire and to determine the computer attitude of the pilot study students.

The pilot study was conducted in June 1996. The Principal of the study school, a Perth Metropolitan Independent school, who was known to the researcher, was contacted by letter [Appendix A: page 71] and asked if the students could participate in the study.

A Class of 22 students, for which the researcher was the teacher, was used for the pilot study. Nineteen students were present on the day the pilot study questionnaire was completed.

This pilot study questionnaire contained 2 distinct parts;

Part 1 The School Internet Attitude questionnaire

[Appendix B: page 73]. This part was used to assess the School Internet Attitude questionnaire for reliability with the intended students and to deal with any corrections, misunderstandings or incorrect interpretations the students in the pilot study had regarding the School Internet Attitude questionnaire. The researcher distributed the questionnaire and answered any questions the students had difficulty with.

Part 2 The Computer Attitude Scale (CAS) (Loyd & Gressard, 1984)

[Appendix C: page 79]. This computer attitude questionnaire was included to assess the pilot study groups' computer attitude. The CAS questionnaire has been tested with junior high school,

high school, community college and college students. Reported reliability figures of the for the three subscales of Computer Anxiety, Computer Confidence and Computer Liking are .87, .91 and .91 (Loyd & Gressard, 1984, p. 69). The CAM, (Kay, 1993) even though it was used as a model for the development of the School Internet Attitude questionnaire, was not used to determine the research study group's computer attitude as it has not been tested on high school students.

Following the pilot study, the School Internet Attitude questionnaire was modified according to the responses of the students and the calculated inter-item correlations of each of the three sub-scales of the School Internet Attitude questionnaire.

The Chronbach alpha co-efficient for the pilot study School Internet Attitude questionnaire were .84, .76 and .81 for the cognitive, behavioural and affective dimensions (sub-scales) respectively and the internal reliability co-efficient for the total questionnaire was .90.

The most significant change to the pilot study School Internet Attitude questionnaire was in the type of question and method of analysis of questions 23-30, the affective dimension. In the pilot study School Internet Attitude

questionnaire, questions 23-30 were semantic differential items using a seven point scale, extremely, moderately, slightly, neither, slightly, moderately, extremely.

These questions were changed to Likert questions on the same seven point scale as questions 6-22. The affective dimension questions were altered because the pilot study students had difficulty understanding what the questions were asking and how to record their responses. In addition to this, the analysis of semantic differential questions requires a much larger sample than that being used in the research study.

Two other questions in the pilot study School Internet Attitude questionnaire were modified. Question 11 was reworded from 'The Internet wastes time' to 'Using the Internet at school wastes time' this was done to directly relate the question to the student's attitude to using the Internet at school.

Question 20 was reworded from 'I would like to use the Internet for research at school' to 'I would like to use the Internet to research topics for school'.

The research study School Internet Attitude questionnaire also included a statement indicating that completing the questionnaire was not compulsory.

Due to the changes made in the pilot study School Internet Attitude questionnaire the reliability figures were again calculated for the research study School Internet Attitude pretest questionnaire [page 32].

The Research Study

Method

Early in Term 3 (July, 1996) a note was sent home to the parents of the students who were participating in the research study, informing them that their child/ charge was to be included in the study [Appendix D: page 82].

In late July 1996, the research study students were asked to complete a questionnaire to determine their computer attitude. The students were given the Computer Attitude Scale (CAS) questionnaire. Fifty nine students (95% return rate) were present on the day of the CAS questionnaire.

In early August 1996, the research study students (59 were present on the day) were given the School Internet Attitude pretest questionnaire to complete. The classroom teacher administered the questionnaire to each of the three classes and gave them a brief explanation of how to complete the Computer ID response (this was used to code the students questionnaires). The School Internet Attitude questionnaire took the students approximately 15 minutes to complete.

The research study students' limited classroom exposure included six 55 minute lessons. The lessons were scheduled once a week during August and September 1996. Each student had access to a computer (running Windows 3.11) which was networked to a server (running Windows NT Server 3.51). The Internet connection to the service provider was through a proxy server with full access to the Internet using a 28.8 Kb/s modem and phone line during the hours of six a.m. and six p.m. The computers were situated in a dedicated computing room which was used every lesson of every school day for Applied Computing Classes.

The students had a very limited exposure to the variety of resources available on the Internet. The six lessons included instruction in;

1. the procedure required to log on to the service provider.

Particularly the function of modems,

2. the use of Netscape Navigator® browser to access the World Wide Web (WWW) and the use of Internet search engines to find information on the WWW,
3. the use of e-mail,
4. the development of an Internet home page using a hard copy template with students adding their own text and graphics from other WWW sites.

The first three areas were covered during the first lesson with the teacher demonstrating each using an overhead projection panel. The following five lessons were devoted to the development of a personal home page for each student which will be part of the study school's home page. The students were free to 'surf' the WWW looking for images and sites to include in their personal home page. The students did not personally use any e-mail facilities nor did they join listservs. The downloading of data and capturing of images was done through the Netscape Navigator® web browser, the students did not use any other programs that did not automatically open using Netscape Navigator®, in essence the research study students were exposed to the WWW and not the other parts of the Internet for over 80% of their limited classroom exposure to the Internet. The students were accessing the Internet from their own computer for approximately 80 minutes during the limited classroom exposure to the Internet, the remaining time was spent writing and learning HyperText Markup Language (HTML) code for their home page.

The School Internet Attitude post test questionnaire (N=58, 98% return rate) was only administered to the students who had completed the School Internet Attitude pretest questionnaire, in mid September, 1996. Four questionnaires contained missing data and were not included in the post test research study analysis. Again, the classroom teacher conducted the distribution and collection of the questionnaire to all three classes on the same day.

Data Collection

The School Internet Attitude pretest questionnaire was completed in the lesson preceding the first lesson of the limited classroom exposure to the Internet. The School Internet Attitude post test questionnaire was completed in the first lesson after the final limited classroom exposure lesson. During the research study limited classroom exposure lessons a daily log was kept to record Internet Network down time (no access to the Internet), Computer down time (no computer access) and other technical problems that occurred during the limited classroom exposure lessons [Appendix E: page 84]. The purpose of this was to record other factors which may have influenced the student's attitude to using the Internet at school during the limited classroom exposure.

Reliability of the Instruments

The Computer Attitude Scale questionnaire measures three subscales or dimensions of computer attitude i.e. Computer Anxiety, Computer Confidence and Computer Liking. Higher scores on the Computer Anxiety subscale correspond to a lower computer anxiety, whereas higher scores on the Computer Confidence and Computer Liking subscales correspond to a greater degree of confidence and liking. The reliability figures (Chronbach alpha) for the three subscales of the CAS questionnaire for the research study group were .81, .84, .84 respectively, the internal reliability co-efficient for the CAS questionnaire was .92.

The reliability (Chronbach alpha) of the School Internet Attitude pretest questionnaire were calculated to be .89, .84, and .86 for the cognitive, behavioural and affective dimensions respectively and the overall internal reliability co-efficient for the School Internet Attitude questionnaire was .93 for the pretest. When initial inspection of the response data (N=59) indicated a difference in subgroup size, non-regular Internet users (n=40) and regular Internet users (n=19) and because of the small sample size of the study, the Box M Test for homogeneity of variances which is specific for Multivariant analysis, as suggested by Huck, Cormier & Bounds (1974) was conducted. The degree of heterogeneity was not significant at $p < .05$ in the pretest [Table 1 page 32] indicating that the two groups do not have significantly different variances satisfying assumptions underlying MANOVA analysis.

Table 1
Box M Test for homogeneity of variance for the Pretest School Internet Attitude questionnaire

	N	Box M	Chi-sqr	df	p-level
Box M	59	11.315	10.535	6	.104

The reliability (Chronbach alpha) of the post test questionnaire were .82, .91, and .81 for the cognitive, behavioural and affective dimensions respectively and the internal reliability co-efficient for the post test School Internet Attitude questionnaire was .93.

Analysis of the Data

To address research question two, a series of correlated sample t tests were conducted to determine a differential change in the student's attitude to using the Internet at school and for each of the three dependent variables between the pretest and post test. This type of analysis was used because of the "before-and after nature" of the research study as described by Huck, Cormier & Bounds, (1974, p. 53).

To address research questions one and three it was deemed appropriate to run two one way multivariate analysis of variance (MANOVA's). The first identifying differences in student's attitude to using the Internet at school with use for the dependent variables, the cognitive, behavioural and affective dimensions at the pretest. The second identifying differences in student's attitude to using the Internet at school with use for the dependent variables at the post test.

An alternate analysis would have been to use multivariate analysis of covariance (MANCOVA) design. However this design would not have addressed the research questions and was probably not as useful in this study as in a true experimental design where the use of the pretest is as a covariant.

The Pillai-Bartlett^V multivariate test of significance using a significance level of .05 was conducted to test for differences in response to the dependent variables, the student's attitude to using the Internet at school in the cognitive, behavioural and affective dimensions by the independent variable use (non-regular Internet user, regular Internet user). This test was used because it is "specific for smaller sample sizes particularly when the ratio of sample size to dependent variables is large" as described by Olsen (in Tatsuoka 1988 p. 287). In the research study the ratio is 59/3 or 19.6. Where a significant difference occurred in the MANOVA, Univariate analysis was conducted to identify where differences at a significance level (p) of .05 occurred.

The research study student's questionnaires with missing data were casewise deleted from the MANOVA's and pairwise deleted from the t tests from the research study data analysis.

A composite attitude measure, obtained by summing the scores within each dimension and determining the mean for each dimension was used in the analysis of the research study data. This was deemed possible as the research study School Internet Attitude questionnaire was modelled closely on the CAM by Kay (1993), where it was found that "each of the three subscales produced a relatively distinct

and cohesive group” (p. 374). This was done to determine an overall School Internet Attitude and the analysis of the three dimensions of attitude as defined in the Construct of Attitude on page 14 of this study.

Each student was assigned a unique code determined by combining the response to Question 1 with the student’s Computer ID, derived from their regular seating position within the classroom, e.g. Class 12A, Row A, Computer 1 = Student Code = AA1.

The School Internet Attitude questions were coded as follows;

Question 1 male=0, Female=1

Question 2 Yes =0, No=1.

Question 3 Never =0, Once a month=1, Few times a month=2, Few times a week=3, everyday=4.

Question 4 Not confident=0, Moderately confident=1, Very confident=2.

Question 5 Strongly disagree=1, Disagree=2, Slightly disagree=3, Neutral=4, Slightly agree=5, Agree=6, Strong agree=7.

The coding of questions 7 to 30 was the same as question 6. For questions phrased in the negative the coding was reversed.

Student’s comments on the School Internet Attitude questionnaire were recorded.

The pretest and post test responses for each student were then grouped

[Appendix F: page 86].

CHAPTER 5

Findings

Introduction

This chapter is organised into four sections;

1. Preliminary Findings,
Crosstab of Internet Use and Sex,
Student's attitude to computers,
2. Results of the Research Study,
Research Question One,
Research Question Two,
Research Question Three,
3. Further Findings,
School Internet Attitude and Computer Attitude, and
4. Summary.

Preliminary Findings

Crosstab of Internet Use and Sex

A breakdown of the study group by the factors of sex and use was completed to determine if there was an even distribution of males to females within each subgroup based on use. The significant difference at $p < .05$ in the Chi square result indicated that the ratio of males to females for regular Internet users and non-regular Internet users was not evenly distributed. Also, the subgroup sample size of female students who are regular Internet users was three, which would create a sub group of limited statistical reliability [Table 2 page 37]. Therefore, sex was not used as a dependent variable as it would create an imbalance in the design and not create a statistically appropriate sample subgroup size.

Table 2

Crosstab of the Research Study Group: Internet Use by Sex

X-sq (1, N=59) =4.795 p=.03			
Sex	Non-regular Internet users	Regular Internet users	Total
Males	22	16	38
Females	18	3	21
Total	40	19	59

Computer Attitude

The computer attitude of the Pilot study group was high ($M=3.84$). These results imply that the pilot study group generally show a positive attitude ($M>3$) to computers [Table 3 page 38] and [Figure 5. page 39].

The pilot study groups computer attitude was calculated to determine if the students in the study school were computer phobic. A negative attitude towards computers may have been an influencing factor towards the student's attitude to using the Internet at school. However, the opposite, a positive computer attitude may also have an influence on the student's attitude. It was therefore deemed appropriate to calculate the research study groups' computer attitude.

Table 3
Pilot Study Group Means and Standard Deviations for the Computer Attitude Scale

N=19 Subscales	Pilot Study	
	Mean	SD
Computer Confidence	3.82	1.04
Computer Anxiety	4.18	1.10
Computer Liking	3.55	1.15
Total	3.84	1.12

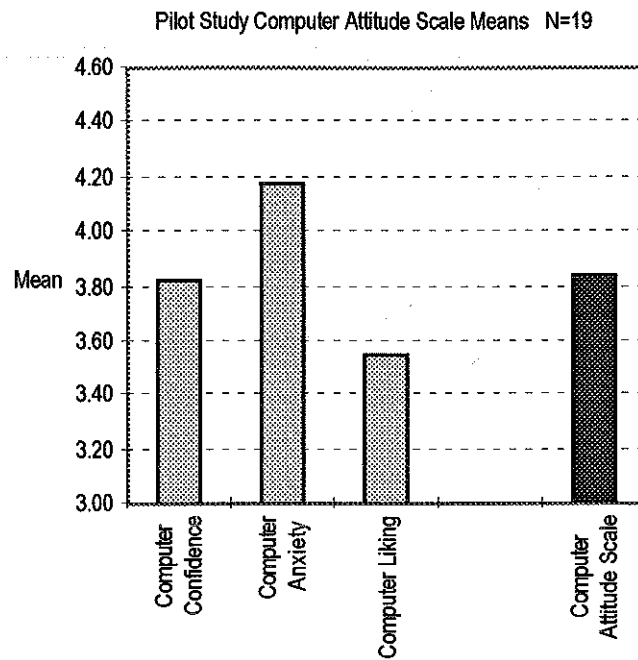


Figure 5. Pilot Study Group Computer Attitude Scale Mean and the Means for the three subscales.

The Computer Attitude measure of the research study group was high ($M=4.00$).

These results [Table 4 page 40] imply that the research study group generally shows a positive attitude ($M>3$) to computers [Figure 6, page 40].

Table 4
Research Study Group Computer Attitude Scale Means and Standard Deviations

Subscales	Research Study	
	Mean	SD
Computer Confidence	4.29	.13
Computer Anxiety	4.18	1.10
Computer Liking	3.72	.47
Total	4.00	1.10

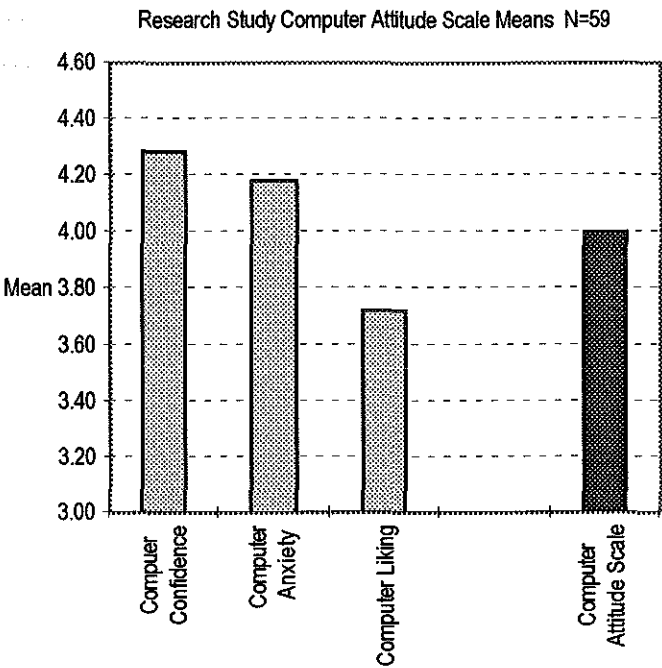


Figure 6. Research Study Group Computer Attitude Scale Means and the Means for the three subscales.

Results of the Research Study

Research Question One

Is there a difference in attitude between non-regular users and regular Internet users to using the Internet at school prior to the limited classroom exposure?

Pearson r correlations were performed to determine if there were significant correlations between the three dependent variables for non-regular Internet users and regular Internet users. The results show significant correlations between the three dependent variables (cognitive, behavioural and affective dimensions) for non-regular Internet users and all but the relationship of the cognitive with the affective dimensions for regular users [Table 5 page 42]. These results indicate that the three dependent variables were all significant in determining the attitude of the non-regular users to using the Internet at school for the pretest. The nonsignificant correlation for regular Internet users between the cognitive and affective dimensions for the pretest could indicate that the student's responses to the affective dimension questions may have developed from their past experiences using the Internet, not necessarily at school. However the regular Internet users experiences using the Internet at school, for school had been very limited prior to the limited classroom exposure. This lack of school use of the Internet may be more apparent

in their attitude to using the Internet at school in the cognitive dimension of the questionnaire which specifically refers to using the Internet at school for school related work.

Table 5
Pretest Correlations of the dependent variables for non-regular and regular Internet users

Dimension	Non-regular Internet users N=40		
	Cognitive	Behavioural	Affective
Cognitive	1.000	.709*	.707*
Behavioural	-	1.000	.617*
Affective	-	-	1.000
Dimension	Regular Internet users N=19		
	Cognitive	Behavioural	Affective
Cognitive	1.000	.490**	.423
Behavioural	-	1.000	.480**
Affective	-	-	1.000

Note. Significant level <.001denoted by * and <.05 denoted by **

The omnibus MANOVA showed a significant difference in the attitude of non-regular Internet users ($M=5.81$) and regular Internet users ($M=6.41$) [Table 8 page 44] prior to the classroom exposure at a significance level of $p<.05$ [Table 6 page 43]. Therefore, the Null hypothesis for research question one [page 19] can be rejected.

Table 6

Pretest One way MANOVA for the School Internet Attitude questionnaire

N=59	Pretest		Significance p<.05
	Value	p-level	
Main effect: use			
PillaiBartlett Trace	.157		
v (3,55)	3.407	.024	s

Note. s= significant, ns=not significant

Univariant analysis showed the cognitive and affective dimensions as being significantly different at $p<.05$ [Table 7 page 43], [Figure 2: page 41]. However, the behavioural dimension showed no significant difference ($p>.05$) between non-regular and regular Internet users.

Table 7

Pretest Univariant Analysis for the three dependent variables of the School Internet Attitude questionnaire

N=59 Dimension	Pretest		Main Effect: Use		significance p<.05
	Mean Sqr Effect	Mean Sqr Error	f(df1,2) 1,57	p-level	
Cognitive	5.430	.720	7.544	.008	s
Behavioural	2.531	.777	3.257	.076	ns
Affective	6.774	.715	9.472	.003	s

Note. s= significant, ns=not significant

Table 8
Pretest Means and Standard Deviations, for the School Internet Attitude questionnaire and the three dependent variables

N=59	Pretest			
	Non-regular users		Regular users	
	Mean	SD	Mean	SD
Dimension				
Cognitive	5.56	.96	6.30	.52
Behavioural	5.87	.96	6.32	.62
Affective	5.93	.98	6.68	.55
School Internet Attitude	5.81	1.39	6.41	1.04

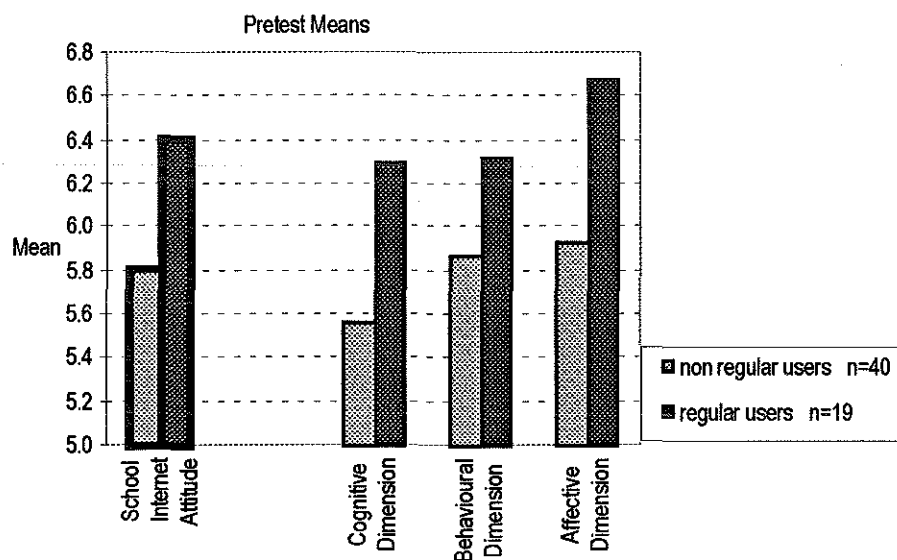


Figure 7. Pretest School Internet Attitude Means for non-regular and regular Internet users and for the three dimensions.

Research Question Two

Is there a differential change in student's attitude to using the Internet at school after a limited classroom exposure?

The dependent sample *t* tests for all the students in the research study group showed no significant difference at $p < .05$ in the student's attitude to using the Internet at school between the Pretest ($M=6.11$) and the Post test ($M=6.14$) School Internet Attitude questionnaire results [Table 9 page 46]. Therefore, the Null hypothesis for research question two [page 19] cannot be rejected.

Furthermore, there was no significant difference between the Pretest and the Post test results for the three dependent variables, the cognitive, behavioural and the affective dimensions of the School Internet Attitude questionnaire at $p < .05$ [Table 9 page 46] and [Figure 8, page 46].

Table 9

Pretest and Post test Means and *t* test results for the School Internet Attitude questionnaire and the three dependent variables

Dimension	Pretest	Post test	Significance			
	Mean	Mean	t	df	p	p<.05
Cognitive	5.93	5.98	.591	55	.557	ns
Behavioural	6.10	6.27	1.665	56	.102	ns
Affective	6.31	6.18	-1.003	56	.320	ns
School Internet Attitude	6.11	6.14	.568	53	.593	ns

Note. s= significant ns=not significant

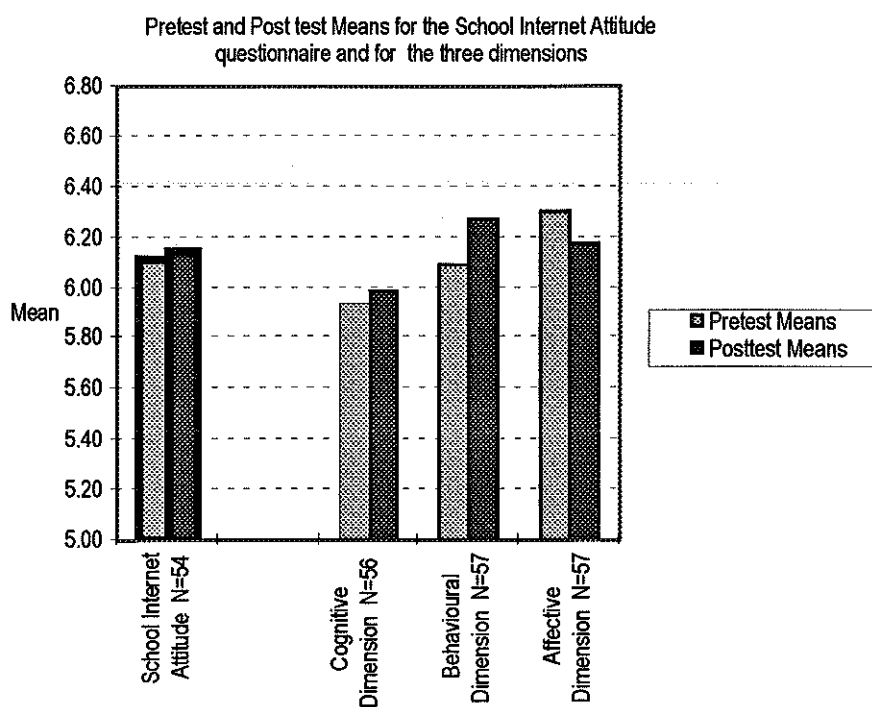


Figure 8. Pretest and Post test means for the School Internet Attitude questionnaire and for the three dimensions.

Research Question Three

Is there a difference in attitude between non-regular users and regular Internet users to using the Internet at school after the limited classroom exposure?

Pearson r correlations were performed to determine if there were significant correlations between the three dependent variables for non-regular and regular Internet users for the Post test. The results show significant correlations between the three dependent variables in both non-regular and regular Internet users. These results indicate that the students' responses to the three dependent variables (cognitive, behavioural and affective dimensions) of the School Internet Attitude questionnaire all contributed to the development of the students' attitudes to using the Internet at school [Table 10 page 48].

Table 10
Correlation of dependent variables for non-regular and regular Internet users

Dimension	Non-regular Internet users N=37		
	Cognitive	Behavioural	Affective
Cognitive	1.000	.708*	.542*
Behavioural	-	1.000	.600*
Affective	-	-	1.000

Dimension	Regular Internet users N=17		
	Cognitive	Behavioural	Affective
Cognitive	1.000	.506**	.784*
Behavioural	-	1.000	.714*
Affective	-	-	1.000

Note. Significant level <.001denoted by * and <.05 denoted by **

The omnibus MANOVA showed a significant difference in the attitude of non-regular Internet users ($M=5.82$) and regular Internet users ($M=6.48$) after the limited classroom exposure at a significance level of $p<.05$ [Table 11 page 49]. Therefore, the Null hypothesis for research question three [page 19] can be rejected.

Table 11

Post test One way MANOVA for the School Internet Attitude questionnaire

N=54	Post test		
			Significance
Main effect: use	Value	p-level	p<.05
PillaiBartlett Trace	.173		
v (3,50)	3.484	.022	s

Note. s= significant ns=not significant

Univariant analysis showed all three dimensions (cognitive behavioural and affective) as being significantly different at $p<.05$ [Table 12 page 49], [Table 13 page 50] and [Figure 9. page 50].

Table 12

Post test Univariant Analysis for the three dependent variables of the School Internet Attitude questionnaire

N=54 Dimension	Post test		Main Effect: Use		significance p<.05
	Mean Sqr Effect	Mean Sqr Error	f(df 1,2) 1,52	p-level	
Cognitive	4.270	.571	7.473	.008	s
Behavioural	5.352	.681	7.857	.007	s
Affective	5.626	.639	8.801	.004	s

Note. s= significant, ns=not significant

Table 13

Post test Means and Standard Deviations for the School Internet Attitude questionnaire and the three dependent variables

N=54	Post test			
	Non-regular Internet users		Regular Internet users	
Dimension	Mean	SD	Mean	SD
Cognitive	5.68	.81	6.28	.60
Behavioural	5.93	.92	6.61	.54
Affective	5.83	.89	6.53	.54
School Internet Attitude	5.82	1.30	6.48	1.00

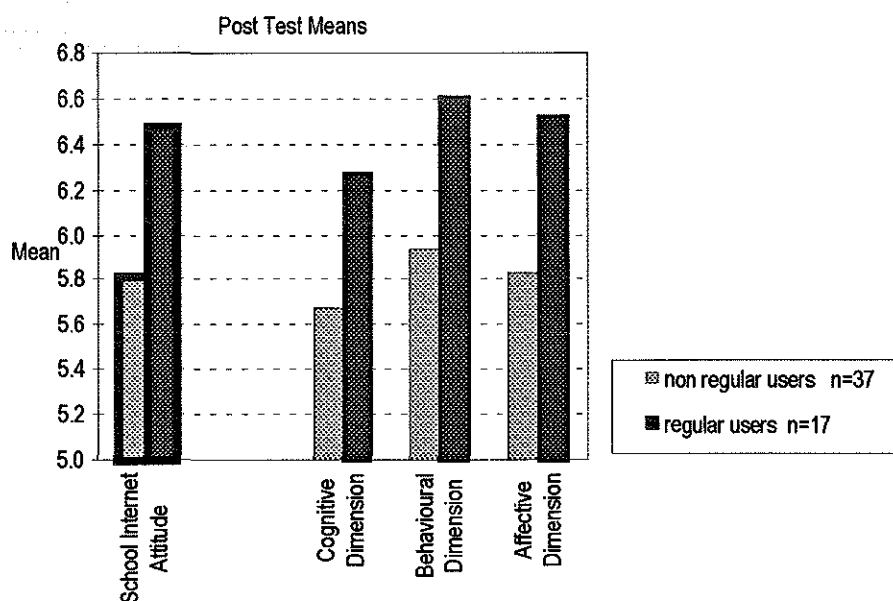


Figure 9. Post test School Internet Attitude Means for non-regular and regular Internet users and for the three dimensions

Further Findings

School Internet Attitude and Computer Attitude

Pearson r correlations were carried out to determine if there was a significant relationship between regular and non-regular Internet users Computer Attitude Scale measure and their School Internet Attitude measure. Moderate correlations as defined by Huck, Cormier and Bounds (1974) $r = .425$ and $r = .370$ were observed in the non-regular users in both the pretest and the post test results respectively.

These correlations indicate a substantial relationship between the Computer Attitude measure and non-regular Internet users attitude to using the Internet at school for both the pretest and the post test as defined by Huck, Cormier and Bounds (1974). For regular Internet users there was no significant correlation at $p < .05$ ($r = .159$ and $r = .270$) between computer attitude measure and their attitude to using the Internet at school for the pretest and post test respectively [Table 14 page 52].

Table 14

Pearson r Correlations of the Research Study group Computer Attitude Scale measure with the Pretest and Post test School Internet Attitude measures for non-regular and regular Internet users

	Non-regular Internet users N=33		Regular Internet users N=16	
	Critical Value* p<.05 at r=.349 df=31		Critical Value* p<.05 at r=.497 df=14	
	Pretest	Post test	Pretest	Post test
Computer Attitude	.425 [#]	.370 [#]	.159	.270

Note. Significant level <.025 denoted by [#]

*Critical values for significant correlations (Gay, 1987, p. 574)

Summary

The results of the research study section contained the statistical results of this study. The classroom exposure was found to have no significant effect on student's attitude to using the Internet at school. There was a significant difference in the attitude of regular and non-regular Internet users in the pretest with the cognitive and affective dimension showing significant differences and in the post test with the cognitive, behavioural and affective dimensions showing significant differences. Regular Internet users showed a more positive attitude than non-regular Internet users to using the Internet at school in both the pretest and the post test and for all three dependent variables (cognitive, behavioural and affective dimensions) of the School Internet Attitude questionnaire.

CHAPTER 6

Discussion of Findings

Introduction

In this section the statistical results of the study are related to the hypotheses and research questions. The descriptive comments made by the students as well as the technical problems log book were used to explain and validate the discussion.

Computer Attitude

Eurich-Fulcher and Schofield (1995) suggested that computer anxiety and network experience are likely to influence attitudes towards using Wide Area Networks (e.g. the Internet). The computer attitude of the research study group was investigated to determine their attitude towards computers. This computer attitude may be one of the influencing factors of the student's attitude to using the Internet at school. The students in the research study group showed a positive computer attitude [Table 4 page 40].

The computer attitude of the non-regular Internet users showed a significant correlation at $p < .05$ with the non-regular Internet users Pretest attitude to using the Internet at school. The non-regular Internet users attitude towards computers may be one of the influencing factor in the establishment of non-regular Internet users attitude towards using the Internet at school [Table 14 page 52].

The attitude of regular Internet users towards using the Internet at school at the Pretest did not correlate significantly at $p < .05$ with regular Internet users computer attitude [Table 14 page 52]. Regular Internet user's attitude towards using the Internet at school may be a reflection of the type of Internet use these students had prior to the limited classroom exposure which was not specifically for school related work.

School Internet Attitude

Students in the research study showed a positive attitude towards using the Internet at school. The attitude to using the Internet at school for regular Internet users was more positive than for non-regular Internet users at both the pretest and the post test. The limited classroom exposure appeared to have no significant effect on student's attitude to using the Internet at school from the pretest to the post test [Figure 10. page 55].

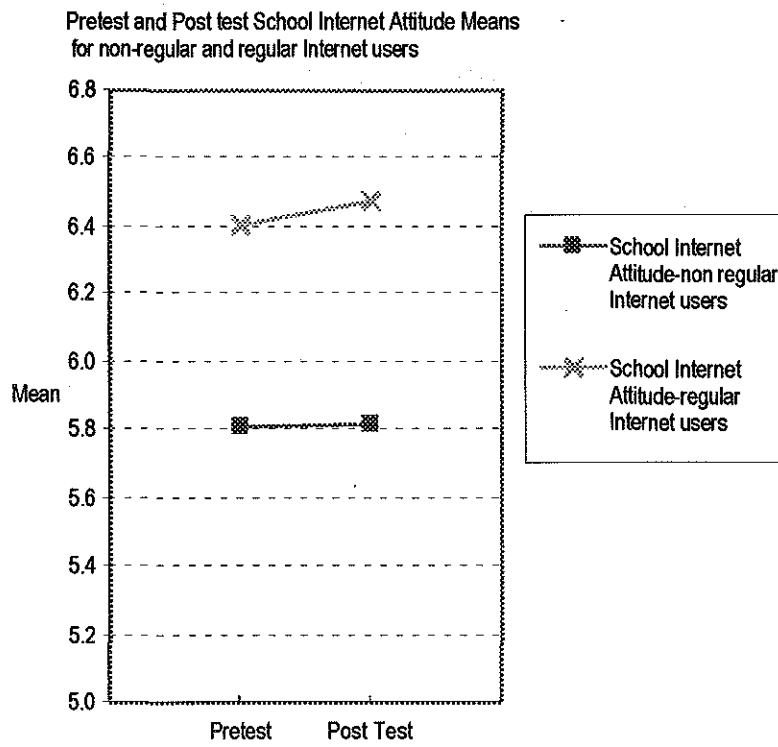


Figure 10. Pretest and Post test Means for the School Internet Attitude questionnaire against the independent variable, use.

School Internet Attitude and Use.

From the results of the pretest and post test of the School Internet Attitude questionnaire, it can be seen that the student’s attitude to using the Internet at school of regular Internet users is more positive than non-regular Internet users [Figure 11. page 56]. Similar findings are common for computer attitude scales. Woodrow (1994) found that “computer experiences are predictors of computer related

attitudes” (p 331). Gardener, Dukes and Discenza (1993) suggest that “increased computer usage causes increases in computer self confidence, which in turn causes favourable attitudes towards computers” (p. 438).

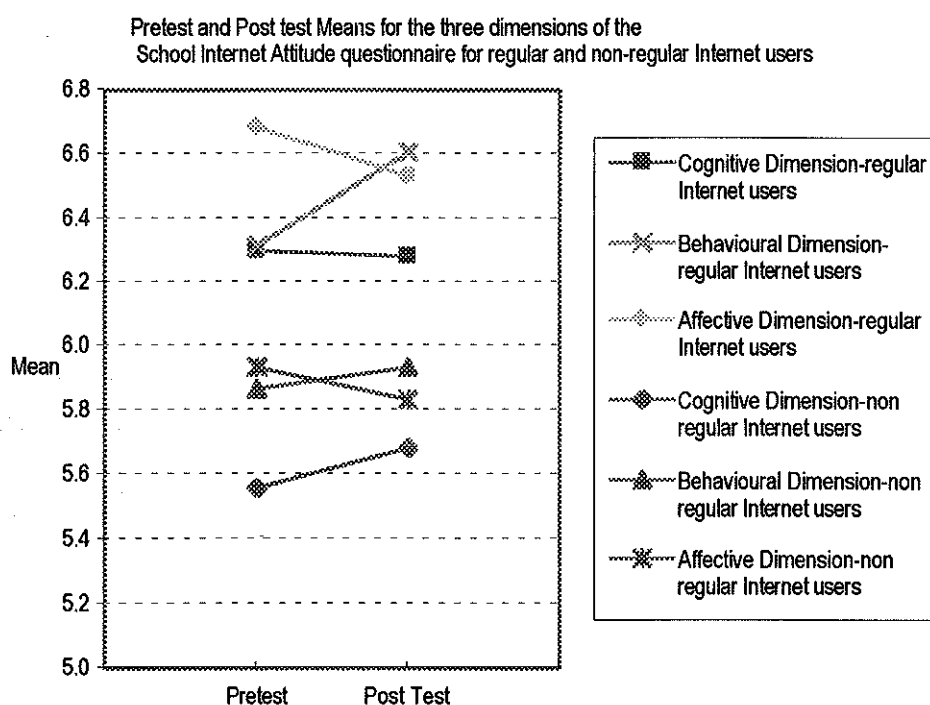


Figure 11. Pretest and Post test Means for the School Internet Attitude questionnaire and the three dependent variables against the independent variable, use.

The pretest findings show that there was no significant difference in the behavioural dimension for non-regular and regular Internet users. This may be because the School Internet Attitude questionnaire phrased the questions as the intended attitude

to using the Internet at school. Both the non-regular and regular Internet users have similar experiences with using the Internet at school. Prior to the study, the students in the study school had a very limited access to the Internet. The students use of the Internet for school related use was limited to one computer in the library. This may have been the factor that lead to less of a difference in attitude to using the Internet at school between non-regular and regular Internet users in the behavioural dimension.

School Internet Attitude and the Limited Classroom Exposure

The attitude of students to using the Internet at school of the research study group both before and after the limited classroom exposure did not alter significantly. In a study on computer attitude involving year 11 students, Woodrow (1994) found that "computer ... training courses had no effect on the attitude of the students" (p. 324). The lack of change in attitude of the research study group to using the Internet at school may have been due to the limited classroom exposure to the Internet not being a true exposure to using the Internet at school but an isolated series of computing lessons on designing and creating a home page.

Also, the limited classroom exposure to the Internet may not have allowed the students the time to explore and gain skills in using the Internet. One student's comment that there is 'too much restriction on using the Internet. i.e. must be

something concerned with school work' suggests that the time available for the students to explore was very limited. The students primary goal while using the Internet during the limited classroom exposure was to find graphics to incorporate into their personal home page. The task of designing and creating a home page may not have been the ideal method of instruction to have an effect on their attitude to using the Internet at school.

Using the Internet across all subjects may have a greater influence on students' attitudes to using the Internet at school than the limited classroom exposure in the isolation of the computing room. Student comments suggest a desire for greater access and use outside of the computing classroom, comments include 'more subjects should be used for the Internet', 'It should be used everywhere' and 'should be available to all students in all classrooms'. The School Internet Attitude question 'I would like to have access to the Internet in all my classes' had a pretest mean 6.11 and post test mean of 6.23 on a seven point scale. These figures indicate very high positive attitudes to using the Internet in other areas within the school. Computer related attitudes have been shown to increase when computers are used within other subjects. Woodrow (1994) suggests that "positive attitudes towards computers would be fostered by their greater use in subject-matter courses such as English, History, and Science" (p.312). The use of the Internet within these same areas may do more to improve the students attitudes to using the Internet at school than a computing training course on using the Internet could ever hope to achieve.

During the series of lessons in the limited classroom exposure it should be noted that the Technical Problem Log Book completed by the classroom teacher showed that both the Internet and the school computer network systems worked without fault for all the lessons. Even with no technical problems student's comments about access and download speeds, 'takes too long sometimes', 'if we had the Internet at school there would have to be a very fast modem!' and 'faster downloading and accessing time' suggest that all schools need to consider the type of Internet connection and service that they provide for their students. The Internet service and training that a school provides its students with should not lead to students developing negative attitude's to using the Internet at school.

Closer examination of the pretest and post test attitude to using the Internet at school for regular and non-regular Internet users shows a slight negative change in attitude in the affective dimension from the pretest ($M=6.31$) to the post test ($M=6.18$) [Table 9 page 46] and [Figure 11. page 56]. This negative change in the affective dimension even though it was not significant ($p=.320$) may reflect the perception that the Internet may not be as much 'fun' as students first anticipated when used in the school situation.

Student's comments relating to the restrictions the school places on the use of the Internet 'Too much restriction on using the Internet. i.e. must be something concerned with school work. Can I just go to [sic] Internet just for fun instead of

working all the time' and 'I think we should have e-mail and be able to use it' may have negatively influenced attitudes in the affective dimension. One student's post test comment that Internet 'addresses should not be erased, even adult addresses' echoes their feelings about the school's censorship of the Internet.

Also, the Year 12 students had completed three questionnaires for this study in the period of 7 weeks and they have also been subject to numerous others. The quantity of questionnaires that they have had to complete may account for the comment "I hope this is the last questionnaire".

School Internet Attitude Questionnaire

From the discussion of the findings the student's attitude to using the Internet at school correlates significantly with computer attitude. The stability of students' attitudes within the age group and the desire to use the Internet in all classes reinforces the questionnaires face validity that it is measuring what it is meant to measure (Willemsen, 1974). The student's comments reinforce the positive School Internet Attitude results obtained in the analysis of the data. Comments such as 'Internet is cool man', 'It's really great', 'Good tool for learning and accessing information about interesting topics. Very entertaining', 'I feel that the Internet at school can help one become more creative and more aware of what is happening in

the world around us', 'Internet is fun to use and is also very educational to use' and 'I like using the Internet at school' mirror the findings obtained from the analysis of the School Internet Attitude questionnaire.

CHAPTER 7

Summary and Conclusion

Summary of the Results of the Research Study

The study found that the limited classroom exposure caused no significant change in the student's attitude to using the Internet at school from the pretest to the post test. However, there was a significant difference in student's attitude to using the Internet at school between regular and non-regular Internet users in both the pretest and the post test. Regular Internet users showed a more positive attitude to using the Internet at school than non-regular Internet users with the cognitive and affective dimension in the pretest and the cognitive, behavioural and affective dimensions in the post test being significantly different.

Limitations of the Interpretation placed upon the

Findings

The findings can only be generalised within the research study group. The sample composition and size, and the particular style of classroom teaching place limitations on the ability to generalise the findings to the larger population.

Sample Composition and Size

The students in the research study group were all enrolled in a Perth Metropolitan Independent school. They all have particular reasons for choosing to attend this school. This choice may have an influence on the research study groups' attitude to using the Internet at school. If the students had been randomly selected from the population of Year 12 students the findings may be different.

Also, the school chosen for the research study has a large number of overseas students who have completed most of their education in different countries. The proportion of overseas students in the sample group may not be representative of the true proportion in the Year 12 Western Australian Applied Computing population. The attitudes of these students to using the Internet at school may be different to students who have lived and been educated in Australia for most of their lives.

The sample size of the research study group was small. The size of the sample did not allow the School Internet Attitude questionnaire to undergo the testing and analysis that would confirm the validity and reliability of the questionnaire, including principal component factor analysis to determine construct validity for the cognitive, behavioural and affective dimension, the three subscales of the

School Internet Attitude questionnaire. Extensive testing on a large, not necessarily computing population, would need to be carried out to allow the findings to be generalised to the larger population.

Classroom Teaching

This was the first time that the Internet had been incorporated into the curriculum of the Year 12 Applied Computing classroom in the study school. The unknown quality and reliability of the Internet connection, and the service provider may have influenced the teaching method of the limited classroom exposure. The development of a Home page allowed flexibility within the lessons for technical problems and access speed not to disrupt the series of lessons completely. When the limitations of the Internet connection and service are known the type of limited classroom exposure may be different within the study school.

Implications for Further Research

This study only examined the attitude of student's who are enrolled in the Year 12 Applied Computing course to using the Internet at school. The attitudes of these students to using the Internet at school may not be the same as students who would not choose to do a computing course. When incorporating the Internet into all classrooms and subject areas the attitudes of non-computing students as well as

computing students to using the Internet at school will need to be researched to allow for effective integration and acceptance of the wealth of resources available using the Internet.

It was noted during preliminary analysis of the data on students' attitude to using the Internet at school that there were differences in attitude between males and females to using the Internet at school. Further research on Internet attitude gender differences and how this may affect the integration of the Internet into the school environment needs to be researched to allow effective use of the Internet at school for both male and female students.

Also, with the Internet being available to every school in Australia by 1999 (Crean, 1995b) there are a number of issues that need to be addressed regarding the use of the Internet within schools. These issues include but are not limited to;

- The ease of use of accessing information on the Internet across the 14 years of education currently in Western Australia (kindergarden to year 12),
- Teacher education and training on educationally beneficial and effective use of the Internet within specific subject areas,
- Students' perceptions regarding the information available on the Internet specifically its accuracy,

- The issues regarding copyright of information and multimedia on the Internet and its implications for schools,
- School use of the Internet and its influence on the current library system,
- the educational benefit of using the Internet in preference to or combined with current educational methods, and
- the legal issues for schools, including censorship of information and resources available on the Internet and the effect undesirable features of the Internet can have on school children if accessed.

Conclusion

The Internet has the potential to link schools and educational institutions across the world. This collaborative learning environment, if the Internet performs to expectations, can only increase the positive educational experiences of students.

Effective teacher and student training leading to educationally sound implementation and use of the Internet within all subject areas in schools should foster positive teacher and student attitudes to using the Internet at school.

Furthermore, positive teacher and student attitudes to using the Internet at school within all subject areas should lead to an acceptance and use of Internet technology within schools (Griswold, 1994).

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Appendix A

Letter to the Principal

September 1, 1996

The Principal
Catholic College
Some Street
Perth Metropolitan

Dear Principal,

As you are aware, I am currently completing my Bachelor of Education with Honours in Computer Education at Edith Cowan University.

To complete my thesis on Student's Attitude Change to using the Internet at school, I require the Year 12 students enrolled in Applied Computing (classes 12A, 12B and 12C) to complete a questionnaire before and after their classroom instruction involving the use of the Internet.

Student names will not be recorded and the school details will remain confidential and only used within the context of this research.

If you have any questions or would like a copy of the questionnaire or the proposal please feel free to contact me.

I hope this request meets with your approval and look forward to receiving your response.

Yours Sincerely,

Anna Hu.

■ C/O EDITH COWAN UNIVERSITY ■

Appendix B

School Internet Attitude Questionnaire

INTERNET ATTITUDE

This questionnaire is being used to determine your attitude to the Internet. All the information collected will remain confidential and the results will be anonymous.

Completing this questionnaire is not compulsory.

Thank you for taking the time to complete the questionnaire with care and thought.

THE INTERNET

The Internet is a collection of resources that require the use of a computer, a modem and a telephone line to use. Some of the resources available include the World Wide Web (WWW), Electronic mail, Inter-relay chat lines and File transfer. The WWW can be used to retrieve information and graphics. Electronic mail is similar to ordinary mail but is delivered almost instantly to the receiver. Inter-relay chat lines can be used to have real time conversations, using the keyboard to type, more than two people can be 'talking' at any one time. File transfer allows you to download programmes to the computer.

Put a circle around the appropriate response.e.g.

12A

Computer ID Number:

Row:		FRONT	A	B	C	BACK				
Computer:	LEFT	1	2	3	4	5	6	7	8	RIGHT

1. Class: 12A 12B 12C

2. Sex: Male Female

3. Do you have Internet access at home? Yes No

4. How often do you use the Internet (anywhere):

Never Once a month Few times a month Few times a week everyday

5. How would you rate your confidence to use the Internet at school.

Not Confident Moderately Confident Very Confident

Put a circle around the ★ that best reflects your opinion.

e.g. ★

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
6. The Internet would help make my schooling more interesting.	★	★	★	★	★	★	★
COMMENT							
7. The Internet would not improve the quality of education for me.	★	★	★	★	★	★	★
COMMENT							
8. The Internet is not useful for school work.	★	★	★	★	★	★	★
COMMENT							
9. It is important to keep up with Internet technology.	★	★	★	★	★	★	★
COMMENT							
10. I would not need the Internet for my school work.	★	★	★	★	★	★	★
COMMENT							
11. Using the Internet at school wastes time.	★	★	★	★	★	★	★
COMMENT							
12. The Internet is interesting.	★	★	★	★	★	★	★
COMMENT							
13. The Internet would help me be more productive.	★	★	★	★	★	★	★
COMMENT							
14. The Internet would help me improve my school work.	★	★	★	★	★	★	★
COMMENT							

Put a circle around the ★ that best reflects your view.

e.g. ★

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
15. I would like to use the Internet at school to find information.	★	★	★	★	★	★	★
COMMENT							
16. I would like to use the Internet at school to communicate with other people.	★	★	★	★	★	★	★
COMMENT							
17. I would like to send mail using the Internet at school.	★	★	★	★	★	★	★
COMMENT							
18. I would like to have my own page on the Internet at school.	★	★	★	★	★	★	★
COMMENT							
19. I would like use the Internet at school to have information sent to me on topics of interest.	★	★	★	★	★	★	★
COMMENT							
20. I would like to use the Internet to research topics for school.	★	★	★	★	★	★	★
COMMENT							
21. I would like to have access to the Internet in all my classes.	★	★	★	★	★	★	★
COMMENT							
22. I would like to have access to the Internet at home.	★	★	★	★	★	★	★
COMMENT							

Put a circle around the ★ that best reflects your feelings about the Internet.

e.g. (★)

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
23. I like using the Internet at school.	★	★	★	★	★	★	★
COMMENT							
24. I feel good about using the Internet at school.	★	★	★	★	★	★	★
COMMENT							
25. Using the Internet at school makes me feel unhappy.	★	★	★	★	★	★	★
COMMENT							
26. Using the Internet at school makes me feel tense.	★	★	★	★	★	★	★
COMMENT							
27. Using the Internet at school is exciting.	★	★	★	★	★	★	★
COMMENT							
28. I get a suffocating feeling when I think about using the Internet at school.	★	★	★	★	★	★	★
COMMENT							
29. Using the Internet at school is unpleasant.	★	★	★	★	★	★	★
COMMENT							
30. I feel comfortable about using the Internet at school.	★	★	★	★	★	★	★
COMMENT							

Please add any other COMMENTS that you may have about using the Internet at school.

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Appendix C

Computer Attitude Questionnaire

COMPUTER ATTITUDE

This questionnaire is being used to determine your attitude to computers. All the information collected will remain confidential and the results will be anonymous.

Thank you for taking the time to complete the questionnaire with care and thought.

Put a circle around the appropriate response.e.g.

Computer ID Number:

Row:	FRONT	A	B	C	BACK					
Computer:	LEFT	1	2	3	4	5	6	7	8	RIGHT

Class: 12A 12B 12C

	Agree Strongly	Agree Somewhat	Undecided	Disagree Somewhat	Disagree Strongly
1. Computers do not scare me at all.	★	★	★	★	★
2. I would like working with computers.	★	★	★	★	★
3. Working with computers would make me very nervous.	★	★	★	★	★
4. I do not feel threatened when others talk about computers.	★	★	★	★	★
5. It wouldn't bother me at all to take a computer courses.	★	★	★	★	★
6. I'm no good with computers.	★	★	★	★	★
7. The challenge of solving problems with computers does not appeal to me.	★	★	★	★	★
8. Computers make me feel uncomfortable.	★	★	★	★	★
9. Generally I would feel OK about trying a new problem on the computer.	★	★	★	★	★
10. I would feel at ease in a computer class.	★	★	★	★	★
11. I think working with computers would be enjoyable and stimulating.	★	★	★	★	★

	Agree Strongly	Agree Somewhat	Undecided	Disagree Somewhat	Disagree Strongly
12. I don't think I would enjoy doing advanced computer work.	★	★	★	★	★
13. Figuring out computer problems does not appeal to me.	★	★	★	★	★
14. I get a sinking feeling when I think about trying to use a computer.	★	★	★	★	★
15. I am sure I could do work with computers.	★	★	★	★	★
16. I would feel comfortable working with a computer.	★	★	★	★	★
17. When there is a problem with a computer program that I can't immediately solve I would stick with it until I have the answer.	★	★	★	★	★
18. I'm not the type to do well with computers.	★	★	★	★	★
19. I don't understand how some people can spend so much time working with computers and seem to enjoy it.	★	★	★	★	★
20. I am sure I could learn a computer language.	★	★	★	★	★
21. Once I start to work with a computer, I would find it hard to stop.	★	★	★	★	★
22. I think using a computer would be very hard for me.	★	★	★	★	★
23. I would do as little work with computers as possible.	★	★	★	★	★
24. Computers make me feel uneasy and confused.	★	★	★	★	★
25. If a problem is left unsolved in a computer class, I would continue to think about it afterwards.	★	★	★	★	★
26. I could get good grades in computer courses.	★	★	★	★	★
27. I do not enjoy talking with others about computers.	★	★	★	★	★
28. I do not think I could handle a computer course.	★	★	★	★	★
29. I have a lot of self-confidence when it comes to working with computers.	★	★	★	★	★

Appendix D

Note to Parents

Dear Parent,

The school is to be part of a study to determine student's attitude to using the Internet at school. Students enrolled in Year 12 Applied Computing who are in Mr Burgermeister's classes will be required to complete an anonymous 10 minute questionnaire in class, on their attitude to using the Internet at school.

If you have any questions, please feel free to contact me at school.

Mrs. Anna Hu.

Appendix E

Technical Problems Log Book

Technical Problems Log Book

LESSON 1

DATE:

CLASS: 12A 12B 12C

PERIOD: 1 2 3 4 5 6 7

INTERNET:.....

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NETWORK:.....

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DATE:

CLASS: 12A 12B 12C

PERIOD: 1 2 3 4 5 6 7

INTERNET:.....

.....

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NETWORK:.....

.....

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DATE:

CLASS: 12A 12B 12C

PERIOD: 1 2 3 4 5 6 7

INTERNET:.....

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NETWORK:.....

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Appendix F

School Internet Attitude Questionnaire -

Student's Comments

Note: The question prefix refers to the following

C=Cognitive dimension, B=Behavioural dimension and A=Affective dimension

Student		Question	Student Comment
AA1 regular	Pretest	Comment	very useful, helpful to search for topics on almost anything
	Post test	Comment	More subjects should be used for the internet
AA3 non-regular	Post test	Comment	Internet is cool man
AA4 regular	Post test	Comment	The Internet is cool man
AA6 non-regular	Pretest	Comment	I would really like my own page in the Internet and send letters to other people in other schools, contries etc.
AA7 regular	Pretest	Comment	It's really great.
	Post test	Comment	Addresses should not be erased, even adult addresses.
AB2 regular	Pretest	Comment	Good tool for learning and accessing information about interesting topics. Very entertaining.
	Post test	Comment	The Internet is a very good, should be able to use it more.

AB8 non-regular	Pretest	C1 (Q6)	no difference
		C3 (Q8)	Info isn't always accurate.
AC1 regular	Pretest	C1 (Q6)	Current affairs covered very well.
		Comment	I feel that using the Internet at school can help one become more creative and more aware of what happening in the world around us.
AC2 non-regular	Pretest	Comment	Too much restriction on using the Internet. i.e. must be something concerned with school work. Can I just go to Internet just for fun instead of working all the time.
AC7 non-regular	Pretest	C2 (Q7)	being able to use the Internet apart from books
		C6 (Q11)	takes too long sometimes
		C7 (Q12)	you can find out almost anything
		C8 (Q13)	should be productive at school anyway
		B4 (Q18)	yes
		A3 (Q23)	sometimes 'cause it takes long.
		Comment	If we had the Internet at school there would have to be a very fast modem! This way time wasting would not be a factor.
	Post test	C3 (Q5)	Information can be found
		B1 (Q12)	makes finding information easier.
		B4 (Q15)	meet new people

BA3 regular	Pretest	C4 (Q9)	In touch with other people.
BB2 non-regular	Pretest	Comment	If I knew how to use it I would enjoy it better.
BB8 non-regular	Post test	Comment	I think the questions may need to be redefined
BC2 non-regular	Pretest	Comment	Internet is fun to use and is also very educational to use.
BC3 non-regular	Pretest	Comment	We need to be educated on how to use it properly.
BC4 regular	Pretest	Comment	The Internet is very interesting and excites and gets me interested. It should be used everywhere and is good to know future technology. I need and want Internet at home, and I shall hopefully get it soon.
BC8 regular	Post test	Comment	I think the internet should be available to all students in all classrooms. Maybe 1 computer to every classroom. Also faster downloading and accessing time.
CA1 non-regular	Pretest	Comment	I like using the Internet at school.
CA4 regular	Pretest	A3 (Q25)	It doesn't make me feel anything.
CA8 regular	Pretest	Comment	Using the Internet at school is a great idea. By doing this we are also keeping up with today's technology.

CB4 non-regular	Pretest	Comment	There should be a LOT more use of the Internet at school and it should be for your own interests and not just for the purpose of the subjects.
CB6 non-regular	Post test	Comment	This better be the last survey!
CC1 non-regular	Pretest	C1 (Q6)	as it will give up to date info
		C2 (Q7)	not true
		C3 (Q8)	False statement
		C4 (Q9)	Keep me up to date with technology
		C5 (Q10)	wrong
		C6 (Q11)	Allows you to explore the Internet
		C7 (Q12)	great places to explore eg. music
		C8 (Q13)	Keep me up with current affairs
		C9 (Q14)	help in research assignments
		B1 (Q15)	on upcoming events
		B2 (Q16)	Yeh
		B3 (Q17)	Like to talk to others
		B4 (Q18)	so I can be known on the Internet.
		B5 (Q19)	help in school work
		B6 (Q20)	for assignments
		B7 (Q21)	It would assist me in class
		B8 (Q22)	It would be fun
		A1 (Q23)	fun

A2 (Q24) cos I am good at it

A3 (Q25) wrong statement

A4 (Q26) I feel confident

A5 (Q27) It is good fun

A6 (Q28) Don't know what you mean

Comment It is great to use. I have fun, wish we could use it more often.

CC2
regular

Pretest

C1 (Q6) sure would

C2 (Q7) no way man

C3 (Q8) wrong

C4 (Q9) yep

C5 (Q10) sometimes, not sometimes

C6 (Q11) no

C7 (Q12) sure is, window to the world. "where would you like to go today"

C8 (Q13) more info

C9 (Q14) yep

B1 (Q15) of course

B2 (Q16) definately, learn about the lives of different people in different countries.

B3 (Q17) great idea

B4 (Q18) definately, cool, people around the world can know us.

B5 (Q19) Yes

B6 (Q20) yes
 B7 (Q21) yes
 B8 (Q22) sure do
 A1 (Q23) sure do
 A2 (Q24) no way
 A3 (Q25) no
 A4 (Q26) yes
 A5 (Q27) no way
 A6 (Q28) no way
 A7 (Q29) yes
 A8(Q30) I think we should have e-mail and be able
 to use.

CC6 non-regular	Pretest	Comment There's not enough time to use it.
CC8 non-regular	Pretest	A2 Q(24) Why would I feel good?
		A2 Q(25) Why would it make me unhappy?

Appendix G

Demographic Data

Table 15

Table Showing Demographic Data for the Research Study Group

N=59		Pretest %
Class	12A	32.0
	12B	31.0
	12C	37.0
Sex	Male	63.8
	Female	36.2
Internet access at home	No	93.2
	Yes	6.8
Current Internet use	Never	10.2
	Once a month	18.6
	Few times a month	39.0
	Few times a week	32.2
	everyday	0.0
Confidence to use the Internet at school	Not confident	16.9
	Moderately confident	44.1
	Very confident	39.0