Further Education students and the Internet: A case Study.

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Dedication

To Sarah Anne

I would like to thank that all the tutors who contribute to the Huddersfield University Ed.D. course, in particular Dr. Matthew Pearson for his support and suggestions.

I would also like to thank the principal, staff and students at Snow Hill College for making it possible for this study to be done.

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Abstract

This research is a case study of the way students at a Further Education College are making use of computer technology, in particular their use of the Internet, both at home and at college. The research used a multi-method approach that involved the collection of data by use of questionnaire and interviews. The questionnaire was completed by two hundred students drawn from a range of courses offered at the college. The students invited to complete the questionnaire represented both full time and part time students. From the students who completed the questionnaire twenty were invited to take part in individual interviews.

From the data collected the researcher has been able to establish a link between a student's cultural background and their use of computers and the Internet. The researcher has been able to gather data to support the theory that for students from some cultural backgrounds there is a likelihood that they will use Information Technology for certain tasks more than students with a different cultural background.

As a means of identifying groups of students who could be described as having the same cultural background the data gathered was analysed by comparing students by gender, ethnic group and religion. This research has shown that the use of computers and the Internet has become part of everyday life and as such part of our society's culture. However the research has shown that different cultural groups within our society are using the Internet in different ways and for different purposes.

The data showed that male students had a more positive attitude towards computers than female students; it was also found that male students made more use of email at college than female students.

The researcher has found two significant differences regarding students' use of the Internet, namely that males use the Internet more than females for entertainment and that students from a Pakistani ethnic origin use the Internet more than white students for private use. Students from Pakistani ethnic origins were also found to use email at home more than students from other ethnic backgrounds.

Part of the questionnaire was used as a student self-assessment of Information Technology (IT) skills and the training they had received. Analysis of this section of data showed that whilst the amount of training of students in the use of IT is independent of gender, religion and ethnicity the level of skills claimed was not. Male students claimed a higher level of IT skills than female students and the level of skill in IT claimed by Christians is significantly less than that claimed by both Muslims and those of no religion.

The questionnaire results led the researcher to believe that students from different cultural backgrounds were using computers and the Internet differently. The interviews were used to probe the implications of these differences with students from particular ethnic groups. The results showed that, at the college where the study took place there were Muslim Pakistani females students who were using the Internet as their main means of social interaction, when not at college. For these students this level of social interaction would not have been available to them they did not have access to the Internet. These students were making extensive use of chat rooms on the

Internet. They prearranged to talk on line to people they knew, and they did this on a regular basis. This is in contrast to female students from other cultural groups who did not use chat rooms to the same extent, and when they did it was to talk to people they did not know.

The research also found that some computer use was independent of a student's cultural background. One such area related to students having difficulties or problems when using the Internet. From the students interviewed the researcher believes that for many of the students the instruction they are receiving, particularly with reference to using the Internet, is inadequate to meet their needs.

In addition to the lack of IT training, some students saw the monitoring of computer use as problematic. Parental monitoring students' use of computers at home was mainly done by having the home computer located in a family room. Few of the students said that content monitoring software was being used on these machines. All students accepted this monitoring within the home environment but many were unhappy with the monitoring arrangements that the college had put in place.

This research project has shown that it is not sufficient for future education researchers to investigate computer use in terms of type of use alone, as has been the case in many previous studies. This research has shown that how students choose to use computers needs to be interpreted in terms of their gender and cultural background.

Robert G Knowles

List of Abbreviations

CD-ROM	Compact disc – read only memory
FE	Further Education
FLC	Flexible Learning Centre
GNVQ	General National Vocational Qualification
HE	Higher Education
ICT	Information Communication Technology
IP	Internet Protocol
IT	Information Technology
NIMIS	Network Interactive Media in Schools
NUD*IST	Non-Numeric Unstructured Data – Indexing Searching Theorizing
PC	Personal Computer
URL	Uniform Resource Locator – the address of a file or document on the WWW
VLE	Virtual Learning Environment
WWW	World Wide Web

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Chapter 1

Introduction

The aim of this study was to construct a picture of how students at a Further Education (FE) college were using computer technology both in and out of college. This chapter explains why this was chosen as the topic to be studied and why the implications of the results of the study should be of interest to this and similar colleges.

The focus of this research was the use of IT, in particular the Internet, in an FE college. The research was based at a college that will be referred to as Snow Hill College.

Snow Hill College

Snow Hill College is a large Further Education College in the north east of England. The college has a wide range of courses on offer covering the full spectrum of post 16 education. The local population, from which the college attracts its students, is multicultural. Although most ethnic and religious groups to be found in England are represented within the college, the predominant ethnic groups are White and Pakistani. Snow Hill College has 17,562 students, 14,120 part time and 3,442 full time. Of the full time students 68% are white, 15% are Pakistani, 3% are Afro-Caribbean and the remaining 14% being from minority ethnic groups. Of the part time students 81% are white, 4.3% are Pakistani, 2% are Afro-Caribbean. The remaining 12.7% being from minority ethnic groups. The college does not keep data on students' religious beliefs, but in the course of the study it became apparent that the predominant religious groups were

Christian and Muslim. The students range from 16 years of age to 85 years of age, with 20% in the 16 to 19 age group.

This study was concerned with how students from different cultural backgrounds make use of the computer facilities available to them. The research raises questions of equality of opportunity regarding both the accessibility of computer facilities for students and use the college assumes. The college chosen for the study is about to embark on an expansion of the use of Information Technology (IT) into the curriculum in the form of a Virtual Learning Environment (VLE). The VLE is a computer-based program that will enable staff and students to access and share course material. It will also enable the college to deliver some parts of the curriculum via the Internet. As this VLE is introduced and expanded to cover more courses the teaching staff will need a clear understanding of how different groups of students are prepared to interact with this aspect of the curriculum. It is hoped that this research will be useful to those staff at the college who are involved with this latest initiative. In order to understand the relevance of the research some understanding of the current developments in IT at the college and neighbouring colleges is required.

Locally some colleges have been working in partnership to produce Web based learning materials. Recent projects in the region have drawn staff from nineteen FE and Sixth Form Colleges to work in curriculum based areas, to produce on-line learning materials. These Web pages have varied in content, but include programmed learning, interactive

exercises and on-line assessment. Other colleges are encouraging teaching staff to develop similar course materials for use on a college Intranet. Some are trying to do both.

Page (1996) stated that Further Education (FE) is an area of education that is under researched and reported hostility toward the researcher in FE. The lack of research based in FE colleges was also noted by Robson (1999). Since incorporation FE colleges have gone through a period of major and rapid change, Scott and Hyland (2001, p123) suggest that because of this fundamental change in the organisation of FE such colleges are not necessarily under-researched but under-valued. More specifically Kimbell (1996) reported a general lack of research into technology as a teaching aid. Information Technology (IT) is one of the fastest changing areas in education and Further Education in particular. It is important that lecturers and curriculum managers in FE understand how their students use this technology. The age range of students in FE colleges is wide and as many FE colleges are in the process of increasing the accessibility of the Internet for students how the different age groups react to the use of computers in college is important. Selwyn and Moss (1996) said that adult IT learners remain an under researched aspect of computer education.

There are aspects of computer use in education that are unique to FE either because of the age of the students, the type of courses on offer or the social setting of the college. Research findings based on schools may not be applicable in a FE college for a variety of reasons. Students in FE have fewer timetabled constraints than school pupils, and therefore greater opportunity to use the IT facilities that are available. The age range of

students in a FE college sets it apart from both schools and Sixth Form colleges. Different age groups could be expected to react differently to new technologies. There have been studies that have focused on particular age groups. Before the introduction of the Internet to schools and colleges Selwyn and Moss (1996) surveyed adult learners' attitudes and use of IT and found these students were motivated by either work requirements or personal interest, but they did not find any gender-based differences. Other researchers, looking at different age groups, report gender difference being significant in a range of IT applications (see Barrett and Lally 1999, Leathwood 1999, Clegg and Trayhurn 2000, Passig and Levin 2000). This research will consider the question of gender differences in use of the Internet, and if these differences, if any, are common to all ethnic groups.

Students' use of IT in Higher Education (HE) has been the subject of many research projects (see for example Lauder et al 1998, Collis 1998, McIntyre and Wolf 1998, Smeaton and Keogh 1999). While interesting these research projects are not directly applicable to the FE setting. The students in these studies were, as to be expected in HE, on more advanced courses than students in FE, one would therefore expect them to be more independent in their learning styles. FE can be seen as sitting between the two worlds of school and HE, and as such presents a different educational society from them. It follows therefore that there is scope for research to be done on the use of IT within the FE sector.

Justification for the research.

Most teachers would probably agree with Means' statement that:

> 'The primary motivation for using technology in education is the belief that they will support superior forms of learning' (Means et al, 1993, p 1).

We could therefore expect to find that research into the use of technology in the schools and colleges to be concerned with investigating aspects of the learning experience that are affected by the technology.

Of prime importance is the students' attitude towards the technology. In the mid-1980s there was encouragement, from the schools' inspectorate, for schools to be aware of pupils' attitudes.

> 'It is important, therefore, that schools seek to promote positive attitudes through the attention they give to content and method' (HMI, 1985 paragraph 104, p16).

In schools and colleges that are multicultural, teachers need to be aware of possible differences in attitude that are attributable to cultural difference. How students or pupils react to and make use of learning materials can be influenced by their personal background and previous experiences, both in and out of the school or college setting.

> "Many teachers will have to face the ways in which ethnic minority children's participation and performance in school in influenced by family, neighbourhood and cultural factors." (Hitchcock and Hughes 1995 p245)

Martinez cited Chisholm's research (1994) which indicated that access to a computer outside the school was strongly related to student's proficiency with information technology. Chisholm (1998) reported on how integrating technology into education affects a multicultural classroom. Working in the USA Chisholm highlighted the inequality of opportunity faced by different ethnic minority groups in American schools. He found that some ethnic groups were less likely to have access to computing facilities outside school (Chisholm 1998). Students who do have access to computers outside school can be expected to be more familiar with their use than those that do not.

Flexible Learning Centre

Colleges can help to redress this inequality of opportunity by making computers available for students to use outside normal class time. Snow Hill College does this. The room where these computers are is referred to as the Flexible Learning Centre (FLC).

The FLC is an open access room with fifty-four computers available from 0900 hours to 2000 hours most days of the week. In this room students can use a range of software

including Microsoft Office and some subject specific packages. There are also scanning facilities and a small CD-ROM library that students can use. The computers are connected to the college Intranet and the Internet. The room is staffed at all times, when it is open. The learning support staff based in the FLC offer basic instruction and help to students in response to student requests.

For many students the FE College is a stepping-stone to Higher Education. As such the FE College has a role to play in transforming the student from a 'School pupil' into a 'College student'. There is a growing expectation at universities that students will be computer literate, and this should include the ability to use IT as a resource for independent study (see Somekh 1998 p27). It follows therefore that IT should be both part of the college curriculum and a method of study or aid to learning available to all students. At Snow Hill College it is one of the aims of the FLC to promote opportunities for individual study.

Snow Hill College has a clear policy statement regarding equal opportunities for all ethnic and religious groups. The researcher is aware that practice does not always necessarily follow policy. If differences in behaviour are found between ethnic or religious groups then further investigation will be required. The researcher was seeking to identify the cause of these differences and to find out if they were because of student choice or if they were present because of the practices or policies imposed on the student by the college.

The aims of the research project

The research project began by investigating in broad terms which students were making use of the college's IT facilities. Differences in the type and length of time of use between ethnic, religious and gender groups were looked at.

There are many factors that could contribute to affecting how, or if, a student chooses to make use of the IT facilities on offer. This research aimed to identify the key characteristics or influences on student behaviour in this respect. This research project set out to investigate the following questions: -

- Who is making use of the Internet facilities in the college?

- Are there any identifiable differences in IT use between different cultural groups?

- If any differences are found are they due to cultural influences or by factors introduced by the college?

- How are students using the Internet and what contribution do they think it is making to their studies?

When asking questions such as these a researcher needs to be aware that some words and concepts may not be interpreted or understood in the way intended:

> 'One of the important preoccupations of philosophers is the clarification of the meaning of terms' (Barrow and Wood 1988 p8)

This was a view also held by Wilson (1972) in respect to educational research, who criticised work in this field because of inadequately defined terms. With this in mind the key terms used in the research are now discussed.

The Internet

The term the Internet is used to encompass the World Wide Web (WWW), e-mail and chat rooms. The Internet is actually a system of connections between many computers. These connections enable computers to share files and so share or transmit information. A similar system that operates within a closed computer network, not readily accessible to the general public is called an Intranet. Many schools, colleges and other companies that have their own Intranet have connected their Intranet to the Internet via an outside service, usually referred to as an Internet provider. It was not important for the purposes of this research that students were able to distinguish between an Intranet and an Internet. The researcher decided that it was more important to consider what web pages students were accessing rather than were these pages were being stored.

A software programme called a Firewall can monitor the connection between an Intranet and the Internet, or between a single computer and the Internet. This software can be tailored to meet the needs of the institution and so access to sites or information deemed by the institution to be unsuitable can be blocked.

Culture

Marsh (1996 p20) begins a definition of culture by stating it is 'the intellectual aspects of a civilisation.' This is the anthropologist's view of culture as the customs and interests of society. He continues that sociologists prefer a broader definition, which includes the 'values, customs and acceptable modes of behaviour.' Other researchers (Chen, Mashadi, Aug and Harkinder 1999 p219) have been less concerned with actions being acceptable by society but rather have considered all 'patterns of action by individuals or groups as contributing to their culture.'

The word culture can be used to describe different aspect of society and does not always mean the same to everyone. According to Hoggart (cited in Entwhistle 1978 p122) unless the majority of a class or group are involved in a particular activity then it is inappropriate to include such activities in accounts of their culture. Other writers on educational research have been interested in behaviour being observed and recorded and less preoccupied with the number of people involved in activities that are grouped under the heading of culture (see Barrow & Wood 1988). Within the context of this research

culture is taken to be the activities engaged in by the students who took part in the study, and the value system and acceptable modes of behaviour (Marsh 1996) that influences these activities.

M^{c}Loughlin (1999) states that culture and learning are so closely interwoven that they should be considered at the same time.

> 'An appreciation of the role of culture in education is essential as it leads researchers and teachers to a deeper and more valid understanding of the nature of learning.' (Chen Mashadi, Aug and Harkrider 1999 p 219)

The definitions of the term culture, referred to above, are not necessarily in disagreement, but are merely looking at a concept from a different viewpoint. How an individual uses their computer or how a group of students use the computers in a college fits these definitions and can therefore be described as part of the individual's or students' culture. The number of students using computers and the extent to which they are using them could be seen as a measure of how much the technology has become part of their culture.

There is sometimes a distinction made between high culture, such as classical music or Shakespeare, and popular culture, such as watching the television or a football match. Such a distinction may lead to the conclusion that only aspects of high culture, which tend to be more intellectually demanding, are worthy of serious study. This is not true.

Evetts (1973 p43) regarded popular culture as being just as worthy of study, using rigorous analytical methods, as high culture. Using a computer has become an activity undertaken on a regular basis by people in our society both at home and at work and can therefore be regarded as part of popular culture.

Racism

A useful starting point is Foster's definition of racism citied by Gillborn (1998). Foster defines racism as practices which restrict the chances of success of individuals from a particular racial or ethnic group. These practices, according to Foster, are based on beliefs that regard particular ethnic or religious groups as 'morally, culturally or intellectually inferior.' This definition of racism, according to Gillborn needs to be widened to cover 'unintentional or institutional racism.' In a school or college setting an example of this could be insisting all students wear a particular style of clothing, which for some could be against their racial culture or religion and is therefore discriminatory against that group.

> 'The vast majority of people in education are not overtly racist but will probably not realise they are racist by default' (James and Griffiths 1984 p160).

As a multicultural college Show Hill is trying to operate an equal opportunity policy for all students. However, the behaviour or actions of students from different cultural backgrounds are not totally within the control of the college. College staff need to be

aware that cultural differences do impact on student behaviour. This affects how students study, how they learn and how they spend their time when not in class. If cultural differences affect how a student relates to particular aspects of a course then teaching staff may need to reconsider course delivery.

This research project looked at the social interaction between students and the Internet in an FE setting. The researcher investigated if gender, ethnic origin and religious group had any influence on students' use of the Internet. The primary aim of this research was to investigate if a student's culture influenced how they used computers and the Internet and to use the data collected to judge if this could have an impact on their studies.

Chapter 2

Review of related research

Information Communication Technology (ICT) is changing the basic or key skills that are needed in order to fully participate in our evolving society, and this includes education or the 'learning society' (Edwards and Usher 1999 p262).

The Internet is also growing in importance within our society. The Internet is seen by some as the latest major technological change that is of such importance that it will affect how we live (Rosenberg 2001). Still in the early stages of permeating into people's lives it is too early to predict what the full impact of this technology will be. Eddings (1994) forecast that the Internet would continue to grow and develop, and one can not help to notice that increasingly it is becoming part of our culture and society. Many firms have their own Web page - schools and colleges increasingly have a presence on the Internet. Radio presenters encourage listeners to contact the radio station using e-mail, and this form of communication is becoming more common.

IT changes quickly and computer use in education, like computer use elsewhere, has gone through a process of evolution. Within this process of evolution the computers, that are available in colleges and homes, have become comparatively cheaper, and therefore more readily available. The hardware has become more sophisticated and the software that can be used on these machines has improved, both have become more reliable. Research in the educational use of computers has mirrored this evolution. As the computers and the software have become more complicated in terms

of both what they can do and how they performs these tasks, the uses made of these machines has also become more complicated.

When computers began to be introduced into the classroom, educational IT research concentrated on how using the computer would help the learning process. There is a body of research relating to the use of computers to support learning (see for examples Suppes 1965, Tsai and Phol 1980, Skues 1983, Ainsworth, Bibby and Wood, 1997, Kumari 1998, French, Ransom, and Bett 1999, Nicol and Anderson 2000, Robson 2000, Weaver 2000). These studies all point to the benefits of using IT in its many forms to enhance students' learning experiences.

This research into IT in education may have led some people to expect IT to have a large impact on our schools and colleges. Generally speaking this has not been the case, and research turned to investigate why this was not happening. Bell (1993 cited in Forsyth 1998 p24) was able to identify what he felt were some of the reasons for this lack of impact. Other researchers such as Selwyn (1999a) investigated further the lack of impact of IT on the curriculum. He asked the question '*Why the computer is not dominating schools?*' He considered the impact of both policy and practice with respect to computers in the classroom. His findings highlight the difficulty faced by those who try to incorporate more IT into the curriculum:

> 'The very ordered individualistic environment of the computer does not easily mesh with the everyday mechanics of education' (Selwyn 1999a p 85)

Before educators can maximise the impact of IT on the curriculum, they need to understand why there has been an apparent lack of effect to date. Davis (1992) wrote about the enormous potential to improve teaching and learning that could be gained by the increased use of computers in education. It is generally agreed that IT in education has yet to reach its full potential (French, Ransom and Bett 1999), but even as an under used resource or aid it is still an important tool in educational settings. Paine (2000 p18) argued that this new technology is not a panacea for schools and colleges, but is a 'fundamental tool that will deliver the efficiencies and opportunities required'. Bell (1993) lists reasons for the failure of IT to have an impact on schools and these include non co-ordinated vision by managers in the school and senior managers are not taking a strategic management of change approach with respect to introducing computers to the curriculum. Another reason given by Bell is that there is little or no evidence of what works.

Educational researchers have for sometime been interested in the role of IT in teaching and learning and within this body of research some themes can be identified. Researchers were initially interested in whether IT had the potential to enhance learning and then latter why this potential was not being fulfilled. There is still a research interest in looking at how IT can enrich the learning experience, but much is focused in schools rather than in FE. One example of such research can be seen in a recent European funded project. In order to investigate further the possible benefits of ICT in the classroom this project (NIMIS: Network Interactive Media in Schools) supported classroom based research. One aspect of this project was to fund a classroom of the future. This involved equipping a year one elementary classroom in a school in Leeds with a range of modern equipment, including networked computers

connected to the Internet. The results of this research (Cooper and Brna 2002) show that ICT, when well planned and integrated into the classroom, does have benefits. It was shown that the children experienced better relationships in the classroom, improved motivation and that this led to longer lasting engagement with activities and learning.

Central to the NIMIS project was the intension to carefully plan and manage the IT activities within the classroom. This does have a point that FE colleges can take note of. In FE, Walker and Greaves (1999) found that all the research they reviewed pointed to a lack of clear policy for ICT. They cite poor management of resources for IT linked to lack of vision regarding its position in the curriculum. Herson, Sosabowski and Lloyd (1999 p269) investigated the use of Intranets in HE and FE organisations and found that they tended to serve administrative rather than academic roles. This may be an over simplified picture of what is happening. IT is repeatedly referred to as a fast moving world of change and it is easy to find examples of IT being used for teaching and learning. Kumari (1998) reported on Web based lessons designed by teachers from a variety of curriculum disciplines, as early examples of good practice in trying to incorporate this resource into teaching and learning.

Here again the pattern of education research has mirrored IT advances. As the Internet has grown in significance, researchers have been increasingly interested in the educational implications. Studies looking at use of the Internet, as opposed to other aspects of computer aided learning, have addressed the following issues:

1. Distance learning

McKinnon (1995), Collis (1999) and Albert and Thomas (2000) reported on how students used the Internet and its positive motivational effects. Passerini and Granger (2000) considered the design models to be used when developing distance learning courses. Other similar studies have been done (see for example Asserini and Granger 2000)

2. Use of the Internet in HE

Sloane (1997), Arthur and Lewis (1998) Montelpare and Paul (2000) are some examples of investigations into Internet use in HE

3. Attitude studies

The studies of Mikropoulos, Chalkidis, Katsikis, and Emvalotis (1998) and Downes (1999) produce some insight into students' attitude towards some aspects of IT in the curriculum. Students' ability to interact with the Internet formed the basis of Robertson's study (1998)

4. Content of the WWW

Bos (2000) and Yates (2000) discussed methods, which can be used, for evaluation the content of the WWW from an educational view.

All of these studies have a common element. They considered the use of the Internet and education in a classroom (under the control of a teacher) or at the student's home (private and unobserved) for a specific learning task. These studies did not investigate students using the Internet in a public open access area or the social impact on the

student of being encouraged to work in this way. Students' behaviour, social groupings, attitudes and activities undertaken in an open access area can be very different from that observed in a classroom. These differences in student culture are worthy of further investigation. This is a theme that this current research project investigated. Questions regarding the social and emotional needs of learners who are to use IT as part of their course (FEU 1987), or as an enhancement of their learning, have not been fully addressed by practitioners in education, in this country. This issue can be seen as an emerging theme in educational research that researchers have begun to address, but there is scope for further study.

For the researcher interested in both computing and the impact of computers on students' culture, the findings and implications of previous research on both must be considered.

Researchers have begun to consider the cultural implications connected with the use of IT and the Internet (see Paul 1995 and 2000) but there is still much to be done. Given the fast changing nature of IT, it is likely that researchers will need to revisit the cultural implications of IT in education as new developments are introduced. Kress (2000) argues that changes in both social and economic circumstances require educators to rethink the curriculum, but he did not address the question of whether these changes are common to all ethnic groups.

Regarding research based on a particular culture, Hitchcock and Hughes (1995) draw our attention to some of the research carried out regarding native North American Indians' participation and performance in schools. They cite three examples of

research, which showed culture to be a contributing factor in education (Wax and Wax 1971, Philips 1972, and Brice-Heath 1982).

Wax and Wax (1971) found that white teachers saw school failure was 'located in the child's culture'. Philips' (1972) account of how North American Indians' participation in classroom activities was affected by their cultural background. He found that teachers' opinion of pupils was affected by the behaviour of the pupils. In some instances this behaviour was part of the accepted code of conduct of the pupil's home culture. Both of these studies found the teachers' lack of understanding regarding the students' culture affected how the teacher viewed a particular student.

Brice-Heath (1982 p245) contrasted the types of questions black Americans were asked at home with the type of question they were asked at school. Responses which students gave to teachers' questions were viewed, by teachers, as either inappropriate in content of in the way they were given. Teachers were labelling students as uncooperative or disrespectful when in reality the student was answering in a way that was consistent with the student's home culture. This research found that social and cultural contexts undoubtedly play a crucial part in influencing and affecting learning.

Schools play a major part in shaping the culture of society (see Byram 1993). It is at school where children have early contact with cultural influences that are not controlled by their parents. Byram argues that the importance of the role schools play in defining and maintaining a national cultural identity is recognised by the government. Government control of the curriculum, and therefore of the cultural values it supports, has long been the norm in many other countries, Byram believes

the introduction of the national curriculum into the British education system was to protect aspects of British culture rather than Educational standards.

> 'The haste with which the British government has sought to catch up is the consequence of the threat to nationhood, implicit in the development of a super national European community.' (Bryam 1993 p175)

Drury and Chathain (2002) are of the opinion that the classroom plays an important part in reinforcing gender differences in children which show in their behaviour, attitudes and achievements. They believe that this is such an important factor in respect to the children's development that all teachers should be trained to be self critical with regard to the gender balance in their classroom.

Part of the difference between students' culturally based behaviour can be attributed to gender differences. Harris (1992) was able to identify some gender differences in the use of IT. Boys were found to use computers on more occasions than girls, but the over all time use was similar for boys and girls. What they used the computer for was also different. Boys tended to use computers for games and amusement, while girls used them for word processing. Some of these differences may be due to what Marsh (1996) calls 'cultural conditioning'. Cultural rules, Marsh explains, regarding gender appropriate tasks or behaviour can vary enormously from one culture to another. The culture controlling these gender activities may be based in ethnic origin, religion or a combination of the two. For younger children, access to a home computer is probably dependant on the willingness of the parents to buy a machine for them to use.

Schofield (1995 p175) found that parents of boys were more likely to purchase a computer for them to use than the parents of girls.

It is not just what students study that contributes to their education. Factors such as how the information in front of them is presented, or how students are required to work, all help to play a part in how successful the learning experience is for the student. Students preferred learning styles are part of an individual student's culture, and the two are interrelated. Working in the United States of America, Park (2000) was able to identify differences in preferred learning styles between Asian and white American students. Recognising the difference in students due to cultural needs, Wild and Henderson (1997) outlined some possible strategies for developing culturally appropriate instructional models for use on the World Wide Web (WWW). DeVoogd (1998) has looked at how teachers can adapt to using IT in a multicultural classroom.

This research project included a survey of home computer ownership. The researcher investigated access to a home machine and compared the level of access to these machines between male and female students. This is an area that has been little researched for FE. The research however, did not just consider gender differences but also sought to investigate if there was a difference in level of access to home computers experienced by students from different ethnic and religious groups.

Connections between race and culture have been investigated and it has been shown that the distribution and definition of gender roles is 'a major activity of all cultures' (Munns, Rejan and Bromley 1995 p485). However, studies into computer use in education have tended to neglect cultural differences of students from different ethnic

backgrounds. Considering ethnic background, according to Corwin (1965 p176), may lead to a more efficient explanation of differences in behaviour between groups rather than social class. Ethnicity is easier to define than social class and if we are becoming a classless society, explanations of behaviour patterns based on ethnicity may be more relevant.

Questions relating to how gender and ethnic origin relate to use of the Internet and if there is a measurable difference between students of different ethnic origin and their use of the Internet are currently unanswered. It was an aim of this research to gather data relating to these questions with a view to providing a better understanding of students' behaviour in relation to computers and the Internet.

If cultural differences mean that particular groups do not feel comfortable using computers and the Internet, then they are in danger of being disadvantaged within the learning environment. The Internet was initially a western innovation,

> 'At present much of the knowledge available online, and the software to access it, is produced by western white middle class men and reflects their interests and priorities' (Leathwood 1999 p11)

This is significant from the point of view of the socio-cultural paradigm (Robson 2000), which views both knowledge and learning and understanding as culturally based. Culture and education are interwoven and inseparable (McLoughlin 1999 p232). As a means of mass communication and dissemination of information it may

be suspected that the Internet would remove cultural obstacles. This however is appears not to be the case. Joo (1999) is of the opinion that the Internet actually adds to these cultural obstacles.

From initial observations at the college selected for this case study it seems that some ethnic groups are the predominant users of the IT drop-in facilities. It would also appear that female students from some ethnic groups are reluctant to use these facilities because of the social implications that may follow from their actions. If these observations are true, then the college needs to be aware of what is happening in the drop-in centres and take appropriate remedial action. One value of the study will be to help the college identify disadvantaged students, as far as IT entitlement or social inclusion (Passey 2000) is concerned, and so plan a course of action.

According to Marsh (1996) factors such as children's social background should not interfere with educational opportunity and educational achievements. In practice however, the type of education received or the end qualifications gained are closely linked to social background. Corson (1998) was concerned with girls from immigrant cultures in so far as how they were treated within our education system and society. He found that they were marginalised first because they were members of a different culture and then because they were females within that culture. Corson (1998) believes that students in this category are also disadvantaged because of gender and culture bias found in the material that is used in classrooms, such as textbooks. Corson (1998) reported that there had been few studies done in schools that had put together gender and culture and this was an area that should be addressed.

An example of this new theme in education research linking IT in education and cultural or social issues in education can be found in the work of Kerawalla and Cook (2002). They report that their work can be seen as an extension of earlier research that looked at how computers were being used at home. They concluded that home computers being used for educational purposes would remain a rarity unless the level of support for such use increased. Why this should be was a question Kerawalla and Cook (2002) tried to answer. They found that many parents said that home computers were bought to help their children with their school work but that was not how the computer was actually used in the home. Kerawalla and Cook (2002) discussed the influence cultural setting has on the activities children engage in. They explained that the cultural setting of the school or classroom is very different to that at home; hence the activities children do at school and home are different. This difference extends to how children use computers.

The importance of the researcher considering home computers and what students are using them for was highlighted by M^{c}Nicol, Nakivivell and Ghelani (2002 p393). They found that:

> 'there are approximately seven times as many computers in homes as there are in schools'

These researchers also investigated what children were using these home computers for. They found a high proportion of the home machines were being used for playing games, but not exclusively. Many of the parents they interviewed claimed that their children were using the computer to help with homework. Within their report they

also identify a disadvantaged group of low income families who did not have access to the Internet at home, because of the costs involved.

Kerawalla and Cook (2002) also considered where the computer was in the home and found 44% were in a central family room and 47% were placed so that the privacy of the user was protected. However, they found that the location of the computer did not affect the type of use. The positioning of the home computer for those that were centrally placed was justified in terms of fairness of use for all family members. For others security of an expensive item was a prime consideration.

Having investigated where home computers were located, Kerawalla and Cook (2002) then looked at how children used computers. They found that 57% of the school children surveyed reported that they preferred working with a partner or group.

> 'Most school use is collaborative and naturally linked to the support of an adult (the teacher) most home use is solitary'
> (Kerawalla and Cook (2002 p767)

Kerawalla and Cook's research was based in primary school and their findings cannot be assumed to be valid for other section of the education system. This research sought to investigate comparable questions, but within the setting of an FE college.

Clegg and Trayhurn (2000) suggest that it is time for computing research to move on and become more focused:

> 'Future research needs to look more closely at who is doing computing and what they are doing.' (Clegg and Trayhurn 2000 p87)

With this in mind this research project focused on students at an FE college and how they were using the Internet. Whilst this was the focus of the research, it was not the sole purpose of the research. The research did therefore consider related topics and activities as were necessary to give a detailed picture.

Chapter 3

Methodology

The practitioner who has decided to do a research project needs to consider the arguments for and against a particular approach. In making this decision the researcher must consider different approaches and adopt the most suitable. This decision will include consideration of the time available for the study, the practicalities of adopting a particular approach and the suitability of a research method in respect of the nature of the topic being studied.

If the researcher views knowledge in the context of the research as hard, objective and measurable and favours research methods that reflect this view, namely scientific methods, the researcher may be described as a positivist. A researcher who is described as anti-positivist would view knowledge as 'personal, subjective and unique' (Cohen and Manion 1994 p6) and would adopt the methods of the social sciences as opposed to those of the natural scientist. These epistemological differences, i.e. how knowledge is viewed, give rise to two different types of research method, which can be called quantitative methods and qualitative methods.

Quantitative methods

Quantitative methods are sometimes referred to as scientific research methods. According to Ebel (1969 p1129) there is no one scientific method, but the methods of science can be considered jointly as a framework or approach for the researcher. Here the meaning of method is that used by Cohen and Manion (1994 p38), and covers the

> 'Range of approaches used in educational research to gather data which are to be used as a basis for inference and interpretation for explanation and prediction'

The science approach to research is based on three assumptions (Cohen and Manion 1994 p13), determinism, empiricism and parsimony.

The determinist view of the research questions being considered within this research would be, *does the college spending money on providing Internet access cause students to use it*? Clearly if the college did not provide the access then the students would not be able to use it. There will be other factors that 'cause' the students to use the Internet. These may include instructions or work set by their tutor, or they may choose to work this way by their own volition. From these questions the researcher should find it relatively easy to formulate some simple hypothesis that could be tested. The scientific researcher works with a hypothesis and its complement the null hypothesis.

Engelhart (1972 p12) describes scientific research as being characterised by 'hypotheses deduced from theory' proceeding to 'empirical testing' leading to generalizations or laws. He refers to this as the hypothetico-deductive model.

The researcher has been teaching at Snow Hill College for a number of years and in this time has witnessed the introduction of IT at the college. In this time the researcher has been interested in a number of patterns of student behaviour that seem to be developing. From these observations the research has identified a number of lines of enquiry that could be followed. To fit the epistemology of the scientific method this initial observation could have been expressed in the form of a hypothesis which could then be tested. These hypotheses could be expressed as

- Internet access within the college is used predominantly by the 16 – 19 age group

- Students use the Internet for recreation more than they use it for study.

- Students from different ethnic backgrounds use computers and the Internet differently.

At this stage the researcher is led by two factors, first is the chosen aspect of the research topic of interest to either the researcher or anyone else, and secondly what is possible within the chosen methodology.

After formulation of the research question we move to the second assumption, empiricism. The researcher takes the view that data to prove or disprove the hypothesis can be collected. As the research progressed it was found that data relating to some of the above hypotheses could be collected, but some could not. The data collected would have to have covered a large number of Internet access points available to staff and students, the time these groups of people spend on the Internet and what was being accessed and why.

The aim of the scientific researcher is to explain events in the simplest way possible, the principal of parsimony. Part of the researcher's explanation will be the acceptance or rejection of their hypothesis. The acceptance or rejection of the hypothesis is a matter of statistical technique. The researcher has to make a decision regarding the rejection of a hypothesis, referred to as the level of confidence. How sure does the researcher want to be that what they say is really true? It is usual for the researcher in social science to use a ninety-five percent level of confidence, meaning that statistically the results reported could have happened by chance in five out of a hundred performances of the experiment or research. Said another way, this means the research data can be interpreted as happening not by chance 95% of the time.

The scientific researcher has to be able to justify his conclusions not only with reference to the statistical tests used, but also taking into account possible errors. The researcher has to account for both random errors and systematic errors (see Mouly 1978 p 137-141). Random errors can be estimated and reduced by increasing sample size. Systematic errors can be both serious and difficult to detect. A common source of these errors is poor sample selection. A researcher who thinks his data is affected by systematic errors can not reduce their effect by increasing the sample size; neither can they be estimated by statistical theory.

The quality of data that the researcher can collect is governed by the quality of the measurement tool he/she uses to collect the data.

> 'Success in research and science depends on the availability of instruments and techniques of sufficient precision to measure the phenomenon under study' (Mouly 1978 p 73)

Instruments here can refer to a gauge, a rule, a test or a questionnaire. For the researcher operating in the field of education or social science Mouly (1978 p 74) argued that:

> '... many of the measurements with which social research is concerned... are also relatively imprecise'

As part of the research or experimental design the researcher had to decide on how to view the students' use of the Internet. Was it to be compared with traditional teaching methods by perhaps setting up an experiment to monitor the progress of one group using the Internet over a second group restricted to traditional methods?

These questions sit well with the positivist model

> 'Eliciting responses to predetermined questions, recording measurements, describing phenomenon and performing experiments' (Cohen et al 1994 p38)

and may they tell the researcher what is happening. Being able to prove or disprove a statement that students in group A are more likely to behave in a particular way than group B will provide useful information for the researcher. The researcher also believes that a positivist approach to this aspect of the research project is the most appropriate. However this approach would not tell the researcher why group A behaves differently to group B.

The researcher's initial perception of what was happening in the college was that students were using the Internet to further their studies. They were also using it for recreation. The researcher's aim was to find out which students were using it, and what they were using it for. The setting up of a controlled experiment may enable us to compare this teaching aid with alternatives and make recommendations for future use, but an experiment of this

type would distort what is happening and how students are choosing to use the technology. Researchers who use a scientific approach sometimes try to simplify their experiment in order to limit the variables being studied, but this can then lead the research results to be viewed as 'banal and trivial' (Cohen and Manion 1994)

It was possible to extract data relating to current usage from the 'fire-wall'. This is the software that monitors and regulates Internet access from within the college. It can be used to produce a history of Internet access for any computer in college. It can also be used to produce a list of the most popular sites accessed from within the college.

Using this data may be viewed by some to constitute covert observation (Hitchcock and Hughes 1995 p48), however all staff and students have already been informed that Internet access is regulated in this way. The current data is presently only viewed by the college IT manager; the researcher's first task was agree a procedure with him so that the researcher can gain access to the data. To be sure an ethical approach to the research is maintained, the researcher will remind all staff of the college policy and there are notices informing students of this policy that come on screen prior to Internet connections being made.

Incorporating this data into the study would be beneficial:

> 'Using existing data has some advantages over data collected through a contrived process. In most cases it has greater

> credibility because it is independent of the teacher's research activities' (Altrichter et al, 1993, p83)

It would have been possible for the researcher to proceed with this project taking the positivist approach of the scientist. Knowledge gained would be genuine in so far as it was obtained by 'means of observation and experiment' (Cohen et al 1994 p9). The research would also meet the scientist criteria for good research, as it would be repeatable (Cohen et al 1994 p19). The researcher may even have been able to make some generalisations regarding use of the Internet in college; the external validity will of course be limited unless the research is extended to include some other colleges at the same level of development. Using one college would be too small a sample for the scientific researcher to make generalisations. There are other colleges that would fit the requirements but it may not be practical to incorporate them into a study of this size. Time and cost would be severely limiting factors.

There is also the criticism that research which uses a scientific methodology cannot paint a full picture. The researcher would be able to say on a certain day a particular student accessed the following Web pages, but he would not necessarily be able to say why. This is where, in the study of human behaviour, positivism is less successful (Cohen et al 1994 p12) than some other research perspectives. There is a human behaviour element to this research, namely how the student chooses to interact with the available technology. Positivism is sometimes criticised for 'contributing to the dehumanisation of the individual' (Cohen and Manion 1994 p23) and over looking this human dimension. One

of the dangers of statistical research is that it reduces both the subject and the data to numbers. Sometimes this means the contribution non-numeric data could contribute to the researcher's understanding of what is happening is lost. Positivists, according to Hitchcock and Hughs (1995), make the assumption that human behaviour is predictable, and that it can be observed and measured. The more complex the activity being observed becomes the harder it is to predict and measure what the subject will do.

The problem facing the scientific researcher here is that he is interested in aspects of the social behaviour of students, which can not be fully described by quantitative data.

> '...a lot of questions about teaching, though undoubtedly empirical to some degree, just don't lend themselves to empirical research.' (Barrow and Woods 1988 p181)

Reasoning in various forms is one of the tools by which the scientist seeks to advance knowledge (see Mouly 1978 pp8 – 10). Deductive reasoning perfected by Aristotle was the first step in developing the systematic advancement of knowledge. The progress of science was hampered by this one-track approach until Francis Bacon advocated the concept of inductive reasoning. Inductive reasoning enabled science to move forward but in some ways it was just as restrictive as Aristotle's deductive reasoning. The modern scientist will probably use what is termed 'Inductive-Deductive reasoning' (see Mouly 1978 p10). This entails the researcher, first using inductive reasoning, to move from observations to hypothesis, then switching to deductive reasoning to view the hypothesis

and the implications in order to check their validity. In this way the scientist builds into his research a self-checking mechanism. By this mechanism scientific knowledge is advanced with an assurance of what is discovered is true.

Qualitative methods.

Qualitative approaches to research are those that employ descriptive techniques rather than a reliance on numerical data or quantitative methods. Hitchcock and Hughes (1995 p25) believe that 'school-based research' offers a unique opportunity to the researcher who plans incorporate qualitative methods into their research. Because of the complex nature of education generalisations that come from rigidly controlled quantitative methods, research based on scientific paradigms cast little light on problems that are interesting to teachers. Kerlinger (1969 p1130) discusses the dilemma faced by researchers. His hypothesis is that the more interesting a problem then the more complex it is, problems that are reduced to quantitative, measurable and manipulable constructs tend to have less general interest. If this is the case then the approach of the qualitative researcher should produce findings that can be of interest to a wider audience.

The context of the research is a contributing factor when deciding on a methodology to employ. The qualitative researcher can be hampered in his quest for the truth if he is known within the institution. Interviewees may be more truthful with someone they know, they may also reveal to someone they do not expect to see again a slightly different truth. As with all data the researcher has to have some way of checking its

validity. Internal validity is an essential feature of all good research, as part of the research design the researcher should consider triangulation as a means of checking internal validity. Observations and interviews can easily be used as a crosscheck, e.g. is what the student says he does the same as the researcher sees him do?

Cohen and Manion (1994 p 193) listed a number of common criticisms of action research, a particular type of qualitative method:

> ' [it] lacks scientific rigour ... situational and specific ... its sample is restricted and unrepresentative ... little or no control over independent variables and its findings are not generalisable ...restricted to environment research is carried out in.'

These criticisms can be directed at all types of qualitative research methods. However lack of scientific rigour is not considered by all as a justification for rejecting this mode of research.

> "Although lacking in rigor of true scientific research, it is a means of providing a preferable alternative to the more subjective, impressionistic approach to problem solving in the classroom." (Cohen and Manion 1994, p189)

It is often acceptable to perform a research project that may not be as scientifically rigorous as it could be, if the end result is a solution to a problem that the practitioner can make use of (see Mouly 1969 p115). Here rigour is used to describe the control the researcher has over the research activity. The control of variables within a social setting such as a school or college is sometimes impossible or too disruptive. There is also the concept of scientific research being repeatable, and that by repeating the research the results are confirmed. Social research is unlikely to be repeatable in the scientific sense, as the researcher cannot claim to be able to control the social environment to this extent. Within this research paradigm the results obtained are often seen to be of less importance than the process.

> 'If emphasis is placed on participant action research as an action technique, the degree of precision of the research findings is not particularly important as long as the action is being steered towards desirable channels.' (Chein et al 1998 p60)

The criticism that qualitative research is specific to the situation it was carried out in is not completely valid. The researcher may only be interested in the solution to his problem within that setting and so will not be concerned with a wider application. Altrichter (1993 p202) argues that the solutions cannot be successfully applied to other situations but they can be of use to other practitioners as a starting point for their research.

For the researcher who does want their work to be useful to others the limitation placed on the research process by restricting it to one location can be a serious drawback. This can be a criticism of all data collection activities, 'data can only represent events selectively' (Altrichter 1993 p70). Whatever the data collection technique used the data gained can only be a representation of part of what was happening at a particular time.

With this in mind part of the research design must take into account sample selection.

> 'An inherent weakness in this type of work is that conclusions are drawn either from experience with a single group or from experience with several groups differing in numerous uncontrolled ways. Despite this weakness empirical action research may lead to a gradual development of generally valid principals.' (Chein et al 1998 p60)

Just as important as sample selection is what the researcher does with the data they collect. It is more than likely than the researcher will collect more data than they can use. This is of particular importance if the researcher is to avoid criticism of bias with regard to the data they choose to use and the interpretation they places upon it (Mouly 1969).

Adopting the qualitative research methodology will mean the researcher will collect a lot of data. Some critics see this as both time consuming and wasteful.

> 'Time-consuming – as well as prone to certain types of error. To make matters worse, most of the data they provide are not amenable to statistical treatment so that a good part of the information they contain may be wasted.' (Mouly 1969 p147)

The counter argument would be that if a researcher chooses to perform their research from this perspective then they would be aware of the demands on their time before the study commenced, and presumably would not see it as a waste of time. If the researcher has the problem of too much qualitative data, then it is their responsibility to ensure that their selection of what to include does not introduce bias into the research report. The characteristics of research of this type mean that the final report will be viewed by colleagues as an investigation into a real problem or setting, that they will be able to relate to and hopefully find useful.

The researcher should consider the criticisms that may be levelled at their research because of the methods used. As an example, consider criticisms of research into racism in schools. From the middle of the 1980s, there has been a shift towards qualitative research methods where researchers have been interested in questions about racism in schools (Connolly 1998 p5). Connolly argues that this body of research does not yet offer 'sufficiently convincing evidence' to prove assertions that teacher racism plays a significant part in affecting the schooling of ethnic minorities. This type of research is hampered by the fact that 'we cannot guarantee neutrality in our interpretations and analysis' (Blair 1998 p13).

Connolly is also critical of much of the other research carried out into racism in school. He points out that early research into ethnic minority performance in schools was largely done using positive paradigms and as such failed to help us understand 'the complex social processes and practices that led to these inequalities' (Connolly 1998 p5). This research project was a multi-method study, how the researcher guarded against Connolly's criticisms is discussed in the following section of this chapter.

Chosen methodology for this research.

After considering the arguments for and against different research methodologies the researcher decided to use a multi-method approach. Hitchcock and Hughes (1995 p25) stated that

> 'The complexity of education demands the use of very many different research techniques and models.'

Deutscher (1966 cited in Brewer 1989) considered that sociologists in the early nineteen sixties had placed an over reliance on surveys as a method of conducting research. This had caused many researchers, in his opinion, to over simplify the research problem. Marsh (1996 p118) believed that some methods when used on their own in educational research could be criticised on philosophical grounds because methods such as surveys cannot uncover the meaning of social action. This does not mean he was against surveys,

but by using more than one method a researcher could provide a fuller and so more valid account Marsh (1996 p115).

Bryam (see Scott 1996a p64) views the 'identification of epistemological paradigms' as 'artificially restricting to the researcher's activities'. The pragmatic adoption of one epistemology may mean the researcher cannot or does not use all the available and suitable research methods that he/she otherwise could. This view is not universally accepted. Bhaskar (see Scott 1996a p64), for example, sees research into the social world, of which education is a part, as necessarily having a single approach. This means that if this places restrictions on the methods available to the researcher, then these have to be accepted.

The research undertaken in this project can be seen as an investigation concerning two types of evidence. Some of this evidence was in the form of hard facts, which were quantitative and measurable. Other aspects of the research gave rise to data, which is descriptive, and relied more on the techniques associated with the qualitative researcher. For this reason the research will be conducted using a multi-method approach.

There has been much debate regarding studies that adopt approaches to research that utilise both qualitative and quantitative methods. Scott (1996a) summarises these arguments by presenting different sides of the debate for and against the extremes of the research continuum. Brynam (1992) describes quantitative methods as being driven by

the researcher's concerns, while qualitative methods try to consider the subjects' perspectives.

In light of the above factors, which show that both qualitative and qualitative methods have their strengths and weaknesses, the researcher decided to incorporate both into the research design. Having made this decision, the researcher had two questions to answer. First does the inclusion or use of the different methods enhance the research and secondly do the different methods conflict with each other in the course of the research? This research was based on a multi-method approach. That is to say it employed some methods which are qualitative and some which are quantitative. It was hoped that the methods used would be complimentary and bring added depth to the study. The methods have been chosen as being the most suitable for the type of data being collected.

The two research approaches considered both gave the researcher the opportunity to go through the process described by Anderson

> 'Research in education is a disciplined attempt to address questions or solve problems through the collection and analysis of primary data for the purpose of description, explanation, generalisation and prediction' (Anderson 1990 p4)

There are conflicting views on which research approach is likely to give the best results or the best understanding of the problem or situation being investigated. Quantitative data

and scientific methods are seen by some as having more credence, and are therefore included in the chosen research methods.

> 'Both sets of techniques have there own advantages and disadvantages, western social science has come to favour quantitative research as the main source of 'hard' or 'rigorous' data' (Griffin 1995 p100)

Case studies are well-established and accepted in educational research based projects (Cohen and Manion 1994). Further, the multi-method approach is a key feature of many case studies. Looking at IT in a college of nursing and midwifery; Lauder, Currie and White (1998) used a case study approach. Combining methods that are qualitative and quantitative can be seen to have produced worthwhile results by researchers in the past. One such example can be found in Walford (2001). Walford endorses the use of different methods to collect data being used in research projects as a way of reducing the possibility of data containing 'gross errors' that can occur when a single data collection method is relied on. A different reason for using a multi-method approach to research is given by Reynolds (1991), who reports on research done by a team. In Reynolds' research different methods were used because of the different experiences and backgrounds of the team members.

A further research project that used a multi-method approach in a series of case studies can be seen in Farish, McPake, Powney and Weiner (1995). These studies into equal

opportunities in colleges and universities use data collected from internal documents and interviews. Descriptive research of this type can be enhanced by the use of different data collection methods. (Lovell and Lawson 1970)

Methods used and samples

As previously stated this research project used a multi-method approach. The researcher chose an appropriate instrument or method of data collection for each type of data being collected. (Lovell and Lawson 1970) The case study research project was based at a single FE College. The data was collected from four sources: the College monitoring software, the flexible learning centre register, a questionnaire and a series of interviews.

Just as important as the methods used to collect the data is the sequence in which these methods are used. Two of the collection methods utilized the college IT network. For these the data was collected simultaneously over a number of months. This data was used by the researcher to provide a picture of what was happening within the college at the time of the study.

The collection of data from students began at the same time, but was done in two stages. In a period of approximately three weeks students completed a questionnaire and the researcher then analyzed the responses. Following this, the researcher conducted a series of interviews with students.

1. The college monitoring process

The college monitoring process for Internet access was used to generate data giving information about how the Internet was being used. This data was not expected to be rich in detail but the researcher was able to identify the main sites staff and students were accessing on the Internet. The researcher was able to monitor the sites accessed over the period of the study and identify changes or patterns in Internet access. Data will be retrieved from the monitoring software once per week over the data collection period.

2. The Flexible Learning Centre

To gain access to the Flexible Learning Centre students are required to put their enrolment card through an optical bar code reader. This means only bona fide students can enter the room. It also enables the college to monitor use of the room. A record of the students using this room over the period this research was kept and is included in the research findings. From the data collected the utilisation of the room, and hence equipment, can be found.

3. The Questionnaire

A questionnaire was used to investigate students' use of IT in general and the Internet in particular, both at college and in other places.

> 'A questionnaire is frequently used to gather data that is 'hard, objective and tangible' (Cohen and Manion 1994 p6).

The questionnaire once completed was anonymous; each one does however have a reference number. The first part of the questionnaire deals with personal details of the respondent, and some questions requiring factual answers. These questions serve two purposes, they help the respondents relax as they complete the questionnaire and can be used by the researcher to contextualise the responses. (Walford 1991 p131)

The second part of the questionnaire consists of open-ended questions. These questions have been placed at a point in the questionnaire where it was felt that the respondent had become committed to completing the questionnaire and was therefore more likely to offer a response here (Newell in Gilbert 1993). Open-ended questions can be of particular use at the start of a research project. They can be used to confirm to the researcher that further study of topics or questions is justified. They can also help the researcher by identifying concerns or questions raised by the respondents that the researcher had not previously considered.

A pilot version of the questionnaire was tested with a group of students who would not form part of the study population. This enabled the researcher to modify questions that were ambiguous and to change the format of some of the questions into a simpler format for the respondents. In the pilot questionnaire questions relating to Internet use were open ended, but the range of responses was so limited it was decided to rewrite this question as

a check list. The option to add uses not given in the list was retained, but was never used any students who took part in the research questionnaire.

This questionnaire included Selwyn's computer attitude scale (Selwyn 1997). This was the last part of the questionnaire (see appendix 1 page 230). As this is an attitude measure that was specifically designed to be used to measure students' attitude towards computers it has not been altered from its original form.

Travers (1978 p55) recommends that researchers make use of existing data collection devices which have already been developed and which are based on sound theoretical foundations. Travers goes on to state that attitudes can be considered as being formed from several different components which cover knowledge, feeling and actions. If Travers statements are taken as criteria for the selection of a data collection tool, then Selwyn's attitude scale can be seen to be a suitable device. Selwyn reports high levels of both reliability and validity from the results gained when using this scale. Further, the questions in the scale can also be seen to cover all the components Travers says contribute to a person's attitude towards a topic.

4. The Interviews

The interviews were carried out after the analysis of the questionnaire had been completed. The questionnaires were used to give the researcher a starting point for the interviews. Themes or areas of interest raised in the questionnaires were pursued and

used as key questions in the interviews. The researcher did not try to select the students who were interviewed with a view to producing a sample that would be representative of the college; rather the students interviewed were selected on the basis of the possible contribution they could make to the understanding of the topics being discussed.

The students to be interviewed were initially selected from the students who were invited to complete a questionnaire. Some students were interviewed because their name was mentioned by other students in the course of the interviews, and the researcher believed that they could make a useful contribution to the research. During the interview period twenty students were seen and have been interviewed. They have been asked to express their opinions on their use of the Internet, and the contribution it makes to their learning. The researcher is aware that the quality of the data collected in the interviews is affected by the rapport that can be developed and maintained in the course of the interview. It was therefore be necessary to ensure that the interviews were conducted with due regard to time, place and sequencing of questions.

The researcher conducted five pilot interviews. This gave the researcher the opportunity to practice interview technique and to gauge the willingness of students to participate in the study. As with the questionnaire pilot these students were excluded from the study. Following the pilot the researcher constructed an interview schedule and some guidelines for the conduct of the interviews. For this research the interviews were held in a controlled environment. A room at the college was used, a notice outside indicated that the room was in use for interview. This ensured no interruptions.

What the researcher is told depends not just on what questions he asks but how he asks them. For any researcher there is a period required for familiarisation with the techniques to be used. This is another reason for practice interviews. The researcher was able as part of this pilot study 'to test data collection method' (Fox 1969 p66). An interview schedule was used which allowed the researcher to practice interview technique and as the research progressed new lines on inquiry were incorporated into this schedule. The piloting of the data collection tools not only gives researchers opportunity to familiarise themselves with the methods to be used but can also be used to 'ensure the data collected are reliable and can be analysed' (Fox 1969 p67 and Atkinson 1971 p150).

There are instances where group interviews are a suitable approach for the researcher to adopt, and others where a one-to-one interview is more appropriate (see Atkinson 1971 p51). These considerations have been taken into account when designing the research project, and it was decided that all of the interviews were to be conducted on a one- to-one basis. Group interviews were specifically not used because it was felt that some informants might have been reluctant to make comments with friends or peers present. Individual interviews, although time consuming if the same number of informants is to be involved, are not susceptible to the same problems encountered by group interviews. A major fault or problem with the group interview occurs when the researcher fails to allow time to ensure that all participants in the interview are fully involved and if that is the case the reliability of the interview is bought into question. Smith (1972) highlights the failings of group interviews with respect to non-participating informants. In a short

interview, of say fifteen to twenty minutes there is barely time for the more enthusiastic and articulate pupils to express their thoughts. It is conceivable that the shyer or less articulate pupils have little chance to contribute. Smith (1972 p 108) identifies two distinct reasons for informants being silent in group interviews, in addition to lack of time, namely the 'silent-shy' and 'silent-aggressive' informant. The group interview is also susceptible to the danger of a third type of informant distorting the data collected, the 'monopolist' (Smith 1972 p 108).

Spradley (1979) offers the researcher some advice on the conduct of research interviews. He begins by reminding the researcher of how important the informants are as a source of information:

> '...literally, they become teachers for the ethnographer'
> Spradley (1979 p25)

All of the interviews were recorded and then transcribed. In two instances the recording was not clear regarding comments or individual words said by an informant. In these cases the researcher returned to the informant with the partially completed transcript and tape recording and with the informants' help was able to complete an accurate record of what the informant wanted to say.

Burroughs (1971) was highly critical of the overuse of the interview as a data collection tool.

> 'No device has been more thoroughly discredited than the interview and none continues in such regular use' (Burroughs 1971 p99)

Burroughs (1971 p99) tells us that 'The essential criticism of the interview is that its reliability is low.' He is careful to point out that it is not lower than many other techniques of measurement in regular use such as written examinations. What probably keeps the interview in such regular use, according to Burroughs, is the fact that its validity is 'very reasonable'. When selecting research methods to be employed the researcher must consider reliability and validity.

Validity in research can be seen as a way of describing how well a particular test or measure, actually measures what it is designed to measure. (Engelhart 1972 p151)

> 'Validity is concerned with the extent to which descriptions of events accurately capture these events ... the material collected by the researcher presents a true and accurate picture of what it is claimed is being described' (Hitchcock and Hughes 1995 p105)

In the context of an interview, the validity of the information collected relies on the researcher asking the right questions to the right respondents. Cohen and Manion (1994

p281) advise the way to achieve greater validity is to minimise the amount of bias. How the researcher addressed this issue is discussed latter in this chapter.

> 'Reliability refers to the extent to which any particular method of data collection is replicable' (Hitchcock and Hughes 1995 p107)

The reliability of some research methods is more easily demonstrated than in others. A written questionnaire can be given to a sample group to complete at a particular time and the results or data could then be compared with that collected from a second sample at a later date by using the same questionnaire. Qualitative research methods that incorporate interviews are not as easily replicated. Hitchcock and Hughes (1995 p107) state that in this type of research the role of the researcher as both collector of data and then as analyser of the data, make reliability more problematic, because it is the researcher's experience and beliefs that predominate.

Human beings tend to talk to each other on a regular basis, and perhaps for this reason the researcher can come to believe that to talk or to interview an informant is a fairly straightforward procedure. It can be if the researcher is careful to control the range and the focus of the interview.

The researcher decided to keep the interviews semi-structured so as not to reduce the opportunity to probe themes or topics as the interviews progressed (Powney and Watts

1987). The purpose of using this technique is to enable the researcher to gain a better understanding, or insight into what the informant is saying or is trying to explain. When deciding to probe or question an informant further, the researcher must be aware of the difficulties this can cause with regard to the conduct of the interview. The researcher does not have time to sit back and carefully construct the question while the interview is taking place. There is the danger, for instance, that the researcher inadvertently asks an ambiguous or even leading question.

> 'such probes should motivate communication without biasing the respondent's attitude. (Engelhart 1972 p 111)

For this reason where a quotation from an interview is included in this report the question as well as the response is given, so that the reader can be assured that questioning was done with care.

Young (1965) warns the researcher

> 'An interviewer, say, is naive indeed if he believes he gets the *truth* from his informant. What he is told depends not just on what questions he asks... but how he asks them' (Young 1965 p13)

It is of course possible that the students were not telling the truth. They did not actually have computers at home, but were saying this because this is what they thought the researcher wanted to hear, (Richardson et al, 1965). This would then naturally bring into question the validity of all of the recorded responses, unless the researcher has some other way of validating the student's comments.

Here is an example of the strength of the interview as a research method compared to a questionnaire. The validity of the student's statement that they have a computer at home is checked by follow up questions such as 'What do you use it for?' and 'Where is it kept?' It is not that these questions could not be asked in a questionnaire, but to answer orally requires the respondent to give a quicker response. The student has therefore less time to fabricate an answer, and responses that suggest a contradiction in what the respondent is saying can be clarified as the interview progresses. Some respondents also are more willing or feel it is easier to communicate orally than by writing. (Lovell and Lawson 1970 p32)

Some philosophers may even argue that the event being observed may not even happen if the observer were not there to see it. The observer or interviewer can affect and influence what people say.

> 'A basic criticism of interviewing as a technique is that what people say they do is not always the same as what they do, or what they intend to do (either consciously or subconsciously' (Altrichter 1993 p109)

This lack of consistency can be attributed to a number of causes. People, especially children at school talking to a teacher, have a tendency to say what they think the listener wants to hear. In structured and unstructured interviews, both of which are used by the qualitative researcher, the researcher has to be careful not to ask leading questions, or phrase the questions is such a way as to give the impression that one response is better than another.

Sample selection

The first stage in sample selection is to correctly identify the population that can be used. The nature of the research questions being considered is such that the population is easily specified namely the students who are attending Snow Hill College. (See Richardson, Dohrenwend, and Klein 1965 p293). With the population clearly defined the researcher can then proceed to select their sample.

The first sample identified was the students who would be asked to complete the questionnaire. The researcher decided to use a non-probability sample. There is nothing inherently wrong with non-probability samples, if used correctly. An example of this type of sample selection within a research project based in education can be seen in Smith and Keep (1986), who use an opportunity sample often referred to as a convenience sample (see Cohen and Manion 1994 p88). The reasons for the researcher using such a sample

are easily understood but research can be criticised when such a basic approach is taken in respect to sample selection.

> 'Convenience sampling is perhaps the most widely used, but the least statistically or theoretically justified, sampling strategy in the social sciences' (Brewer and Hunter 1989 p115)

The researcher must be aware of the ability of the sample to represent the population.

> 'More important than the size of the group tested is its representativeness.' (Evans 1984 p33)

The sample used was 208 students from a cross-section of the college. Care was taken to ensure the sample selected was as far as possible representative of the whole college; to ensure this sample based on types of courses was used. Course code numbers were used to select groups of students to be invited to complete a questionnaire. The resulting sample was then compared to the college population.

	Bangladeshi	Black African	Black Caribbean	Chinese	Indian	Pakistani	White	Other Asian	Not Known	totals
Access to HE		1	1				12			14
AVCE business year 1					1		1			2
AVCE IT year 1			2	2		7	17	1		29
AVCE Science Years 1 + 2			1			1	3			5
First Diploma Health and Care						2	11			13
GCE AS and A level	1				4	11	10			26
GCSE Full time						3				3
GCSE Part time						1	4			5
GNVQ Advanced IT						4	4		2	10
GNVQ Advanced IT year 1					1	2	4			7
GNVQ Intermediate Catering							1			1
GNVQ Intermediate IT						4			1	5
GNVQ Intermediate Leisure and Tourism			1				20			21
GNVQ Intermediate Science		1				7				8
HND Animal Care year 1							10			10
HND Animal Care Year 2						1	7			8
National Diploma in Care Years 1+2			1			1	7	1		10
National Diploma in Construction year 1						1	8			9
National Diploma in Sport Science Year 1 + 2							4	1		5
NNEB							7			7
Nurse Cadets						2	8			10
Totals	1	2	6	2	6	47	138	3	3	208

Percentage of sample	0.5	1	2.9	1	2.9	23	66	1.4	1.4	100
Percentage of ethnic groups in college	0.4	0.4	2.8	1.5	2.7	13	75	0.7	3.1	100
Percentage of ethnic groups in college excluding adult education	0.5	0.4	2.9	0.2	2.2	19	71	1.5	2.5	100

Table 1
Ethnicity of students in sample

Table 1 shows that the resulting sample covered a wide cross section of the courses offered at the college. The range of courses in the sample covers both the level of qualification available at Snow Hill College and the vocational and academic departments at the college. However the distribution of ethnic groups within the sample does not exactly reflect that of the college. This is because the college offers an

extensive adult education provision, and the majority of these students are from the white ethnic group. These students follow a range of courses some vocational, some general interest courses. The nature of these courses is such that there is no expectation, or need for these students to make extensive use of the college IT recourses and facilities. The researcher has not, therefore, included these students in the sample to be used in the research. The way in which the age of students in the sample differs from the college population is shown in table 2.

	sample		college	
Age	Number	Percentage	Number	Percentage
<19	160	76.92	9602	48.77
19+	48	23.08	10087	51.23
Totals	208	100	19689	100

Table 2

Age of students in sample and college

A comparison based on gender shows that the sample obtained closely matches the gender distribution of the college population. This is shown in table 3.

	Sample		College	
	Number	Percentage	Number	Percentage
Male	98	47.12	8269	42
Female	110	52.88	11420	58
Totals	208	100	19689	100

Table 3

Gender of students in sample and in college

Comparing the distribution of ethnic groups in the sample with the distribution of these ethnic groups in the college, excluding the adult education provision, demonstrates that the sample closely represents the college population.

The distribution of religious groups within the sample can be seen in table 2. The college does not collect data on student's religion, and so the researcher cannot comment on how representative of the college population the sample is in this respect.

	Christian	Jewish	Hindu	Muslim	Sikh	None	Other	Totals
Access to HE	3					10	1	14
AVCE business year 1						2		2
AVCE IT year 1	13			5	1	8	2	29
AVCE Science Years 1 + 2	1			1		3		5
First Diploma Health and Care	4			1		8		13
GCE AS and A level	2		2	16	1	5		26
GCSE Full time			1	1	1			3
GCSE Part time	3			1		1		5
GNVQ Advanced IT	4			4		2		10
GNVQ Advanced IT year 1	2			2		3		7
GNVQ Intermediate Catering	1							1
GNVQ Intermediate IT		1		4				5
GNVQ Intermediate Leisure and Tourism	10			5		5	1	21
GNVQ Intermediate Science	1			7				8
HND Animal Care year 1						10		10
HND Animal Care Year 2	5			1		2		8
National Diploma in Care Years 1+2	5			1		4		10
National Diploma in Construction year 1	4			1		4		9
National Diploma in Sport Science Year 1 + 2	4					1		5
NNEB	4			2		1		7
Nurse Cadets	8					2		10
Total	74	1	3	52	3	71	4	208
Percentage of sample	35.6	0.5	1.4	25	1	34	2	100

Table 4
Religion of students in the sample

The results from the analysis of the questionnaire need to be viewed with these minor limitations relating to the nature of the sample in mind. In particular it must be stressed that the sample used is only representative of the main college provision, excluding the

adult education section, and that it is not possible to claim that the religious background of the students used in the research is representative of the college, as the college does not collect this information from its students. However all steps have been taken to ensure that a balanced sample from the college was obtained and the survey results can therefore be considered valid.

Hitchcock and Hughes (1995 p108) suggest that the researcher endeavours to obtain data which are typical and representative of both the population and situation being investigated. The extent to which the sample who completed the questionnaire is representative of the college population will be reported as part of the research findings (Evans 1984 p33).

Some of the students who completed the questionnaire formed the sample to be interviewed. The initial plan was to interview twenty students, but the researcher was aware that this number could be adjusted as the interviewing process progresses. Hitchcock and Hughes (1995 p 126) stated that in many case studies, researchers have relied on a few or even single 'key informants'. It is not the number of students interviewed that matters, but the quality of information collected. This second sample can be described as a theoretical sample.

> 'Theoretical sampling eschews attempting to obtain a representative sample, arguing that sampling should be entirely

> governed by the selection of those respondents who will maximise theoretical development' Arber (1993 p74)

This theoretical sampling method enables the researcher to select informants that can contribute to the research project (see Mason 1996) The researcher uses this method not to produce a representative sample which would give a different picture of what students are doing with computers at the college, but rather as part of the qualitative research method.

Spradley (1979 p25) advises that it is common practise for the qualitative researcher to seek out 'ordinary people with ordinary knowledge and builds on their common experience'. He goes on to suggest that it is possible for almost anyone to act as an informant. When interviewing any group of people it is likely that a researcher will meet some informants that are very good and others that are not so good. (Spradley 1979 p45). There is no suggestion that the responses given by these poor informants should be ignored, it is just that they may not be able, for whatever reason, be able to make a contribution to the research.

With Spradley's comments in mind the researcher approached students and invited them to contribute to the study. The selection of these students was neither random nor done with a view to providing a representative sample of the college. None of the students invited to be interviewed said no, although some added little to the data collected during the interview process.

Analysis of interview data

The interviews were all recorded and then transcribed and typed up as text files. With the aid of computer software package NUD*IST (Non-Numeric Unstructured Data – Indexing Searching Theorising) the researcher was able to locate recurring themes and responses with the interview records. These themes were pre-defined from the questionnaire data and are listed on the interview schedule (see append 5 p243).

These eight themes covered a variety of issues concerning situations where the student was using a computer and what it was being used for. These theme also involved where the computer was in the family home, who used it and the level of monitoring that took place by either parents or installed software. The themes used were:

- Use of IT on course.
- College use of computers identified as course related, entertainment or other.
- Home use of computers identified as course related, entertainment or other.
- Internet use for course related work, entertainment or other.
- Use by other members of the family or household.
- Location of home PC at home.
- Monitoring of computer use by parents or college staff.

As the researcher was working alone the analysis of the interview data, under these themes, not been validated. This is the case with most doctorial studies where it is not

possible to validate the chosen categories or themes using another researcher. Actions such as this do increase the reliability of analysis, but the constraints of the doctoral work prevented this. There were however discussions with the supervisory team and discussions of samples of data. These discussions helped to ensure that the researcher's subjectivity was tempered with other viewpoints. Care had to be taken to ensure that the researcher did not just select data that supported a preconceived point of view or opinion. The researcher also had to ensure that objectivity was maintained in both the interview process and the subsequent analysis of the data (see Breuer et al, 2002 and Glaser et al 2002).

To aid the researcher when searching the interview transcripts the computer software package NUD*IST was used to help the researcher overcome, what could otherwise have been, a source of error in the research. The software package was used to enable the researcher to quickly move through the transcripts. It also enabled the researcher to search the text for key words and therefore minimise the risk of data being overlooked. The questions asked in the interviews were included in these transcripts, meaning the text search could be used to move through the transcripts to specific questions as well as the students' responses. This software was then used to code sections on the transcripts under the themes being investigated.

Ethical considerations for the researcher

Ethics covers what the researcher should regard as the correct and accepted means of performing his research. As a professional, the researcher has responsibilities to the

participants in the research, to colleagues and to himself (Hitchcock and Hughes 1995 p44).

Before submitting the research proposal, the researcher sought the permission of the Principal in which the college the study will be based. This was granted. To protect the identity of both students and staff, the college will be referred to using a fictitious name. At all stages respondents in the project had the option not to participate, and the purpose of the study was explained so that they can make an informed decision. Informed consent is a key issue for researchers in an educational setting (Burgess 1985). In schools there is sometimes the suggestion that the children involved in a study are not old enough to make this decision for themselves, this is not the case at an FE college. While there are a small number of students under sixteen at the college, there are none under fourteen, so all the students can be considered old enough to make the decision to participate or not for themselves (see Cohen and Manion 1994).

Anderson (1998) on consent suggests this be in writing and

> 'naturally, the information needs to be suited to the language, culture and age of the participants' Anderson 1998 p19)

A good example of researchers recording consent can be found in Smith and Keep (1986 p 84). They state that they were careful to explain to the pupils the nature of the research and during the interviews, which were recorded, the tape recorder was in view. The

procedures used by Smith and Keep regarding consent were adopted for this research project.

To consider it ethical to get informed consent however does not, according to Kimmel (see Cohen and Manion 1994 pp359 - 360), mean that failure to do so automatically renders the research unethical. However in this research, the researcher considered it important that all those involved where fully informed and were able to make a free and informed choice.

Research that involves individuals must consider the question of confidentiality. Individuals and locations included in the research should not be identifiable in the final report. Students who were invited to complete a questionnaire did so anonymously. To ensure the confidentiality of the data used, the students who were interviewed were asked to choose a reference name. After the interviews, respondents were given the opportunity to review the transcript and comment on its accuracy.

As college policy, staff and students are told that all Internet use, using college connections is monitored. The college IT manager and his staff maintain a 'firewall' which records all accessed sites on the Internet. It can also be used to monitor where in the college someone is trying to access a prohibited site. Data relating to the location of Internet access which was in breach of college regulations was not part of the data set used in the research.

Best (1983 cited in Delamont 1996 p346) referred to a 'hidden curriculum' which included the learning of expected behaviour patterns for males and females. This hidden curriculum is 'learned from peers and enforced by them.' Delmont warns that there can be ethical problems associated with any research that includes gender issues. Part of this research was a comparison of the use made of the Internet by male and female students and an investigation of any identifiable attitude towards IT. The researcher was aware that some aspects of technology are often seen as gender biased, care was taken not to reinforce this stereotyping.

Travers (1978) recommends that this possible source of error in data collect must be taken into account at the question design stage. The researcher, therefore, ensured that questions that a respondent could answer quickly and without much thought were avoided. The researcher endeavoured to ask questions in such a way that the respondent's answer on the day questioned, would be the same if the respondent was asked the same question tomorrow. Questions in the interview were asked in a logical sequence. As an example, the researcher established if a respondent had a computer at home before asking what they used it for. All key questions were tested in a series of pilot interviews. These interviews were seen by the researcher as an important part of the research design. The researcher was aware of the need to practice asking questions in such a way as to make them clear and understandable to the respondent, but also in a way that did not encourage the respondent to give an answer because they thought it was what the researcher wanted to hear. The researcher was also aware that body language plays an important part in the interview process. Visual reactions to respondents' answers to questions asked may have

had an effect on respondents' answers in latter parts of the interview. The researcher therefore used the pilot interviews to practice appearing to be interested in the respondents answers without encouraging the respondent to develop a particular line or pattern in their responses.

The sample interviewed included male and female students. So that these students were not made to feel uncomfortable by being interviewed by a male researcher, the location of the interviews was chosen so that the interview was conducted in the sight of other college members.

Hitchcock and Hughes (1995 p45) discuss whether research should be done overtly or covertly. Opportunities in schools and colleges for teacher-researchers to covertly observe students are abundant but to use these opportunities for the benefit of the research programme could be wrong (Hitchcock and Hughes 1995 p48). To ensure that this research did not become covert, those involved, at what ever level, were reminded of the researcher's purpose during appropriate stages of the research. In instances where the researcher heard students make comments that could contribute to the research, the researcher invited these students to take part in a recorded interview.

Naturally the researcher overheard conversations between students while working in the college and had to deal with the ethical question regarding the use of these pieces of information. Anderson (1990 p24-25) said that it may or may not be ethical to use

information gained during the research process via informal or unplanned conversations depending on how it is used. Anderson said it was unethical to use this information if

> 'You wish to quote something a specific individual said, or you change you research plan because of this information, it is you duty as a researcher to try and return to the source to obtain written consent'

He did not see it as unethical however if

> 'the information gathered is used personally to help you as a researcher understand the phenomena you are exploring'

To overcome this on these occasions, the researcher, when faced with this situation, invited the students to take part in the research by being interviewed. This happened on two occasions, and both students agreed to be interviewed as part of the research project.

Other members of staff at the college have been made aware of the aims of the research. In particular the researcher asked the staff who work in the flexible learning centre to discuss the research proposal, with regard to the researcher having access to the drop in centre and talking to students in that room. This was done at one of their weekly staff meetings. All of the staff were happy for the research to go ahead.

In the course of the research, the qualitative researcher will affect what the subjects of the research are doing. Travers (1978 p290) refers to this as a reactive effect. For the qualitative researcher this means making the subjects aware that research is being done, and giving them a choice as to whether they take part or not. The teacher researcher has to be particularly careful that they do not abuse his/her position of authority and trust. Teachers need to be aware that students will do something just because a teacher has asked them to, often complying without considering if it is in their best interest to do so. This tendency to comply to please the teacher can also carry over into the observations or data being recorded. Will the students who know that they are being observed modify their actions in order to be looked upon favourably? More importantly will the researcher be able to identify this behaviour when it occurs?

In this study the researcher works at the institution where the research is taking place. This can be a source of bias and one the researcher needs to guard against. For instance the teacher researcher may have a particular interest in a curriculum area and feel that the school or college should devote more resources to that area. The researcher needs to be sure that his motivation for the research is to improve practice and not promote his own beliefs. As someone involved with an institution, before the research commences the practitioner is likely to have data of a historical nature relating to the problem. This is not data the researcher can ignore because it will affect their thinking in the course of the research project; indeed it may have been instrumental in the formulation of the research idea.

The question of confidentiality here is more complex for the qualitative researcher as compared to most other research approaches. When a researcher is collecting data in the school or college in which they normally work, colleagues and students may forget that the request is for research purposes. Recent changes in the law (the data protection act) may also mean that data the researcher has access to within his school or college should not be used for reasons other for which they were collected.

The researcher needs be sure not only that they do not use research to further their own interests, but they should take care to proceed with the research in such a way that 'the values of the school' are not compromised. (Altrichter 1993 p6). Will the researcher be asking members of the school or college to do things they would not normally be asked or expected to do? As example here, if the research interview overruns the planned time will the student be delayed for a timetabled lesson? For this research project students were asked to make sure they had sufficient time to complete the interview without overlapping other commitments.

This leads to another ethical consideration for the researcher, namely that of the respondents' time. Anderson (1998) regards it as an important ethical consideration for the researcher

> "To waste the participants' time by asking him or her to complete irrelevant questions or participate in studies which by

> their nature cannot lead to significant results' (Anderson 1990 p21)

There must be a distinction here between research that could lead to significant results and research that does lead to significant results. At the time of conducting the research the researcher will not be able to ascertain the actual outcome of the research. If they could, then it would certainly not be ethical taking up respondents' time to find a result that was already known. In order to justify research projects that make use the students' time at college, the researcher must be convinced that what they are doing is of value to others, and not just to themselves.

These points may be regarded as aspects of loyalty to those studied. Further to this, it is not the intention of the researcher to use any aspect of this research as a means of criticising any aspect of a group's culture or values.

Anderson (1990 p24) alerts us to he danger that

> 'Sometimes it is not just the topic, but also the sponsor which creates issues'

The researcher's employer did make a contribution to the research in the way of help with course fees and granting access to the students. Senior staff were interested in the progress of the research project but at no time sought to influence how it was carried out.

The College has procedure for publications by staff. In order to comply with this, the principal has been invited to comment on the research process and findings before any publication.

Chapter 4

Analysis of data

This research project uses data from four sources: the college firewall, the FLC electronic register, a questionnaire and a series of interviews. This chapter looks at the data from the first three sources in turn; the data gathered from the interviews is discussed in the next chapter.

Data from college monitoring system

With the aid of the college IT supervisor, reports were produced regarding web sites accessed. This was done on a regular basis over a period of weeks. It was done at the same time as the data used in other parts of this research was being collected. The software the college uses to monitor access to the Internet, called the firewall, monitors access between the college Intranet and the World Wide Web. Its principal design use is site security and can be used to control how the college Intranet can be accessed and used from outside the college. The software was set to produce a report showing the top twenty five sites visited in the given time period. The figures reported here represent the number of hits, meaning the number of times pages on the identified sites were visited in a one-hour period.

Snow Hill College, as in other colleges, also uses the firewall to control which pages on the WWW can be accessed from within the college. To be precise, it blocks sites the college IT supervisor does not want anyone within the college to have access. It does this

by comparing the URL for requested pages against a checklist. If the URL is on the list of pages to be blocked, or contains a prohibited key word, access to that page is denied. Instead of the page being displayed on the monitor, the user is faced with a warning that they have tried to access a prohibited site. The warning advises the user that if they feel this page has been wrongly classified as a prohibited page they can contact the IT supervisor. The supervisor will first check out the content of the page, and if it contains nothing that would infringe the college policy on Internet use, the page is added to a permitted list.

It is a concern for the college that adding URLs to the prohibited list or the URLs of pages that can be accessed to another list held within the firewall software actually slows up the college Internet access. Every request for a web page has to pass through this checking procedure and the longer the list the slower it becomes.

While the firewall is performing these checks it keeps a record of all pages viewed on the WWW from within the college. The software tracks all pages viewed, this includes pages not requested. These pages that pop up as new windows are typically advertisements. References to these non-requested pages have been removed from the data set, and are therefore not included in the following analysis.

As an example of these pop up pages consider the Internet site advertisement.com. This site appeared in the top twenty five sites visited in week 6, and was viewed 299 times. Removing pop up pages reduced the number of links shown on the top twenty-five list.

Servers that act as a host for an Internet site have limitations. For a popular site this can mean that at busy times access to a particular site can be slow. To overcome this problem, owners of these sites make arrangements for their site to be available via more than one host server. The college firewall treats each of these routes to a web site as different and the sites therefore show as different items in the top twenty-five lists.

This repetition caused the researcher two problems. First there was the need to combine references to the same pages in the data. The effect of this meant that in week 4, after the removal of the pop up pages and combining repeated sites, the list was reduced to 11 sites, while in week 6 there where 13 sites. Secondly there is the question regarding sites that were not in the top twenty-five, it may be that by combining references for these pages would have moved them up the popularity lists.

Yet another problem for the researcher was the number of students accessing the Internet whilst this data was collected. Some weeks it was high and sites in the top twenty-five had a high number of hits. Other weeks the number of students using the Internet during the sampling period was low, and sites were listed in the top twenty-five with a relatively low number of hits. How this number fluctuates can be seen in the graph below (figure 1)

With these constraints or difficulties inherent in the availability of the data, the researcher cannot make comments regarding overall popularity of the sites that are being visited from within the college. What the researcher can do however is to make observations regarding the type of site visited and in some instances the timing of the visit to the site.

Graph to show the number of web sites accessed

during sampling period

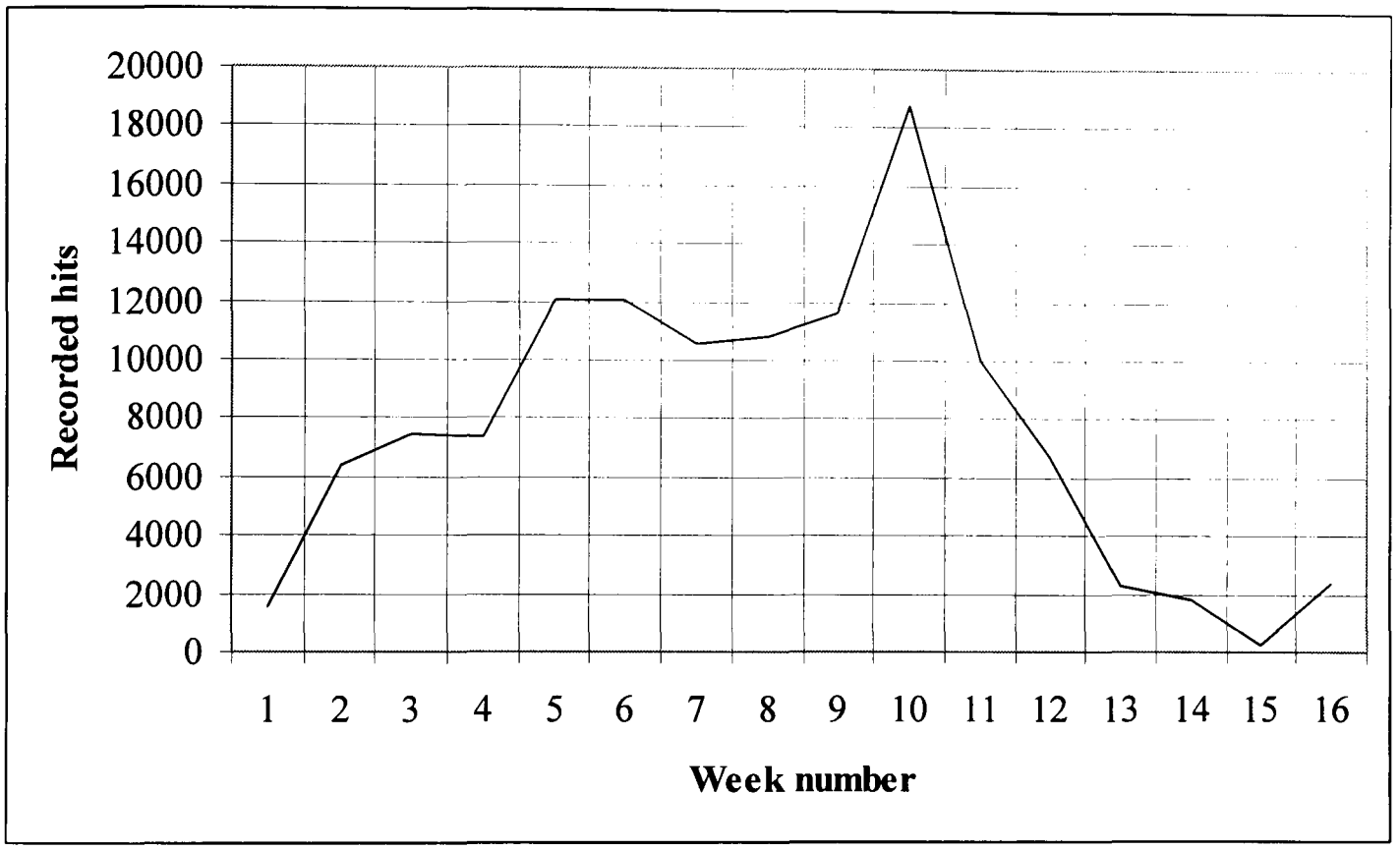

Figure 1

There were 109 different sites that were on the top twenty-five lists over the data collection period. Some sites appeared constantly, some were on the list for a few weeks then never again and some sites appeared for a single week.

The sites were seldom if ever out of the top twenty-five included www.altavista.com, www.aol.com www.google.com and www.lycos.co.uk all of which can be regarded as search engines. This type of page can be best described as an index system for the

Internet, and is therefore understandably a popular site for anyone wishing to search the Internet. Another site that falls into this category is www.gotoworld.com, which appears in the list for weeks two and three. This site offers a reward scheme for regular users, but this would not apply to users from within the college, as it requires a small program to be downloaded and installed on the machine that is to be used. Students cannot download and install software onto college machines, even if they could, they could not be sure to be able to use the same machine each time they used the Internet. Having these sites in the top twenty-five lists every week suggests that there are students using the Internet to access web pages for which they do not know the URL.

How students find sites that they are interested in looking at is a theme pursued in the student interviews.

Some sites can be grouped by the type of service they offer, one such group could be described as contact sites. Examples found in the hit list include www.epals.com, which is a host for student email and www.talk21.com a similar site for email accounts. Talk21 accumulated 2000 hits in a one-hour period during week four of the data collection period. Talk21 was in the top sites list every week apart from week one. Using the Internet as a communication tool is clearly a significant use for the students at Snow Hill College.

This is a theme the researcher had already planned to investigate further as part of the student questionnaire.

One site that appeared in the top twenty-five for one week only was www.blackpool.com with 214 hits, and as its name suggests, this is a tourist information site for the seaside resort of Blackpool. The researcher was able to identify the probable users as a group of Leisure and Tourism students who were being shown how to access the site as part of their induction to the FLC and using the Internet, whilst the sample data was being collected. Another site being used by a group of students was www.buildstore.co.uk. Construction trade students accessed this site as part of a project that required the costing of materials.

There were sites listed that the college would not necessarily add to the firewall prohibited list, but would never the less discourage students from using. One such site is www.cahoot.com, which appeared in the list again just for one week, with 257 hits. This site offers an online banking service. As the college cannot guarantee the security of its Internet service, it is not a site that the college would recommend that students use.

The college Internet is being used, as stated previously, for communication and for information seeking in connection with college based work. However, there were some sites that were visited that fall out side the categories mentioned above. The researcher can not be certain that these sites were unrelated to college work, but the content of the sites concerned would suggest that this is unlikely. These sites included: www.bolt.com a magazine for youth, www.argos.co.uk a mail order site for household goods and www.brookside.com the web site giving background information to a television show. At

least some of the sites falling in this category suggest that students are using the Internet for general interest or entertainment.

This again is a theme the researcher had already planned to investigate further as part of the student questionnaires.

Data from the Flexible Learning Centre

Data regarding the use of the FLC can be viewed in a number of ways. The data can be looked at by considering the number of users that go into the room, or by considering the length of stay in the FLC for these students. The data can also be used as a measure of room utilisation. The data was collected every week over one academic year. For clarity when graphically presenting these data all the data items were used but only some of the dates have been included on the graph axes in figures 2 and 3.

The graph below shows how the number of users fluctuates over the period of one academic year. The line for users shows discontinuities, or breaks, which coincide with college closures that are of varying length. Some of the closures were for periods in excess of a week, such as Christmas and Easter; some were for a week such as at half term. At other times classes at the college were closed but rooms such as the library and the FLC were open for student use. To smooth out the apparent effect of these periods on the data a four week moving average has been superimposed on to the graph (figure 2)

The peaks, or maximum values, on the moving average line coincide with college weeks immediately prior to the ends of half terms. Traditionally this is when many courses within the college set students hand in dates for assignments and other assessed work. This suggests that there are some students in the college who use the FLC when they have assignment work to do, and that they do this work immediately prior to the hand in dates.

Students using the FLC over one academic year

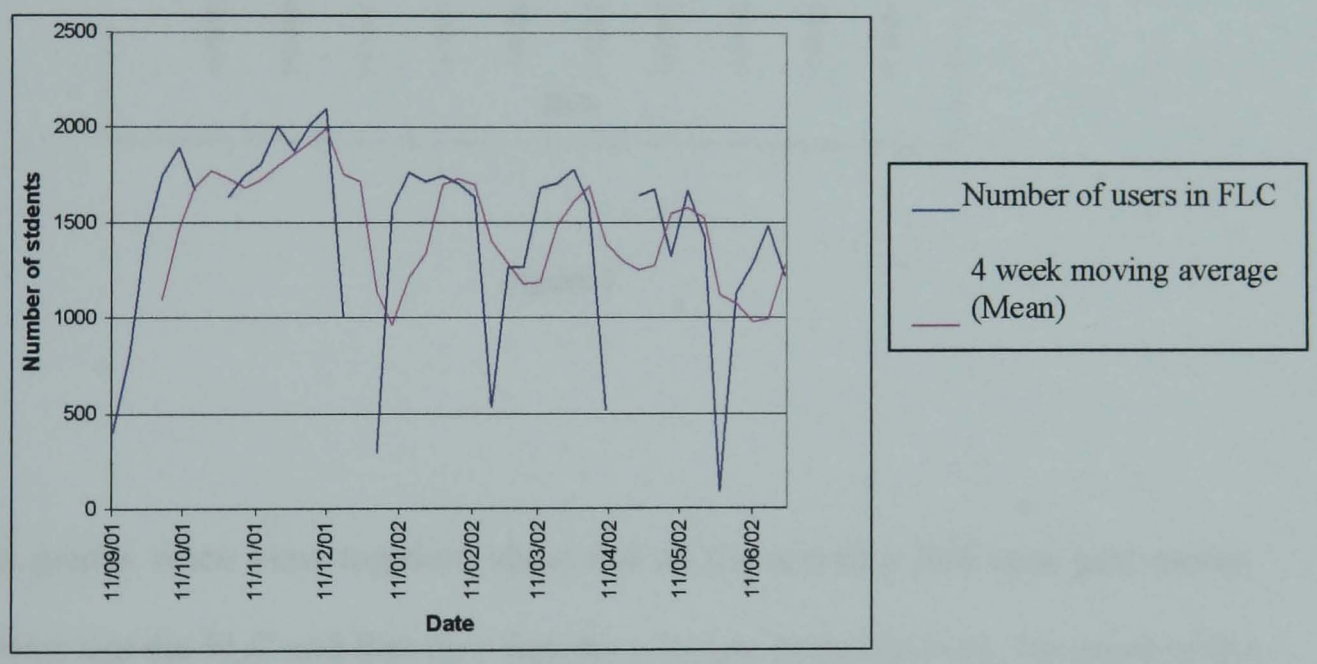

Figure 2

The following graph (figure 3) shows the attendance data for the FLC in terms of average length of stay per user on a week-by-week basis. As in the previous graph, a four-week moving average has been included on the graph. As in figure 2, breaks in the graph coincide with college closures.

Average (mean) length of students' stay in the FLC

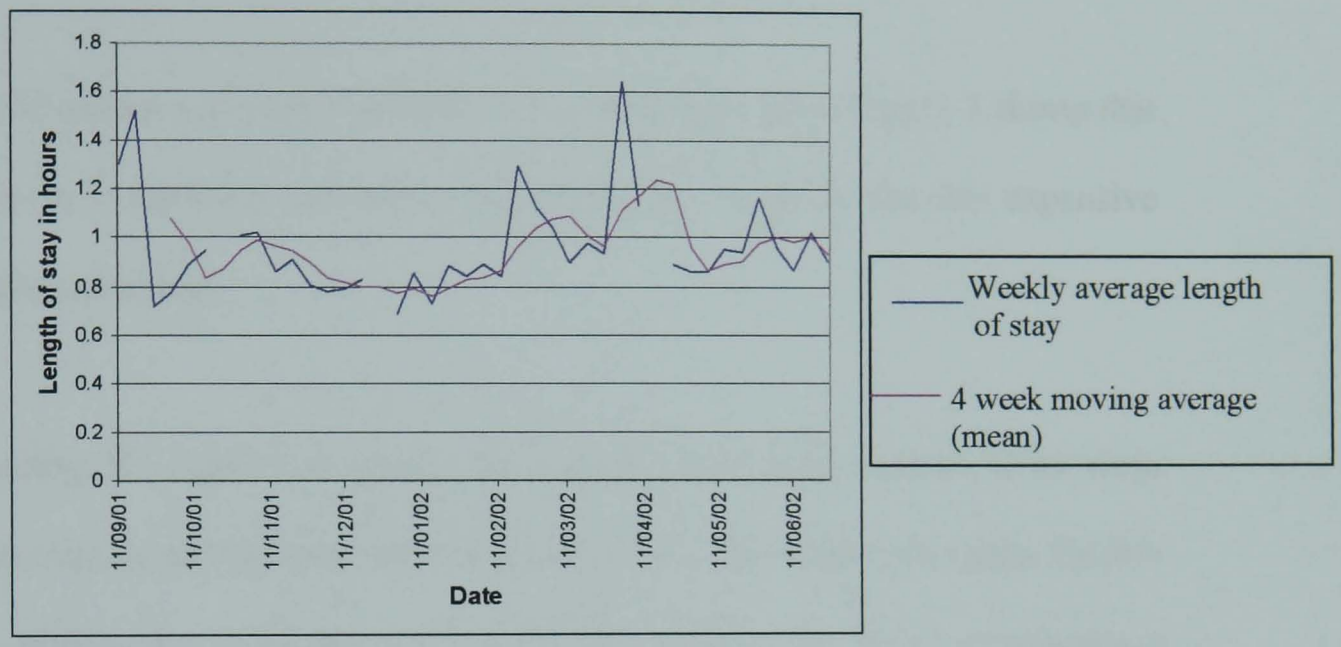

Figure 3

These two graphs when view together, show that as the end of a half term gets nearer, more students use the FLC and that they stay for a longer period of time. For most of the year the average (mean) length of stay in the FLC for students is between 45 minutes and 1 hour

Demand from the students regarding the use of this room, and therefore the equipment in it, can be seen as a combination of the number of students who want or need to use the room and the time they stay in the room. To show this demand in a more accessible form an utilisation factor has been calculated.

$$\text{Utilisation} = \frac{\text{Total student hours per week in the FLC}}{\text{Total number of PCs in room x hours FLC open per week}} \times 100$$

The college would consider a room utilisation factor of 60% as good. Figure 4 shows that the utilisation factor is normally just below this level. This suggests that this expensive resource is greatly underused.

The week beginning 2nd April was clearly the busiest. Over 2600 student visits were recorded with an average stay of over one and a half hours. The utilisation factor for this week was 97%. With a drop in facility, such as the FLC students are free to choose when they use the room, and it is, therefore, difficult for the college to control the utilization directly.

Weekly utilisation factor for the FLC

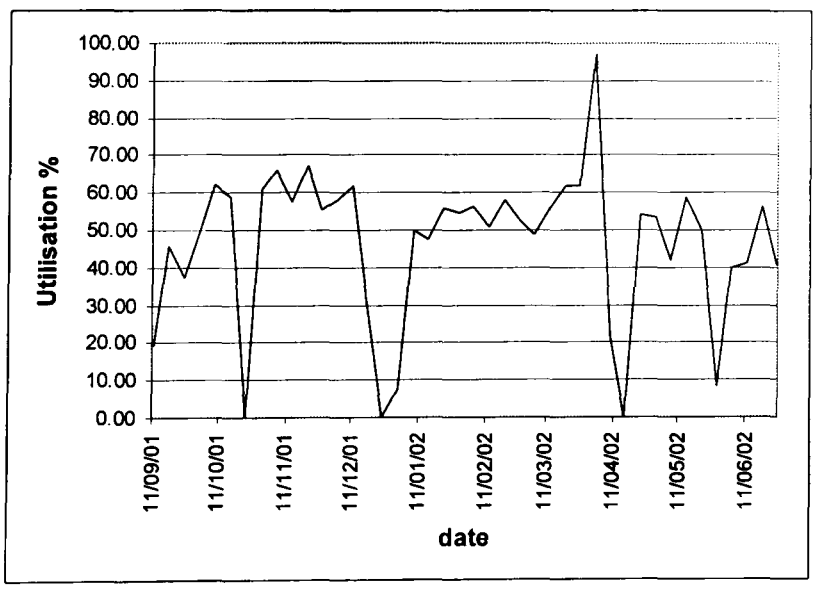

Figure 4

How students regard the college IT provision is important. This is something that Snow Hill College already recognises and the college places the needs of the individual learner at the heart of the college mission statement. Canvassing student opinion is part of the college quality control system for all courses. In the context of this research, student opinion of the college IT facilities was investigated as part of the questionnaire.

Analysis of Questionnaire data

As part of the research reporting process the researcher has to decide what the data analysis is to be used for, and what its contribution to the research report is expected to be. The data from the questionnaire has been analysed here using two widely accepted inferential statistical tests. Where a statistical test requires a method for the comparison of means a one-way ANOVA analysis has been performed. In the cases where the data collected needed to be compared using reported and expected frequencies Chi squared tests have been carried out.

Choosing one type of analysis over another may put limitations on the results or findings of the study. In this particular research project more sophisticated analysis techniques, such as multivariate analysis using a two-way ANOVA, could have been used. The researcher's decision to use the tests reported here is based on what the questionnaire data section of the research was designed to do. The qualitative data is intended to provide a background or a snap shot of IT within the college and background for the student interviews conducted in the college. This research is adopting a mixed methods approach,

and therefore the use of standard inferential statistical tests to probe hypotheses about the quantitative data is sufficient.

Response rate for questionnaire

When reporting on the data collected for a questionnaire, it is common practice to give the response rate. Arber (1993) said the researcher should aim for a response rate of at least 80%, but one around 70% is more realistic. In some studies a response rate of 60% has been thought to be acceptable. For this research the questionnaire was given to students while they were in class. The purpose of the questionnaire was explained to the students and they were invited to complete a copy. 216 questionnaires were given out and all 216 were returned to the researcher. Of these 208 were filled in, 2 were completed in such a way as to lead the researcher to believe the students concerned had not been helpful in their responses because obscenities or responses unconnected to the questions had been given. These two were therefore not used in the data set. A further 6 were returned uncompleted. The researcher was therefore working with a response rate of 96.3%

The questionnaire

The questionnaire was designed to collect data under five headings

1. The student's details

Students were asked to give details regarding age, ethnic group and religion. These responses enabled the researcher to compare responses between these different groups.

2. The student's level of computer literacy

Students were asked to indicate what they could do from a list of IT skills. These skills range from turning on a PC to editing web pages. From these responses a rough measure of the students perceived level of skill was obtained.

3. How the student makes use of Internet facilities that are available.

Students were asked to provide information regarding their use of the Internet, both in and out of college. They were asked to say the type of activity they engaged in and the length of time they used the Internet.

4. What the student thinks of the college provision for computers and the Internet.

The student was asked to respond to three open ended questions regarding the college provision for students wanting to use the Internet.

5. The students' attitude towards computers.

This is Selwyn's (1997) instrument for measuring the attitude of 16 – 19 year old students. This section is a series of 21 questions requiring responses on a five point likert scale and it was specifically designed to discriminate between students who have a positive attitude towards computers and those students with a negative attitude. Selwyn recommended the use of this scale as a comparative measure of attitude between students according to gender, race and socio-economic status.

Skill

Question 5 asked the student to identify things they could do on a computer from a list of tasks. Each item ticked by the student was counted and so a score for each student's self assessed level of skill was arrived at. These scores had a possible range of 20, where 0 would be the score for a student who claimed to have no IT skills and a score of 20 would represent a student who felt they had very good IT skills. This method was used in preference to asking students to describe their IT skills as good, very good, etc. as it was considered by the researcher to be less subjective.

Students' level of self-assessed skill with computers was first analysed by grouping the responses by gender, ethnic origin and religion. Possible correlations with other variables were then considered.

Before using a parametric test, such as one way ANOVA, it is usual to check the two assumptions made by the test. The test assumes that the data (population) is normally distributed and that the data is collected randomly.

The importance of the data being checked for normality diminishes as the sample size increases. For samples over 30 it is generally accepted that the data will approximate to a normal distribution. The symmetry of the sample can be used as an indication as to whether the researcher should test the normality further. Pearson's test for skewness is a simple test of the data set's symmetry, (see Owen and Jones 1977 p184).

Pearson's test for skewness uses the formula:

$$\text{Coefficient of skewness} = \frac{3(\text{mean} - \text{median})}{\text{Standard deviation}}$$

Normal distributions have a skewness coefficient of zero, but an acceptable range can be taken as -1 to $+1$. The coefficient for the variable skill in the data set was calculated to be -0.3981, and is therefore in the acceptable range.

All of the respondents who completed a questionnaire were chosen independently of their religious or ethnic group. That is to say, they were asked to complete a questionnaire before their religious or ethnic group was known, so this variable in the data set can be regarded as random.

The data on self-assessed skill was tested against the hypothesis:

H_0: there is no difference between the level of skill claimed by male students and the level of skill claimed by female students.

H_1: there is a difference between the level of skill claimed by male students and the level of skill claimed by female students.

The details for this calculation are in appendix 2 page 231. From this calculation the decision is to reject H_0 and accept H_1 as there is sufficient evidence to suggest that there is a difference in the level of IT skills claimed by female and male students. Male students claimed to have greater IT skills than skills claimed by female students.

The data was then grouped for the skill variable on the basis of gender, religious group and ethnicity. Not all student data could be analysed in this way, because of low frequencies for some religious groups. The three groups that could be looked at in this way were Christian, Muslim and students with no stated religion. The fist comparison was between Christian and Muslim students. Similarly not all ethnic groups could be included and only the groups with a frequency of over 5 are used in the calculations. The ethnic groups that could be used were black Caribbean, Pakistani, Indian and white.

Hypotheses to be tested:

H_0: there is no difference between the levels of skill claimed by students from different religious or ethnic groups.

H_1: there is a difference between the levels of skill claimed by students from different religious or ethnic groups.

The details for this 1-way ANOVA calculation can be found in appendi2 pages 231 – 233.

The decision to reject or accept H_0 is not clear cut here. The analysis shows that there is insufficient evidence to suggest that there is a difference in the level of skill in IT claimed by students when analysed separately for ethnic group or religion. There is, however, sufficient evidence to suggest that there is a difference in skill between many sub-groups, when these sub-groups are defined in terms of gender and religion.

The researcher is not saying here that a student's IT skill is affected by their religion. It is rather the case that religion is part of a student's culture, and students sharing the same culture are likely to have had similar experiences. The results here therefore suggest that culture does impact upon how student interact with IT.

The data on self-assessed skill was tested against the hypothesis:

H_0: there is no difference between the level of skill claimed by male students and the level of skill claimed by female students.

H_1: there is a difference between the level of skill claimed by male students and the level of skill claimed by female students.

The details for this calculation are in appendix 2 page 231. From this calculation the decision is to reject H_0 and accept H_1 as there is sufficient evidence to suggest that there is a difference in the level of IT skills claimed by female and male students. Male students claimed to have greater IT skills than skills claimed by female students.

The data was then grouped for the skill variable on the basis of gender, religious group and ethnicity. Not all student data could be analysed in this way, because of low frequencies for some religious groups. The three groups that could be looked at in this way were Christian, Muslim and students with no stated religion. The fist comparison was between Christian and Muslim students. Similarly not all ethnic groups could be included and only the groups with a frequency of over 5 are used in the calculations. The ethnic groups that could be used were black Caribbean, Pakistani, Indian and white.

Hypotheses to be tested:

H_0: there is no difference between the levels of skill claimed by students from different religious or ethnic groups.

H_1: there is a difference between the levels of skill claimed by students from different religious or ethnic groups.

The details for this 1-way ANOVA calculation can be found in appendix 2 pages 231 – 233.

The decision to reject or accept H_0 is not clear cut here. The analysis shows that there is insufficient evidence to suggest that there is a difference in the level of skill in IT claimed by students when analysed separately for ethnic group or religion. There is, however, sufficient evidence to suggest that there is a difference in skill between many sub-groups, when these sub-groups are defined in terms of gender and religion.

The researcher is not saying here that a student's IT skill is affected by their religion. It is rather the case that religion is part of a student's culture, and students sharing the same culture are likely to have had similar experiences. The results here therefore suggest that culture does impact upon how student interact with IT.

in the level of skill in IT claimed by Christian students and students with no stated

- The skill level claimed by Christians is significantly less than that claimed by both Muslims and those of no religion.

- There was no significant difference between Muslims' claimed skill level and that of students with no religion.

The researcher has therefore been able to identify a difference in level of IT skills claimed by Christian and Muslim students, and this difference is also identifiable between Christian male and Muslim male students. However no significant difference was found between Christian females and either Muslim females or males; Christian females' level of skill is not significantly greater than Christian males.

The researcher is not saying here that a student's IT skill is affected by their religion. Rather that religion is part of a student's culture, so it can be used to identify groups of students who could be expected to have the same cultural experiences. The results here therefore suggest that culture does impact upon how students interact with IT.

The small frequencies recorded for some religious groups restrict what the researcher can do with the data and as the college does not keep a record of students' religion there is no easy way that students from different religions could be sampled. Viewing the data set as a whole there was insufficient data to test if was any difference between the skills of differing religious groups. What the researcher could argue is that as differences were found between students from the large religious groups, then staff at the college should be aware that differences might exist for students from any religious groups.

The same problem was encountered when looking at the responses grouped by ethnicity. Again only the main ethnic groups could be compared. For these ethnic groups there was no significant difference when the claimed skill levels were compared.

IT Training

Question six asked if the respondent had received any IT training, 78.4% said they had received training and 21.6% said that they had received no IT training. In order to see how differing groups answered this question and to see if there were any significant differences between these groups a series of tests were performed on the data. Gender was used as the first grouping variable

To test the hypothesis

H_0: there is no difference between the number of male and the number of female students who have received IT training.

H_1: there is a difference between the number of male and the number of female students who have received IT training.

Calculation:

	Male	Female
Case1	68	96
Case2	77.7	86.7

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values. This gave:

Chi-squared = 2.209 with 1 degree of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: Accept H_0 and reject H_1. There is no difference between the number of male and the number of female students who have received IT training.

The same data was then looked at using religion as the grouping variable. However not all the data could be used as Chi-squared calculations are not valid for small frequencies. The calculation of Chi-squared assumes that the expected frequencies are not too small, meaning that they are not less than 5. This problem can be overcome in two ways. By combing adjacent groups so that expected frequencies are all 5 or greater than 5. This would make little sense, since the order of religious groups is arbitrary. The alternative is to consider a subset of the data, in this case the religious groups that do not have low frequencies.

To test the hypotheses:

H_0: The number of students who have received IT training is independent of their religious group.

H_1: The number of students who have received IT training is not independent of their religious group.

Calculation:

	Christian	Muslim	None
Case1	64	34	58
Case2	55.3	41.8	55.9

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values.

This gave Chi-squared = 2.903 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$

Decision: Accept H_0 and reject H_1 the number of students who have received IT training is independent from their religious group.

The data was then grouped on the basis of ethnic group. This produced the same problem as with the religious groups because some groups had an expected frequency of less than 5. Again the arbitrary grouping of some of the minor groups was considered to be not meaningful. The difference between the two major ethnic groups was looked at as a subset of the data.

To test the hypotheses:

H_0: The number of students who have received IT training is independent from their ethnic group.

H_1: The number of students who have received IT training is not independent from their ethnic group.

Calculation:

	Pakistani	White
Case 1	32	117
Case 2	38.5	110.5

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values.

This gave Chi-squared = 1.48 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: Accept H_0 and reject H_1 the number of students who have received IT training is independent from their ethnic group, for the groups tested.

These results are significant for Snow Hill College, as the analysis of responses to question 6 is what the college would like and expect to see. From an equal opportunities point of view the training of students in IT skills is independent of gender, religion and ethnicity.

If there is no measurable difference in the IT training male and female students receive, how can the researcher account for the difference in their levels of IT skills? The remainder of the questionnaire responses can be used to address this question. Two factors that will have an affect on a student's level of IT skill are the student's attitude

towards using IT and the amount of time the student uses IT and therefore the time the student spends practicing and developing these skills.

Computer use

In the questionnaire students were asked to give information regarding computer use. The questions asked can be grouped under four headings. First do they have access to a computer, second where do they use a computer, thirdly how long do they spend using a computer and finally what do they use it for? The researcher felt it was important to distinguish between having access to a computer and using it, as the first does not necessarily imply the second. Within these headings, computer use was analysed using the three grouping variables, Gender, Ethnic Origin and Religion.

Questions 10 and 11 asked the student to quantify their use of computers at home and at college.

	Regularly	Sometimes	Never
Do you use a computer at home?	55.8%	22.6%	21.6%
Do you use a computer at college?	41.3%	52.4%	6.3%

Questions 14, 15, 16 and 17 asked respondents to give a little more detail about the length of time they were using computers. By asking students to say how many times in a week

and for how long they used a computer, an estimate of each student's time using a computer, both at home and at college, was obtained.

The data was grouped by gender, religion and ethnic group and a series of 1-way AVOVA calculations were used to test the data against the hypothesis:

H_0: there is no difference between the amount of computer use at home or college by students from different gender, religious or ethnic groups.

H_1: there is a difference between the amount of computer use at home or college by students from different gender, religious or ethnic groups.

The details for these calculations are in appendix 3 pages 234 - 241.

The decision here is to accept H_0 and reject H_1 as there is insufficient evidence to suggest that there is a difference in the amount of computer use by students, from different religious or ethnic groups, at either home, college or combined, with one exception. The analysis suggests that there is a significant difference in use of computers at home and at college between male and female students. This gender difference was significant for white students, but not significant for students from other ethnic groups.

Having compared the time students spent using computers, with grouping variables gender, religion and ethnic group, the different activities students were using computers for was investigated. Question 13 asked students to specify which of the listed activities

they used the Internet for. In the pilot questionnaire this question had been written as an open ended question. From the pilot, it was found that students were only using a limited number of responses, therefore, in the questionnaire used in the study the question was written giving the students a choice between uses. These choices were the ones that had been used by students in the pilot questionnaire and were:

- Using the Internet to find information.
- Using the Internet for entertainment.
- Using the Internet for college related work.
- Using the Internet for private use.

There was also the option to give examples of Internet use not covered by the choices listed but no student used this for any additional response.

The first activity was given as using the Internet for information. The responses were analysed using grouping variables gender, religion and ethnic group.

Regarding using the Internet for information the hypotheses to be tested:

H_0: there is no difference between the number of male students and the number of female students using the Internet for information.

H_1: there is a difference between the number of male students and the number of female students using the Internet for information.

Calculation:

	Male	Female
Case 1	91	86
Case 2	83.4	93.6

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values.

This gave Chi-squared = 1.31 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1 as $T < 3.84$. There is insufficient evidence to suggest that there is a difference between the number of male students and the number of female students using the Internet for information.

The second use of the Internet listed was using it for entertainment. Regarding using the Internet for entertainment the data was tested against the hypotheses:

H_0: there is no difference between the number of male students and the number of female students using the Internet for entertainment.

H_1: there is a difference between the number of male students and the number of female students using the Internet for entertainment.

Calculation:

	Male	Female
Case 1	81	64
Case 2	68.3	76.7

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values.

This gave Chi-squared = 4.464 with 1 degree of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: reject H_0 and accept H_1 as $T > 3.84$. There is sufficient evidence to suggest that there is a difference between the number of male students and the number of female students using the Internet for entertainment. For the students that took part in this study there is a clear indication that male students are using the Internet for Entertainment to a greater extent than the female students.

The third use of the Internet listed was using it for college related work. Regarding using the Internet for college work the data was tested against the hypotheses:

H_0: there is no difference between the number of male students and the number of female students using the Internet for college work.

H_1: there is a difference between the number of male students and the number of female students using the Internet for college work.

Calculation:

	Male	Female
Case 1	92	81
Case 2	81.5	91.5

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values.

This gave Chi-squared = 1.31 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1 as $T < 3.84$, there is insufficient evidence to suggest that there is a difference between the number of male students and the number of female students using the Internet for college work

Regarding using the Internet for private use hypotheses to be tested:

H_0: there is no difference between the number of male students and the number of female students using the Internet for private use.

H_1: there is a difference between the number of male students and the number of female students using the Internet for private use.

Calculation:

	Male	Female
Case 1	93	86
Case 2	84.3	94.7

A Chi-squared calculation was performed using case 1 as the observed values and case 2 as the expected values.

This gave Chi-squared = 1.697 with 1 degree of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: accept H_0 and reject H_1 as $T < 3.84$. There is insufficient evidence to suggest that there is a difference between the number of male students and the number of female students using the Internet for private use.

Ethnic group was then used to group the data obtained from questions 13. Using the frequencies for the two largest ethnic groups, each part of the question was considered in turn.

The data from the fist part of question 13 was tested against the hypotheses:

H_0: there is no difference between the number of Pakistani students and the number of white students using the Internet for information.

H_1: there is a difference between the number of Pakistani students and the number of white students using the Internet for information.

Calculation:

	Pakistani	White
Case 1	42.6	114
Case 2	40.2	115.7

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.168 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1 as $T < 3.84$, there is insufficient evidence to suggest that Pakistani students use the Internet more than white students for information.

Regarding using the Internet for entertainment the data was tested against the hypotheses:

H_0: there is no difference between the number of Pakistani students and the number of white students using the Internet for entertainment.

H_1: there is a difference between the number of Pakistani students and the number of white students using the Internet for entertainment.

Calculation:

	Pakistani	White
Case 1	32	93
Case 2	32.3	92.7

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.0038 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1 as $T < 3.84$, there is insufficient evidence to suggest that Pakistani students use the Internet more than white students for entertainment.

Regarding using the Internet for college related work, hypotheses to be tested:

H_0: there is no difference between the number of Pakistani students and the number of white students using the Internet for college related work.

H_1: there is a difference between the number of Pakistani students and the number of white students using the Internet for college related work.

Calculation:

	Pakistani	White
Case 1	40	114
Case 2	39.7	114.3

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.0031 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1 as $T < 3.84$, there is insufficient evidence to suggest that Pakistani students use the Internet more than white students for college related work.

Regarding using the Internet for private use the data was tested against the hypotheses:

H_0: there is no difference between the number of Pakistani students and the number of white students using the Internet for private use.

H_1: there is a difference between the number of Pakistani students and the number of white students using the Internet for private use.

Calculation:

	Pakistani	White
Case 1	41	81
Case 2	31.5	90.5

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 3.862 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: reject H_0 and accept H_1 as $T > 3.84$, there is sufficient evidence to suggest that Pakistani students use the Internet more than white students for private use.

This is an important result in the context of this research. It clearly shows that students' cultural background is linked to either how they use the Internet or to how they describe their use of the Internet.

The data obtained from question 13 were grouped by religion using the three most frequent responses.

Regarding using the Internet for information hypotheses to be tested:

H_0: there is no difference between the numbers of students from different religious groups who use the Internet for information.

H_1: there is a difference between the numbers of students from different religious groups who use the Internet for information.

Calculation:

	Christian	Muslim	None
Case 1	60	48	63
Case 2	63.9	45.7	63.3

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.355 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1 as $T < 5.99$, there is insufficient evidence to suggest that there is a difference between the numbers of students from different religious groups who use the Internet for information.

Regarding using the Internet for entertainment the data was tested against the hypotheses:

H_0: there is no difference between the numbers of students from different religious groups who use the Internet for entertainment.

H_1: there is a difference between the numbers of students from different religious groups who use the Internet for entertainment.

Calculation:

	Christian	Muslim	None
Case 1	45	39	54
Case 2	51.6	36.9	49.5

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 1.373 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1 as $T < 5.99$, there is insufficient evidence to suggest that there is a difference between the number of students from different religious groups who use the Internet for entertainment.

Regarding using the Internet for college related work hypotheses to be tested:

H_0: there is no difference between the numbers of students from different religious groups who use the Internet for college related work.

H_1: there is a difference between the numbers of students from different religious groups who use the Internet for college related work.

Calculation:

	Christian	Muslim	None
Case 1	57	45	62
Case 2	61.3	43.9	58.8

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.503 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1 as $T < 5.99$, there is insufficient evidence to suggest that there is a difference between the number of students from different religious groups who use the Internet for college related work.

Regarding using the Internet for private use hypotheses to be tested:

H_0: there is no difference between the numbers of students from different religious groups who use the Internet for private use.

H_1: there is a difference between the numbers of students from different religious groups who use the Internet for private use.

Calculation:

	Christian	Muslim	None
Case 1	45	34	45
Case 2	46.3	33.2	44.5

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.061 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1 as $T < 5.99$, there is insufficient evidence to suggest that there is a difference between the number of students from different religious groups who use the Internet for private use.

Having tested the data grouped in a number of ways the researcher has found only two significant differences. Namely that males use the Internet more than females for entertainment and that Pakistani students use the Internet more than white students for private use.

As with previously mentioned findings, where religion was viewed as a contributing factor to a student's culture, ethnic origin can be regarded in the same way. As was the case for religion, ethnic origin is a way of grouping and identifying students from similar cultureal backgrounds. The significance of the results here point to a difference in how students from different cultural backgrounds use and describe, their use of the Internet

Questions 18 to 21 covered student use of e-mail at both home and college. The students were asked if they had access to e-mail and then if they used it. This was done separately for home and college use.

When asked if they had access to e-mail at home 62 % of the students said yes they had e-mail at home and 45.9% said that they used it. At college 47.9% said that they had e-mail at college and 33.2% said they used it at college.

As with previous questions, the data will be grouped in turn by gender, ethnic group and religion. Grouping the data first by gender the data was tested against the hypotheses:

H_0: there is no difference between the number of male students who have e-mail at home and the number of female students who have e-mail at home.

H_1: there is a difference between the number of male students who have e-mail at home and the number of female students who have e-mail at home.

Calculation:

	Male	Female
Case 1	60	66
Case 2	59	66.6

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.022 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1, there is insufficient evidence to suggest that there is a difference between the number of male students who have e-mail at home and the number of female students who have e-mail at home.

Grouping the data by gender, question 18 was used to filter students who had e-mail at home; these students' responses were then tested against the hypotheses:

H_0: For students who have access to e-mail at home there is no difference between the number of male students who use e-mail at home and the number of female students who use e-mail at home.

H_1: For students who have access to e-mail at home there is a difference between the number of male students who use e-mail at home and the number of female students who use e-mail at home.

Calculation:

	Male	Female
Case 1	57	46
Case 2	48.9	53

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 2.266 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: accept H_0 and reject H_1, for students who have access to e-male at home there is no difference between the number of male students who use e-mail at home and the number of female students who use e-mail at home.

Comparing male and female student responses to question 18, which asked if they have e-mail at college, the following responses were obtained.

	Yes	No	Do not know
Male	68%	22.7%	9.3%
Female	30%	57.3%	12.7%

These students' responses were then tested against the hypotheses:

H_0: there is no difference between the number of male students who have e-mail at college and the number of female students who have e-mail at college.

H_1: there is a difference between the number of male students who have e-mail at college and the number of female students who have e-mail at college.

Calculation:

	Male	Female
Case 1	66	33
Case 2	46.6	52.3

Chi-squared Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 15.2 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: reject H_0 and accept H_1, there is sufficient evidence to suggest that there is a difference between the number of male students who have e-mail at college and the

number of female students with e-mail at college. A greater proportion of male students have access to e-mail at college compared with female students.

It has already been shown that male students make more use of the college IT facilities than the female students do, and it may be that the male students are more aware of what is available. It could be argued that the male students, compared to female students, may not have more e-mail accounts that can be accessed when in college, but are just better informed.

Comparing male and female student responses to question 18, regarding use of e-mail at college, these students' responses were then tested against the hypotheses:

H_0: For students who have access to e-male at college there is no difference between the number of male students who use e-mail at college and the number of female students who use e-mail at college.

H_1: For students who have access to e-male at college there is a difference between the number of male students who use e-mail at college and the number of female students who use e-mail at college.

Calculation:

	Male	Female
Case 1	44	25
Case 2	46.2	24.1

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.138 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1, given that a student has access to e-mail at college there is no difference between the number of male students who use e-mail at college and the number of female students who use e-mail at college.

If the data is not filtered for those with access to e-mail at college, a different result is obtained. The data for all students, regardless of whether they have access to e-mail at college or not, can be tested against the following hypotheses:

H_0: there is no difference between the number of male students who use e-mail at college and the number of female students who use e-mail at college.

H_1: there is a difference between the number of male students who use e-mail at college and the number of female students who use e-mail at college.

Calculation:

	Male	Female
Case 1	44	25
Case 2	32.5	36.5

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 7.693 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: reject H_0 and accept H_1, there is a difference between the number of male students who use e-mail at college and the number of female students who use e-mail at college.

The data suggests that there is a gender difference regarding e-mail at college, namely that male students are more likely than female students to maintain an e-mail account that they can access from college. This is not something controlled by the college. Both male and female students have the same opportunities regarding the use of IT at the college. It is the students who choose to either access an existing e-mail account from college or to set up a new one. Alternately this may be further evidence that the male students are better informed regarding what IT facilities are available at the college, either because they make more use of the college IT facilities as previously mentioned, or they have been sufficiently motivated to find out what is available. Which ever is the case, the

researcher has found further evidence to support the theory that gender differences do contribute to differences between students' behaviour regarding use of the Internet.

Questions 18 and 19 were then looked at using ethnicity as the grouping variable. The data set was grouped by ethnic group, and then the two major ethnic groups were compared by testing the data against the hypotheses:

H_0: there is no difference between the number of Pakistani students who have e-mail at college and the number of white students with e-mail at college.

H_1: there is a difference between the number of Pakistani students who have e-mail at college and the number of white students with e-mail at college.

Calculation:

	Pakistani	White
Case 1	27	56
Case 2	21.1	61.9

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 2.212 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: accept H_0 and reject H_1, there is insufficient evidence to suggest that there is a difference between the number of Pakistani students who have e-mail at college and the number of white students with e-mail at college.

Looking at the responses regarding email at home, the data was tested against the hypotheses;

H_0: there is no difference between the number of Pakistani students who have e-mail at home and the number of white students with e-mail at home.

H_1: there is a difference between the number of Pakistani students who have e-mail at home and the number of white students with e-mail at home.

Calculation:

	Pakistani	white
Case 1	25	66
Case 2	23	67.8

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.222 with 1 degrees of freedom at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1, there is insufficient evidence to suggest that there is a difference between the number of Pakistani students who have e-mail at home and the number of white students with e-mail at home.

Question 19 asked about use of e-mail at home, the data was tested against the hypotheses:

H_0: there is no difference between the number of Pakistani students who use e-mail at home and the number of white students who use e-mail at home.

H_1: there is a difference between the number of Pakistani students who use e-mail at home and the number of white students who use e-mail at home.

Calculation:

	Pakistani	White
Case 1	44	66
Case 2	28.4	81.6

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 11.55 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: reject H_0 and accept H_1, there is evidence to suggest that there is a difference in the number of Pakistani students who use e-mail at home and the number of white

students who use e-male at home. There is a larger proportion of the Pakistani students who use e-mail at home compared with the proportion of white students.

Regarding the use e-mail at home, if students answered yes to question 18, the data can be tested against the hypotheses:

H_0: For students who have access to e-mail at home there is no difference between the number of Pakistani students who use e-mail home at and the number of white students who use e-mail at home.

H_1: For students who have e-mail at home, there is a difference between the number of Pakistani students who use e-mail at home and the number of white students who use e-mail at home.

Calculation

	Pakistani	White
Case 1	44	66
Case 2	27.9	82

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 12.41 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: reject H_0 and accept H_1, there is sufficient evidence to suggest that for students who have e-mail at home there is a difference in the number of Pakistani students who use e-mail at home and the number of white students who use e-mail at home.

Access to e-mail at college is now considered. A comparison was made between the Pakistani and white students who have access to e-mail at college. The data was tested against the hypotheses:

H_0: there is no difference between the number of Pakistani students who have e-mail at college and the number of white students who have e-mail at college.

H_1: there is a difference between the number of Pakistani students who have e-mail at college and the number of white students who have e-mail at college.

Calculation:

	Pakistani	White
Case 1	27	56
Case 2	21.2	61.8

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 2.131 with 1 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1, there is insufficient evidence to suggest that a difference in the number of Pakistani students who have e-mail at college and the number of white students who have e-mail at college.

Question 21 asked students if they used e-mail at college. Again, comparing the responses from the Pakistani and white students the data was tested against the hypotheses:

H_0: there is no difference between the number of Pakistani students who use e-mail at college and the number of white students who use e-mail at college.

H_1: there is a difference between the number of Pakistani students who use e-mail at college and the number of white students who use e-mail at college.

Calculation:

	Pakistani	white
Case 1	21	37
Case 2	15	43

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 3.237 with 1 degrees of freedom at a 95% confidence level the critical value of $\chi^2 = 3.84$.

Decision: accept H_0 and reject H_1, there is insufficient evidence to suggest that there is a difference between the number of Pakistani students who use e-mail at college and the number of white students who use e-mail at college.

Filtering the data so that the use of e-mail at college, by students who have access to it, could be compared, and tested against the hypotheses:

H_0: For students who have e-mail at college, there is no difference between the number of Pakistani students who use e-mail at college and the number of white students who use e-mail at college.

H_1: For students who have e-mail at college, there is a difference between the number of Pakistani students who use e-mail at college and the number of white students who use e-mail at college.

Calculation:

	Pakistani	White
Case 1	21	37
Case 2	25.5	32.5

Using case 1 as the observed values and case 2 as the expected values. Chi-squared = 1.417 with 1 degrees of freedom at a 95% confidence level the critical value of $\chi^2 = 3.84$

Decision: accept H_0 and reject H_1, for students who have e-mail at college there is insufficient evidence to suggest that there is a difference between the number of Pakistani

students who use e-mail at college and the number of white students who use e-mail at college.

Here the researcher has found further evidence that supports the theory that students from different cultural groups use the Internet, in this case e-mail, differently. While the researcher found no difference between ethnic groups' use of the e-mail at college, Pakistani students, compared with white students, do make more use of e-mail when at home. This evidence suggests that students from different cultural backgrounds use the Internet for different tasks, and their activities are influenced by where they happen to be.

Using e-mail as a means of communication in an easily identifiable use of the Internet. The researcher decided to investigate using e-mail and the Internet for communication further. This was done as part of the student interviews which are discussed in the following chapter.

Questions 18 and 19 were then looked at using religion as the grouping variable. Here again the two main religious groups were considered.

The data set was grouped by religion, using the three most frequent religious groups and tested against suitable hypotheses.

	Yes	No	Do not know
Christian	44	30	0
Muslim	30	20	1
No religion	46	25	0

Regarding students who have email at home the data was tested against the hypotheses:

H_0: there is no difference between the numbers of students who have e-mail at home when compared by religious group.

H_1: there is a difference between the numbers of students who have e-mail at home when compared by religious group.

Calculation:

	Christian	Muslim	None
Case 1	44	30	46
Case 2	45	31.2	43.5

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.212 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1, there is insufficient evidence that for the students from the religious groups considered, there is a difference in the proportions having e-mail home.

For the use of e-mail at home by students from these religious groups, the data was tested against the hypotheses:

H_0: there is no difference between the numbers of students who use e-mail at home when compared by religious group.

H_1: there is a difference between the numbers of students who use e-mail at home when compared by religious group.

Calculation:

	Christian	Muslim	None
Case 1	32	29	37
Case 2	36.6	26.6	35

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.909 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1, there is insufficient evidence that for the students from the religious groups considered, there is a difference in the proportions using e-mail home.

Regarding the subset of students who have e-mail at home, their use of e-mail was tested against the hypotheses:

H_0: For students who have e-mail at home, there is no difference between the numbers of students who use e-mail at home when compared by religious group.

H_1: For students who have e-mail at home, there is a difference between the numbers of students who use e-mail at home when compared by religious group.

Calculation:

	Christian	Muslim	None
Case 1	32	29	37
Case 2	34.5	25.7	37.0

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.605 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1, for students who have e-mail at home, there is insufficient evidence that for the students from the religious groups considered there is a difference in the proportions using e-mail at home.

The data for these religious groups regarding access to e-mail and use of e-mail at college was looked at.

Regarding access to e-mail at college, the data was tested against the hypotheses:

H_0: there is no difference between the numbers of students who have e-mail at college when compared by religious group.

H_1: there is a difference between the numbers of students who have e-mail at college when compared by religious group.

Calculation:

	Christian	Muslim	None
Case 1	32	30	30
Case 2	34.6	24.3	33.2

Chi-squared using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 1.841 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1, there is insufficient evidence that for the students from the religious groups considered, there is a difference in the proportions having e-mail at college.

Regarding these students use of e-mail at college, the data was tested against the hypotheses:

H_0: there is no difference between the numbers of students who use e-mail at college when compared by religious group.

H_1: there is a difference between the numbers of students who use e-mail at college when compared by religious group.

Calculation:

	Christian	Muslim	None
Case 1	22	22	20
Case 2	23.9	17.1	22.9

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 1.922 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1, there is insufficient evidence that for the students from the religious groups considered, there is a difference in the proportions using e-mail at college.

Considering the subset of student in these religious groups who have access to e-mail at college, their use of e-mail at college can be considered and the data tested against the hypotheses:

H_0: for students with access to e-mail at college, there is no difference between the numbers of students who use e-mail at college when compared by religious group.

H_1: for students with access to e-mail at college, there is a difference between the numbers of students who use e-mail at college when compared by religious group.

Calculation:

	Christian	Muslim	None
Case 1	22	22	20
Case 2	22.6	20.7	20.7

Using case 1 as the observed values and case 2 as the expected values.

Chi-squared = 0.121 with 2 degrees of freedom, at a 95% confidence level the critical value of $\chi^2 = 5.99$.

Decision: accept H_0 and reject H_1, there is insufficient evidence that for the students from the religious groups considered there is a difference in the proportions using e-mail at college.

Summarising these results, it can be seen that for students who took part in the study, male students use e-mail at college more than female students and Pakistani students use e-mail more than white students at home. Using religion here to identify cultural groups, failed to show any significant difference between them. However, religion on its own does not define a cultural group, and so does not detract from the earlier evidence reported by the researcher to support the claim that there are differences between cultural groups and the way they use the Internet.

Student opinion

This part of the questionnaire consisted of three open ended questions. Students were invited to comment on aspects of the college Internet provision. They were asked how they would like to see the college develop this provision, what encourages or discourages them from using the Internet and what they think about the college provision for access by students to the Internet. Not all of the students chose to write a comment and comments that were written down tended to be brief. Although there was opportunity for a comment in three sections, many students' comments cut across the questions. This has been taken into account when this part of the questionnaire has been analysed.

Regarding opinion of the standard of the college provision for Internet access, 4.3% (9 students) said that the provision was poor. In justifying this response or opinion, one student sited 'computers always breaking down' as an area of complaint. A further 11%

(22 students) thought the provision was 'OK'. None of these respondents chose to elaborate on this response.

A response that was given by 3.8% (8 students) was that the college provision 'could be better'. Although a vague response in itself, some students gave limited access as a further explanation. Access here covered time (theirs) and availability of machines.

16 % (33 students) rated the provision as good or better. Again, not all of these students chose to expand on their one word answer. Two students thought the provision was good because of the 'way it is controlled', referring to both access to machines and the content of web pages that could be viewed. Some students commented on the college's web monitoring software, referred to as a 'firewall'. From the sample 1.9% (4 students) thought that restricting web access by this means was a good idea, and 5.8% (12 students) reported that they had had problems because of the firewall. Examples of sites that were blocked for no apparent reason were given together with other dubious sites that were readily accessible.

The firewall is not the only level of monitoring use of the Internet by students in college. Students can only use computers, and therefore access the Internet, in rooms where a member of staff is present. There were students who were concerned or discouraged from using the FLC because of the actions of some staff. Staff on duty in the FLC obviously watch what students are doing and this has been interpreted by some students as 'spying on you' (3.8%, 8 students) or as 'rude staff' (1.9%, 4 students). The question of

monitoring students' use of the Internet at both home and in college is a theme the researcher investigated further in the course of the student interviews.

When asked to say what, if any, factors encouraged or discouraged them from using the Internet 5.8% (12 students) took the opportunity to say what encouraged them, while 25% (51 students) gave factors that discouraged them.

Four students saw the Internet as a useful source of information that could help with college work. Students expressed the opinion that accessing the Internet at college was faster than the access they had at home and that generally the location and number of machines available was good.

There were more students who were found to be discouraged from using the Internet because of the location and number of machines available. At two of the College sites, students reported that there was no access to the Internet. Some students who could only use the college computers at lunch times said it was 'too busy' (2.9%, 6 students) or 'too noisy' (1.4%, 3 students).

The largest single discouraging factor was concerned with charges for using the Internet. The college policy is that Internet access is free for college related work and there is a charge of £2.50 for other use before 17.00 hours, after this time it is free to all students for any use. 25% (51 students) expressed concern over these charges. Some of these

3.4%, (7 students) recommended that it should be cheaper, and 13% (28 students) thought that it should be free at all times.

Regarding what the college could do to improve its provision, students suggested the following

- Make it faster 3.4% (7 students)
- Give access to chat rooms 2.4% (5 students)
- Integrate using the Internet into classrooms and classes 5.8% (12 students)
- More training on using the Internet 11% (22 students)

All of these percentages are low, which would suggest that the students were either unwilling to express an opinion on these questions, or did not have one.

Attitude

The last section of the questionnaire consisted of Selwyn's attitude scale. Analysis of the scores generated by this part of the questionnaire gave some interesting results.

Selwyn suggests that the scores from the attitude scale can be interpreted in the following way. Scores above 51 can be interpreted as students with a relatively positive attitude towards computers, while scores below 35 would indicate students with a relatively negative attitude towards computers. These cut off, or boundary points, were obtained from the 25^{th} and 75^{th} percentile respectively.

In the sample, only 4.3% (9 students) came within the negative attitude category, and 76.0% (158 students) were in the relative positive category. This would suggest that either the students at this College exhibit a more positive attitude towards computers than could normally be expected or there has been a general shift in the attitude of the population towards IT.

The 9 students who were scored as having a negative attitude consisted of 8 females and 1 male. Their ages ranged from 16 to 38 years old, and they came from 6 of the 21 courses covered by the sample. Of the females, 6 were white Christians, 1 was white with no religion and 1 was a Pakistani Christian. The male was a Pakistani Muslim. Most (7 students) had received some IT training but only 1 had received any instruction on using the Internet. All of these students were found to be infrequent IT users, 6 being complete non-users, 2 infrequent users at home only and 1 an infrequent user at college only.

Using different grouping variables, the student t-test was used to test the null hypothesis that there is no difference in average (mean) attitude scores.

These tests showed that male students tend to have a more positive attitude than female students.

Using ethnic group as the grouping variable, none of the possible comparisons showed any significant difference in mean attitude score.

Using religion as the grouping variable, there was no significant difference between the mean attitude score taking religious groups two at a time, with one exception. The exception being there was a significant difference in attitude between Christians and students with no religious conviction.

Students in the sample as a whole, demonstrated a negative correlation between the variable 'age' and 'attitude' ($r = -0.202$). This indicates that the younger students had a more positive attitude towards IT than the older students. This is significant for Snow Hill College which has a wide cross section of age groups on many of the courses offered. Older students should not be put in the position where their progress on a course is hampered by the use of IT if IT is not the primary learning objective of the course. Tutors on courses that utilise IT as a learning aid, should ensure that these older students receive additional help as required.

Attitude and skill were found to be positively correlated ($r = 0.69$). This was born out by these 'negative attitude' students who's self assessed skill levels were all less than or equal to 8.

It was not surprising that attitude was strongly correlated with much of the data collected regarding student use of IT. This bears out Selwyn's assertion that his attitude scale is a useful indication of how student will react or respond to computer use in an educational setting.

Table 1

Table showing Pearson's product moment of coefficient of correlation between Attitude and listed variable.

Variable	Coefficient
Internet use for information	0.42
Internet use for Entertainment	0.47
Internet use for college related work	0.324
Internet use for private use	0.446
Use of IT at home	0.534
Use of IT at college	0.382

Variable	Coefficient
Time using the Internet last week	0.533
Time using the Internet last month	0.56
Time using the Internet this academic year	0.511
Length of average Internet session	0.463
Combined use of IT, home and college	0.581
Frequency of reading e-mail	0.475

In order to decide if a correlation coefficient is significant Connor (1949 p154) suggests the use of the test $r > 3/\sqrt{n}$, where n is the sample size and is large. For this sample, $n = 208$, and so the critical value is 0.208. More recent publications tend to give critical values for correlation coefficients in tabular form (see Mathematical formula and statistical tables: Edexcel 2000 p25). For a 2-tailed test at the critical value for r is 0.1966 ($n \geq 100$, $p < 0.05$). Using either of these values all of the above can be seen as significant indications of correlation.

The significance for Snowhill college staff here can be described in terms of student motivation. Where students are known to have a very positive attitude towards the use of IT, staff can structure their courses to incorporate the use of different IT skills and therefore increase the student motivation or enjoyment.

Correlation between variables

The students' age and the self-assessed skill level were compared. These data pairs can be seen in figure 6

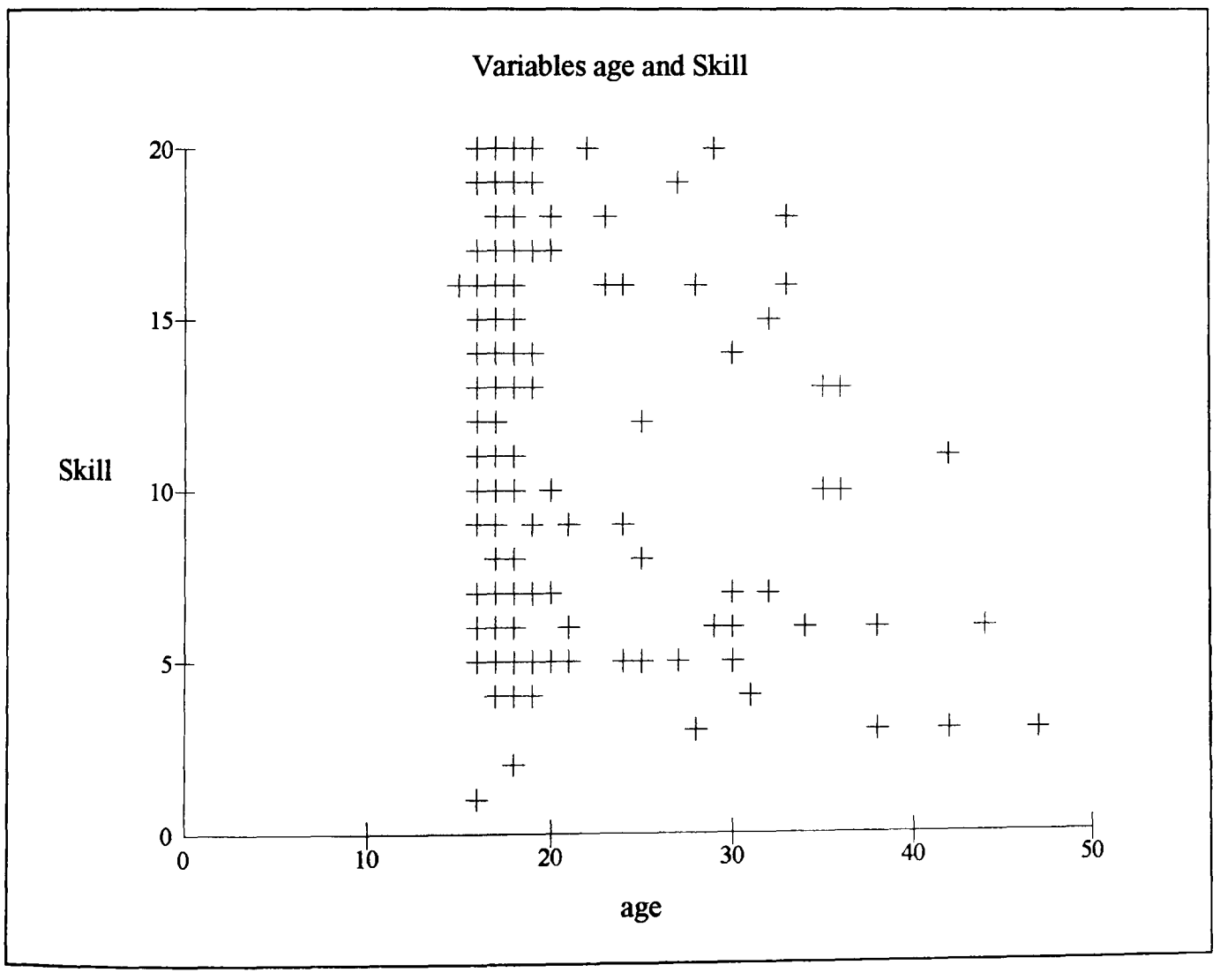

Figure 5

Pearson's coefficient of correlation for these two variables is r = - 0.271. This suggests that there is evidence of a negative correlation between the variables age and skill. That is to say, older students are more likely to rate their skill lower than a younger student would. Care must be taken here, to remember that whilst the college does take a broad cross section of students in the under twenty age group, students over this age tend to be individuals who have missed out on education in their younger years.

This scatter graph clearly shows that students in the 16 to 18 age group have a wide range of levels in IT skills. It is only for students over 35 years of age where this range is not so great, and tends to be lower.

Positive correlation was found between skill and attitude; between skill and use (at home college or combined use); and between skill and frequency of reading e-mail. This is understandable, as one would expect students who were adept with IT to have a positive attitude towards it, and those with a positive attitude could be expected to be the more frequent users.

Chapter 5

Interviews

The interviews begun by using the interview schedule shown in appendix 3; this incorporated the themes from the questionnaire that the researcher wanted to pursue. The interview schedule was used to ensure that the researcher did not inadvertently overlook a theme or key question (See Spradley 1997 and Smith 1972). The early interviews made it clear that students were prepared to talk openly about their experiences regarding computers and their use.

As each interview was completed the recording was transcribed. Using the computer software package NUD*IST the researcher coded the transcriptions identifying themes and key words. In this way the themes and concerns raised by students could be pursued in the following interviews. The researcher began with some of the themes that were raised in the questionnaire. In addition to these themes, a number of themes were raised in these early interviews that the researcher decided to investigate in more detail in latter interviews. Consequently the interview schedule developed into an aide-memoir for the researcher as these themes were investigated.

The sample of students used for the interviews is sometimes called a theoretical sample (see Arber 1993 and Mason 1996). The students who were interviewed were not selected with a view to producing a sample that would be representative of the college; rather the students were selected on the basis of the possible contribution they could make to the

understanding of the topics being discussed. This type of sample is also referred to as a purposive sample.

> 'In purposive sampling, researchers handpick the cases to be included in the sample on the basis of their judgement of their typicality. In this way, they build up a sample that is satisfactory for their specific needs.'(Cohen and Manion 1994 p89)

The interviews conducted- using this type of sample, are described by Anderson (1998) as 'key informant' interviews. The students interviewed are detailed in table 6 .

Gender	Ethnic origin/Religion	Age	Course	Name
Male	Asian /Muslim	19	Advanced GNVQ IT	Jwad
Male	White / none	17	Full Time GCSE	Arthur
Male	White / none	18	Full time GCE year 1	
Male	Asian /Muslim	17	GNVQ Intermediate Science	
Female	Asian /Muslim	18	Full time GCE year 1	Shabana
Female	Asian /Muslim	17	Full time GCE year 1	Fozia
Female	Asian /Muslim	24	Part Time GCSE	Ikra
Female	Asian /Muslim	17	Full time GCE year 1	Sundeep
Female	Asian /Muslim	19	Business Studies GNVQ Level 3	Adnana
Female	Asian /Muslim	22	Access to HE and GCE	Farah
Female	Asian /Muslim	18	First Diploma Health and Care	
Female	Black / Caribbean	18	Full time GCE year 1	Amie
Female	Chinese / None	17	Full time GCE year 2	
Female	Asian /Muslim	19	Full time GCE year 2	
Female	Asian /Muslim	20	AVCE Science Year 1	
Female	Asian /Muslim	17	Full Time GCSE	
Female	White / none	19	GNVQ Intermediate Catering	
Female	White / Christian	21	NNEB	
Male	White / Christian	18	Full time GCE year 2	
Male	Asian /Muslim	18	GNVQ Intermediate IT	

Table 6
Students interviewed

The key points of these interviews are reported in this chapter using the students named in table 6; the remaining students are not named as they are not directly referred to in this chapter. These interviews with these unnamed students consisted largely of points and issues raised with students whose contributions are analysed here and therefore add little new information to the study.

The key points of these interviews are reported in this chapter. These nine can be regarded as the key informants. The researcher believes that it is not just what was said by the students interviewed that is important, their comments need to be considered in the context of who they are. This chapter therefore presents the findings from the interviews in two ways. First in the context of the themes raised by the key informants and who they are and then as common themes that arose in the course of the interviews. The first of these key informants is Jwad.

Jwad is an Asian Muslim male student aged 19 years old. At the time of this interview he was in the final term of an advanced GNVQ IT course. He had been at the college for nearly three years. This student clearly had some strongly held beliefs, which reflected his thinking and observations regarding computers and the Internet. This student was on a course that required a good deal of computer use, even so he thought that his use of a computer could be described as '50% for college work and the rest entertainment'. He did not see himself as a typical student and said that other students used computers and the Internet mainly for entertainment

Jwad: I think more students will use it for entertainment. My personal view.

Researcher: All students or ..

Jwad: The majority of the students 'cause a lot of the students have an interest in music and so go on the Internet to download music, and they are interested in mobile tunes so go on the Internet to download mobile tunes. And then they'll have an interest in other things but I can keep out of that.

Researcher: Do you think that is all students?

Jwad: I would say it is boys more than girls. The majority of boys also.

Researcher: Do you see many girls using the Internet for entertainment? (pause)

Jwad: Not really I would see (pause) I generally think girls are harder working than boys, work harder then boys, and therefore they are more serious more determined to get the work done. Whereas boys will be less determined and not very serious so girls will do more research than boys and will actually find what they need to know but boys will use it for entertainment and all that.

Jwad's opinion here is in partial agreement with the findings of the questionnaire, namely that male students do use the Internet more than female students for entertainment. He

may, or may not, be correct in thinking that female students are harder working than male students. He was careful in the interview to separate himself from those males he did not see as serious students. He sees himself as a hardworking student who wants to progress. He certainly does not have time for what he sees as trivial entertainment on the Internet. Jwad had some ideas as to why he is different from some other students.

Researcher: What do you think is different in your upbringing that stops you wanting to use the Internet for entertainment?

Jwad: Right. Well I would say for a start, right, my parents are from Pakistan so they are not educated that well. Whereas a white boy his parents will probably be well educated, better off financially you know. So they will have more facilities for the Internet, they will have more use and better ways and all that whereas I will have that limited time, I will not have that access there. That could be the difference there.

He is also saying that he believes there is a connection between level of education and wealth. The student's statement here is in agreement with Hammersley (1997 p105) who pointed out that:

> 'Differences in home background came to be seen by many commentators as the major factor behind variation in school achievement'

Jwad says that he expects white students to be better off than his family. Jwad is in appearance a smart young man; he is well spoken and polite. From the comments he made during the interview his family does not lack for material possessions, including a sophisticated computer system. Although there are certainly white families in the region that are better off than Jwad's family he is wrong in thinking all white students have the same advantages. Although Jwad attends a multicultural college he admits to having no friends outside his own Asian community, and does not mix with any non-Muslim students. None of the students interviewed had friends or acquaintances from cultural groups different from their own. This suggests that the local community although multicultural has at least some sections that are not culturally integrated. His lack of social interaction with people from other ethnic groups has led Jwad to a stereotyped image of other students. Jwad thinks that all white students are better off or more fortunate than he is. In this assumption he is wrong, one such underprivileged white student, that was interviewed, is Arthur.

Arthur is a white British student he is studying GCSEs at Snow Hill College as a full time student. He is 17 years old and lives with his parents. Arthur describes his family home as a small terrace house. In the course of the interview he described the house as having two bedrooms, a kitchen, a bathroom and two sitting rooms. Arthur lives with his two parents and his two sisters.

Arthur sat some GCSEs at school, but only achieved low grades. He cannot afford to be a full time student, his current plan is to re-sit two GCSEs this year and then a further two next year. He has no clear idea about what he will do after this. At the time of the interview he had a job at a local supermarket, but he did not think he would stay there much longer.

Researcher: Do you have a computer at home?

Arthur: No, we don't have the space; they take up too much room.

There is a close paralleled between Arthur and some of the school children referred to by Jackson and Marsden (1962). In their study of the grammar school system in a northern industrial town they discussed problems faced by middle and working class children. In their study it was found that homework was a particular problem. The researchers reported that these children had difficulty finding space in which to complete homework.

> 'the relative failure of working-class children in schools .. explained by many in terms of the effects of culturally deficient home backgrounds' (Jackson and Marsden 1962)

Contributing to this cultural deficiency in working class households was the lack of books and quality newspapers. It may be that in the near future a home without a computer will be the modern equivalent of this aspect of cultural deficiency.

Space may be the real reason for Arthur not to have a home computer, or it may be his way of overcoming any embarrassment he may feel by admitting he does not have one. For some students the cost of a home computer may be beyond the limits of the family budget. For other families the computer may be affordable but the running costs may cause difficulties.

Just looking at the number of students in different ethnic groups who own a computer is not a good way of judging how they will be able to use facilities such as the Internet. The cost of connection fees may be a limiting factor for some students. So asking students if they have a computer and Internet access at home is not a true measure of if they use it. A student who is limited to a fixed amount of time per week or per month may choose to use this time for relaxation rather than for study. The access a student has to a computer at home is also be restricted by the number of other people wanting to use the computer. Access to home computers, where they are located and the numbers of people using machines are themes the researcher investigated in other interviews.

The researcher questioned all students interviewed about access to computers at home. One such student was Shabana. Shabana is an 18 year old AS level student at Snow Hill College studying Psychology, English and Computing. She comes from a Pakistani Muslim family. Her parents were both born in this country. As an AS level computing student it might be expected that Shabana would be a confident and frequent user of computers. This proved not to be the case. However Shabana does use a computer for a

range of activities. To try and ascertain how easy it was for her to have access to a machine Shabana was asked about her use of computers at both home and college.

Researcher: Do you have your own computer at home?

Shabana: Yes.

Researcher: Nobody else uses it?

Shabana: Well it's really my brother's, so we just try and be nice to him to get into it.

Researcher: An older brother or a younger brother?

Shabana: Older brother, yes, older brother, because he's at university at the moment. So we use the computer, we just take turns.

The 'we' Shabana uses here turns out to be a younger brother and two younger sisters. Shabana also describes her father as a 'really big fan of the Internet', citing his present pastime whilst on line as 'searching for a new house'. Shabana does not have easy access to a computer at home, this proved to be the case with all of the ethnic minority students interviewed. If she wants to use a computer or the Internet at home Shabana has to negotiate with other members of the household. From her comments it would seem that she is not very good at this and it is common for others in the house, particularly her brother, to take precedence, regardless of what he is using the machine for.

With limited use of computer facilities at home it could be expected that Shabana relies of the college IT facilities. However Shabana's experience of computers at Snow Hill has

not been as good as the college might have liked. When asked directly about the college IT facilities Shabana was uncomplimentary.

Researcher: What do you think of the college IT facilities?

Shabana: Oh the computer rooms are rubbish.

Researcher: Which room is that?

Shabana: In G block, Mr A and Mr B, they are our teachers, and there are about 40% of the computers in that room that just don't work at all. It's like when you type in your log in number it says please contact your programme administrator. Like that, and then we have to keep changing. Because while we were doing our project I had to do final bits like in class, because I needed help. And I was just messed around for about an hour because my computer wouldn't work and I have to go onto another machine. So I am not really pleased with the computer facilities in the G block at all.

Snow Hill College tries to respond to students' comments regarding all aspect of their course. One of the instruments use to gauge student opinion is an annual questionnaire, referred to as a course evaluation. The college quality unit collates the results and comments from these completed questionnaires. In addition to this course evaluation exercise all courses at the college have regular course team meetings, which should be attended by student course representatives. Shabana could not remember completing a

course evaluation questionnaire, neither had she asked her course team student representative to raise any of her concerns at course team meetings. She was in fact unaware of who her course team representative was and was unaware of any course team meetings. In answer to the question had she raised her concerns or criticisms of the college IT provision with any member of college staff her answer was no.

The researcher was able to verify which course Shabana was on. For this course the course team minutes showed regular team meetings had taken place with student representatives present.

Shabana's poor experience of IT at Snow Hill College was not confined to her computing classroom. This was a theme the researcher pursued with other students interviewed and found that Shabana's experience was not an isolated case. All students interviewed said that they had experienced some problems with the IT equipment at Snow Hill College. For most the problems were seen as just a minor irritation, for a few however these problems were seen as a major hindrance to their studies. Clearly what is seen by one student as an accepted consequence of using modern technology is seen by another as the college failing to provide adequate IT equipment.

While being asked about her use of the Internet she made some interesting comments. Initially Shabana's instruction on using the computers appears to have been based on learning by discovery methods. This lack of formal or unstructured instruction may be the cause of some her problems when using the internet.

Researcher: When you use the Internet, what sort of things do you use it for?

Shabana: Well because I have been having exams I went on the Internet for past papers, so I got about five different past papers for psychology and loads . . . like our teacher at the beginning of the year, we were told just mess around on computers because that's the way you learn. So I used to spend like an hour a day just mess about with it, play around with it and that's how I learnt different things on the computer. That's basically it.

Shabana's answers lack consistency, and these can be understood if her basic difficulties are kept in mind. She tries to use computers at home, but is hampered because there is only being one machine and several people all want to use it. She lacks confidence because she has had insufficient instruction or training. The interview went on to discover that she had experienced other problems why trying to use computers at college.

Researcher: Have you used the Internet at college?

Shabana: No I never have.

Researcher: Never?

Shabana: I think I have just once, yes in a computing class, when we had a cover, and they said just go on the Internet.

Researcher: But not in the FLC?

Shabana: No not in the FLC, no.

Researcher: Because you would rather go home and use it there?

Shabana: Yes, go home, yes, because in the FLC it's a bit too noisy as well. Because once I had to do my project and my brother was doing his final year project at home, so that was not free, and we were not allowed to go into the computer room, because it was locked. So I went into the FLC and it was really noisy and I could not concentrate at all so me and my friend came out.

Researcher: Was it noisy because of the number of machines in there or because people that were in there were talking?

Shabana: Yes, people were actually talking a lot so I could not concentrate at all.

Researcher: So do you think we should run it more like the library and not have . . . . (Interrupts)

Shabana: Yes, yes, like even the library, like I thought I'd try the library and not this friend another friend of mine, her name is Rehanna, me and her went into the library and it was just completely useless. Two or three groups sitting behind us and they were just talking and talking and that was really noisy as well. So I rather prefer doing my work at home.

Not only is Shabana complaining about how busy the open access facilities to IT are, in both the library and the FLC, she also reveals a little of how she uses computers. In reference to her visit to the FLC she says 'me and my friend came out', similarly when she 'tried the library' she went with a friend. A pattern of behaviour was beginning to be suggested here, Shabana increasingly as the interview progressed, referred to using a computer with other people present.

Researcher: So you do not get to use it on your own?

Shabana: Sometime I use it on my own, but I just get fed up with it sometimes, like sometimes it takes ages to do every thing. Like sometimes you type in something and it does not get you that particular thing, it just comes out with loads of details. And I don't like going on the Internet on my own, because I just waste time on it, because I can't find my way round.

This statement is particularly significant when we remember that Shabana is an AS level computing student. When talking about using a computer at home Shabana constantly refers to being with someone else. This includes when playing games and when using the Internet.

Like other students interviewed Shabana said that her teachers were encouraging them to make use of the Internet. What the teaching staff were not doing however was to ensure

that the students were receiving some instruction on how to access the web and refine their searches if necessary. It could be that Shabana's lack of formal instruction is hindering her from developing her IT skills.

Researcher: What did you do in Psychology?

Shabana: She (the teacher) always tells us to go onto the computers, get some past papers … they have got loads of different sites for Psychology.

Researcher: But not for additional information?

Shabana: No just for past papers. Whenever she sets us homework or essay she always tells us to go onto this site to get information. For example we were doing stress before the exam, so she said type in stress and psychological effects and all that and all the details came up, then you get loads of research in that way.

Researcher: Is that quicker than using the library?

Shabana: Yes it is quicker, yes. But they give you loads of stuff that you don't even need and than it confuses you, so that's confusing, and plus the language that they use it isn't like informal; it's just like really hard to understand.

Other students interviewed reported having a mixed experience regarding their IT training or instruction whilst being at Snow Hill College. From the questionnaire 78.4%

said that they had received some IT training and 21.6% said that they had received no IT training. These figures however give no indication of either the quality of the instruction students are given or the applications covered. All of the students interviewed said that they had had some IT training or instruction at college, but that this instruction was limited to the use of word processors and spreadsheets. None had had any instruction on the use of databases and few had received training on the use of the Internet.

From the comments made by the students interviewed it appears that in a growing number of lessons lecturers are encouraging students to use the Internet. The College is in the process of expanding the Intranet, but has yet to introduce a policy on the training of students to use it effectively. For some students this training is done by their Key Skills tutor, for others it is done by the lecturer who wants the students in their class to use the Internet for a specific task. The researcher however came across many students like Shabana for whom the instruction they received was at best unstructured or in many cases non-existent. From the students interviewed the researcher believes that for many of the students the instruction they are receiving, particularly with reference to using the Internet, is inadequate to meet their needs.

Similar to Shabana other students interviewed spoke of using computers in shared rooms, or with other family members watching what they were doing. How students are being monitored when using the Internet was a theme investigated as part of the interviews. At Snow Hill College the students are monitored when using the Internet. As previously mentioned Web pages that students try to load are regulated by the firewall. In addition to

this monitoring it should be noted that students cannot use the Internet at college without a member of staff being present. Students are also made aware that accessing obscene or offensive material on the Internet is regarded as a serious breach of the college code of conduct.

These restrictions on student use of college computers will affect the students' description of how they use the facilities. For some students these restrictions present no problems, for other students these restrictions can influence how they spend some of their time at college. Whilst interviewing students it became apparent that there were mixed reactions amongst the students to this monitoring. There were students who thought aspects of the monitoring process were good. The students who saw these restrictions as problematic commented that it was a factor that discouraged them from using the college facilities.

Regarding the firewall there were students who reported that they had tried to access what they saw as legitimate Web pages only to have them blocked. When asked to give examples or specific instances these students were unable to do so. These students were also asked if, when they had tried to access to a page blocked, if they had sort the assistance of a member of staff, none had. This despite the fact that when a page is blocked by the firewall a message appears, on the computer screen, advising students that accessing forbidden site is a breach of the college rules. This message goes on to advise the student that if they feel that the page has been blocked in error the college IT

supervisor can make the page available. None of the students interviewed had chosen to do this.

Students have no choice regarding the level of monitoring of what they are doing when using College computing facilities. At home the level of monitoring placed on them is at the discretion of their parents or guardians. Part of the interview was used to investigate the level of control or monitoring that students faced when working at home.

In the interview students were asked if their Internet use at home was monitored or checked on by either their parents or other members of the household. Some students said that either their parents or they had installed a firewall or similar software in order to restrict access to adult sites on the Internet. Where this was the case students said that this was good if there where younger brothers or sisters in the house, and none saw it as a restriction on their activities.

Another way of how the use of home computers may be monitored is for parents to locate the computer in a shared room. In this situation the monitoring of how the computer is being used may be either intentional or unintentional. Of the students interviewed of 17 those that had a machine at home said the home computer was in a shared room. All of the Asian students said the home computer was in a shared room. It may be that the computer is in a shared room so all family members can have easy access to the machine and the subsequent monitoring is therefore unplanned. Which ever is the case the net result is the same, what the student is doing on the computer is open to view by others in

the house. This differs from the findings of Kerwalla and Cook (2002) who reported that in their research they only found 44% of home computers to be in a shared family room. However, their research was concerned with families with younger children than is the case with this research. Furthermore Kerwalla and Cook do not give details of the ethnic background of the families that took part in their study. If their sample was from a widely different cultural mix than this present study this may be of significance. However since their data was collected home computer use has increased, and home use has changed. More homes are now connected to the Internet and it could be that this change in use influences where the home computer is placed.

The next key informant Fozia was also asked about home computers in shared rooms. Fozia is a 17-year-old Asian girl. She comes from a Muslim family, her parents are originally from Pakistan, but she was born in this country. Fozia is an intelligent girl; she obtained good GCSE grades at a local 11 – 16 comprehensive and is now studying AS levels at Snow Hill College. She is studying English, Law, Psychology and Zoology. She also attends a college workshop for key skills (Application of Number, Communication and IT). After her GCE A levels she wants to go to University but has not yet decided what course to take.

When questioned, Fozia said that she had a computer at home that she used and that had Internet access. This computer is in a family room and during the course of the interview it became clear that she did not have sole use of this machine.

Researcher: Do you have any brothers and sisters at home?

Fozia: Yes two sisters.

Researcher: And do they use it?

Fozia: My one sister she's 18, she's uses it a lot, my older sister, she used to use it a lot. She's 19 but now she's gone to London - she's probably got one down there.

To clarify what Fozia is saying here, she has two older sisters, one who lives at home the other has moved to London. The sister in London is at University and returns home at the end of term, so Fozia still thinks of this sister as living at home. During college term time there is therefore Fozia and her one sister using the home computer. It could be that other household members were using the machine, such as her parents.

Researcher: Does anyone else in the house use it [the computer] or just you?

Fozia: Well I don't use it, it's more my sister, she actually uses it a lot. I usually use the FLC

Researcher: Rather than at home?

Fozia: Rather than at home, yes.

Researcher: Why is that?

Fozia: Because . . . I don't know, usually she . . . her . . . she is always using the computer I don't get a chance. So I always use the FLC, because I don't need it a lot for my A levels.

Fozia was very complementary about the college computing facilities and of the FLC in particular. 'I think the FLC is really good'. In comparison to Shabana, Fozia gave the impression of being a confident user of IT and the internet. She does make use of the college computers in connection with her AS level studies. She was able to give examples of how she had used the Internet to search for information she needed for her AS English.

Fozia was found to be not only using computers for her studies but for recreation as well.

Researcher: What about private use or entertainment - do you use it for that?

Fozia: Yes, at weekends.

Researcher: What do you use it for?

Fozia: Go onto chat.

Researcher: What sort of chat rooms?

Fozia: There is an Asian chat room I go on that a lot.

Researcher: What room is that?

Fozia: The Asian dot .. what's it called? . . . (pause). . . I have forgotten what it's called. It's just an Asian chat room.

Researcher: Bollywood?

Fozia: Yes, that's it.

Fozia has contradicted herself here. She has said that her sister uses the home computer to such an extent that it is unavailable to Fozia for her college work, yet she can use it to access chat rooms. This is opposite to the position taken by, or claimed by Jwad. He said the he had limited access to the Internet at home so chooses to use that time for study, Fozia however is using her limited time to use the Internet in order to socialise. All of the students interviewed mentioned some restriction on the amount of time they could use computers at home. These restrictions varied, for some students it was the cost of the connection to the Internet, but for the majority the biggest restriction was having to share use of a computer with other family members.

The interviews revealed that using chat rooms was a major activity for some of the students. The use of chat rooms had been mentioned in the questionnaire, but the data there had not enabled the researcher to become fully aware of the importance of these rooms to certain groups of students. This theme was therefore pursued with other students interviewed. The researcher sought to discover which students were making the most use of these rooms and if this use was having any impact on their social life.

Fozia describes the chat rooms she visits as Asian chat rooms. What does she mean by this? Are they rooms that only Asians can access because of the language being used?

Researcher: What language do you use in the chat rooms?

Fozia: Chat room - English, but sometimes we use our own language -Urdu.

Researcher: How do you decide which language you are going to use?

Fozia: Our language only if . . . because if you swear, I'll tell you the truth. If you swear on the Internet they chuck you out of the room.

Researcher: So there is some protection in the chat room?

Fozia: Yes they do. There is a lot of protection in the room, because there is a main person at the top of the room. He or she is always watching what you say and if you say it in our language they don't chuck you out. That's what it is like.

Researcher: So if you think they are going to edit what you say you use your own language?

Fozia: Yes (laugh) they chuck you off for about a week because they know your address.

Researcher: Do you know any sites that are available in your own language?

Fozia: Yes.

Researcher: Such as?

Fozia: Just mainly … just like Bollywood sites and chat rooms with just Asians on it. There is all sorts of sites really, there's quite a lot and they are just Bollywood movies sites. There's all sorts. I think there is quite a lot.

Researcher: Can you get onto these sites easily from college?

Fozia: I've never tried from college - I don't know, I think it's all right.

The researcher looked at the content of the Bollywood site. It is a site aimed at people with an interest in Asian culture, covering details of Asian films, television and celebrities. The home page is in English, but the site does contain pages that are in Asian languages, examples of which can be found in the poetry section of the site. Most of the site was easily accessible from a computer in the college. However, the College firewall blocked access to the chat rooms hosted on this site.

Researcher: What do you chat about?

Fozia: (laugh) I don't know (laugh) what I would chat about. I don't know because it depends who you are talking to. No because . . . you don't go into a chat room and talk to just one person, it's like there is a crowd of you.

Researcher: A crowd?

Fozia: Yes, and you talk like that and just pick anyone out.

Fozia was not alone in making comment regarding the use of chat rooms as a way of contacting other people. Ikra, interviewed later, talked about chat rooms can as an integral part of her social life.

Ikra is a Asian Muslim female student; she is 24 years old. Ikra is a single mother and she lives with her parents. This is her first year at Snow Hill College, she was encouraged to join some part-time courses by her parents when her child was able to start at a nursery. Having left school with no qualifications she is presently studying for some GCSE subjects and basic IT. The household consists of Ikra, her mother and father, her brother who is aged 20 and her son aged 6 years. Ikra uses a computer a lot, for both social contact and for entertainment. In common with other students with a similar family background the home computer she uses is a shared resource.

Researcher: Where do you keep your computer?

Ikra: In my study room next to my bedroom.

Researcher: Is that a study room everyone in the house uses?

Ikra: Yes.

Researcher: Who else uses the computer at home?

Ikra: My brother he likes programming, he's doing a course as well, he's doing a postal course.

How she uses the computer is therefore open to the view of other family members. Ikra's father is a taxi driver and tends to work most evenings. Her brother goes out with friends most evenings, this leaves Ikra and her mother largely alone. Ikra described a typical evening as one where she used the computer for an extended period of time.

Researcher: Does she [Ikra's mother] ever watch what you are doing?

Ikra: Yes, she comes in and sits and watches me. She sits next to me and talks. Last night she sat next to me for half an hour.

Researcher: Is she interested in what you do or the amount of time you spend using a computer?

Ikra: She knows, I tell her. There was a lot of us that used to go out. But we are Asian and we are not supposed to do that or stuff like that. But we got the Internet a couple of years ago and now I don't go out. I'm there 24 / 7, you don't see me going out.

It could be that Ikra's evening social life was restricted because of her child, but this is not the case. Ikra's mother, as the oldest female in the family home, has taken on the responsibility of caring for the child. Using the computer and being on the Internet is how Ikra spends her evenings at home.

Researcher: So it has affected your social life?

Ikra: Yes it has it's usually at half-eight when I used to go out, I don't do that now.

Researcher: Is that when you would meet your friends?

Ikra: Yes. It's straight after college or whenever.

Researcher: Is that for every one in your age group or is it because you are an Asian girl?

Ikra: It depends on what sort of parents you have. If they let you have freedom, let you go out it's alright. But my mom she's not like that, she prefers to have me inside doing whatever I want, drugs or whatever, than have me go out and do it. She lets me smoke cigs. She lets me do it in front of her, before I used to hide and do it. Same with the Internet, I wasn't allowed to use it when we first got it, now I use it all the time. Like someone will ring me and say are you coming out and I say no, I'm on the Internet, downloading or whatever. And that's it.

As a twenty-four year old single mother Ikra is not a typical Snow Hill College student. What she does have in common with other students at the College is the way she is treated or is expected to behave by her parents. Other students interviewed expressed the same experiences as Ikra. The researcher was told by all the unmarried Asian Muslim girls interviewed that they lived with their parents and were expected to spend their evenings in the house. This can be seen as part of these students family culture and all the students from this cultural group agreed that the local community frowns on girls going against this. Ikra is very aware that her actions in the past were against her parents' wishes and disapproved of in the local community.

As with other students interviewed Ikra was asked about her use of computers.

Researcher: What sort of thing do you use the computer for?

Ikra: Internet.

Researcher: What sort of thing do you use the Internet for?

Ikra: E-mail, if I need anything like fashion, Indian wear, bridal wear and all that sort of stuff. Anything I want, if I need anything I just go on there and look around, I mean shop around. Not buy anything, just look around.

Researcher: You don't go to the shops then? It's the first place you look is it?

Ikra: No I don't go to the shops first - I just look there if I'm bored.

Researcher: Anything else you use the Internet for?

Ikra: Entertainment. Everything really, just everything I do – Internet.

Ikra was a little unsure regarding what her brother used the Internet, for although she knew of some of his activities, there were times when he locked himself in the study. She could not say with certainty but thought that some of the time he was accessing adult sites. She regarded him accessing these sites as 'normal' behaviour and gave the impression that her parents condoned what he was doing. While Ikra was not critical of this particular assumed activity of her brother, there was an example of his use of the Internet that she thought was a waste of time.

Researcher: What about your brother what does he do on the Internet?

Ikra: He is looking for marriage.

Researcher: On a particular site?

Ikra: It's a site just for Asian marriage, for people who want to get married.

Researcher: Is that world-wide or is it local?

Ikra: Yes everybody, anywhere. He's keen to get married.

Researcher: What do you think about meeting someone that way?

Ikra: No, I don't agree with that. There was one but she was just having him on. Faking it all. Every thing he said she agreed with. She was just having a laugh.

Ikra was able to give a detailed description of some of the on-line conversations her brother had had with this particular young lady. At one point it appears she interrupted to advise her brother to break off the conversation, because she felt he was being made fun of. This had been unsuccessful and he was left to find out for himself.

Researcher: Has it stopped him?

Ikra: No, but I don't think he will meet anyone.

Ikra's brother had a specific design in mind when accessing these sites, he was looking for a marriage partner. The sites Ikra referred to were, in her opinion, targeted at people of Asian ethnic origin. While no other student interviewed mentioned any such similar sites, the fact they these sites exist would suggest that there is a demand.

One other student interviewed did say that he used the Internet to 'look at' members of the opposite sex. Although Arthur does not have a computer at home, his reliance on the college facilities does not appear to be a hindrance when it comes to accessing the sites he wants to view.

Researcher: Do you use the computers at college?

Arthur: Yes.

Researcher: What do you use them for?

Arthur: I use the Internet.

Researcher: In the FLC?

Arthur: Yes, I use it for looking at women and the news.

Researcher: Women?

Arthur: Yes, but not porno sites… Just pictures and stuff.

Researcher: And you read the news on the Internet?

Arthur: Yes, it's better than a newspaper.

Researcher: How is it better?

Arthur: I don't know it just is. The pictures are better, and you can look at different papers. Pick the best stories to read.

Arthur knew about the college monitoring system but said that it had never stopped him from accessing the sites he wanted to see. The sites Arthur talked about covered

newspapers, some magazines and celebrity fan sites, few of which would be blocked by the college firewall system.

A few students interviewed said that parents had put software on home machine to restrict access to unsuitable sites. Ikra was unusual as having taken responsibility for this herself.

Researcher: Some people are concern about the content of the Internet…

Ikra: X-rated stuff?

Researcher: Yes.

Ikra: I've banned all that on my computer.

Researcher: Is that with a security programme?

Ikra: Yes, it's like you put a password on, we banned that, don't like it. X rated and violence, animal cruelty and stuff like that. I don't like it.

Ikra said that English was her main language, and was quick to point out that she was born in this country. She claimed to read Urdu and speak Punjabi, this being the main language used in her parents' home. As with other Asian students who were interviewed the question of language used while on the Internet was investigated. Ikra said that she only accessed sites that were written in English, and this included the chat rooms she went into.

Researcher: What language do you use in the chat room?

Ikra: English, it's just English but we use Asian words for some things, like halal.

Researcher: Can you give any other examples?

Ikra: er .. . There's loads of words I use them for texting as well.

Researcher: Is that because they are shorter?

Ikra: No it's just for a laugh. To take the Mickey, everyone using their own language, it's like when your mom she does that doesn't she. She says something and she says it in her own language she won't say it in English. In the chat room I'm the eldest so I do that.

Researcher: How does that work?

Ikra: It's done in telling someone off in our own language, that's what they mostly do. Like a mother will say don't do that or don't do that thing.

Researcher: What sort of things do you talk about?

Ikra: Age, what you do, where you are from. A lot of them talk about family problems and arranged marriages, no communication with parents. What they do in college. Some of them think they stay in college much longer because their parents want them to get to university. Stuff like that. How they feel, they don't fit in ... Asian stuff. Everything.

Researcher: Is that different from what you would talk about in a mixed room?

Ikra: Yes. Because in a mixed room it's like this, it's change a person's details. It's like an Asian girl will come into our chat room and pretend to be English just to bug us. So they lie. When I was in grapevine they just ignore you as they are really into dating and stuff like that. That's what they are there for, to meet people, to date, but where we go we don't do it. That's it.

Researcher: So you are saying why people go into chat rooms, Asian chat rooms, is really different from non-Asian chat rooms?

Ikra: Yes we go in to just chill out. It's like being in a room and everyone having a laugh. English rooms are just more dating, you get some men coming up and asking for dates. They lie to you they say they are twenty but they are not, they are about thirty or forty. And you can tell by their English, they can't type properly, you can just tell the way they chat to you. First thing A-S then where do you live.

Researcher: A-S?

Ikra: Age, sex, you can just tell.

Researcher: You spend a lot of time on the Internet don't you?

Ikra: It's my life. It's like out side . . . I don't go out. I used to do it a lot I've calmed down.

Ikra's mother appears to have dual standards regarding her daughter's behaviour. Things that were allowed in the house were not allowed outside. To clarify what came under these actions or behaviour the researcher asked further questions to probe Ikra's responses.

Regarding smoking Ikra said that she could smoke in the house but not outside. She said that this was normal for both herself and her friends. When asked why she responded

'Good girls just don't do it'

When asked to explain what she meant she said she meant Asian girls and that it was all right for other girls to smoke in public. She explained that where she lives it is the community's responsibility to look after Muslim girls when they were seen out of the house.

Researcher: Does this include at college?

Ikra: Yes – on the streets, at college, they watch you everywhere.

When Ikra's family first had an Internet connection installed she was not allowed to use it, it had been reserved for her brother. Now she can use it at home, but only uses it in college when she is in a class.

Researcher: Do you use the Internet in the FLC?

Ikra: No – I never go there.

The researcher wanted to know at this point why Ikra, who was clearly a keen user of the Internet did not want to use it in the FLC. She admitted that she had plenty of free time at college, so why did she not want to use it there? Her answer was that when she had free time at college she wanted to be with her friends.

Some of Ikra's friends use the Internet in college but not all. This was because like Ikra some of them had easy access to the Internet at home and would rather use their free time at college to be with their friends. She did suggest that for some of her friends there could be another reason for them not wanting to use the Internet at college

Ikra: They're watching.

Ikra said that this did not apply to herself, as she did not use the Internet in the FLC. However, she did have friends who would not use the Internet in the FLC because they would be seen. Ikra seemed to genuinely believe that some of her friends would not use the Internet there because members of their local community could see them. Ikra agreed to introduce the researcher to some of her friends.

The first of these friends was Sundeep. Sundeep is a seventeen year old Asian Muslim girl. This is her first year at Snow Hill College and she is re-sitting some GCSE subjects.

Sundeep said that she did not use the Internet at college because she only used it to go into chat rooms. She knew that access to these was blocked at college by the firewall software. Regarding being watched by members of her community she said that a lot of Muslim girls are told by their mothers that when out of the house they are being watched, but personally she did not think that this really happened.

The second of Ikra's friends to be interviewed was Adnana. Adnana is a nineteen year old Asian Muslim girl. She is on the second year of a Business Studies course. Like Ikra she is an avid user of the Internet when at home, and said that she spends a lot of time either surfing the Internet of in chat rooms.

Researcher: Do you use the Internet at college?

Adnana: No.

Researcher: Why is that?

(long pause)

Researcher: Do you have any free time at college when you could be using the Internet?

Adnana: I could do – I just don't, it's not nice.

Adnana went on to say that there were a lot of things, without being specific, that you would not want to look at on the Internet. She was not aware of the firewall software that monitored Internet access from within the college. What she was aware of was at the time of being interviewed she had a brother and two cousins at the college and that they would

disapprove of her using the Internet in the FLC. Using the Internet in the FLC was something she had been told not to do by her family.

The researcher was unable to find any other students who would confirm Ikra's and Adnana's ideas. However, on the basis of these two interviews the researcher believes that there is a sub-group of Asian Muslim female students who do not use the Internet in the FLC. The underlying reason for this is that within their community or family it is seen as unacceptable behaviour.

In strong contrast to Ikra is Farah, a student who is a little younger than Ikra. Farah is a Muslim Asian female; she is 22 years old, married with two children. She has been a student at the college for three years, in that time she has completed an access to higher education course, gained some GCSEs and has begun studying AS GCE subjects. Fahah is unclear as to what she wants to do after her present courses are completed, she already has sufficient qualifications to get a place on a variety of university courses, and this is what she says wants to do. However she says that by getting some good grades in her A level subjects she will be able to get onto a better university course. The number of subjects she is studying this year means she attends classes for a total of 19 hours; her family is clearly very supportive of her and her ambitions. Farah's husband shows his support in very practical ways.

Researcher: Do you have a computer at home?

Farah: I've got one at home.

Researcher: Do you use it.

Farah: I don't use it. I desperately wanted one, my husband got me one, and he goes what do you want with it, and I said everything. He got me everything. He got me the scanner, he got me the computer, he got me a printer, he got everything and I've never used the printer or the scanner and I don't know how - because I don't know how.

None of Farah's subjects require the use of a computer, and she chooses not to use IT as an aid to her studies. She knows that other students in the same classes as her use IT to help with their studies, her decision not to use IT appears to be based on previous bad experiences.

Farah: Well like for instance for biology a couple of years ago I was doing abortion on the access course and I went on the Internet, you get so much information, you get loads and loads of information by the time you go through it all, if I'd just got it from a book it would be a lot simpler. That's why I decided not to. A few of my friends decided to go on it for biology coursework.

Researcher: That could be for two different reasons, it could be when you are searching you are not being specific enough, or it could be that there is a lot of information on that topic.

Farah: Tons of information, there is tons of information.

Farah is not the sort of student who is easily put off, if she were she would have soon left the college, bringing up two small children and studying as a full-time student at the same time is a demanding life style. She has looked for ways to improve her IT skills

Researcher: Do you have Internet access at home.

Farah: Yes.

Researcher: Do you ever use it?

Farah: No - I tried once, and I've tried using the Internet here once, you get in ,... log on, but it just comes at home it doesn't. So I thought I'm not bothering with this again. Then I went on the technology course, it runs in the evening, this was a couple of years ago - but the course didn't run. I thought if I went on that course it would help me, but it didn't.

Farah's problems can be divided into two categories Hardware and Software. Although she has what sounds like a good system at home she has been unable to setup and install the devices she has. This problem could be easily overcome as most shops that sell home computer systems provide a setup service for a small charge. The difficulties she has experienced with software, such as Internet search engines, has been mentioned by other students interviewed, but as a mature student Farah case is a little different from most.

All 16 –19 year old students at the college come under the government initiative referred to as 'curriculum 2000'. Under this initiative 16 –19 year olds have the opportunity to develop their key skills. The key skills are communication, application of number, and IT. There are also further units referred to as the wider key skills, which cover 'Working with others', 'Improving own learning' and 'Problem solving'. Within these Key skills students have the opportunity to work with a computer and to learn how to use a range of computer software. As she is over 19 Farah is not covered by this provision on her timetable. Farah therefore faces obstacles she does not know how to overcome and because none of her chosen subjects are IT based it looks as if the college is not identifying her need in this area.

There are also implications for Farah's family because of her lack of expertise with IT. Farah has two children a ten year old son and a six year old daughter.

Researcher: What about your children, do they use it?

Farah: My son does sometimes.

Researcher: What does he use it for?

Farah: He used it for some schoolwork, he said he doesn't use it so much because he doesn't see me using it and I don't encourage him.

Researcher: Does he use the Internet?

Farah: He asked once but I said don't because you'll do something wrong and I won't get it fixed again I won't get it running.

It could be argued that Farah's home computing problems are not the concern of the college, but the development of Farah's study skills is. Curriculum 2000 recognises the importance of IT as one of key skills, unfortunately there are students like Farah who currently do not have access to this section of the curriculum, it is something the college has yet to properly address.

As a parent Farah was able to express a different viewpoint from the majority of students interviewed. While her children can not as yet use the Internet at home this does not stop Farah from having concerns regarding the content of the Internet.

Researcher: Some people worry about the content of some pages on the Internet. If you let your children use the Internet will that worry you?

Farah: Yes

Researcher: So what will you do?

Farah: What can you do? One of the ladies I my evening class has a son, he's just a bit older than my son and he was on the Internet. She said he does quite a lot of work on it and she was saying he was coming across all these sites. She had to monitor him.

On the basis of this remark we could expect Farah to monitor her children when they use the Internet. How will she do this? She is aware of software solutions to this problem, but she is also aware that these software packages are not perfect.

Researcher: One of the things we do in college is we have a firewall which restricts access to some Internet sites. Have you heard anyone mention that?

Farah: Yes - in the library.

Researcher: What do you think about it?

Farah: It's a good idea.

Researcher: Do you think it's done fairly?

Farah: Yes, I was in the library once and some boys were using it. I was doing some work, the boys were using it and some lady came up and said you're not supposed to be accessing those sites.

Researcher: Do you remember which sites they were?

Farah: (pause) No, she just said to them not to access those sites.

On the evidence of this observation by Farah it looks as if the college Firewall is not working as effectively as the college staff would like. Farah says that this would not stop her from using the Internet, but as a parent it is something she has thought about. If she lacks the skill to setup or install a good Internet monitoring or 'adult filtering' system on her home machine she will probably consider monitoring her children's use of the

computer in another way. The easiest is going to be to have the home machine in a shared room in the family home and to be about when the children are using it.

As previously mentioned the researcher asked Asian students if they accessed web sites not written in English. As Farah was not a user of the Internet this was not an applicable question to put to her. She was however asked which languages she spoke. Her answer made the researcher think about some of the responses from other students. Farah said her mother's and father's language was Urdu. She explained that some Pakistanis said they spoke Urdu but this was often not true and they really spoke Punjabi. The reason they claimed to use Urdu rather than Punjabi was because traditionally Urdu users were a better class of people. This could explain why students like Ikra used phrases like 'Asian words; and 'in her own language' rather than saying the language being used.

The researcher also interviewed students who spoke languages other than English, Urdu or Punjabi. Snowhill College has overseas students many of whom speak English as their second or third language. The next key informant, Amie, is one such student.

Amie is an 18 year old female West Indian student; she has come to Snow Hill College to study GCE A levels as an overseas student. She is studying Computing, Business Studies, and French. When asked why she had chosen this last subject she explained that French was her second language and she had many friends who spoke French. She has been at the college, and in this country, for one year. Amie's parents are still in Jamaica, she is

living with a cousin who has moved to this country. She found out about the college and the courses offered through her cousin.

Amie is an IT literate student and had an interest in using computers before she came to this country. This is why she chose computing as one of her A level subjects, but she admits that the course is not what she expected.

Researcher: Are you enjoying your computer course?

Amie: Well it's all right, is OK.

Researcher: Only OK, is it not what you expected?

Amie: Well actually I thought . . . it's a bit hard, I didn't realise it would be that hard. I think I did the wrong thing, I wanted to do IT, I thought it was the same as computing (laugh) so I was a bit confused (laugh) but it's OK.

Amie makes extensive use of her IT skills, from her comments she is a confident user of the technology and enjoys using a computer. She had used computers at home in the West Indies and at her school there before coming to Snow Hill College. Her old school ran classes on using the Internet as a part of the basic computer class Amie said everyone had to attend. The formal instruction she received she now puts to use in a number of ways.

Researcher: Do you have a computer at home?

Amie: Yes, I have, yes, it helps a lot. I go onto the Internet.

Researcher: What do you use the Internet for?

Amie: Shopping.

Researcher: What sort of things do you buy?

Amie: Clothes (giggle)

Researcher: What about trying them on?

Amie: No - the size - it's all right - the shopping on the Internet. I do chat rooms, e-mail and stuff like that as well.

Researcher: What sort of chat rooms do you use?

Amie: For kids - my age, teenage chat. I got this friend in the USA and we can only communicate in chat rooms.

Amie is not unlike other students who said they used the Internet to keep in touch with friends. Where she does differ is that she is using a chat room to communicate with a person abroad. Other students have said they use email or instant messenger to contact friends abroad and use chat rooms when talking to friends in this country. Chat rooms by their nature are not the place for private conversations but this does not appear to be a cause for concern to Amie. Neither is she put off this method of contacting her friend in the USA by the time difference. They have a room they both use regularly, Amie's philosophy is if they meet in there they chat, if they do not meet on a particular day there is always another time.

The use of chat room was wide spread amongst girls interviewed, but not universal. Some had tried them , but had not liked them; others had not tried at all.

Farah: I've never been on a chat line.

None of the four male students interviewed used chat rooms, they thought they were either for girls or for boys looking for girls.

During the interview Amie said that she did not know many people in this country apart from the cousin she was staying with. She has not made many friends at College and finds that her cousin's friends do not have the same interests as she does.

Researcher: So you use computers a lot?

Amie: It's all right; I go down to the FLC and use a PC down there.

Researcher: Do you use the Internet down there?

Amie: No - never did.

Researcher: Why not?

Amie: Only do projects and stuff down there.

Researcher: You can use the Internet down there.

Amie: I know, but I never really use it there.

Researcher: Why is that?

Amie: Nothing much I get too busy. In home always on the Internet, so I'm just taking a break in college (laugh) yes.

It looks as if Amie keeps her recreational use of the computer confined to her home. Apart from chat rooms she talked of using the computer for music and games.

Researcher: What sort of other web pages do you visit?

Amie: Music.

Researcher: How do you find out about those sites - is it by recommendation?

Amie: No, not me (laugh)

The researcher was not sure what Amie had found funny about this question and was therefore unsure as to how this response should be interpreted. The question was asked again latter in the interview.

Researcher: How do you find out where the music sites are?

Amie: From my cousin, she is into music a lot, so she knows most of them and like on the tele they've got the web sites so I just go on them.

Amie's use here of the Internet is focused and she reaches the pages or sites she is interested in. It is important to note that working in this way, i.e. entering specific site addresses; she is not using a search engine. This contrasts strongly with comments from Farah who had been put off using the internet because of the large amount of information

she had been faced with when she did try to use the Internet. Farah's experience of using the Internet had involved using search engine rather than going directly to a site.

Amie was asked about playing games on a computer. Like some other students she has or had access to a Playstation.

Researcher: Do you ever play any games on the computer?

Amie: Oh that's what I do sometimes, yes.

Researcher: What games do you play?

Amie: Solitaire - that's all - and what's the other one called? Free cell.

Researcher: The small games that come with Windows?

Amie: Yes that's all. I haven't gone to any game web sites because I haven't got any games, that's why. We've got a Play Station at home.

Researcher: I've heard some girls say that they don't play games.

Amie: No! That's my favourite. (Laugh) I like playing games, I play all the time.

Amie's use of the Internet was not confined to sites written in English. She was able to give the researcher a varied list of sites she accessed on the Internet written in French. Although the sites were all of a non-academic nature, and she currently only accesses

these site from her home this raises an interesting question for the college firewall software.

The researcher spoke to some of the college IT technical staff who were able to confirm how the firewall software works. When access to web page is requested the Web address or URL and key words in the web page are compared with a stored list. The college IT manager is able to add to or remove words on this list. It is the college's interest to keep this list as small as possible, as the longer the list is the more comparisons which have to be made and the longer it take to access any web page. This list currently only contains English words.

Summary of themes from the interviews.

Access to computers is problematic for many of the students interviewed. At college students said that there were insufficient computers available in the drop in centre at times when they wanted to use them. Students expressed a reluctance to come to college either before their timetabled classes or on days when they had no classes so that they could use a computer. Similarly students do not want to stay in college to use the computers in the evening.

Not all the students who were interviewed had a computer at home. Those students that did often had to compete with other family members for computer time. For some

students this meant that they had to prioritise what they used their computer time for. In many instances students chose to use this time for recreation rather than college work.

There were found to be students who had technical problems with home computers. Some students had been unable to set up their home system to make full use of the hardware and software they or their parents had bought.

All of the students reported some level of monitoring of their use of computers at home. Some of this monitoring had been planed. Parents or the student themselves had installed web content filtering software. Some students said that one of their parents sat with them when they were using the Internet. Other aspects of monitoring in the home appeared to be unplanned. Of the students interviewed 17 said their home computer was in a shared room and other family members were therefore able to watch what the machine was being used for.

Students generally accepted this monitoring of their use of computers at home, but there were some who expressed concern or dissatisfaction regarding the level of monitoring of computer use, and the Internet in particular, when at college. A small number of students had experienced problems with the firewall, but this was not the main cause for concern. When students did express a negative response regarding the monitoring of computer use in college it was because they disliked being watched, or as some said, being spied on by staff.

From the students interviewed the researcher was able to identify differences in computer use that were both gender and ethnically based. The majority of the students interviewed were found to be making use of the Internet for a considerable time on a daily basis. This may seem a contradiction with the claim made by students regarding problems with computer availability at either home or college, but this is not the case. When using a computer for academic work students report problems regarding access either at home or at college because the majority need to have individual use of the computer for this task. When using a computer for recreational activities students reported working with other family members. These group activities covered playing games, down loading music files and using chat rooms.

The most significant difference in computer use between gender and ethnic groups was found to be how students made use of the Internet. The use of chat rooms was found to be common place for female students, however few male students either in the interviews or in the questionnaire said they made regular use of these rooms. Cases were found where students used this form of communication as a regular way of contacting friends or relatives. For some female students use of chat rooms and e-mails has given them a greater degree of social interaction than they believe they would otherwise have. This was found to be particularly true for students who were from Asian Muslim families. Furthermore by using the Internet in this way some element of family conflict has been removed. They can now have some social interaction with their friends without leaving the family home in the evening.

For these female Muslim students their home culture was directly affecting their behaviour at college. The expectations their families placed on their behaviour meant that these students were choosing to spend some of their time at college, when not in a class, to fulfil some of their social needs. These students said that they preferred to socialise with their friends when not in class, rather than use college facilities such as the FLC. Students from other cultural backgrounds had the option of socialising in the evening, an option not always available to the Muslim females.

The researcher not only found a difference in the pattern of Internet use between male and female students and their use of chat rooms, but was able to identify differences between ethnic groups. How the female students were using chat rooms was different between some ethnic groups. Female Muslim students said that at home they used chat room to talk to their friends. This use was both regular and prearranged. They used these rooms to talk to other female Muslims that they knew about common areas of interest. Non-Muslim female students, usually white, said that they used chat rooms to make contact with new people, these same students preferred to use e-mail if they wanted to contact a friend.

Using the Internet as a method to find information was important to many of the students interviewed. From their comments the researcher was able to build a picture of the students' skills regarding use of the Internet. The researcher found students who were very skilled in using search engines and advanced search techniques such as Boolean strings. There were other students who described instances of searches resulting in so

many results they had found this disconcerting and did not know how to proceed. These students said they preferred to use a known or given URL. Examples of students using the Internet in this way were found in both college and home use. Some students said that a lecturer had directed them to a particular web site, and many said they preferred this. The majority of students said that they had been told of a good site by a friend and that they had subsequently visited that site. Others said that they visited sites they had seen advertised in the press or on the television; this was often a site that gave access to downloadable music files.

Down loading music files was found to be a popular activity for the majority of students and was found to be independent of gender and ethnicity. All of the students who were interviewed who said that they used the Internet at home said that they spent some time downloading music. The college firewall should stop students downloading music at college, and the researcher did not find any student who said that they had been able to do this. Some students had tried but had not been successful.

Inadequate instruction on the use of the Internet has led some students having poor experiences or to them feeing a lot of time had been wasted whilst trying to use it. As a learning skill or method of study the college has not yet recognised the use of the Internet as having the same level of importance as, for example, using the library. Course team leaders or curriculum managers at the college currently have the responsibility of organising student's induction program at the beginning of their course. This induction program includes a tour of the college so that students are aware of the facilities

available. In the induction programme students visit the college library, where one of the librarians shows the students what is available in the library, and how to use the catalogue. From the comments made by students in the interviews it would appear that few courses however build on this and show students how using IT can enhance their studies.

Chapter 6

Discussion of the findings and implications for the college.

This research project set out to investigate how students, from different cultural backgrounds in an FE College, were using computers and the Internet. The project has enabled the researcher to build a detailed picture of how students are using IT both within the college and at home. The findings of the research are important if the staff at Snow Hill College, and other colleges, are to understand better how the students use this technology to support their learning. In this chapter the links between students' cultural backgrounds and how they were making use of IT both at home and whilst in college are discussed.

Snow Hill College draws students from a wide range of cultural backgrounds. It is a multicultural college and the mix of students enrolled at the college is representative of the local community, which is ethnically and culturally diverse. During this research the field work made me aware of other issues relating to student cultural backgrounds that may be of concern to the college.

As part of the questionnaire, the students stated the course they were studying at the college. From these responses, the researcher was able to identify a number of courses at the college that do not have a balanced ethnic representation when compared with either the local population or the rest of the college. This means that students on these courses have a limited opportunity to mix with other students from different cultural backgrounds

or ethnicity while they are at college. Also, when not in class, students at the college can be seen to congregate in common rooms or other social areas in groups which can be defined by the students' ethnic group.

From the interviews the researcher learnt that some students have a stereotypical view of students from different cultural background to their own. This can be explained by the fact that outside college these students experience little integration or contact with other cultures or ethnic groups in the community. The ways in which some students are using the Internet, in particular chat rooms, may be reinforcing this lack of integration. In particular Asian girls who spend a lot of time using chat rooms choose to limit their contact to others persons from the same cultural group.

The impact of students' religious background on their education has been investigated by Abbas (2003). In that study of young south Asian women it was found that the importance of religion varied between faiths. For the Muslims in the study their faith was critical to how they lived, for other faiths, Sikhs and Hindus, their religion was a less important factor in their lives. Abbas found that

> 'varying interpretation of Purdah, the ability to socialise with young men ... all impact on the Muslim' (Abbas 2003 p 423)

Abbas further claimed that these factors contributed to the marginalisation of Asian women in education. This research confirms Abbas's findings that a student's religion does impact on their behaviour, in this case their use of ICT. For Asian Muslim female

students use of ICT is influenced by their religious code of behaviour to a greater extent than students of other religions.

For these students their code of behaviour, enforced by their families, restricts their opportunities for social contact, particularly in the evening. The home computer with an Internet connection enables these students to contact other, usually people they know, via chat rooms. Asian female students in the study said that the chat rooms they used were predominantly visited by Asians. They further said that they used these rooms to talk about topics that interested or concerned them, such as arranged marriages, pocket money and styles of dress. Non-Asian female students at Snow Hill College used chat room s to a lesser extent, but when they did visit a chat room it was to talk to people they did not know.

These observations suggest that while Snow Hill College is a multicultural college, it is not a culturally integrated college and that there are parts of the local community that are limited in the level of integration that they experience. Understanding the cultural diversity of the students could help staff promote the college as a more integrated part of the local society. The cultural influences on students' use of IT are a facet of that understanding.

As an example of encouraging greater integration within the college, and being aware of how students from different cultures want to work, consider how different cultural groups are using the Internet when at college. At present, Asian girls, as shown in the

questionnaire data and in the interviews, choose to use their free time to meet with their friends and not to use the college computers. These same students often reported that they prefer to use a computer in the company of another person. The computers that students have access to outside formal classes are currently in study areas not social spaces. If colleges could find a way to make some computers available in either student base rooms or in some of the college social areas, these students may be encouraged to use these for academic purposes in pairs or as part of a group. By placing computers in social areas, colleges may also encourage greater interaction with students from different cultural groups.

Other studies have shown that students' culture is more dominant in ICT or IT lessons in comparison to lessons in other subjects (see Holloway and Valentine 2003). This can be observed by noting seating patterns where students from the same cultural background sit together and in the way the lesson is conducted.

Holloway and Valentine (2003) found that ICT lessons were often more relaxed and students had a greater level of autonomy in relation to their learning. This research has shown that some of the Asian female students were unhappy with this level of autonomy. They reported feeling insecure when required to work alone and that they preferred to work with another student.

Other studies suggest that working with another student, when in an ICT or IT class, is more common elsewhere than at Snow hill college. Bosco (2004) found that 80% of

students worked in pairs when in an IT room and that this was a larger proportion than was seen in other subject lessons. At Snow Hill College all IT classes are resourced on a basis of one student to one computer, and in the Flexible learning centre student are expected to work individually at machines.

Bosco (2004) does not give any information regarding the resources in the IT classes that were observed. We do not therefore know if it was through lack of machines or through choice these students were working in the way reported. At Snow Hill College IT classes are time tabled so that there is a computer for each student in the class. At Snow Hill College some of the students worked in pairs, when permitted, as a matter of preference. Unfortunately for some of these students this was not as often as they would have liked.

Lecturers are generally aware that students like to work in different ways, or have different preferred learning styles, but IT classes tend to be a little inflexible in some aspects of classroom organization. This research has shown that some students, particularly Asian females, are clearly happier when working in pairs when using a computer and lecturers should therefore consider whether this is something they can cater for in an FE classroom. This does not just apply to Snow Hill College and it is an aspect of working with computers that all colleges should be aware of and consider when organizing IT based activities.

The Flexible Learning Centre

The FLC is used by students as a drop-in centre where they can have access to computing facilities. The students are able to use the equipment for a range of IT activities. Students at the college have reported that course and subject tutors require them to word process assignments. Some subjects, such as A level chemistry encourage students to use the Internet for research. The college is also in the process of developing a Virtual Learning Environment (VLE). This was being introduced to staff at the college in the course of the research, and as yet has had no impact on students and their programmes of study. If the VLE does develop, as the senior college management team would like to see, the college may be faced with a situation where the present IT facilities, that are available to students on a drop in basis, are inadequate.

What this study has shown is that there are shortcomings regarding the availability of IT resources for students. From the students' perspective, the current level of provision is insufficient. As part of the college mission statement is to 'put the learner first' these findings cannot be ignored. This does not automatically mean the college buys more computers for the FLC, although this is a possibility. The college could teach or encourage students to use the existing resources more efficiently.

Snow Hill College regards rooms that have a utilisation factor of 60% or more as being used well, the average utilisation of the FLC was found to be 53%. This would suggest that the room is adequate to meet the students' need. However, this figure only gives part

of the picture of what is happening at the college. In both the questionnaire and in the interviews, students reported that the FLC was busy when they wanted to use it and this in turn discouraged them from going there. Observations made by the researcher confirmed that at times the centre was not meeting demand. It was found to be a common occurrence for there to be a queue of students waiting for a machine to become available, particularly around lunchtime. The researcher also observed quiet periods, at other times of the day, when students could walk straight in and find an available machine.

No one can predict what will happen within the college regarding the use of IT, so the college position regarding use of resources must be viewed and judged against current usage. What is evident here is that the college has an expensive resource that appears to be underused, but is in fact insufficient to meet demand at peak times. It is a problem the college should address. One answer would be to expand the centre so that it is sufficient to meet peak time demand. This would entail commitment of more resources, both money and space, neither of which may be immediately available. Other colleges have reported that investment in IT has been of benefit to students, and this has been praised by Ofsted inspectors (Boyland 2003). High levels of investment in IT equipment may become to be regarded as good practice and colleges and will be expected to spend large proportions of their budget on computers.

The pressure of IT on college finances may fall as desktop machines become comparatively cheaper, however the impact of mobile technology may negate this fall in cost. William and Edge (cited by Selwyn 2003) claim that the introduction of mobile

technology into educational establishments should be of interest to researchers and one of the things that will influence how students use this technology will be shaped by the students' culture. This research agrees with William and Edge that the ways in which students use IT is influenced by their culture, but it can offer little supporting evidence regarding the use of mobile technology. Many students now have access to mobile telephones, and these they use regularly for both voice and text messaging. For some teaching staff this aspect of mobile technology has caused some problems in the classroom. Snow Hill College has a policy that mobile telephones are banned from examination rooms, and should be turned off in class. The Staff at the college are confident that the examination rooms are secure, but controlling the use of mobile telephones in classes continues to be a problem. How students will make use of wireless computing is yet to be seen, but the evidence from this research would suggest that as few students have sole access to a computer at home it is unlikely that many will be able to afford an individual portable machine that they could bring to college. However this area of technology is moving very rapidly, with Personal Digital Assistants increasingly being wireless enabled, and some hybrid PDA/Mobile devices. The rate of development of this technology will challenge Snow Hill College, as well as other FE colleges, to evolve IT policies which can deal with the fast moving world of mobile computing.

Before this happens an alternative for the college would be to better manage the present resource. It has been common practice at the college for course teams to construct timetables in isolation. There are instances in the college where a faculty may take in to account a faculty resource that is used by a number of courses, such as a workshop or

kitchen, when constructing timetables. However there was no evidence that this had been extended to cover cross college resources such as the FLC.

The FLC is always described as a drop in facility and lecturers cannot book their students machines in the room on a regular basis. What they could do, with some foresight and co-operation, is to plan when their students are not in a formal class. The present practice of time tabling means it is pure chance as to whether one or twenty-one groups are not in a class at any one time. This inevitably leads to congestion in a room such as the FLC. There is no reason why, at least on a faculty basis, more emphasis could not be placed on staggering the students' non-class time.

The Flexible Learning Centre is an expensive resource. Other colleges have similar open access rooms that are called different names but fulfil the same purpose. To maximise the use of these open access rooms other colleges need to address the same problems faced by Snow Hill College.

Student use of the Internet

From the data collected from the Internet monitoring software, the researcher was able to identify some of the Internet use as being directly related to students' college work. There was some recorded use that may or may not have been for college use, but undoubtedly the vast majority of Internet use was unrelated to any college course. This, however, is

not an argument for cutting or restricting further the access students have to the Internet whilst in college.

When students are using the Internet, whether for college use or otherwise, they are practicing and developing their IT skills. This will therefore have a beneficial effect on how they are able to use the Internet and their IT skills when they come to do some college work. In the same way that teachers may encourage students to read the better quality newspapers by making them available in the school or college library, there is opportunity to encourage students to be more selective in the Internet sites they access.

The college could address this issue in a variety of ways. Some subject leaders have provided content pages for the college Intranet, and on these pages they have listed useful links to other Internet sites for students to follow. There is scope for more curriculum areas to do the same. By doing this, the college would be offering more in the way of support to those students who felt that the Internet swamped them with information. The researcher observed GCE A level Chemistry students using links provided by a tutor in a very effective way. This is the IT equivalent of providing a book reference for the student; it does not do the work for them but points them in the right direction. This would be used by students who were using the Internet in relation to their studies, and would not have an effect on those who are using the Internet for other purposes. For these students, the college should consider suggesting links for students to follow from other points on the college Intranet pages. The college Intranet home page would be a good place to start. There would be no guarantee that student would follow these links, in the

same way there is no guarantee that students will read the quality newspapers in the library. This would be a way to support the students who lack the confidence to use the Internet at present.

This study found from the students interviewed and the completed questionnaires, that for many of the students the instruction they are receiving, with reference to using the Internet, is inadequate to meet their needs. All 16 to 19 year old full time students have the opportunity to improve or learn new IT skills as part of the Key Skills provision. Use of the Internet, however, is not an explicit part of this curriculum. Further it is not part of the curriculum that is automatically available to those students over 19 years of age, or part time students. From the students interviewed, it is apparent that there is no clear policy at course level on which staff are to be responsible for supporting this important study skill. Unlike the introduction to the library all students receive as part of their induction into the college, Snow Hill College has no formalised introduction to the Internet for the majority of students.

A lack of formal training on the use of modern technology is not peculiar to Snow Hill College. Sefton-Green and Buckingham (1998) suggest that while students can learn a great deal when using discovery methods

> 'There is a need for students to learn complicated software in a more structured way' (Sefton-Green and Buckingham 1998 p81)

This lack of formal introduction to the use of the Internet could be damaging to the students' ability to benefit fully from the resources available at the college. Snow Hill

College, like most other FE colleges, does have a basic skills policy regarding literacy and numeracy. At the beginning of every full time course all student are assessed for his or her literacy and numeracy level, and if required additional support is put in place. The college monitors this testing to ensure that all course teams implement the policy. The researcher would argue that this policy now should be extended to cover IT, and while the format of the testing and support may be different for IT, the needs of these students should be addressed.

There were aspects of IT use in the college that the researcher was able to identify as being independent of the student's gender and cultural background, such as using the Internet for college work. The research has however found some differences in student use of IT that can be described as gender based, and some IT use that can be described as culturally based.

Previous research (see. Harris 1992) suggests that gender has a strong influence on students' use of IT. This research has been able to identify what some of these differences may be. The data from the questionnaire suggests that male students use the Internet for different purposes compared to female students. Male students used the Internet more than female students for finding information, for personal use, and significantly for entertainment ($p<0.05$). In the interviews, however, the research found some female students who were spending a considerable amount of time everyday at home on the Internet.

The findings of this research project here agree with research conducted by Lewin, Maver and Somekh (2003) who found that there was evidence that both extent and type of computer use was gender related.

Vered (1998) attributes this to the fact that males and females have different expectations and behaviour in all aspects of their life. Vered, using games, illustrates this by observing that girls play different games to boys.

Males claimed a higher use of IT at both home and college than females; this difference remained significant when home and college use were combined. Males were also found to send and read e-mail, from college, more frequently than female students. Exceptions to this were found; the researcher identified a number of female students who were using the Internet for a considerable period each day.

This research set out to investigate differences in student usage of IT and the Internet that could be attributed to cultural background. Some clear differences in use were identified, of these there are patterns of use that can be described as gender differences and some that can be explained in terms of the student's family culture.

There was no significant difference found between ethnic groups or religious groups for computer use for most of the data collected. However comparing responses from white students with Pakistani students, the data show that Pakistani students use the Internet to a greater extent than the white students for what they termed private use, and using e-mail at home is significantly higher for the Pakistani students than the white students.

Evidence from the interviews suggests that this difference is due to the restrictions placed on these Pakistani students by their family and the family culture. In particular these students reported that, unlike students from other cultural groups, they were not free to go out in the evening. There was no difference in how these students used the Internet for academic purposes.

From the interviews, the researcher found that there are students who use the Internet as a means of social interaction. The researcher found that some of the Asian female students interviewed were not allowed to go out in the evening. These students have been using the Internet at home as a way of contacting their friends. Some used it to make new social contacts, but most used it as a way of talking to existing friends and relatives. Of these students, a small number have also come to rely on the Internet for other day to day needs, such as shopping for clothes.

The interviews showed that there is a group of students, namely girls from Asian Muslim families, who use the Internet at home for social interaction. They did this by making extensive use of chat rooms. For these students their family culture guides their behaviour and the Internet has become a means for social interaction that they would not otherwise have. For some of these female students, the Internet has become a crucial part of their life. The researcher would not suggest that these are the only group of students who use the Internet in this way; there may be other students from other ethnic groups who rely on the Internet for social interaction just as much as these Muslim students. What sets these Asian Muslim students apart is that their reason for using the Internet in this way is the

restrictions imposed on these students by their parents. Further these restrictions were only applied to the female family members and were independent of their age.

Modern technology has given society new ways to communicate. Young people are particularly attracted to using these new methods of communication because they find it both worthwhile and interesting. (Abbott 1998). Certainly the students at Snow Hill College, including the Muslim females, are no different to young people elsewhere.

Roald (2001) explains that for Muslim society, and men in particular, there is a need or requirement to protect women. Different groups within Muslim society may choose to interpret aspect of religious teaching differently (Abbas 2004), so what is observed in one local community need not necessarily apply to similar communities in other parts of the country. For some of the Muslim families with children at Snow Hill College this need to protect women is taken seriously. The restrictions these families put on female family members regarding leaving the family home in the evening is their way of ensuring that protection.

This research has found that for these female Muslim students using chat rooms is an important part of their social life. Understanding these students' social needs is crucial to understanding their behaviour in college. Whilst the use of Internet chat rooms may have given these students opportunity for greater social interaction outside college, it can not be a replacement for face to face social interaction. For some students their only opportunity to socialise with some of these friends is while they are at college. These students are reluctant to exchange this social interaction for the opportunity to use a

college computer. College staff should therefore be aware of the social needs of these students when they are in college.

The research findings here are important for all colleges as there is no reason to suspect that the Asian females at Snow Hill College are any different from Asian female students at other colleges. This research has produced evidence to show that these students do use the Internet in a different way compared with other ethnic groups, and that this is bought about by what is seen as acceptable behaviour by their cultural group,

In the interviews, all students, who had a computer at home, reported that Internet use at home was restricted. For some students this was because they had to share a machine with other family members, while for others, the limitation was due to costs involved. For the Asian girls who currently use their Internet time for social interaction, these limitations can be seen as a serious disadvantage. If the time to use a computer at home is limited, as some reported, then they are faced with a dilemma. They have to choose between using the computer and the Internet to assist their studies or using the Internet to provide them with social interaction. This not a choice the female students from other ethnic groups are normally faced with.

The researcher was able, in both the data from the questionnaire and from the interviews, to identify students who were using computers and the Internet for long periods of time. Other researchers have also found that students were using PCs for prolonged periods of time (Lewin 2004). If the college increases the expected use of IT in the curriculum, will

these students reduce their non-academic use of IT accordingly? From the comments made by some students, the use of IT and the Internet is becoming a fixed part of their daily life. There are many students at Show Hill College who would empathise with the statement:

> 'Jenny Brown says her life has been changed by the computer'
> (Angus et al 2004 p11)

Carrington (2004) argues that all those involved with education must now accept the fact that modern technology, and here the research is not confined to computers has profoundly altered the lives of young people. Other research (Lewin et al 2003) also states that computers, and the Internet in particular, are now embedded in youth culture. Using IT has become part of their culture in much the same way as previous generations acquired the habit of reading a daily newspaper. It would therefore be wrong of the college to expect students to maintain their use of IT at the present level. They are more likely to increase their usage if the courses they are on make demands for greater IT use.

Students at Snow Hill College did use home computers for playing games. Lewin (2004) found that two-thirds of children's computer use was devoted to playing games. Students at Snow Hill College not only played games on their home computers, but also said that they used the Internet to interact with other game players via dedicated web sites. At first glance this may seam unimportant within an educational setting. However Carrington (2004) reports that there is a growing body of evidence that points to benefits experienced by PC game players. These include increased decision making skills, PC game players have been found to be prepared to make decisions quicker, they also exhibit improved hand-eye coordination and improved memory strategies.

Some of the students interviewed expressed a reluctance to use the Internet in the FLC. As found in the responses to the questionnaire, the reasons ranged from the room being too busy to the student preferring to work at home. There was a small group of Asian Muslim female students who are not using the Internet in college because of the cultural pressures they have or perceive they are under. The college should address this issue by making it clearer to users of the college IT facilities that the college takes every effort to protect users from offensive material on the Internet.

With respect to these students who feel that they cannot make full use of the college computing facilities, the researcher has identified a group of students who could be disadvantaged compared to other college students. If the college does develop its VLE, then these students could be further disadvantaged. In the future it will not be sufficient for the college to tell students about the protected environment it has for Internet access, the college needs to develop better communication links with the local community that these students come from. Further, the college staff responsible for these community links need to be aware of community concerns regarding Internet use, so that an open discussion can take place. Prior to this research being undertaken, the college was not aware of this community concern. This concern within the local community, whether real or imagined, is not helped when the firewall software is seen to fail or can be circumnavigated.

The researcher found that some students were accessing Internet web sites that used languages other than English. Some students did this because they wanted to use their first language whilst others were doing it to negate the college firewall.

In order to clarify this issue the researcher sought the advice of the college technical staff who supervise the firewall software. These staff confirmed for the researcher that the firewall uses two methods of blocking access to particular sites. First by the web address being listed as one that should be blocked and second by blocking sites that use specific key words. The software package was configured for use using English, and although the list of prohibited words could be extended to include words from a foreign language, there was no plan to do this at present. There is a policy issue for the college here. The college does plan to move to a system whereby all users of the Internet within college will be required to login using an individual login name and password. The firewall will then keep a record of sites visited by staff and students on an individual basis. However, this will only let breaches of the college Internet access policy be investigated where these breaches have been identified by the firewall. The volume of Internet traffic prohibits manual searches of sites accessed by individual students.

There is at the college tension between the culture of students from some ethnic minority backgrounds and the dominant culture of the college. How the college operates the firewall is an example of this. The college management would argue that one of the purposes of the firewall is to protect students from offensive content on the Internet. The

college, however, does not extend this protection to students who want to use a language other than English.

Youdell (2003) describes this type of experience for students as institutional racism. From the college's point of view to operate a firewall that catered for all languages, or even just the languages used by the majority of students, would be possible, but extremely impractical.

As previously stated Asian students were found to be visiting chat rooms on a regular basis at home, but were unable to access these rooms from within college. This could lead these students to feel isolated by how the technology is being used, were it not for the fact that these students have clearly adapted to using the Internet at home in a way that enables then to express their cultural differences.

This research found that the student population at Snow Hill College has a very positive attitude towards IT and although there is a wide range in level of IT skills students have, students do make extensive use of computers as part of their everyday life. Using computers has become part of the students' culture. There was a small group of students for whom this may not be the case, namely some adult students.

How adult learners at Snow Hill College are making use of computers and the Internet was found to be more limited than for the younger students. Part of this difference can be explained in terms of these students culture.

> 'A wide range of cultural influences will affect the adult learner. Differing learning styles and communication styles, differing perceptions of involvement ... all have the potential to produce cultural conflict or tension.' (Sparks and Butterworth 2004 p279)

The research at Snow Hill College has show that for adults using computers is not part of the adult learners' culture to the same extent as it is for younger students.

For some staff who teach classes which have students with a wide age range, this research highlights one area to which they should give some consideration. The research found that in general older students at the college, and by this the researcher means students over thirty, are not as comfortable with IT as the younger students. These older students were found to have a less positive attitude towards IT and used it less. If these staff are planning to use an IT element within their course, then these older students may need some additional support. Brooks (2005) found that 40 years of age is currently a significant break point for students. Brook suggests that students over 40 experienced a very different curriculum in the 60's and 70's to that experienced by younger students. The differences in curriculum cover both content and teaching or learning styles.

Regardless of students' ages, there is a strong case for suggesting lecturers in all colleges consider using either Selwyn's computer attitude scale (Selwyn 1997) or a similar device before they decide to use computers in their courses.

Some researchers have warned about putting too much reliance on this type of self-assessment tool. One of the problems researchers have identified is that males tend to be

more self-confident when completing self-assessment exercises and may therefore exaggerate their capabilities. (Haynes et al 2004).

When using the Internet, students in general, are prepared to accept some level of monitoring. From the questionnaire and interview data, the research shows two types of monitoring was in use, namely software applications and being watched by someone.

Content filtering software had been installed on some home computers, and where this was the case students found it acceptable. The use of similar software in the college, that is the firewall, was not universally accepted. For a small number of students, the blocking of some sites was seen as problematic. Although the college offers staff and students the option of contacting the IT manager regarding sites that may have been blocked in error, so that the access to such sites can be permitted, in practice this does not happen.

Many of the students said that home machines were in shared or family rooms and that what the computer was being used for was open to view by other family members. Students at Show Hill College said that the home computer had been placed in a shared or family room for various reasons, such as ease of access to all family members, parental monitoring of use, availability of space, and so on. Holloway and Valentine (2003) found that where the home computer was placed did affect family life. They claim that previously television had fostered family bonds and that was now a role to which the home computer contributed. At Snow Hill there were students who said that one or other of their parents sat next to them when they were using a computer.

Some students said that a parent often sat with them and watched as they used the computer. These students did not see this as unreasonable, but many of these students said that being watched by staff when in college was not acceptable.

The need for monitoring of student use of computers and the Internet at home and at college is not necessarily for the same purpose. At Snow Hill College the primary aim of the college acceptable use of the Internet policy is to ensure that the use of college equipment is legal, and that what one student does is not offensive to other students or staff. In the context of the home, parents may have a variety of reasons for monitoring the use of computer equipment. Holloway and Valentine (2003) found that parental fears regarding the Internet centred on chat rooms and adult sites. They found that these fears caused parents to feel that there was a need to monitor Internet use within the home. Angus and Snyder (2004) found parents who regarded monitoring use of the Internet in the home as necessary, but introduced it by simple observation rather than the use of firewalls or, as in the case of some parents in Holloway and Valentine's study, by reading the Internet history file on the home machine.

Lewin (2004) said that one of the crucial differences between computer use at home and at school or college was the constraints involved. It obviously makes little sense to argue that students use a computer at home for a particular purpose to a greater extent than when in college, if that purpose is prohibited or restricted there.

There is scope for further research regarding monitoring students' use of IT and the level of monitoring students will readily accept. It may be a simple matter of staff training and how this type of monitoring can be done in an unobtrusive way. It may also be a conflict between what is acceptable in the students' home and what is acceptable in the college. Both staff and students need to be fully aware of the college policy on Internet access and how it will be monitored within the college.

The researcher found that many of the A and AS level students interviewed used IT as an aid to their studies. There were students, as previously mentioned, who used the Internet only to access past examination papers, but these were the exceptions rather than the norm. Where A and AS level students said they used the Internet to help with their studies they said they were using it to search for information. This is in strong contrast to the reported finding of Selwyn (1999b) who found little use of IT by A level students. Somekh (1999) was critical of Selwyn's paper, and clearly disagreed with the finding of that research project. Somekh points out that the small sample used by Selwyn is insufficient to make the generalisations presented in the paper. Selwyn's research used 1000 student questionnaires and 100 student interviews, so Somekh's comment may not be completely valid. The argument that schools and colleges have made little progress in encouraging the use of the computers in the curriculum is strengthened by Selwyn's work (Selwyn 1999b) in which he investigates why computers have not come to be a dominant part of the curriculum. This research provides evidence to support Selwyn's case, but care must be taken to view the data with caution. This research suggests that the impact of computers on the curriculum is variable. The courses being looked at, the lecturing

staff involved and the nature of the subject, all contribute all contribute to the students' decision whether to use the Internet or not.

In the interviews conducted as part of this research, cultural background has been considered. There were AS and A level students from different cultural groups who reported using the Internet to aid their studies. This would suggest that use of the Internet at Snow Hill College is independent of a student's cultural background. The findings of this research would also suggest that either attitudes among A level tutors has changed dramatically in the short time since Selwyn's study, or the A level tutors at Snow Hill College are more actively promoting the use of the Internet than the staff at the nine institutions at which Selwyn's research was based.

Other research has shown that there is a wide variation in the level of IT skills among academic staff. (Haynes et al 2004). Clearly if a member of staff has a low level of IT skills then they are less likely to encourage their students to use IT as part of their studies.

For many of the students in the study access to a computer at home was not always easy. Reporting on research undertaken as part of the government's initiatives to transform educational practices with new technology Lewin (20040 said that home ownership of PCs was increasing. In that report it was said that 90% of children had access to a home computer. At Snow Hill College home ownership of PCs was 78%. If modern technology is to be used to broaden access to the curriculum (Lewin et al 2003) then educators need to ask if those who do not have access to a PC at home are disadvantaged.

In previous research (Angus 2004) students that were identified as being disadvantaged were given access to computers, it was found that this access did not mean these students were no longer disadvantaged. Equal access to ICT on its own was found to be insufficient in ensuring that these students were no longer disadvantaged. Research by Sefton-Green and Buckingham (1998) found that there was a significant difference in the amount of modern technology to be found in working class homes. The research at Snow Hill College has not tried to identify students as belonging to a particular class, but it was evident that home ownership of a computer was not confined to the better off.

Sefton-Green and Buckingham (1998) said that

> 'Access to a computer is possibly as important a part of the distribution of cultural capital as access to books.' (p81)

They did, however, qualify this by saying that access alone was not enough; use of home computers needs support. This is where college like Snow Hill can help.

This research has shown that the use of computers and the Internet has become part of everyday life and as such, part of our society's culture. The research has shown, however, that different cultural groups within our society are using the Internet in different ways and for different purposes.

For Snow Hill College, the findings of this research project will be significant if it raises staff awareness regarding how students are using the Internet. Further staff should be aware that the students' cultural background does affect how they use the Internet. These

finding will also be of significance to other FE college with the same type of cultural diversity in the student population.

Within this research, it has been shown that their cultural background influences how students use computers and the Internet. The findings of this research suggest that if there are identifiable differences in use between the cultural groups represented at this college, then similar differences are likely to exist between other cultural groups that are not represented at this college. Other FE colleges should now set themselves the task of investigating IT use by students from the ethnic groups at their college with a view to identifying these differences. With these differences, if any, identified colleges will be able to consider possible impact on curriculum delivery, and how these differences are likely to influence student's preferred leaning styles.

This research project has shown that it is not sufficient for future education researchers to investigate computer use in terms of type of use alone, as has been the case in many previous studies. This research has shown that how students choose to use computers and the Internet needs to be interpreted in terms of their gender and cultural background.

Conclusions

This research has implications on two levels. First the there are implications for future research in FE and secondly there are implications for curriculum development within Further education colleges in England.

This research was unique in so far as it was concerned with the cultural differences displayed by students when using IT in an FE setting. We have already seen there is limited research taking place within FE colleges which concerns students' independent use of IT facilities and then links this data to what can be found out about usage at home. Where research has taken place the research as usually looked at students as a homogenous group, although in some research gender has been taken into consideration. The findings of this study suggest that this approach is of limited use in understanding the complex patterns of ICT usage within further education and that future researchers will need to consider students' cultural background and ethnicity in their research plans if they are to understand fully the complex factors underlying access and use of technology. The research has shown that cultural background is a major influencing factor regarding students' use of ICT, but not a factor having a major impact on their attitudes towards using ICT. The challenge for colleges is to encourage this generally positive attitude towards ICT and use it to enhance the students' learning experience.

Given that at the present time some students' access to computers and the Internet while not at college is limited, college need to consider how they can help students use the time they have at college to use this technology effectively. This does not mean trying to reduce the time some groups of students use the Internet, or restrict their social interaction via the Internet, but rather ways should be sought to make more efficient use of the time students use computers and the Internet. Students using computers not for longer periods but being able to use them more efficiently would help students at home, where they may have to share a computer with other household members or have a time

limit on use of the Internet, but would also have resource implications within the college. This research clearly identified a need for colleges to address the standard of training and instruction on the use of IT in general, but in the use of the Internet in particular.

Finally this research should be seen as an aid to the staff in FE when considering curriculum reform and development. The importance of these research findings will increase as the use of IT in the curriculum increases. When planning curriculum reform, the teacher or curriculum manager has to be aware of many factors; these include resources, student demand, delivery methods and the preferred learning styles of the students. The findings of this research show that there are teachers who want students to make use of the technology, but these teachers are not ensuring that all of the students have the necessary skills in order to do this. The findings show that training on the use needs to be planned for as part of the students' curriculum. At a course team level this requires curriculum managers that this skill is incorporated into student schemes of work.

The research showed that students do want to make use of the college IT facilities, but are often frustrated by problems of availability. To try to meet this student demand course teams need to work closer with other course teams from across the college in order to increase the spread of times students may use the Flexible Learning Centre.

The research has also shown that at present little attention is paid to students' preferred learning styles in respect to the use of IT. The research found many students, often from minority ethnic groups, who preferred to work with another student when using a

computer. Whilst in a classroom individual teachers may be able to accommodate this style of working, there is no provision for students in the open access IT rooms of the college for students to work other than on their own.

The findings of this research show that ICT is a complex resource, and the use of it by students can be influenced by many factors, which may be cultural, contextual or just what is possible for an individual student. These factors need to be considered at by the teacher planning a single lesson and the curriculum manager when planning a complete course. This research should raise the teacher's awareness regarding the fact that a student's cultural background will influence how that student uses IT. Being aware of this means the teacher can make an informed choice regarding how IT resources are integrated in to the course.

Appendix 1:Questionnaire: Access to the INTERNET

The following questionnaire is part of a research project to investigate student access and use of the INTERNET

Personal details (please tick √)

Male		Female		Full time		Part time	

Age last birthday……..

1.

Course of study	

2.

College site where you spend most of your time			
New North Road		Leeds Road	
Taylor Hill		Marsh	
Holmfirth		Highfields	

3. Ethnic Origin

Bangladeshi	Chinese	Other-Asian
Black African	Indian	Other
Black Caribbean	Pakistani	Not Known
Black Other	White	

4. Religion

Buddhist	Hindu	None
Christian	Muslim	Other
Jewish	Sikh	

5. Your IT skills, please tick all that you can do confidently

Turn on a PC		Attach a document to an e-mail	
Format a disc		Change e-mail properties	
Open a new word file		Use an Internet browser	
Save a file to disc		Save an Internet page	
Delete unwanted files		Download a file	
Copy between windows		Delete e-mail	
Open e-mail		Produce a web page	
Send e-mail		Put a graphic on a web page	
Save a received e-mail		Modify simple HTML script	
Use a search command on the Internet		Incorporate a web address in a word document	

6.	Have you received any IT training?	Yes		No
7.	Have you received any Internet training?	Yes		No
8.	Do you have access to a computer at home?	Yes		No
9.	Do you have Internet access at home?	Yes		No

	Regularly	Sometimes	Never
10. Do you use a computer at home?			
11. Do you use a computer at college?			
12. Do any of your teachers set work that requires you to use the Internet?			

13. If you use the Internet please tick ALL that apply to you

	Yes	No
For information		
Entertainment		
College related work		
Private use		
Other, please specify		

14. Approximately how many times have you used the Internet at home?

	Never	1-5 times	6-10 times	10-15 times	More than 15 times
In the last week					
In the last month					
This academic year					

15. When you use the Internet at home how would you describe the time of your connection?

Less than 5 minutes	
More than 5 minutes but less than 30 minutes	
Between 30 minutes and an hour	
More than an hour	

16. Approximately how many times have you used the Internet at college?

	Never	1-5 times	6-10 times	10-15 times	More than 15 times
In the last week					
In the last month					
This academic year					

17. When you use the Internet at college how would you describe the time of your connection?

Less than 5 minutes	
More than 5 minutes but less than 30 minutes	
Between 30 minutes and an hour	
More than an hour	

18. Do you have e-mail at home?

Yes		No		Do not know	

19. Do you use e-mail at home?

Yes		No	

20. Do you have an e-mail account you can use from college?

Yes		No		Do not know	

21. Do you use e-mail at college?

Yes		No	

22. If you have an e-mail account how often do you read your email?

Every day		Every week		Every month	
Never		Not applicable			

23. How would you like to see the college develop the use of the Internet?

_____

_____

_____

24. What, if any are the factors that encourage or discourage you from using the Internet in college?

_____

_____

_____

_____

25. What do you think about the college provision for Internet access by students?

_____

_____

_____

_____

26. Please indicate whether you agree or disagree with each statement. Try not to think about your answer for too long. This is not a test, so there are no 'right' or 'wrong' answers —just answer as honestly as you can. Please tick one answer for each question

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
If given the opportunity to use a computer I am afraid I might damage it in some way.					
Computers help me organise my work better.					
I could probably teach myself most of the things I need to know about computers.					
I would avoid taking a job if I knew it involved using computers					
I hesitate to use a computer in case I look stupid					
Computers can enhance the presentation of my work to a degree which justifies the extra effort					
I am not in complete control when I use a computer					
I don't feel apprehension about using a computer					
I can make the computer do what I want to do					
I only use computers in school / college when told to					
I need an experienced person nearby when I use a computer					
Using a computer does not scare me at all					
Most things a computer can be used for I can do just as well myself					
I avoid coming into contact with computers in school / college					
If I get problems using the computer, I can usually solve them one way or another					
I hesitate to use a computer for fear of making a mistake I can't correct					
Computers can allow me to do more interesting and imaginative work					
I will use computers regularly throughout school / college					
I do not need somebody to tell me the best way to use a computer					
Computers make me feel uncomfortable					
Computers make it possible to work mare productively					

Thank you for taking the time to complete this questionnaire.
If you would like a copy of the analysis of the results please send an e-mail to rknowles@huddcoll.ac.uk

Appendix 2
Analysis of self assessed IT skill levels

Test	**1-way between subjects ANOVA**
Comparison	Skill by gender: Male, Female
n	208

Skill by gender	n	Mean	SD	SE
Male	98	14.929	5.126	0.5178
Female	110	9.900	4.698	0.4479

Source of variation	SSq	DF	MSq	F	p
gender	1310.523	1	1310.523	54.49	<0.0001
Within cells	4954.400	206	24.050		
Total	6264.923	207			

		Tukey 95% CI		
Contrast	**Difference**			
Male v Female	5.029	3.686	to 6.372	(significant)

Test	**1-way between subjects ANOVA**
Comparison	skill by ethnic origin: B Caribbean, Indian, Pakistani, white
n	197

skill by ethnic origin	n	Mean	SD	SE
B Caribbean	6	12.000	5.060	2.0656
Indian	6	15.167	4.750	1.9394
Pakistani	47	13.170	5.772	0.8420
white	138	11.797	5.371	0.4572

Source of variation	SSq	DF	MSq	F	p
ethnic origin	119.468	3	39.823	1.34	0.2619
Within cells	5725.790	193	29.667		
Total	5845.259	196			

		Tukey 95% CI	
Contrast	**Difference**		
B Caribbean v Indian	-3.167	-11.316	to 4.983
B Caribbean v Pakistani	-1.170	-7.290	to 4.949
B Caribbean v white	0.203	-5.684	to 6.090
Indian v Pakistani	1.996	-4.123	to 8.116
Indian v white	3.370	-2.517	to 9.256

Test	**1-way between subjects ANOVA**
Comparison	Skill by EO and gender: Pakistani male, Pakistani female, white male, white female
n	184

Skill by EO and gender	n	Mean	SD	SE
P male	26	12.500	5.701	1.1180
p fem	21	14.000	5.891	1.2854
w male	67	12.955	5.088	0.6216
w fem	70	10.771	5.446	0.6509

Source of variation	SSq	DF	MSq	F	p
EO and gender	251.373	3	83.791	2.87	0.0380
Within cells	5261.709	180	29.232		
Total	5513.082	183			

		Tukey 95% CI	
Contrast	Difference		
P male v p fem	-1.500	-5.614	to 2.614
P male v w male	-0.455	-3.695	to 2.784
P male v w fem	1.729	-1.491	to 4.949
p fem v w male	1.045	-2.462	to 4.551
p fem v w fem	3.229	-0.260	to 6.717
w male v w fem	2.184	-0.212	to 4.580

Test	**1-way between subjects ANOVA**
Comparison	Skill by religion: Christian, Muslim, None
n	197

Skill by religion	n	Mean	SD	SE
Christian	74	11.081	5.551	0.6453
Muslim	52	13.154	5.929	0.8222
None	71	12.887	4.883	0.5795

Source of variation	SSq	DF	MSq	F	p
religion	172.263	2	86.132	2.93	0.0560
Within cells	5711.381	194	29.440		
Total	5883.645	196			

		Tukey 95% CI	
Contrast	Difference		
Christian v Muslim	-2.073	-4.392	to 0.246
Christian v None	-1.806	-3.935	to 0.323
Muslim v None	0.267	-2.073	to 2.606

Test	**1-way between subjects ANOVA**
Comparison	Skill by gender and religion: Male Ch, Male Mus, Male none, Female Ch, Female Mus, Female none
n	197

Skill by gender and religion	n	Mean	SD	SE
Male Ch	38	14.895	5.145	0.8347
Male Mus	20	15.850	4.591	1.0267
Male none	35	14.286	5.470	0.9245
Female Ch	43	9.674	5.107	0.7788
Female Mus	21	11.524	4.771	1.0411
Female none	40	9.650	4.252	0.6723

Source of variation	SSq	DF	MSq	F	p
gender and religion	1235.801	5	247.160	10.15	<0.0001
Within cells	4653.052	191	24.362		
Total	5888.853	196			

		Tukey 95% CI		
Contrast	**Difference**			
Male Ch v Male Mus	-0.955	-4.881	to 2.970	
Male Ch v Male none	0.609	-2.720	to 3.938	
Male Ch v Female Ch	5.220	2.057	to 8.384	(significant)
Male Ch v Female Mus	3.371	-0.493	to 7.235	
Male Ch v Female none	5.245	2.026	to 8.464	(significant)
Male Mus v Male none	1.564	-2.419	to 5.547	
Male Mus v Female Ch	6.176	2.330	to 10.021	(significant)
Male Mus v Female Mus	4.326	-0.113	to 8.766	
Male Mus v Female none	6.200	2.309	to 10.091	(significant)
Male none v Female Ch	4.611	1.376	to 7.846	(significant)
Male none v Female Mus	2.762	-1.160	to 6.684	
Male none v Female none	4.636	1.347	to 7.925	(significant)
Female Ch v Female Mus	-1.849	-5.632	to 1.933	
Female Ch v Female none	0.024	-3.097	to 3.146	
Female Mus v Female none	1.874	-1.955	to 5.703	

Appendix 3
Analysis of computer use at home and at college

Test	**1-way between subjects ANOVA**
Comparison	Home use by gender: Male, Female
n	208

Home use by gender	**n**	**Mean**	**SD**	**SE**
Male	98	24.327	21.784	2.2005
Female	110	18.573	19.689	1.8772

Source of variation	**SSq**	**DF**	**MSq**	**F**	**p**
gender	1715.795	1	1715.795	4.00	0.0467
Within cells	88284.469	206	428.565		
Total	90000.264	207			

Contrast	**Difference**	**Tukey 95% CI**		
			to	
Male v Female	5.754	0.084	11.423	(significant)

Test	**1-way between subjects ANOVA**
Comparison	Home use by Ethnic origin: Black Caribbean, White, Pakistani, Indian
n	197

Home use by Ethnic origin	n	Mean	SD	SE
Black Caribbean	6	18.167	19.600	8.0017
Indian	6	36.500	24.362	9.9457
Pakistani	47	19.489	20.613	3.0068
White	138	21.493	20.563	1.7505

Source of variation	SSq	DF	MSq	F	p
Ethnic origin	1603.378	3	534.459	1.25	0.2921
Within cells	82364.571	193	426.759		
Total	83967.949	196			

Contrast	Difference	Tukey 95% CI
Black Caribbean v Indian	-18.333	-49.243 to 12.576
Black Caribbean v Pakistani	-1.323	-24.532 to 21.887
Black Caribbean v White	-3.326	-25.652 to 19.000
Indian v Pakistani	17.011	-6.199 to 40.220
Indian v White	15.007	-7.319 to 37.334
Pakistani v White	-2.003	-11.045 to 7.038

Test	**1-way between subjects ANOVA**
Comparison	Home use by religion: Christian, Muslim, none
n	197

Home use by religion	n	Mean	SD	SE
Christian	74	18.608	18.332	2.1311
Muslim	52	21.365	21.331	2.9581
none	71	24.817	22.640	2.6869

Source of variation	SSq	DF	MSq	F	p
religion	1399.870	2	699.935	1.62	0.1998
Within cells	83620.313	194	431.033		
Total	85020.183	196			

		Tukey 95% CI	
Contrast	**Difference**		
Christian v Muslim	-2.757	-11.630	to 6.116
Christian v none	-6.209	-14.355	to 1.937
Muslim v none	-3.452	-12.402	to 5.499

Test	**1-way between subjects ANOVA**
Comparison	Home use by gender and religion: Male Ch. Male Mus, male none, Female Ch, Female mus, Female none
n	197

Home use by gender and religion	n	Mean	SD	SE
Male Ch	38	24.711	22.099	3.5850
Male Mus	20	25.750	20.005	4.4732
male none	35	21.057	22.101	3.7358
Female Ch	43	15.581	18.272	2.7865
Female mus	21	25.286	20.514	4.4765
Female none	40	20.425	20.797	3.2883

Source of variation	SSq	DF	MSq	F	p
gender and religion	2609.708	5	521.942	1.22	0.3004
Within cells	81587.977	191	427.162		
Total	84197.685	196			

Contrast	Difference	Tukey 95% CI
Male Ch v Male Mus	-1.039	-17.477 to 15.398
Male Ch v male none	3.653	-10.286 to 17.593
Male Ch v Female Ch	9.129	-4.118 to 22.377
Male Ch v Female mus	-0.575	-16.754 to 15.604
Male Ch v Female none	4.286	-9.193 to 17.764
Male Mus v male none	4.693	-11.985 to 21.371
Male Mus v Female Ch	10.169	-5.936 to 26.273
Male Mus v Female mus	0.464	-18.126 to 19.055
Male Mus v Female none	5.325	-10.970 to 21.620
male none v Female Ch	5.476	-8.070 to 19.021
male none v Female mus	-4.229	-20.652 to 12.195
male none v Female none	0.632	-13.139 to 14.404
Female Ch v Female mus	-9.704	-25.545 to 6.136
Female Ch v Female none	-4.844	-17.914 to 8.227
Female mus v Female none	4.861	-11.173 to 20.895

Test	**1-way between subjects ANOVA**
Comparison	Home use by gender and ethnic origin: Male B Caribbean, Male Pakistani, Male white, Female B Caribbean, Female Pakistani, Female white
n	189

Home use by gender and ethnic origin	n	Mean	SD	SE
Male B Caribbean	4	24.750	12.093	6.0467
Male Pakistani	17	23.765	21.388	5.1873
Male white	68	25.515	22.884	2.7751
Female B Caribbean	4	18.500	21.000	10.5000
Female Pakistani	18	27.833	22.398	5.2793
Female white	78	17.654	19.237	2.1782

Source of variation	SSq	DF	MSq	F	p
gender and ethnic origin	3052.634	5	610.527	1.38	0.2352
Within cells	81191.948	183	443.672		
Total	84244.582	188			

Contrast	Difference	Tukey 95% CI
Male B Caribbean v Male Pakistani	0.985	-32.728 to 34.699
Male B Caribbean v Male white	-0.765	-31.977 to 30.448
Male B Caribbean v Female B Caribbean	6.250	-36.648 to 49.148
Male B Caribbean v Female Pakistani	-3.083	-36.618 to 30.451
Male B Caribbean v Female white	7.096	-24.005 to 38.197
Male Pakistani v Male white	-1.750	-18.200 to 14.700
Male Pakistani v Female B Caribbean	5.265	-28.449 to 38.978
Male Pakistani v Female Pakistani	-4.069	-24.586 to 16.449
Male Pakistani v Female white	6.111	-10.127 to 22.349
Male white v Female B Caribbean	7.015	-24.198 to 38.227
Male white v Female Pakistani	-2.319	-18.399 to 13.762
Male white v Female white	7.861	-2.204 to 17.926
Female B Caribbean v Female Pakistani	-9.333	-42.868 to 24.201
Female B Caribbean v Female white	0.846	-30.255 to 31.947
Female Pakistani v Female white	10.179	-5.684 to 26.043

Test	**1-way between subjects ANOVA**
Comparison	College use by gender and Ethnic origin: Female White, Female Pakistani, Female B. Caribbean, Male white, Male Pakistani, Male B. Caribbean
n	189

College use by gender and Ethnic origin	n	Mean	SD	SE
Male B. Caribbean	4	14.000	10.456	5.2281
Male Pakistani	17	17.588	11.869	2.8787
Male white	68	19.515	15.067	1.8271
Female B. Caribbean	4	7.500	6.455	3.2275
Female Pakistani	18	10.889	12.565	2.9615
Female White	78	8.744	9.530	1.0790

Source of variation	SSq	DF	MSq	F	p
gender and Ethnic origin	4768.655	5	953.731	6.33	<0.0001
Within cells	27592.753	183	150.780		
Total	32361.407	188			

Contrast	Difference	Tukey 95% CI		
Male B. Caribbean v Male Pakistani	-3.588	-23.242	to 16.065	
Male B. Caribbean v Male white	-5.515	-23.710	to 12.681	
Male B. Caribbean v Female B. Caribbean	6.500	-18.508	to 31.508	
Male B. Caribbean v Female Pakistani	3.111	-16.438	to 22.661	
Male B. Caribbean v Female White	5.256	-12.874	to 23.387	
Male Pakistani v Male white	-1.926	-11.516	to 7.664	
Male Pakistani v Female B. Caribbean	10.088	-9.565	to 29.742	
Male Pakistani v Female Pakistani	6.699	-5.261	to 18.660	
Male Pakistani v Female White	8.845	-0.622	to 18.311	
Male white v Female B. Caribbean	12.015	-6.181	to 30.210	
Male white v Female Pakistani	8.626	-0.749	to 18.000	
Male white v Female White	10.771	4.903	to 16.639	(significant)
Female B. Caribbean v Female Pakistani	-3.389	-22.938	to 16.161	
Female B. Caribbean v Female White	-1.244	-19.374	to 16.887	
Female Pakistani v Female White	2.145	-7.103	to 11.393	

Test	**1-way between subjects ANOVA**
Comparison	College use by gender and ethnic origin: Male B Caribbean, Male Pakistani, Male white, Female B Caribbean, Female Pakistani, Female white
n	189

College use by gender and ethnic origin	n	Mean	SD	SE
Male B Caribbean	4	14.000	10.456	5.2281
Male Pakistani	17	17.588	11.869	2.8787
Male white	68	19.515	15.067	1.8271
Female B Caribbean	4	7.500	6.455	3.2275
Female Pakistani	18	10.889	12.565	2.9615
Female white	78	8.744	9.530	1.0790

Source of variation	SSq	DF	MSq	F	p
gender and ethnic origin	4768.655	5	953.731	6.33	<0.0001
Within cells	27592.753	183	150.780		
Total	32361.407	188			

Contrast	Difference	Tukey 95% CI		
Male B Caribbean v Male Pakistani	-3.588	-23.242	to 16.065	
Male B Caribbean v Male white	-5.515	-23.710	to 12.681	
Male B Caribbean v Female B Caribbean	6.500	-18.508	to 31.508	
Male B Caribbean v Female Pakistani	3.111	-16.438	to 22.661	
Male B Caribbean v Female white	5.256	-12.874	to 23.387	
Male Pakistani v Male white	-1.926	-11.516	to 7.664	
Male Pakistani v Female B Caribbean	10.088	-9.565	to 29.742	
Male Pakistani v Female Pakistani	6.699	-5.261	to 18.660	
Male Pakistani v Female white	8.845	-0.622	to 18.311	
Male white v Female B Caribbean	12.015	-6.181	to 30.210	
Male white v Female Pakistani	8.626	-0.749	to 18.000	
Male white v Female white	10.771	4.903	to 16.639	(significant)
Female B Caribbean v Female Pakistani	-3.389	-22.938	to 16.161	
Female B Caribbean v Female white	-1.244	-19.374	to 16.887	
Female Pakistani v Female white	2.145	-7.103	to 11.393	

Test	**1-way between subjects ANOVA**
Comparison	Combined home and college use by gender and ethnic origin: Male B. Caribbean, Male Pakistani, Female White, Female Pakistani, Female, B Caribbean, Male white
n	189

Combined home and college use by gender and ethnic origin	**n**	**Mean**	**SD**	**SE**
Male B. Caribbean	4	38.750	16.235	8.1176
Male Pakistani	17	41.353	29.582	7.1748
Male white	68	45.029	31.282	3.7935
Female B Caribbean	4	26.000	27.191	13.5953
Female Pakistani	18	38.722	26.497	6.2454
Female White	78	26.397	23.606	2.6729

Source of variation	**SSq**	**DF**	**MSq**	**F**	**p**
gender and ethnic origin	13784.088	5	2756.818	3.67	0.0034
Within cells	137418.864	183	750.923		
Total	151202.952	188			

Contrast	**Difference**	**Tukey 95% CI**		
Male B. Caribbean v Male Pakistani	-2.603	-46.463	to 41.257	
Male B. Caribbean v Male white	-6.279	-46.886	to 34.327	
Male B. Caribbean v Female B Caribbean	12.750	-43.058	to 68.558	
Male B. Caribbean v Female Pakistani	0.028	-43.600	to 43.655	
Male B. Caribbean v Female White	12.353	-28.109	to 52.814	
Male Pakistani v Male white	-3.676	-25.078	to 17.725	
Male Pakistani v Female B Caribbean	15.353	-28.507	to 59.213	
Male Pakistani v Female Pakistani	2.631	-24.062	to 29.323	
Male Pakistani v Female White	14.956	-6.170	to 36.081	
Male white v Female B Caribbean	19.029	-21.577	to 59.636	
Male white v Female Pakistani	6.307	-14.613	to 27.228	
Male white v Female White	18.632	5.537	to 31.726	(significant)
Female B Caribbean v Female Pakistani	-12.722	-56.350	to 30.905	
Female B Caribbean v Female White	-0.397	-40.859	to 40.064	
Female Pakistani v Female White	12.325	-8.313	to 32.963	

Appendix 4

Interview Schedule A

Interview number

- ☐ Check consent
- ☐ Turn on tape

Themes		Covered
Course		
IT on course		
College use	course related	
	entertainment	
	other	
Home use	course related	
	entertainment	
	other	
Internet use	course related	
	entertainment	
	other	

End of interview

- ☐ Contact in case of need
- ☐ Thank you

Appendix 5

Interview Schedule B

Interview number

- ☐ Check consent
- ☐ Turn on tape

Themes		Covered
Course		
IT on course		
College use	course related	
	entertainment	
	other (specify)	
Home use	course related	
	entertainment	
	other (specify)	
Internet use	course related	
	entertainment	
	other (specify)	
Use by other members of the family		
Location of home PC		
Monitoring		

End of interview

- ☐ Contact in case of need
- ☐ Thank you

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