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IN

ORIGINAL

The management implications of multimedia applications in secondary school libraries

by

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Abstract

The objective of this thesis is to discover the effects that CD-ROMs and the Internet have had on the management practices of secondary school librarians. The study answers two core questions. The first question identifies the issues that librarians believe need to be addressed in order for them to be able to manage multimedia resources successfully. The second question identifies those strategies that librarians already use to manage this technology and this empirical evidence has produced a set of recommendations. The study also provides an evaluation of the methodology used to conduct this study. Both the strengths and weaknesses of the research tools employed are identified. The methodological approach employed was found to be particularly suitable for gathering the concerns, perceptions and opinions of secondary school librarians.

Firstly, the study provides an overview of the relationship between IT, school libraries and education. Secondly, qualitative data from a questionnaire on CD-ROMs and the Internet is analysed. The responses from Nottinghamshire school librarians form the basis of this study. To evaluate whether the trends identified are representative across the region, a comparison is then conducted with the responses gained from school librarians from two neighbouring counties. Thirdly, qualitative data gained from Focus Groups and Interviews undertaken by Nottinghamshire librarians is examined. This data reflects both the group and individual perspective on the issues discussed.

The survey reveals the structure of the communication network that exists between the school librarian and teachers and also with other school library professionals. The study shows that the librarian needs to be both proactive and flexible to accommodate teachers' needs in relation to IT training and usage. The introduction of the Internet into the library provides an opportunity for the librarian to expand his/her role, and increase his/her status, within the school community. In order for this to be successful problems relating to access, supervision and pupil information retrieval skills need to be resolved.

Taken together the findings show that in answer to question one librarians believe there are seven key issues that need to be addressed. These are: investment into technology; the availability of quality educational software; the delivery of a whole-school information skills programme; the provision of training; access to an Education Library Service; the adoption of student-centred teaching and learning; and the recognition by senior managers that the librarian has the ability to raise the standards of pupils within the school.

In answer to question two the study produced two sets of recommendations. For the individual library manager these are: to increase the level of communication with other library professionals to ensure that expertise is shared; to liaise with teaching staff in the selection and use of multimedia software and the Internet; to raise the awareness of both staff and pupils by promoting resources; to encourage reluctant users by providing additional support and guidance; and to train pupils in the effective use of multimedia resources. The main recommendations directed towards the school managers are: to provide adequate computer equipment; to create IT training opportunities for both the librarian and the teachers; to provide staff with the time to undertake IT training; and to implement and deliver a coherent information skills policy across the curriculum.

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Abbreviations

BECTA	British Education Communications and Technology Agency
BETT	British Education Training and Technology
CTC	City Technology College
ELS	Education Library Service
ICT	Information and Communication Technology
IMM	Interactive Multimedia
IT	Information Technology
KS	Key Stage (National Curriculum)
LIS	Library and Information Show
NCET	National Council for Education Technology
Ngfl	National Grid for Learning
Ofsted	Office for Standards in Education
P.S.H.E	Personal, Social and Health Education

1. Introduction

1.1 Purpose of the study

This research has been undertaken with the aim of identifying the issues that librarians believe need to be addressed in order for them to be able to manage multimedia resources more effectively. The research has also sought to gain a picture of the effects that electronic information sources, such as CD-ROMs and the Internet, have had on library management practices, and the strategies that have been used to manage this new technology. The responses gathered from Nottinghamshire secondary school librarians form the basis of the research. To ascertain whether the trends discovered in Nottinghamshire could be considered as being representative of library practice in that area, the results have been compared with data collected from two neighbouring counties. Data has been collected by using three methods; questionnaires, focus groups and interviews. The information obtained reflects the experiences, views and opinions of individual librarians, as well as some collective outlooks. This provides a comprehensive data set from which to draw some valuable conclusions concerning management practices.

1.2 Significance of the study

The study is a significant contribution to knowledge for the following reasons:-

1. At a time of rapid technological change, this study can provide a benchmark against which the impact of future training and activity can be evaluated.

2. The set of research tools used in this study were found to be particularly appropriate for gathering both quantitative and qualitative data in the field of school librarianship.

Multimedia technology is now firmly part of many pupils' educational experience and resources such as the Internet are being introduced into schools. New initiatives including the introduction of the National Grid for Learning are being supported by the Government, and organisations such as BECTA are undertaking valuable research into education and technology. Analysis of the data has revealed some important issues that librarians face surrounding the utilisation of CD-ROMs and the Internet in their libraries. The data shows that there are several issues that librarians believe need to be addressed in order for multimedia technology to be harnessed successfully within school libraries. This research has produced a set of recommendations for school and library managers that are based upon the pooling of common practice and systems. These recommendations should enable librarians to ensure that multimedia technology is exploited successfully within schools.

1.3 Research rationale

It is important to note that at the outset of this study in 1995, there was a lack of research into the management of CD-ROMs and the Internet in a school library setting. This changed in 1996 when NCET (1996a) published a report that examined the effects that multimedia technology had on both the learning process and those involved in supporting the learning process, by introducing new technologies into a number of schools and colleges. A further study by Wishart (1999) focused on the introduction of CD-ROMs into schools from both the teacher's and librarian's perspective. However, it was largely due to a lack of research from a library management perspective that provided a rationale for this study. This study probes deeper than the research undertaken by either NCET or Wishart and presents a major and in-depth analysis of the management of CD-ROMs and the Internet from the librarian's perspective. On a personal level, my involvement as a practitioner in a secondary school library provided me with further motivation for conducting this research.

1.4 Research questions

The study seeks to suggest ways in which new technology can be exploited to its maximum potential within the library. The following core questions provide the focus for this thesis:

1. What issues do librarians believe need to be addressed in order for them to manage, exploit and develop multimedia resources successfully within the secondary school library?

2. What strategies do librarians apply in order to manage these technologies effectively?

In order to answer these questions, a range of resource management issues have been explored. Due to the interconnected nature of these issues it was important that they were addressed as a group. This enabled the researcher to gain a complete picture of the area under investigation. Both internal and external factors have been analysed. Internal factors are those over which the librarian has control or influence and include resource management, physical space, quality assessment, finance and personnel. External factors include the use of technology both inside and outside the school environment, the role of supporting agencies and teaching and learning styles.

1.5 Structure of the thesis

This thesis is structured in twelve Chapters. The literature review provides a sound contextual basis for the research and covers three main areas of importance. These areas are examined in Chapters 2-4. Chapter 2 contains a general discussion concerning the development of educational technologies. Chapter 3 examines the differences between student-centred and more traditional teaching styles. The importance of the institutional context is also examined in relation to technological innovation and change. The management issues surrounding the introduction and utilisation of new technology that face both the librarian and the teacher, are examined

in Chapter 4. This Chapter also considers the impact that technology has had on teaching and the type of learning that multimedia can support.

Chapter 5 focuses on the methodology used to undertake this study and provides a rationale for the approach used. This Chapter explains how the research was conducted and administered and evaluates the strengths and weaknesses of the research tools used.

The results from the questionnaires that were sent out to school librarians are analysed in Chapters 6 to 9. Chapters 6 and 8 discuss the responses of the Nottinghamshire librarians to the CD-ROM and Internet questionnaires respectively. Results obtained from Derbyshire and Lincolnshire librarians form the *"Other"* data set with which the results from the Nottinghamshire questionnaires are compared. Summaries of the main findings are provided at the end of each of these chapters. The Focus Group data is analysed in Chapter 10 and the responses from the Interviews with individual librarians are examined in Chapter 11. Chapter 12 details the conclusions of the study, provides a list of recommendations and suggests areas for further research.

The strategies and approaches that are revealed by this study are vitally important as they could enable practitioners to utilise new technology more effectively. These practises are a fundamental part of the constant process that is management.

2. Literature review: Multimedia technology

Introduction

The initial and most comprehensive literature gathering took place in 1996, with the researcher continuing to browse in relevant journals for the duration of the study. The main sources of bibliographic information used were ERIC, *The Education Index* and LISA. This provided the researcher with access to a range of references in academic journals in the fields of librarianship and education. The resources available from Loughborough University library were also used extensively. In addition, on-line journals and Government reports were obtained from the Internet.

The focus of this study is secondary schools, however some of the literature reviewed pertains to primary, Further and Higher Education. This is to provide a context within which secondary schools exist and to show how multimedia technology is being used in other educational sectors.

The purpose of this review is to provide comprehensive background to this research by examining the literature that has been written about multimedia and education. Due to the large number of studies that have been undertaken the literature review has been divided into three chapters.

Chapter 2 provides a technological background to the research. The different technologies that are available to schools are examined and the Government's initiatives and priorities for ICT are also reviewed.

Chapter 3 considers the impact that new technology has had in schools. In this Chapter different teaching styles, including traditional and student-centred approaches are examined. The problems of integrating multimedia technology into teaching practises are also discussed. In addition, this section of the review includes a discussion of different learning styles and the type of learning that multimedia can support. How technology has been integrated into other sectors of education is also considered. The key issues of

staff training, the availability of quality products and information skills are all issues that are explored in this Chapter.

Chapter 4 focuses on management issues. One factor that is examined in some detail is the provision of IT training for teachers, pupils and the librarian. How the librarian can support teachers' use of technology is also explored. The impact that multimedia technologies may have on library management practises provides the focus for the latter part of this Chapter. The introduction of multimedia technologies poses some new challenges for the library professional and the effect that new systems and practises will have on the role of librarian are explored in this section. The integration of technology into libraries means that librarians will have to devise practical solutions to problems that arise in the area of resource management.

The use of CD-ROMs in both primary and secondary schools is now common place. The continual growth of the communications market means that, as the relative cost of equipment has fallen, an increasing number of secondary schools are able to provide their pupils with access to the Internet. Microcomputers and BBC machines were the first computers to be introduced into education in 1981. They have now been superseded by more powerful computers and computer networks. The library, as a central resource base, can provide both pupils and staff with access to this technology. The role of the librarian has expanded accordingly and now encompasses the management of electronic equipment and software. The librarian may also be the driving force behind the expansion and development of the technological resources in the library. The introduction of this technology creates challenges for librarians, and how they manage these resources needs to be analysed. The following subject areas are examined; the Internet, the National grid for learning, CD-ROMs, and other multimedia technologies.

2.1 The Internet

The Internet, which originated in America, enables the user to access a wide range of information from around the world. Thomas (1996 p.18) views the Internet in a positive light and states that

> One thing I have noticed over the last year has been the incredible rate of growth of the Net. For once the hype is justified. We are at the beginning of a revolution which will have profound repercussions, not only in education, but in society.

This comment shows that the size of the Internet is increasing and that the expansion of this resource could have a significant impact on society. People today, as opposed to previous generations, have the opportunity to access a wide spectrum of information from the comfort of their own home. In this respect Thomas is justified in viewing the Internet as being "revolutionary." The developments that have occurred within the communications industry have enabled this change to take place.

Campus world, an Internet service for education, allows users to access a range of carefully selected Internet sites that are relevant to the school curriculum. This service was developed by the telecommunications provider British Telecom. *Campus world* is designed to prevent users from accidentally straying onto either unsuitable or irrelevant sites. However, a fundamental problem with this package is the ethos of pre-selecting information and restricting the user to searching within a limited range of material. Pupils are unable to "surf" freely on the Internet unless the school has decided to subscribe to the full access package. One desirable feature of this service is that it provides users with access to information that has been structured. Providing a "walled garden" might seem like a viable solution, but users could find that they want to, and sometimes need to, "jump" over the wall and access the wider range of information that is available on the Internet.

What are the problems associated with providing pupils with access to the Internet? If students "browse" the Internet then it is possible that they will access unsuitable material. There is a risk that children who use the Internet will be exposed to pornography and materials of an explicit sexual nature. This means that although it is desirable for children to have access to a wide range of information, there is also a need for control. This concern has also been reported in the media and in *The Independent* Watts (1994 p.8) refers to the creation of a "cyberbrothel" on the Internet which she states illustrates "..the rising tide of sex-related sites on the Net." It is this type of article that causes parents to be concerned over the information that their own children may be

accessing at school. A strategy introduced by an American school employs the use of both a code of conduct and a parental permission slip. This requires both the student and his/her parent to take joint responsibility for the information retrieved by that pupil when he/she uses the school Internet (Flanders, 1994). This model ensures that pupils understand the expectations that are being placed upon them by both the school and their parents when they use the Internet to undertake research. The philosophy of this approach is one of trust and freedom of access to information. It promotes the individual student's right to use the Internet to (Flanders, 1994)

> ...facilitate personal growth in technology, information gathering skills, and communication skills.

Although Flanders has not conducted a methodologically rigorous study, his approach does provide the reader with an overview of the opposition that librarians may face from parents and governors in relation to students' access to the Internet. Unfortunately the information concerning the qualitative research undertaken is limited and one shortcoming is that the reader is not provided with details of the sample that was surveyed. However, this article is particularly useful as it includes an example of a "Technology code of conduct" from an American high school. This provides librarians in the UK with a framework for solving the problem of how to manage pupil access to the Internet.

In Britain the Government chose the "self-policing" approach to the Internet as they did not wish to repeat the mistake made by President Clinton, whose attempt at Internet legislation was declared to be unconstitutional (Watson, 1996). How the Internet will be regulated in Britain is still uncertain. Watson (1996) cautions that making Internet service providers responsible for restricting user access to web sites not only provides a conflict of interest, but is also impractical. In his article in the *LA Record* Watson examines the practical implications of controlling the content of web based information and e-mail groups. His interview with an IT professional provides an additional perspective on the problems associated with using software that for example, blocks user access to particular words. This article is of particular relevance to this study as the issue of restricting pupil access to undesirable information is a key concern for school librarians.

Cherwell school in Oxford has implemented two solutions to the problem of student access to the Internet. Firstly the school has devised a code of conduct which "...emphasises that the use of the Internet is a privilege not a right" and secondly it has subscribed to an educational filtering system (Clare, 1996 p.15). The latter option requires considerable financial support and commitment. Research Machines charged £1,000 for the installation of the filtering program together with an annual subscription fee of £3,000. Cherwell school also has an ISDN line which will allow simultaneous access for up to thirty computers to the Internet. However, filtering systems are not infallible and blocking words from searches such as "sex" and "pornography" also denies the user from accessing any sites where these issues are discussed in a critical and sensitive manner including "self-help" groups. In part, the problem is one of seminology. The recommendation from the "Internet community" is for parents to monitor their children (Watson, 1996). This poses a problem for schools as it would be impossible for either librarians or teachers to monitor all the sites which pupils access and Flanders (1994 p.35) states that supervision is "unrealistic at best and intrusive at worst." This means that the school needs to create a balance between Internet access and supervision that satisfies the needs of pupils, teachers and parents.

The ability to access such a wide range of information sources and materials has never previously been possible in school libraries. Caywood believes that the impact of the Internet will be to "...change the nature of library service" (Caywood, 1994 p.164). The impact that the Internet will have on library management practises is one of the themes of Caywood's article. She acknowledges that the traditional approach of downloading and printing materials in order to store a hard copy is not an efficient style to adopt when using the Internet. Her article provides a public librarian's perspective and is particularly relevant to this study as she emphasises the need for school librarians to ensure that they possess the skills that will enable them to create electronic access gateways to information for students.

Summers (1995 p.52) suggests that access to the Internet will allow pupils to think of themselves as "...global citizens, seeing the world and their place in it." This implies that the Internet has the potential to widen the horizons of students and even to change their

perceptions of the world. Summers paints a positive picture of the Internet and the benefits it can offer to teachers. She provides numerous suggestions and examples of projects that have been undertaken at her school and in others. The main focus of her article is to share ideas and provide practical advice for other interested librarians and teachers. The fact that this article appeared in an American journal is important as it reveals that the integration of technology into teaching practises is not limited to this country. Examining projects that have been undertaken in America could provide librarians and teachers in this country with a valuable insight into the process of integrating IT into schools.

Unless a school provides multi-user access, how can the information needs of the whole school community be served by one terminal? Clare (1996) suggests that having a single-line connection is equal to the library only having one book. This concern is also echoed by Thomas (1996 p.18) who states that

> All we need to work out is how to give a whole class access to this quality and variety of information.

This suggests that until schools have solved the problem of providing multiple access points to the Internet, then concerns over the content of the retrieved material may be premature. Thomas is an IT co-ordinator and his article in the *Times Educational Supplement* (T.E.S) provides an example of a teacher's perspective of using IT. The T.E.S is a national weekly supplement that focuses on education. It is useful therefore to consider the issues that are presented to the education community in this publication. Thomas advocates the use of the Internet in lessons and has a positive approach to IT. However, he does gloss over issues such as searching the Internet by stating that in his experience pupils were "always successful." Although this type of reporting may encourage teachers to use IT, it could also raise unrealistic expectations in relation to students' abilities to carry out focused and efficient searches on the Internet.

In her review of a CD-ROM encyclopaedia, Martyn (1996b p.21) states that the on-line revolution is clearly upon us

> At a recent Parents, Teachers and Governors Show in London, it was claimed that an increasing number of schools have stopped buying

> CD-ROM encyclopedias, preferring to download information from the Internet.

This suggests that the use of the Internet in schools will continue to evolve and that it will become a key resource in the library. The speaker implies that on-line information will supersede the CD-ROM format and that in some schools this switch is already taking place.

An issue raised by Chew (1996 p.49) is one of language, and she states that "...surfing the Internet is easy, at least for one culture." A person who does not understand English may be at a disadvantage as a large proportion of Internet sites use this language. She also suggests that the Internet will evolve into an arena which is more multicultural, although she concludes that it is likely that "...minorities won't be able to survive the information age" (Chew, 1996 p.50). This issue has implications for pupils for whom English is a second language. As the impact of English is global, having a command of this language ensures inclusion into a large segment of society. It can be concluded that in order for pupils from all cultures to be able to access the information that is available on the Internet, schools need to ensure that all students have command of an "international auxiliary language." (Chew, 1996 p.50)

2.1.1 The National grid for learning (Ngfl) and ICT

Information Technology (IT) has been renamed Information and Communications Technology (ICT) by the Labour government. This change has been accompanied by a new set of initiatives. The consultative document *Connecting the learning society* states that (DfEE, 1997a p.8)

> ...it is clear from international comparisons that our early lead in world terms has been eroded.

The initiatives in this document are aimed at harnessing "...new technologies to raise educational standards." (DfEE, 1997b p.6) If pupils are to benefit from the introduction of new technologies then teachers need to be able to successfully integrate IT into their lessons. This requires both training and support.

The Government has placed education firmly on its political agenda and has created a new Internet site called "The National grid for learning" (Ngfl). This site is dedicated to education and has been developed by the Department for Education and Employment in collaboration with the private sector (Barnard, 1997). A model of the grid was launched in early 1998, with the consultation process taking place from October-December 1997. A more developed version was launched in Autumn 1998 (DfEE, 1997b). The Ngfl is to be provided free to all teachers and is designed to enable educators to share good practice and discover how other professionals use IT.

The basis for this initiative stemmed from *The Stevenson Report* (Stevenson, 1997). This was an independent report, commissioned by Tony Blair and David Blunkett in 1995, that examined ICT at both primary and secondary level. This is a key report that provides a benchmark against which the Government's achievements in the area of ICT can be assessed. The report advocates the development of an external network and the training of teachers and Inspectors. It also emphasises the importance of ensuring that teachers have access to equipment. These are issues that are raised in this study.

The *Stevenson Report* does not support wide scale investment in new hardware for schools, but rather advocates initiatives that will raise teacher skills and confidence with existing hardware (Stevenson, 1997). However, despite this recommendation the Government will be investing £100 million into schools to upgrade obsolete equipment (Barnard, 1997). The term "outdated" refers to computers which are over five years old and, according to Barnard (1997), approximately half of the schools in 1997 were relying on old equipment. Funding will be available to schools from a variety of sources, including Government initiatives and, for example, the Standards Fund which provided £100 million in 1998/9. Schools are required to have an ICT development plan which they can then use to formulate and submit a bid. Successful ventures usually involve schools either in the creation of outside partnerships or in conjunction with the relevant LEA. Other sources include (VTC, 1999a);

- **National Lottery:** £235m from the People's Lottery Fund has been earmarked for the training of teachers and librarians from 1999.

- **Initiative funding:** This includes the Single Regeneration Budget (SRB) and other funds related to development. These are usually geographically distributed but can sometimes be applied to specific targets such as developing literacy and numeracy.

- **Training Enterprise Council Initiatives:** Funds may be available for linking schools and community education providers.

- **Voucher schemes,** for example from supermarkets: This is a way of activating parental support, as many parents see ICT as an appropriate target for fund-raising.

- **Sponsorship:** This is available from major companies wanting to be seen to be working with education.

- **A loan from the LEA or city council:** Some authorities offer interest free loans.

- **Local universities, FE colleges or Private companies:** These may offer Internet access for primary and secondary schools in their area.

The majority of these options require schools to formulate detailed plans and projects that relate to specific areas of development. To access these sources of funding schools need to adopt a proactive approach.

2.1.2 Government priorities for ICT

The *Stevenson Report* (1997 p.24) recommended that the Government should include four main elements in its ICT strategy aimed at schools:

> 1. First...every school will be encouraged to formulate, implement and report back on its own ICT policy.
>
> 2. Second...formulate and launch a set of initiatives that will ensure that teachers in training and in schools have the support that they need to use ICT effectively in schools.
>
> 3. Third...for Government to provide a major stimulus to the development of educationally relevant software.
>
> 4. Fourth...making the cost and usage of external networks by schools easily affordable.

These aims will have a radical effect on education if they are realised. The Government has placed a firm emphasis on both teacher training and school ICT policies. A policy should ensure that each school has a clear vision of its current usage of ICT and is also formulating plans for future developments in this area. The report suggests that funds allocated from the existing education budget can meet the need for increased teacher support and software development (Stevenson, 1997); whether this can be achieved is yet to be proven.

The Government also aims to provide every teacher and child over nine with their own e-mail identity. The Stevenson Report suggest that this will be a low cost initiative (Stevenson, 1997) and schools can choose to use either BT or cable companies to provide them with connections to the Internet. A Government consultation document specifies that the following targets have been set for the year 2002 (DfEE, 1997b):

> 1. That the UK will be a "..centre for excellence in the development of networked software content for education and lifelong learning." (DfEE, 1997b p.12).
>
> 2. By 2002 training initiatives will have been established ensuring that teachers will be confident in using ICT and that pupils will be IT literate when they leave school.
>
> 3. As many schools and libraries as possible will be connected to the Grid.

The report also acknowledges the growth in the home market and includes the results from research that shows that 22% of UK households have a home computer, excluding those bought before 1989, and that this number could increase to 44% by the year 2000/1 (Stevenson, 1997).

The Government has allocated itself four years in which to change the role of ICT in education. Teacher training needs to take place within both schools and training colleges and in response to this need the Government has established the National Opportunities Fund through which £230m will be made available, between 1999 and 2002, to support both teachers and librarians. Training is to be delivered by an approved set of providers who will need to fulfil a set of expected outcomes (TTA,

1999). To achieve this goal, there will need to be complete co-operation from the teaching profession.

The success of initiatives such as the Ngfl will depend to a great extent upon the amount of time that the individual teacher is willing to contribute to them. The Government is providing a national framework, but the teaching profession is expected to harness and exploit the potential of ICT and to implement subsequent changes. This is an ambitious plan and the outcome is, as yet, very uncertain. Pupils who have a good basic education are valued by employers and Schofield and Smithers (1997) state that employers are interested in people who have a broad general knowledge. Businesses are happy to provide the necessary technical training to employees who they believe have a sound educational background. Schools need to remember therefore, that information technology should not replace but rather enhance the delivery of the curriculum.

2.2 CD-ROMs

The introduction of CD-ROMs into schools followed their successful introduction into public libraries and, although Martyn (1996b) suggests that school librarians are moving away from using these resources, this format is continuing to be popular in schools. Abbot (1996) also believes that the changes that are beginning to take place in libraries will result in this format being superseded by on-line resources, although his opinion is based on the services offered by public libraries. However, the number and range of CD-ROM titles available has increased considerably since their introduction into schools in 1992. Herring (1999) stresses that this expansion of the market does not necessarily take into account either the quality of the disc or the relevance of the material to the secondary school curriculum. He suggests that it is vital that the librarian considers the quality of the information when considering the purchase of a disc.

The Government has carried out research into the value and use of CD-ROMs in an educational setting by placing machines and disks into schools across the country. The medium is reported as being easy to use, interactive and highly motivational. (Steadman, Nash and Eraut, 1992 and Ray, 1994). The *CD-ROMs in school* study conducted by

Nash and Eraut produced practical recommendations for the introduction of CD-ROM technology into schools. How CD-ROMs could be integrated into the curriculum, and how their educational value could be assessed, were two key issues of the report. Both the opinions and experiences of teachers and librarians were recorded. This study is relevant as the researchers concluded that it was important for pupils to possess adequate information skills and for teachers to employ student-centred teaching styles. The best use of CD-ROMs was deemed to be when students were allowed to explore the material freely. Methodologically, this study is interesting as data was gathered from a large number of schools by using a combination of questionnaires and interviews.

In the report *Teaching and learning with interactive media*, Laurillard et al (1994) stated that interactive media can have a positive effect on pupil learning, and for those of lower ability

> ...it can often make the difference between learning something and learning nothing.

The focus of this study was to develop an educational perspective on the benefits that interactive media could offer to both teaching and learning. Providing support to teaching staff was noted as being important as was the teaching of information skills to students. However, only responses from teachers were gathered for this study and there is a notable absence of any comments relating to the role that the librarian could fulfil in either of these areas. This means that the librarian's impact on teaching and learning in relation to the introduction and utilisation of new technology is not evaluated. Methodologically the study has relevance to this research as a combination of research tools were successfully employed to collect both quantitative and qualitative data. Both interviews and observations were undertaken alongside the use of a questionnaire.

Davitt (1995) stated that in 1995, 44 percent of the total sales of multimedia computers were sold to the home market. The producers of successful CD-ROMs would therefore also be seeking to exploit both sectors of the market. However, this increase of materials does not, in itself, indicate quality. Martyn (1996a p.22) reminds us that "All encylopedias are highly selective in their content" and therefore choices made by the buyer are important. To the majority of school librarians cost is as important a factor as

content and range of information. Products such as *Encyclopaedia Britannica*, which retailed at £233.82 in 1997, seemed to be pricing themselves out of the market, whereas comparable products such as *Encarta*, *Hutchinson's Encyclopaedia* and *Crompton's Encyclopaedia* were more affordable at £39.99. These discs are therefore more prevalent in school libraries. Since 1997 the price of *Encyclopaedia Britannica* has been greatly reduced and the company now also has an on-line retailing site. Microsoft have also responded to the British market by creating a world English version of its *Encarta* encyclopaedia.

It is important that pupils who use CD-ROMs to undertake research can print out relevant information. Oliver and Perzylo (1994) commented that taking notes from a computer screen for a child is time-consuming and less efficient than if they had been using a text based source. This is because pupils find it difficult to transfer information from the screen to their note books. Pupils valued the ability to print out and during the study made specific requests for information to be printed out. This apparent benefit can, however, cause problems in relation to copyright laws. School Library 2000 (1994) states that librarians are often caught in-between the law and pleasing teachers and students. The study conducted by Oliver and Perzylo found that with appropriate instruction pupils were able to extract meaningful information from CD-ROMs. The study is useful as both the teacher and the librarian were involved in the project to provide pupils with support and guidance. One drawback of the research was the sample size, as only the behaviour of one class of 27 pupils was studied. To ensure that the results are valid, other studies in this area would need to be conducted.

Successful student interaction with multimedia software is important. The design of the user interface and navigational system are key features that can dictate the success or failure of the individual to retrieve information. In his review of *Dorling Kindersley* products Ray (1994 p.138) states that CD-ROMs provide an "excellent alternative" to text versions and are more accessible. However, research conducted by Oliver (1996) highlighted that it was import that the navigational structure employed by software can be understood by "naive" users. Oliver's study measured the skills and knowledge that users needed in order to use interactive information systems and the research provided an interesting insight into this area. He discovered that if software designers choose an

unconventional "design metaphor" then the user may encounter information retrieval difficulties and therefore be unable to make effective use of the system.

An increase in software producers could also exacerbate this problem as each company has its own style of graphics and navigation interfaces. However, despite these potential problems Kelly (1991) insists that users find information retrieval "significantly" easier when using this technology as opposed to searching through traditional printed indexes. This underlines the need for software publishers to develop consistent interface designs for their products (Oliver, 1996). A clear navigation system would help to reduce the need for a technical advisor, a role which Shoemaker (1995) suggests that the librarian has been forced to adopt.

Cox (1995 p.60) states that one of the problems faced by schools is their reliance on CD-ROMs as the "sole source of computer based educational enhancement". Can schools become too dependent on CD-ROM disks? CD-ROMs enable students to access information through a structure which is referenced and indexed. One disadvantage of CD-ROMs is that because they have a fixed content, users are unable to broaden their research (Cox, 1995). Software companies, including Microsoft, have overcome this problem by providing the user with the ability to access World Wide Web sites from the CD-ROM. In theory, this should enable students to expand their research, however, unless they are monitored, this facility could lead to users becoming side-tracked and looking at irrelevant sites. This web site link service usually has an additional cost as the producers often require the school to subscribe to the service. Although Cox finds the medium of CD-ROMs to be limiting, it is important to remember that in order to conduct successful searches students need to possess some on-line searching skills and the ability to critically assess the large amounts of information that they can retrieve on the Internet. As these are complex skills, it is vital that students are provided with both guidance and support when they use on-line resources.

How interactive are CD-ROMs? Plowman (1996) believes that the interactivity that CD-ROMs provide is illusory. This illusion is created through the highly publicised role of the user in determining meaning and constructing narrative. She states that (Plowman, 1996 p.45)

> CD-ROMs are fixed media, the user can add nothing and take away nothing.

A complaint aimed at the performance of CD-ROMs is that they can fail to live up to the users' expectations because the interactivity available is limited to a series of preordained choices. Plowman's research is based on observations of pupils using multimedia products. Unfortunately the reader is not provided with a detailed explanation of the methodology used to conduct the study or the rationale behind the selection of research tools. However, the article is useful as Plowman considers the limiting aspects of CD-ROMs and the problems that can occur for pupils who are used to interpreting linear narratives.

Buckingham (1993) considers that CD-ROMs are inherently restrictive, as all the possibilities for research and exploration have been predetermined and are fixed within the software. The user can only choose a pathway through the information available. Plowman (1996) concludes that most of the choices a user makes when interrogating a CD-ROM are primarily concerned with either navigating through the information or establishing the limitations of the available information.

Several studies have highlighted the need to provide students with training and experience of multimedia applications if they are to become proficient users (Steadman, Nash and Eraut, 1992, Oliver and Perzylo, 1994 and Oliver, 1996). Without proper instruction users can waste time and experience frustration due to their lack of understanding and skills needed to interrogate the software. This can lead to decreased pupil motivation in relation to the usage of technology. To use this type of information source Small and Ferreira (1994, p.104) state that children need to employ specific skills. These are:-

- Linking relevant information (synthesis)
- Determining whether they have located the appropriate information need to accomplish the task (analysis)
- Determining whether all of the information they have found is appropriate for their needs (evaluation)

The librarian needs to ensure that these skills are taught to all pupils. There is a need to balance "finding and exploring" activities, which occur more frequently with pupils using CD-ROMs, with the extracting and selecting of information that occurs when pupils use print based materials (Small and Ferreira, 1994). This study was rigorously constructed and employed the use of a combination of research tools including interviews and focus groups to gather both quantitative and qualitative data. The research is useful as it studied student behaviour that provides school librarians with information that will help them develop appropriate information skills programmes.

NCET (1992) suggests that although guidance is needed, librarians should not seek to "unduly constrain" the learning process. In practice this means that pupils should be allowed to explore this medium whilst also being made aware of its strengths and weaknesses as an information source. NCET (1992) also suggest that skills such as skimming and scanning should be taught. Oliver and Perzylo (1994) agree that with appropriate training, users will be better equipped to exploit this technology.

Traditional printed materials commonly have a linear construction whereby a narrative flow is created as one event follows another. CD-ROM software can provide an alternative to this approach. Hypertext can, in theory, enable infinite links between documents. This facility should enable readers to browse through a wide range of information at will. This transforms the reader into an active participant who is able to construct his/her own narrative pathway through the information (Sefton-Green, 1993). The reader therefore becomes the "author" of an individual route and constructs a "reading" of the information available. However, Plowman (1996) suggests that breaking from the linear narrative can disturb narrative flow and may not necessarily ensure active "meaning making" by the user. This method of creating a pathway through information could also change readers into "browsers" who have little understanding of how the pieces of information they encounter relate to each other (Buckingham, 1993). It can be concluded that CD-ROM software needs to provide the user with adequate guidance to ensure that they do not become lost in the information available. Plowman (1996) comments that if they are not given support or direction, then users will have to undertake a "leap of faith" each time they conduct a search.

2.3 Computers in schools

The Computer Education Group conducted a survey of IT co-ordinators in secondary schools in January 1996 (Kennewell, 1996). The results of the survey are based on 535 replies and this enables Kennewell to undertake some useful analysis of the data collected. The findings show that in 1996 the overall pupil-computer ratio was 11.5 to 1 and that most schools preferred to purchase PCs, as opposed to Acorn computers. The survey showed that the majority of institutions have an IT specialist. This person often fulfils several roles including IT resource allocation, maintenance of equipment, and the delivery of examination courses at KS4. This illustrates that although schools are committed to providing pupils with IT experience, that they often have limited specialist manpower to administer and support these aims. Respondents from the survey also voiced concern over the general level of resources available in schools (Kennewell, 1996). This survey provides some valuable data in relation to IT provision in schools in 1996.

Russell (1995) states that in relation to IT, educators are not learning from their mistakes. He suggests that consolidation, not innovation needs to occur. Teachers need to be allowed to focus on the practical applications of the IT which is already in schools, instead of being continually bombarded with new material. Drawing on evidence and personal experience in his article that traces over 30 years of IT development in education, Tagg comments that teachers need to learn how to exploit IT in the classroom if they are to discover its "great scope for enhancing teaching and learning" (Tagg, 1995 p.7). Unless IT is effectively utilised by pupils then the benefits of having the technology will be lost. In his chronological discussion of educational computing research Maddux (1993 p.14) identifies one constant outcome from the introduction of computers into schools

> ...nothing miraculous happens as a result of putting a child and a computer in the same room.

As there is no inherent educational effect from the presence of computers, educators should be concentrating upon investigating the learning processes associated with IT (Russell, 1995). Kilkie (1995) believes that the profession is still treating IT in schools

as a "pilot experience," when in fact its presence has been growing since 1981. Serious reflection is needed if Great Britain's world lead in computing is to remain. Russell (1995) suggests that if research were carried out, then assumptions concerning the educational value of new technology could be replaced by conclusive evidence.

The Government has a role to play in undertaking research in new technology. In the document *Superhighways in Education* (DFE, 1995) the Government promises to fund research into on-line, interactive video and integrated learning system (ILS) technologies. The Government states that it is committed to raising the "general level of IT capability in schools" and to develop network literacy. Pilot projects included *School libraries for the future* supported by DENI, NCET and the British Library, and *Schools on-line* sponsored by the DTI. The expectation is that schools will start with the introduction of "affordable" technology and subsequently upgrade their software. Money should be available to schools through grant schemes, for example Grants for Education Support and Training (GEST). The amount of funds available and the submission process were not detailed. As sources of funding are limited, competition between schools for grants will be inevitable and could result in some schools being poorly equipped and resourced.

Computers have been introduced and integrated into schools and are now viewed as being a necessary educational resource. They also have a firmly established role to play in the curriculum. Cole (1996 p.22) states that

> Information technology is now an important part of the National Curriculum, with students expected to use skills such as word processing and data handling. Pupils are now using computers for creating text, art and music, for recording data on field trips, and for accessing information in new ways. Some are even making their own multimedia programs.

Full multimedia authoring programs can now be purchased by schools. This type of software enables students to create their own interactive presentations. AppleMac have produced successful programs such as *HyperCard* and its successor *HyperStudio*. *HyperStudio* is also available for Acorn machines. Chandler (1995) rates these programs highly and states that the software has an "intuitive" interface and modular construction, both of which are easy for young people to use. The developments in the area of multimedia presentations offer exciting possibilities for students. If pupils are able to

create their own multimedia presentations then this could provide them with meaningful insight into how information can be structured; a skill which could help them to understand how electronic encyclopaedias function. It is to be hoped that pupils could then use this knowledge when interrogating CD-ROMs or on-line information sources.

2.4 Other technologies

There are other technologies on the market that include multimedia features and also provide an interactive experience for the user. These technologies include CD-I (compact disc interactive) and CDTV, both of which are the successors to Video disks. ILS (interactive learning systems) and video conferencing are also available.

Research into the effectiveness of ILS technology has already been conducted in America. In Britain NCET has also begun to examine this area. In 1994 the results of research undertaken with this technology were inconclusive and a summary of a report compiled by NCET indicated that ILS could benefit underachieving students by raising their basic skills, improving their motivation and increasing attendance levels (NCET, 1994). This report recommended that further research needed to be undertaken in this area to enable the benefits and effects that ILS has on teaching and learning to be assessed. This study is a useful reminder that other types of multimedia technology may also be adopted into education in the future.

In January 1995 there were 2,000 CD-I machines in British schools (Davitt, 1996). CD-I and CDTV, unlike CD-ROM, do not require a computer as they plug straight into a television set. They also have the ability to play audio CDs. A range of educational, reference and entertainment programs are available in these formats. The level of interactivity is different to that available on CD-ROMs. One of the strengths of this format is that it can store video and audio material separately and these can then be accessed in any sequence by the user (Mulford, 1994). In her article Mulford provides a brief overview of CDI and CDTV technology and classes them as being emerging technologies that will need to be developed in order to capture the educational market. The literature reviewed for this research shows that unlike CD-ROMs, this technology has not lived up to the expectations placed upon it by Mulford. The use of this

technology in Britain has been piloted and supported by NCET. However, research suggests that software producers are more interested in the domestic, rather than the educational, market (Plowman and Chambers, 1994). A small study by Plowman and Chambers cites the poor quality of the material available for the systems as one of the reasons for the low usage of the technology in schools. Pedagogically the discs were found to be both lacking in substance and unable to meet National Curriculum requirements. This study provides a useful insight into why these systems have experienced low usage in schools.

CD-I technology can allow users to input their own text and send e-mails, if they have access to a keyboard and the appropriate connections to the Internet. Gold (1996) reports that the teachers involved in the pilot scheme were generally positive about CD-I technology, whereas the children stated that in terms of the relevant speed and graphics, they preferred to use PC's and the Internet. CD-Is, like CD-ROMs, can support independent learning, but they also require the user to possess basic information handling skills for the equipment to be fully utilised (Plowman and Chambers, 1994). NCET was concerned that the disks available did not "exploit the technology fully." The material also needed to be "comprehensively indexed" and made "explicitly relevant to National Curriculum requirements" (Laurillard, 1994). It can be concluded that if CD-I technology is to become widely adopted in schools, that the software available must be tailored towards meeting the requirements of the curriculum. Teachers are more likely to use disks which follow national targets and enhance classroom delivery of the curriculum (Plowman and Chambers, 1994).

Advances in technological developments mean that some schools now have access to equipment and communications technology that will enable them to install video conferencing facilities. This is a relatively new development for schools. The system utilises both televisual images and audio channels. This enables the user to see and interact with other participants. This technology provides the students with opportunity to take part in "live" debates and discussions that previously would have been impossible to arrange, due to the location of the people involved. At Monkseaton High, North Tyneside, pupils have been using this system to converse with students in Europe. Kelly (1996 p.26) suggests that these developments equate to a "new system of learning" that

is pushing back the boundaries of previous multimedia technology. He also states that the impact of the technology on students has been "profound". The project is funded jointly through business and the European Union and has the potential to provide the school with further links to British and European Universities. This technology has also been utilised by three schools in Whitby, in a project that has been supported by NCET, their LEA and outside sponsorship. The objective of the study was to ascertain the value of using this type of telecommunications in schools. The project focused upon the teaching of modern languages and found that language skills, both English and foreign, had been positively influenced (NCET, 1996c). This shows that new technology can benefit pupils as it can provide them with a completely new way of approaching and experiencing learning in school.

Computers have become firmly established within education. A range of electronic tools are now available to schools, including CD-ROMs and the Internet. Communications technology has also become relatively more "affordable" for schools and the different technologies that are available have been outlined in this section. The Government aims to support schools by providing them with the opportunity to apply for funding to improve their IT resources and to invest in teacher training. The introduction of new technology means that teachers and librarians face new challenges and need training if computers are to be successfully utilised in schools. The Government has an important role to play in this area and one noticeable development has been the creation of the Ngfl. Introducing multimedia technology creates new challenges for both teachers and librarians and the impact of this technology on teaching and learning is discussed in the next Chapter.

3. Literature review: Teaching and learning

The introduction of multimedia into the classroom of secondary schools means that teachers need to find ways in which to utilise these resources successfully. Collins et al (1997 p.ix) state that

> Rather than doing away with teachers, multimedia imposes demands on teachers to manage learning in sometimes new and innovatory ways.

Technology cannot simply replace teachers and this Chapter discusses the impact that new technology has had in the classroom. Firstly, the motivational factors involved in the learning process are examined. Secondly, the different teaching styles that are currently in use are discussed. The implications of implementing student-centred teaching and learning are then explored, before the influence that multimedia technology has had on teaching practises is examined. Finally, how IT can be integrated into education is reviewed by looking at the institutional context in relation to the process of change.

3.1 Motivational factors

Sotto (1994) has considered the factors that affect student motivation in an educational setting. He suggests that teachers strive to find ways to motivate their students as they believe that, unless they do so, the pupils will not learn. However, Sotto (1994 p.18) holds the opinion that pupils are already motivated and that it is the "absence not the presence of motivation" which needs to be examined. Teachers need to create the conditions within which pupils' natural motivation is not inhibited, as opposed to employing methods which they hope will result in students becoming motivated.

What inhibits motivation? Within the classroom situation Sotto (1994 p.23) suggests that constraints can exist when

1. Teachers do most of the talking.
2. Pupils tend to be passive.

This can occur if pupils are simply being placed in the situation of information exchange and material is communicated by the teacher directly to the learner, through the medium of speech. The teacher therefore needs to provide an environment which enables the learner to become actively engaged with the process of learning (Sotto, 1994). This means that the teacher needs to adopt a learner-centred approach to teaching. One way of encouraging pupils to learn is the act of consultation. Sotto (1994) suggests that this approach is helpful in changing a learners' negative attitude into one that is more positive.

Motivation is an important factor and it is vital that pupils actively want to learn. Using a teaching style that encourages rather than inhibits learning is the key to success. Learners need to be actively engaged with tasks which allow them to build their own models of understanding. Only when an individual produces his/her own knowledge model, can learning be said to be taking place (Sotto, 1994).

Pupils must therefore be provided with tasks that simulate their need to learn. Sotto (1994 p.50) states that learning only takes place when the following situation occurs:

> Learning, real learning isn't what happens when we are fed information. Learning is what happens when we realise we don't know something which we consider worth knowing...in doing that we may have to find some information first, but notice that finding that information is only part of that process. And notice that the process begins when we realise we don't know something.

This suggests that in order to stimulate the individual's own motivation to learn, the teacher must create an environment in which questions are continually asked, and to which learners realise that they wish to know the answer. Once this environment is created then real learning can begin, as the learner is now motivated to start his/her own quest for knowledge. For a successful environment to be created the following factors need to be present. Learners seem to learn when (Sotto, 1994 p.110)

- they find there is something that they wish to learn;
- they are able to tackle the task reasonably directly;
- the task affords intrinsic rewards;
- the task is sensible and manageable;

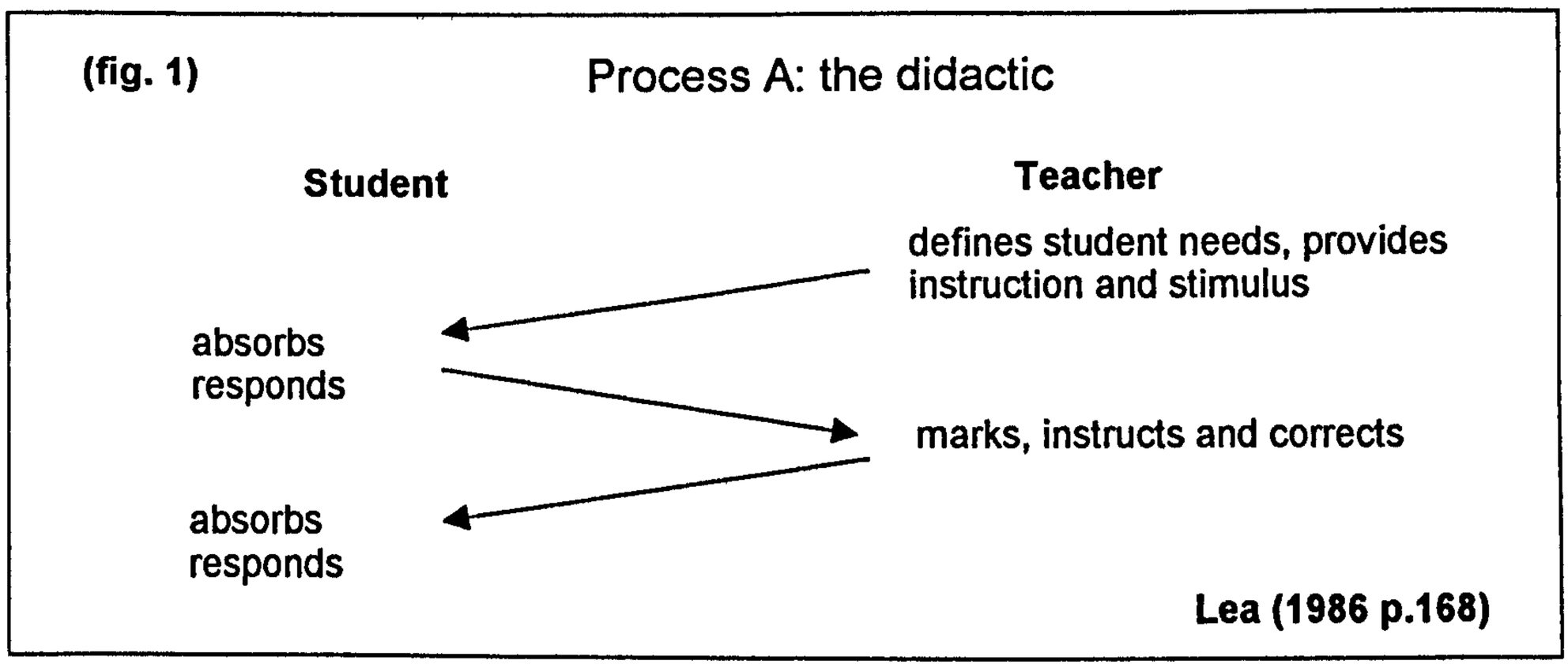
- they can formulate hunches, test them, and see the results of their actions;
- they are able to see patterns (or gain them tacitly);
- they find themselves in a challenging but friendly and supportive environment.

This list shows that learners require an environment which allows them to be actively involved in tasks which they believe are of value. The completion of the task and the process of finding the answer, both provide satisfaction for the learner who now feels motivated to learn. However, it is important that the task set is achievable and that the teacher allows pupils the independence they need to find out the answer. Some form of support needs to be available to learners so that they can receive help if required. This forms the basis of an approach to teaching which according to Sotto (1994) creates the conditions within which individuals are able to learn. This is an important piece of research as Sotto demonstrates that an educator's choice of teaching style can have an effect on the motivation levels of his/her students.

3.2 Teaching styles

If the environment described above enables pupils to learn then this raises three questions, firstly, how can these conditions be created, secondly, what are the differences between this approach and traditional teaching methods and finally, what is the effect of new technology on this situation? These issues are discussed below.

What teaching styles are available for educational practitioners to use? Lea (1986) provides a description of three different processes, didactic (traditional), loose ended and interactive. The first process (fig. 1) shows that the teacher is the controller of events and directs the content and form of the lesson. In this approach the pupil's learning is totally dependent upon the teacher.

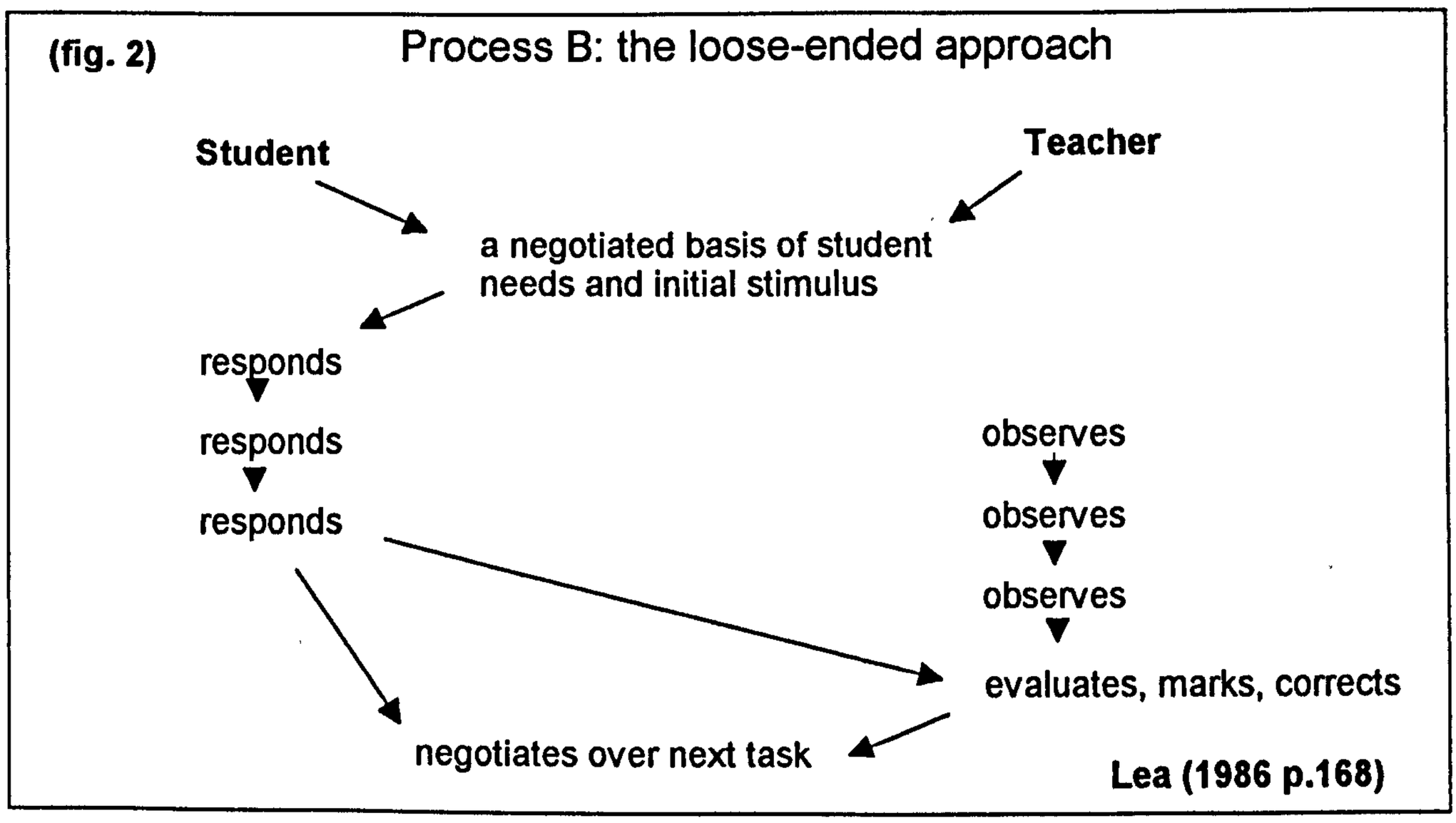


The above process can be seen as stifling for the student whose responses are firmly controlled by the teacher. The pupil is unable to control any aspect of his/her learning. Pupils without control over their learning can lose their motivation as Collins et al (1997 p.49) state

> Pupils who are carrying out their own research are more likely to be able to identify what they need to know and be motivated to find answers than pupils who are completing teacher directed tasks.

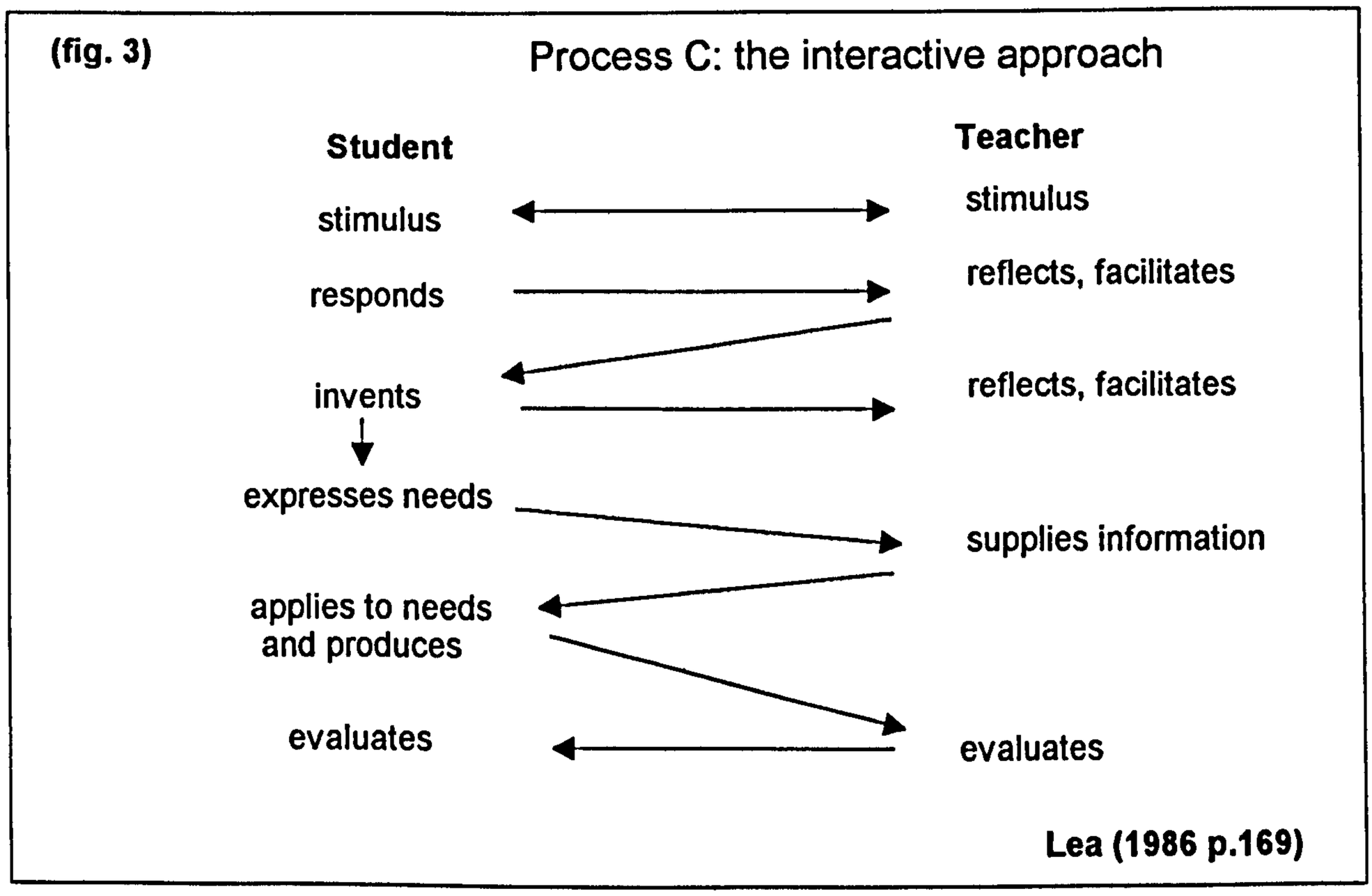
This means that lack of control over the learning process limits the ability of the individual to learn. To alleviate this problem some form of dialogue, or learning conversation, needs to exist between teacher and learner.

Process B (fig. 2) termed the "loose-ended approach" by Lea (1986 p.168), is a teaching style which includes some interaction between the teacher and learner. The task that the learner is asked to undertake, results from a process of negotiation that occurs between both parties.



The learner then responds to the task whilst the teacher observes. The teacher then marks and evaluates the learner's finished piece of work before negotiating the next task with the student. This process fails students because it does not provide them with enough support from the teacher whose only interaction is at the beginning and the end of the task. In this model it can be seen that the teacher is losing responsibility for the learning process.

The third process (fig. 3) is the student-centred approach which provides the learner with active tasks and full teacher support. The whole learning process is now negotiated between both parties.



In process C the student has overall control of the learning process. The teacher has become the facilitator of learning, a role that requires him/her to provide appropriate information and support to pupils. The teacher has released the total control which he/she possessed in process A. Because the teacher is allowing the learner to have greater control over the learning process, this approach also requires the teacher to use different skills to those needed in process A. This style also changes the relationships between both parties, as noted below (Collins et al, 1997 p.60)

> Pupil directed learning necessitates a change in pupil-teacher relationships with the teacher increasingly assuming the role of facilitator or guide.

Lea (1986) suggests that adopting a teaching style which is more student-centred can be difficult. It requires the relationship which exists between teacher and learner to change. A collaborative environment needs to be created which enables the pupils and the teacher to share the responsibility for deciding upon the direction of the learning activities. This requires the teacher to encourage pupils to have an active input into task setting and completion. The teacher must not exert complete control over the process of learning. One problem which teachers who wish to make this change may face is noted by Lea (1986 p.170) who states that

> The management of the school must also share the same philosophy or the teacher can be undermined - not least by didactic, directive teachers who feel threatened by this alternative approach.

This comment shows that if a change in teaching style is undertaken at a classroom level it needs to be supported by the whole school, and especially senior management, if it is to be effective. This issue of institutional culture is discussed later in this section.

Two additional student-centred teaching approaches are outlined by Fox (In Collins et al, 1997 p.105) and summarised below:

> Travelling theory which treats a subject as terrain to be explored with hills to be climbed for better viewpoints with the teacher as travelling companion or expert guide. Growing theory which focuses more attention to the intellectual and emotional development of the learner.

These two theories correspond with Lea's process C. They place the student firmly in the centre of the learning process and emphasise the importance of the development of the individual as a learner. It is this type of approach which, according to Collins et al (1997 p.105), is likely to lead to the

> ...kind of independent learning, open ended activity and flexible curriculum which computers in general, and multimedia technology in particular, are best able to support.

This indicates that a student-centred approach to teaching creates an environment which is conducive to learning. It also creates the conditions within which technology can be effectively utilised to support the individual learner. Indeed Wishart (1999) states that providing pupils with the combination of individualised student-centred activities and access to multimedia software can actually enhance teaching. Lea's overview of different teaching styles is useful as it enables the researcher to begin to identify those approaches that support the integration of multimedia technology into lessons.

What type of learning cycle needs to take place for students to be able to convert information into knowledge? It has been shown that for a student to learn, he/she must be actively engaged with a task. This could involve either the learner undertaking a practical exercise that results in him/her experiencing a new situation, or it could

require the learner to understand another person's interpretation of a situation or experience. Laurillard (1993 p.26) suggests that the challenge facing teachers who wish to promote academic learning is

> ...to help students go beyond their experience, to use it and reflect on it, and thereby change the way they experience the world.

Laurillard's statement is significant as whatever teaching approach is adopted, it is important to provide pupils with the opportunity to reflect upon their learning. Academic learning requires the learner to interpret other people's theories and to process information and ideas in such a way that it results in a transformation of their own understanding. This type of activity also occurs within secondary schools. Pupils use a variety of different texts to gain insight and understanding in subjects such as History and English.

The learning process needs to include a dialogue or conversation between teacher and learner. This dialogue should be directed by the teacher and enable the student to understand new concepts or experiences. A careful questioning process led by the teacher that enables the student to come to his/her own conclusions, should create such a dialogue. This teaching strategy would need to include the following components according to Laurillard (1993 p.95)

Discursive

- teacher's and student's conceptions should be accessible to each other
- teacher and students must agree learning goals for the topic, and task goals
- the teacher must provide an environment within which students can act on, generate and receive feedback on descriptions appropriate to the topic goal

Adaptive

- the teacher has the responsibility to use the relationship between their own and the student's conception to determine the focus of the continuing dialogue

Interactive

- the students must act to achieve the task goal
- the teacher must provide meaningful intrinsic feedback on the actions that relates to the nature of the task goal

Reflective

- the teacher must support the process in which students link the feedback on their actions to the topic goal for every level of description within the topic structure

This approach includes aspects which have been previously raised by both Sotto (1994) and Lea (1986). The responsibility for learning is placed firmly with the teacher. The style of teaching creates an environment which allows the learner to control their learning. This strategy requires careful planning of the topic to be studied and Laurillard (1993 p.95) notes that it "will be difficult to apply." The structure outlined above highlights the interactive and cyclic nature of student-centred learning. The student acts and then reflects upon his/her actions. Guidance and support is provided by the teacher, who adapts his/her own actions to provide meaningful responses and feedback to the learner. Laurillard's comments relate directly to Higher Education and teachers within secondary schools may find it difficult to achieve meaningful learning dialogues with younger and less experienced learners. The implications for secondary schools is that teachers would need support from school managers in order to successfully implement this strategy.

Non-didactic teaching styles were supported by pupils in a study undertaken by Morgan and Morris (1999 p.121). They reported that

> Pupils of all ability groups across all schools clearly favoured the use of a variety of teaching methods and a limited use of traditional or expository teaching methods.

This suggests that if teachers used an approach which provided more freedom for the learner, that this would be favoured by pupils. However, this is a labour intensive approach for the teacher to introduce as it requires them to undertake a considerable amount of planning. According to Morgan and Morris (1999) pupils who receive didactic teaching, currently portray themselves as being in a recipient rather than partnership role with their teachers. It is important to remember that there are some problems facing the teacher who may wish to

allow pupils more control over their learning and these constraints are summarised below. (Collins et al, 1997 p.47)

Constraints which may exist within a school environment,

- Limited access; they may have to share a CD-ROM with 30 other people.
- Small group work with peers who have different interests, skills and experiences.
- Teachers and pupils work within curriculum constraints.
- There is a need to demonstrate the relevance of what is learned to predetermined topics or subjects.

Although teachers might wish to adopt different teaching styles, the conditions within which they work may limit their ability to implement change. This could result in either teachers making no change and using the same teaching style with which they are familiar, or teachers who are forced to compromise and combine old and new teaching methods. This approach could prove to be ineffective. Changing teaching style therefore needs to be carefully planned and supported if it is to be sustained and successful. This research highlights the fact that educational change can be difficult to implement. It is important to remember that although a student-centred teaching style is advocated, the reality may be difficult to achieve. This issue is of relevance to this study as if teachers are unable to successfully employ a student-centred teaching style then this may inhibit the ways in which teachers and librarians are able to work together.

How can educational media support a student-centred teaching strategy? The software used in schools and education has been mainly developed by commercial producers. It has, as Laurillard (1993 p.99) states

> ...an odd mix of engines driving it - technological pull, commercial empire building, financial drag, logistical imperatives, pedagogical pleas.

This comment highlights the wide range of factors that influence the development of educational software. Practical aspects including technological and financial considerations are coupled together with the need for the product to incorporate educational theory and practice. This is an uneasy and unequal relationship. Laurillard

(1993) states that it is clear that educational media were not developed to a pedagogical imperative, and this is where one problem arises for teachers. How can they integrate multimedia into their teaching if the software itself does not, or cannot, supply the factors which are needed to facilitate learning? How can multimedia support the conversational framework required for student-based learning?

According to Laurillard, the main problem with multimedia technology is that it is unable to support adaptive or reflective learning (Laurillard, 1993 p.128). Teachers therefore, need to fulfil this role and provide the support that learners require. Laurillard (1993 p.129) suggests that

> Student use of such systems will need further support from tutorial dialogue with the teacher, therefore, if they are to be sure that they have interpreted their findings correctly.

This means that the majority of multimedia resources cannot be used to provide learners with "stand alone" teaching. The teacher needs to discuss and examine the findings of students who have been using this software to ensure that they are not misinterpreting the information or using it to draw invalid conclusions. What type of tasks are suitable for pupils to research? Collins et al (1997 p.48) suggest that teachers should ensure that research questions are "neither too closed nor unstructured". Topics for research can be broken down collaboratively in class through the use of brainstorming or other interactive techniques which also promote pupil involvement with the topic. Providing questions which allow choice within a structure is deemed by Collins et al (1997) to be the most effective means of supporting pupils as they explore CD-ROM encyclopaedias. A task should allow (Collins et al. 1997 p.49)

> ...enough guidance for pupils to identify relevant or useful information without predetermining exactly what the information should be.

This element of freedom enables pupils to become independent learners. It is important that worksheets are carefully designed so that they ensure that tasks are structured without becoming too prescriptive. This type of activity is supported by Morgan and Morris (1999 p.121) who found that pupils wanted the teacher involvement in the delivery of the curriculum to be

> ...measured and well directed, not all encompassing and stifling of pupils' active involvement.

A problem highlighted by Collins et al (1997) was that although teachers in the UK wished to integrate CD-ROMs into their lessons, they felt that the materials available did not always reflect or support curriculum objectives. Demand exists therefore, from teachers for software manufacturers to develop CD-ROMs which not only match the topics prescribed by the National Curriculum but also support and encourage exploratory learning. If the multimedia resources that are available to teachers are not relevant to the curriculum or unable to support student-centred learning, then this will have an effect on how teachers are able to use them in lessons. The availability of high quality resources is a subject that is explored further in this research.

CD-ROMs are viewed by Laurillard (1993) as being truly interactive only when the learner is able to juxtapose materials and compare them with each other. The facility of being able to view an original document together with an interpretation of that document, enables the user to make his/her own judgement over the validity of the interpretation. It is this function which Laurillard (1993) states is "revolutionary". The fact that multimedia databases and encyclopaedias allow the learner access to a wide range of material is beneficial to the learner. The ability to juxtapose documents and, possibly, create a new thesis is significant. However, Laurillard (1993 p.129) states that

> The pedagogical claims for multimedia resources should stop there.

This shows that CD-ROMs can only fulfil some of the facets in the learning cycle. The use of multimedia has to be supplemented by teachers as they can provide the adaptive and reflective elements of the learning process. According to Laurillard (1993) the type of new educational media which includes the greatest range of essential learning activities are tutorial programmes.

CD-ROMs are resources that can enable pupils to undertake independent research by allowing them access to a wide range of information. Collins et al (1997) noted that

although the multimedia features available on CD-ROMs may encourage students to use the software, they are not in themselves adaptable to the needs of an individual. A spoken version of the text does not help overcome the conceptual barriers which a learner may face from the written text, as no further explanation is provided. Collins et al (1997 p.63) state that

> ...we cannot expect that the addition of a spoken version of the written text increases readability, enhances understanding or overcomes conceptual barriers.

This shows that it is vital for pupils to have access to CD-ROMs which have been designed for their age group. If software is purchased that contains language which is too sophisticated, it will demotivate learners rather than enable them to pursue their own research. However, Collins fails to acknowledge the advantages that multimedia features such as the inclusion of a spoken version of the text, would have for pupils who have difficulty reading.

If utilised correctly within the classroom, multimedia can contribute successfully to the learning process, provided it is used with appropriate "intervention and caution" (Collins et al, 1997 p.81). Two aspects of this intervention that are important are information handling skills and "critical media literacy". If pupils do not have adequate information skills, then they will not be able to interpret the wealth of information provided by CD-ROMs. Laurillard (1997 p.213) comments that

> ...this [multimedia] is of no value to them if they are not able to make selective judgements about what to use, and critical judgements about the content of what they find. The teaching that surrounds students' use of such systems will need to address this kind of issue...and the prerequisite skills it entails.

This means that learners who are being expected to use this type of software must be taught the skills described above if they are to utilise the resources correctly. Collins et al (1997) support this conclusion and emphasise the importance of teaching the following research strategies in respect to electronic sources: searching, selecting, and retrieving information. A potential pitfall of not equipping students with suitable skills is outlined by Collins et al (1997 p.61) when it is argued that

> The process of identifying relevant information and note taking are highly complex skills, and pupils who are not trained to develop these skills often resort to lifting chunks of texts into their own writing without understanding the material they are using.

If pupils have the ability to assess and evaluate the information that they retrieve, then they will be able to incorporate it into their own work instead of merely duplicating a piece of text and presenting it as an answer. The fact that teachers are concerned over the copying of information suggests that information skills have not been taught to pupils. This indicates that the importance of these skills has also not been recognised. To overcome these problems Laurillard (1993 p.213) has formulated some action points which teachers can follow when introducing new technology to a group of students:

> Review new material to:
> 1. Check whether prerequisite knowledge and skills are covered.
> 2. Provide prior teaching if necessary.
> 3. Decide how to follow up on what students have learned.

These three steps illustrate how new material, if it is reviewed by the teacher, can be integrated successfully into a teaching programme. Teachers can prepare students by building into the structure of the course the skills that the learners will need in order to use the technology. The teacher then needs to support learners with follow-up activities to encourage or create a dialogue between himself/herself and the students. This will allow the student to reflect upon, and evaluate his/her learning outcomes. In this way the new technology is integrated into the learning cycle. Pupils need to be taught how to assess critically the information which they access. Although Laurillard and Collins highlight the importance of pupils possessing information research skills, they do not mention the role of the librarian in relation to the delivery of these skills. This is a noticeable omission.

One problem with information presented in electronic form can be the issue of authority. A good web site is one where both the author and the publisher are clearly displayed. Knowing who is responsible for a web site provides the user with insight into possible biases that could exist within the material. There is a danger that information retrieved by pupils will be seen as the "truth" as opposed to being a

viewpoint expressed by an individual (Collins et al, 1997 p.64). Learners need to be able to assess material from a critical standpoint and develop an awareness of what they see, hear and read on multimedia products. Users need to know the origin of the information, the criteria by which it was selected and the reasons for its inclusion in the final product. (Collins, 1997). Education needs to provide students with the ability to examine all the sources they use in a critical manner because, as Goodman (In Collins, 1997 p.83) states, society seems to be moving towards a culture of "multimodality" where the interpretation of complex texts will be vital. Recognising that publishers of web-based information could be following their own agenda is an important skill for pupils to learn. One solution would be to provide guidelines for pupils to enable them to evaluate electronic sources.

The effect of integrating CD-ROMs and multimedia technology into teaching practice differs between subject areas. Teachers of science have expressed the opinion that multimedia should not replace pupils having to undertake practical experiments. Collins et al (1997 p.77) expresses the following opinion

> ...if multimedia use is a *compliment* to good practical work rather than a replacement for it, then its place in science can be justified and it will add value, not take it away.

An interesting situation arises in science in relation to multimedia. Software can be viewed as beneficial when it provides simulations of experiments which may be too dangerous or impractical to carry out in the classroom. Simulations can also provide pupils with the "correct" result of a scientific experiment. Science teachers have expressed concerns over the possibility of simulations replacing actual experimentation. They are worried that reliance upon multimedia software will produce a "distorted view of the nature of science" (Collins, 1997 p.77). If pupils used software extensively they would not learn either how experiments can go wrong, or of the importance of accurate and precise scientific practice. In this instance, software must be used to support the practical elements of the curriculum and not replace them. The example provided by Collins of the potential difficulties caused by the integration of multimedia into science lessons highlights the fact that incorporating

the use of technology into schools will have different implications for individual subject areas.

3.3 Multimedia technology and teaching

The previous discussion provided an outline of different teaching styles. A student-centred approach was advocated as being able to provide the flexibility needed to both motivate the learner and allow him/her to pursue a more independent style of learning. This section further examines how multimedia applications can be used to enhance the learning process.

A major study undertaken by NCET called *Libraries of the Future* is of particular relevance to this study. The impact of multimedia and communications technology in school libraries was evaluated in a pilot study that was undertaken by NCET (National Council for Education Technology) in 1996 (NCET, 1996b). The study is interesting as it focused on the impact of new technologies and the changing role of those involved in the learning process. Part of the study concentrated on the management of teaching and learning resources, and the skills that learners needed in order to be able to use these technologies effectively.

Eleven institutions were included in the NCET project; seven secondary schools, one sixth form college and three primary schools. All schools were provided with the same technology, including multimedia facilities and access to the Internet. As part of the study the management and use of the resources was monitored. A Focus Group of learners in each school was also identified to provide information relating to the integration of the technologies into the curriculum (NCET, 1996b).

Two recommendations from the NCET report are of particular relevance. Firstly, the report recommends the development of a whole-school IT strategic plan to be undertaken by each school. NCET states that this document would need to take into account issues concerning how to integrate new technologies into curriculum delivery and the importance of the library in this endeavour: (NCET, 1996 p.15)

Recommendations for senior managers in schools and colleges

It is recommended that senior managers develop a strategy for IT development which covers management, staff development, curriculum administration, resources, external links and evaluation. The strategy should cover the role and staffing of the library to support teaching and learning with IT.

The second recommendation focuses on the needs of the individual in terms of IT training, and the importance of developing staff confidence and familiarity with new electronic media: (NCET, 1996 p.15)

Recommendations for teachers and librarians

It is recommended that staff consider their own development needs, taking into account the need for new approaches to teaching and learning, team teaching, techniques for tutorial support, confidence as well as competence with IT. There is a need to identify where in schemes of work IT skills will be delivered and assessed and to decide on strategies for managing learners' access to resources.

Both of the NCET recommendations are whole-school issues and to implement them successfully extensive planning and discussion would need to take place to ensure that all members of staff supported these initiatives. The drive to adopt electronic media must be led by the learning needs of the students. This will ensure that they gain the skills and the experience that help them fulfil the requirements of the curriculum, and that they will also be able to use once they have left school if they wish to continue with their education.

The recommendations from the NCET report emphasise the importance of adopting a whole-school strategy focusing on IT. This is an approach that acknowledges that an individual's response to the problems associated with integrating IT into teaching are important, whilst also recognising that senior managers need to create structures that enable the development of both physical and human resources in relation to IT. This study is particularly important as the role of the librarian in the management of resources and the delivery of information skills provide the focus for the research. The NCET report is relevant to this study as it examines similar issues, including the effect

of the introduction of new technologies on the role of the librarian and the skills that users will need to be able to maximise the potential offered by IT.

The study is important methodologically as extensive use of both focus groups and interviews have been employed to gather data. The project was experimental in nature and was designed to discover how pupils, teachers and librarians responded to new technologies, as opposed to trying to prove the value of a particular piece of technology. The overall approach to the study is similar to that used for this piece of research.

Sharma (1999 p.13) provides an outline detailing the advantages technology offers to the classroom teacher, together with some possible applications. These benefits are summarised below:-

Features	Applications
Mixed media	A particular advantage is using it for required messages, e.g. graphics for spatial relations and animation for dynamic information.
User control	The ability for the user to take his/her own path through the material and the potential to build up his/her own knowledge.
Simulation and visualisation	A clear role for IMM to be used as a lecture aid, projecting simulations of complex concepts in the classroom situation.
Different learning styles	It accommodates people with different learning styles. It supports styles by creating a multisensory learning environment whilst encouraging students to move out of their style as much as possible.
Instructional aid	It is suitable for displaying complex processes, generally guided by the lecturer.
Interactive tutorial	It is suitable for self paced tutorials, especially for moderately complex processes which can be simulated.

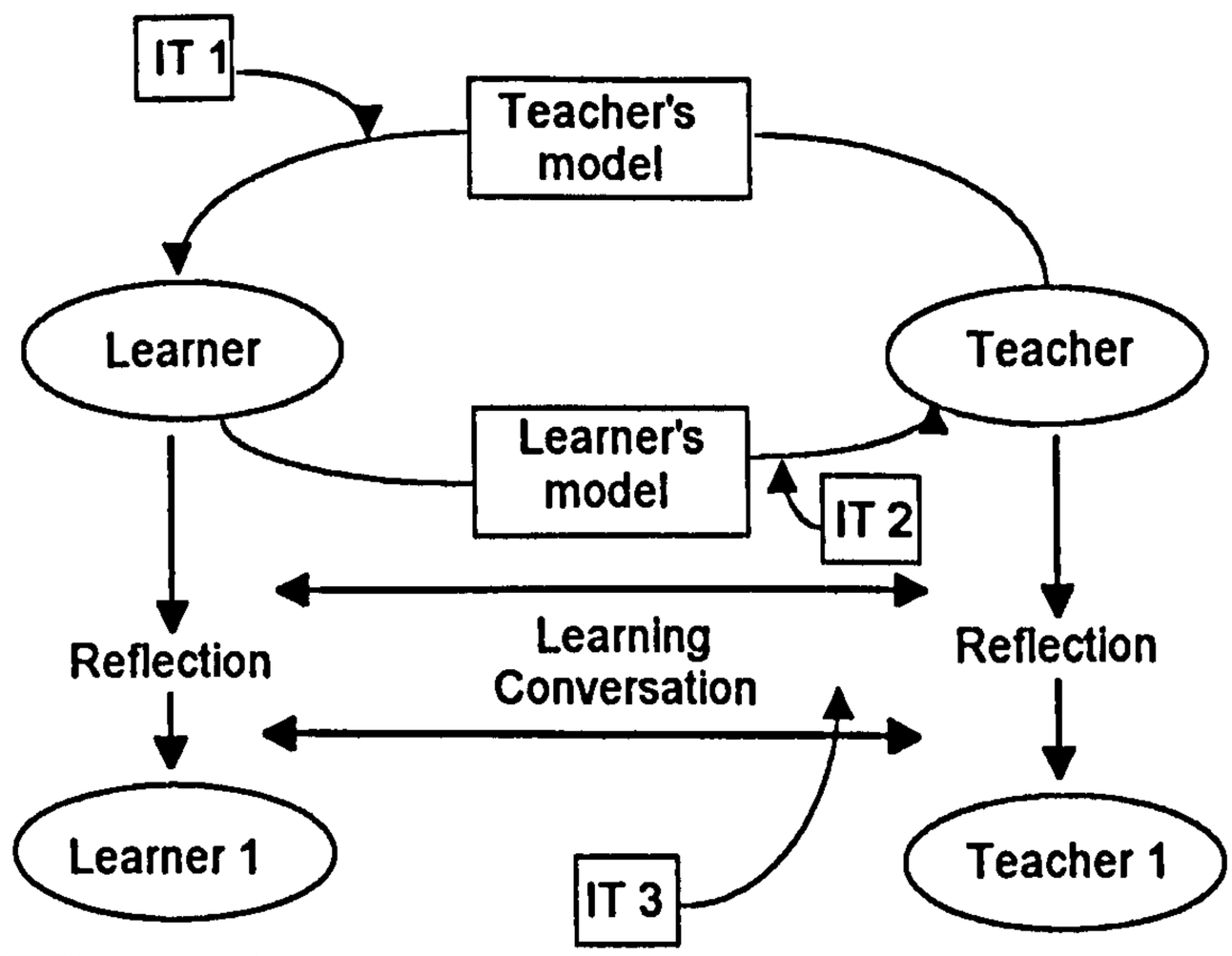
Sharma suggests that if the curriculum of an education system places a higher value on the learners and their autonomy, as opposed to an emphasis on content, then there will be an increase of the use of "interactive dissemination resources" (Sharma, 1999 p.18). If independent learning is adopted in schools then Sharma (1999 p.18) argues that the role of the teacher will need to facilitate

> ...individualised, interactive, media based learning, and learners will need to be empowered to accept far greater responsibilities for their own learning.

This model requires pupils to become proactive and take control of their learning and represents a complete cultural change in terms of teaching styles and methods. Technology can offer many benefits to classroom teachers, however in reality constraints imposed by the National Curriculum guidelines may mean that teachers are forced to concentrate more upon the delivery of content than on facilitating the autonomy of the learner. This may inhibit teachers from using a student-centred teaching style.

How can IT be incorporated into teaching and learning? Pask's model, which details the interaction between teacher and learner, has been modified by Whalley (1995) to incorporate the integration of IT into the learning process (fig. 4).

(fig. 4) Pask's model of the shared presentation of knowledge
(modified by Whalley.)

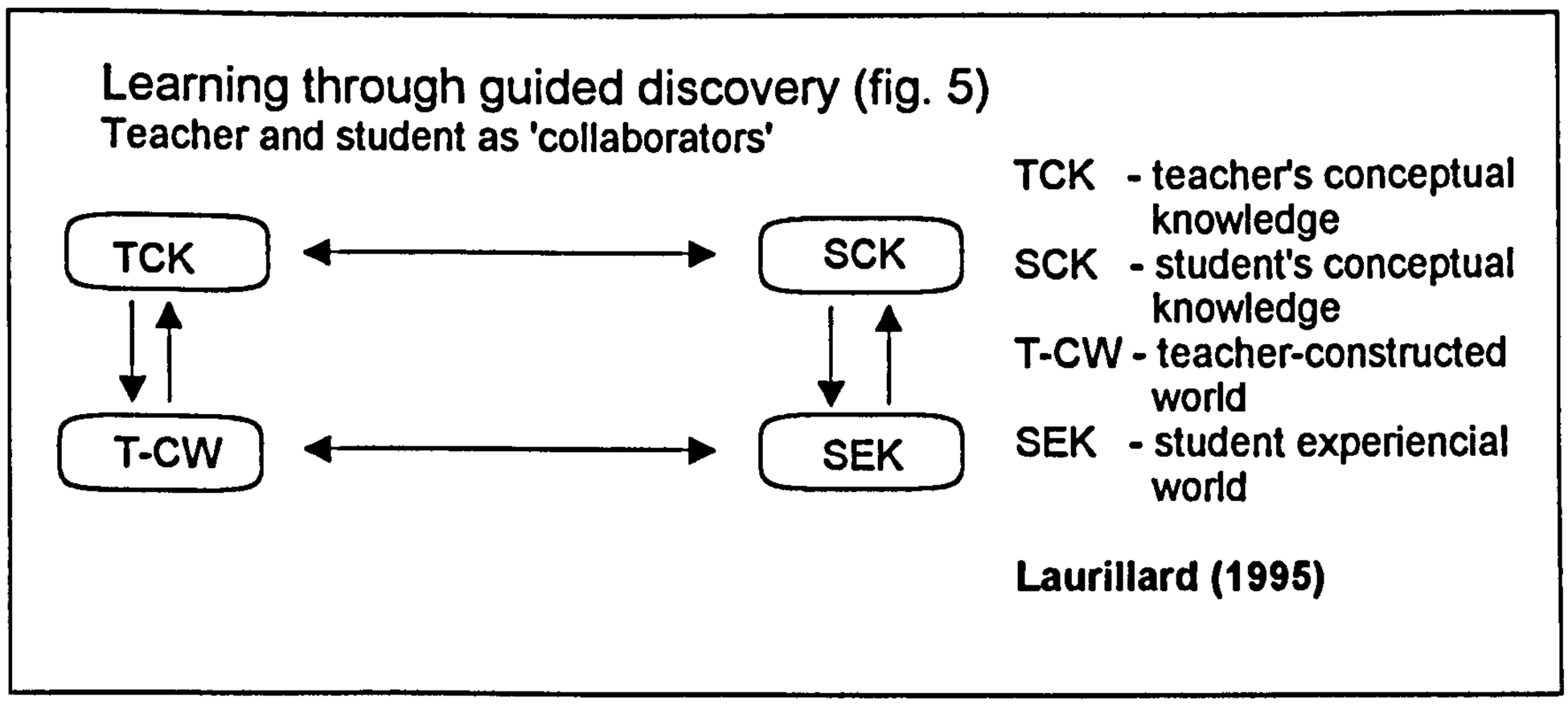


IT1 aids the teachers in their presentation of information to the learner. IT2 is then used by the learner to present his/her ideas back to the teacher. IT3 is termed as "computer supported co-operative work" which occurs between the teacher and learner through discussions of the topic.

Whalley adds that if learners had the appropriate information skills, then using applications such as CAL, e-mail and video conferencing, could enable them to reach the same standard as those learners who had access to information and discussions through traditional tutorial systems (Whalley, 1995). It shows that the teacher and the learner can use IT to aid the process of reflection. This method encourages the use of IT to enhance the learning dialogue. Parallels can be drawn with the "Socratic dialogue" of classical learning where the same question and answer technique is advocated (Hare, 1987 and Warner, 1958). However, this method unlike the Socratic approach, does not seek to demolish the learner or to prove that his/her thinking is inconsistent. Technologies such as e-mail and video conferencing support the question and answer framework and are used to encourage the learner to draw his/her own conclusions.

What type of learning does multimedia support? Laurillard (1995 p.183) suggests that using multimedia applications can enhance learning, as the traditional teacher role of "telling" is replaced by "facilitated learning." This involves a move away from the teacher simply delivering descriptions and information, towards encouraging the student to direct his/her own learning. This strategy requires greater pedagogical understanding from the teacher than more traditional approaches. Multimedia is a format which encourages active learning and learning through discovery. However, it must be remembered that the traditional narrative media of print is good for knowledge acquisition, as the user can follow the linear path of development.

According to Laurillard (1995) guided discovery is the preferred mode of learning. It uses the teacher as commentator, guide and advisor. The teacher supports the independent learner by offering the necessary support and offers explanations to questions raised by the learner (fig. 5).



This method requires a great deal of input from the teacher. The teacher-constructed world is the subject of examination, evaluation and reconstruction by both parties. This method encourages reflection and is responsive to the needs of the learner. It is important to remember that in a school situation it is likely that only the older students would be able to evaluate the teacher-constructed world successfully.

Narrative teaching styles cannot be directly transferred into the multimedia format. The structure of the material needs to be adaptive and interactive (Laurillard, 1995). The learning activities provided by Laurillard as a guidance for the design of multimedia, as discussed earlier, also create a useful framework within which independent learning can flourish: (Laurillard 1995, p.186)

discussion	break down the ultimate goal into interim goals for investigation; provide advice on how to approach the investigation; provide an expert's commentary on the goal in relation to the relevant data;
interaction	provide the means for learners to articulate their own commentary; make the desired interim conclusion the goal stated at the start; provide ways of investigating the data and recorded findings; suggest the amount of investigation appropriate to each goal: inspect and comment on the amount done;
adaption	make the expert's analysis available only after the student's analysis has been done; allow editing of the learner's own descriptions;
reflection	encourage appropriate processing of the information found; use higher level goals to integrate work done at lower levels.

The pedagogical benefits of multimedia include the opportunity for teachers to present and structure information in new ways. The learner is also provided with a variety of approaches for accessing and manipulating information (Whalley, 1995). However, Whalley also notes that teachers often lack the knowledge and "appreciation" of new technology which is vital for its successful exploitation within the classroom environment.

The pedagogical changes that teachers will have to introduce to incorporate new technology are encapsulated by Drake (1996) who states that

> Teachers will have to transform themselves into multimedia producers, team leaders, directors and coaches.

Teachers will need to consider how they can most effectively fulfil the roles defined by Drake. If the student's "imagination, curiosity and creativity are stimulated" then Drake (1996) suggests that this shift in responsibility from the teacher to the learner can be a positive experience.

The NCET study also supported the idea that when utilising electronic media to enable learning to take place, the teacher should adopt a flexible learning style (NCET, 1996 p.10)

> -flexible approaches were more suited to enabling learners to access and choose from a range of resources.

This supports the previous findings of Lea (1986) and Wishart (1999) who suggested that learning is enhanced when teachers employ a student-centred approach. The NCET study also noted that both the teacher and the librarian need to adopt this approach, (NCET, 1996b p.10)

> -staff needed to become gatekeeper, facilitator, demonstrator, guide, team worker...there was a need to move away from didactic methods as students' IT capability grew.

This statement shows that there are a variety of roles that the teacher and librarian need to fulfil, all of which are aimed at supporting the independent learning of the

student. It is important that all parties, pupils, teachers and the librarian, work together to form a three way partnership. If there is good communication between the librarian and the teacher, then it will enable both parties to provide effective support for the pupil. The librarian needs to ensure that he/she adopts a student-centred approach when undertaking any type of information skills teaching. The librarian needs to ensure that pupils are active learners who are engaged with completing a task, as opposed to simply transferring information relating to search protocols.

The previous discussion has shown that several different studies (Wishart, 1999, NCET, 1996b and Drake, 1996) endorse a student-centred approach to teaching as it can enhance a student's experience of learning with multimedia applications.

3.3.1 Teaching styles and the Internet

Tait (1997 p.4) suggests that Internet-based learning can be organised by using a constructivist model of learning. This is based upon some common learning principles which are summarised below:

- Learning involves the active construction of a conceptual learning base.
- Learning is reflective and builds upon the learner's existing knowledge.
- Learning benefits from multiple views.
- Learning is facilitated by relevant authentic activity which can be applied to a given situation.

The formation of concepts and the process of reflection are two important elements of learning. The constructivist model views knowledge as being composed of "discrete, linked conceptual objects" (Tait, 1997 p.4). This model supports the idea that learning styles vary between individuals and also between learning activities.

To facilitate learning Tait (1997) suggests that the use of the Internet requires a structured interface. His framework does not mirror the pre-existing hierarchy available in books, but provides a study programme which can be started from any object. The learner can then proceed on to an interconnecting object. In this model there is no assumed learning sequence and the learner can interrogate each subject as

he/she wishes. This method therefore complements different learning styles. Each facet of a course can be expanded and can provide different links and direction through the module. This means that the user can encounter the same topic but from a different perspective. The study map created replaces the traditional linear syllabus within a navigable interface. The map also provides a context and overview of the material available and enables the user to undertake the process of reflective learning.

This model would also allow teachers to refer students to materials that are available on the Internet. The information would be presented as a series of interconnected modules and would provide students with a range of additional information and perspectives to support the taught element of the course. The pupils could then choose a path through the Internet information which matched their interests. This system allows students to have some control over their own learning and also allows them to have access to information available on the World Wide Web. Students would not simply be restricted to a pre-selected range of resources, but would have the opportunity to discover information for themselves. The fact that students do not have to follow a specific route through the modules means that any extra information which they gather from the global interface can be evaluated when a topic is encountered via another pathway. Tait (1997 p.7) concludes that

> ...the model facilitates the presentation of Internet information in a constructive way, and gives students the confidence to engage in active exploratory learning.

This indicates that a constructivist methodology may provide an effective structure that can allow students to have access to both local and global resources within a controlled environment.

Laurillard (In Tait, 1997 p.3) refers to the above process as "Internet Based Learning" (IBL). One drawback to allowing students access to global resources is that the teacher has no control over the materials discovered and cannot therefore guarantee that they will either be suitable, or relevant or valid. To solve this problem the results of searches undertaken by students could be discussed in the classroom. This would result in group evaluation of the materials which have been discovered. IBL requires a

mode of teaching which includes prescriptive and exploratory learning. This can be achieved by allowing the students to have access to a range of materials which incorporate a variety of views on a particular subject. This system does not restrict the learner to simply using the materials available on an Intranet and the learner's access to information is global as opposed to local.

IBL offers schools an exciting new way to harness the benefits that the Internet can offer to students. Laurillard's proposal of providing tutorials creates the opportunity for both students and the teacher to discuss the materials retrieved. This approach to learning seems to offer students a genuine experience of independent learning.

Sosabowski et al (1998a) reported that one positive result of the introduction of an Intranet was the students' use of support material and CAL software. The Intranet allowed these packages to become integrated into teaching modules as lecturers could recommend their use, or make reference to them, in lectures. Sosabowski et al (1998a p.24) stated that

> The Intranet provides a means of demonstrating to the student the relationship between the didactic teaching and the other learning support material available, thereby more effectively encouraging the student to learn independently.

This shows how an Intranet can provide a link between lecturer-led and resource-based learning. The sources of information on an Intranet should be available in a wide variety of formats to enable a range of different learning styles to be accommodated. This system is exciting as it provides a framework within which pupils can learn independently. The teacher also controls the information that pupils can access. This ensures that the material available complements his/her teaching. Recommendation of a resource to pupils by teachers should encourage its use, and could also lead to discussions between the teacher and pupil that focus on the information that has been retrieved. This process can be viewed as being appropriate for pupils in school, as it enables them to undertake independent learning within a controlled environment.

3.4 Learning styles

How can multimedia CD-ROMs be used by pupils who have differing learning styles? Learning styles are divided into two main dimensions by Riding and Rayner (1998 in Riding and Grimley, 1999 p.44). These are:-

1. The **Wholist-Analytic** dimension of whether an individual tends to organise information in wholes or parts.
2. The **Verbal-Imagery** dimension of whether an individual is inclined to represent information during thinking verbally or in mental pictures.

Riding and Douglas (In Riding and Grimley, 1999) concluded that Imagers learn best from pictorial information, whereas Verbalisers prefer verbal communication. The results of a study by Riding and Watts (1997 in Riding and Grimley, 1999) indicated that pupils prefer to use materials that match their own learning style. This means that the use of multimedia by pupils allows the individual more control over his/her learning than traditional methods. The learner can choose the approach that best suits his/her learning style. This choice empowers the individual and enables him/her to process information more effectively. Another benefit of CD-ROMs is that users can experience situations and interact within specified environments with which they might not otherwise come into contact. This is also true of the Internet and highlighting the benefits of using multimedia to reluctant teachers, could persuade them to integrate this technology into their lessons. The research conducted by Riding and Grimley provides a clear indication that multimedia technology can enhance students' learning experiences.

3.5 The integration of IT into education

Perzylo suggests that there are several factors resulting from the use of multimedia technology which can benefit the user. These factors have been summarised below:-

1. The presentation suits a variety of learning styles.
2. Learning is self-paced.
3. Provides increased access to subject areas.
4. Contains visually attractive information.
5. Offers non-threatening entry to subject areas for non-specialist or beginner.
6. Multimedia learning can cater for a multicultural society.

(Perzylo, 1993 p.193)

The challenge for the education profession is how to successfully integrate IT into classroom teaching. The manner in which multimedia products are used within lessons is a critical factor. Learning objectives will only be met if they are specified and Laurillard (1995) suggests that "extensive teacher input" is needed in order to utilise the benefits of multimedia. This means that teachers need to ensure that they set realistic research tasks that pupils can complete by using the available software.

An important consideration for teachers is how they can employ new technology to enhance their delivery of the curriculum. The NCET report (1996, p.13) suggested that "...initial training to develop IT skills is followed up by opportunities for staff to look at curriculum issues." This is a valid comment as it recognises the fact that teachers will need to discuss how the inclusion of IT and multimedia technology will affect the delivery of the curriculum. Issues for discussion could include, timetabling, access to computers, possible changes in teaching styles and consideration of how to implement these changes, and the benefits that can result from the formation of a working partnership with the librarian. The envisioned time plan within which the teachers feel able to implement these changes, must also be agreed upon.

How has the introduction of IT affected primary schools? Davis (1998) argues that the introduction of the National Curriculum in 1988 halted the innovation which had been taking place with computers in schools. Firmly stipulated IT targets had to be implemented which provided little room for individual development to take place. The situation changed when use of computers was included in the course guidelines for every subject. IT now has a cross-curricular focus which means that teachers have greater freedom in deciding how to integrate IT into their lessons. Teachers are able to create meaningful tasks which require the use of IT by pupils. This is a positive development.

The National Grid for Learning is now operational and may be accessed by schools throughout the country and is aimed at both the primary and secondary education sector. The aim of the resource is to provide teachers and students with access to a wide range of learning materials and to support teachers in their use of new technology (DfEE, 1998b). One of the aims of the Ngfl is to provide a forum where teachers are

able to locate examples of good practice relating to the integration of the Internet into schools. This resource will be based upon the ideas of individual teachers who have shared their experiences. This will require the enthusiasm and skills of individual teachers who not only have the time, but also the expertise to use the Internet. It is likely that initially only a small core of highly committed teachers who have both the technological competence and the time to devote to exploring the Grid will participate in the development of this resource.

How could a secondary school benefit from installing an Intranet? Selinger (1998) notes that the development of the Ngfl will mean that a host of resources will be made available to teachers. By viewing other school sites teachers could gain an insight into the ways in which the technology is already being utilised. However, this approach could be time consuming. Selinger (1998) provides some examples of the type of information which schools have placed on their Intranet and these include:

Pupil portfolios
Art Gallery
Parent information - policy and timetabling
Lesson handouts
Homework
Schemes of work
Notice board
Course work deadlines
Book reviews
Internal e-mail
Collaborative writing

This information can be accessed by staff, pupils and parents. The main disadvantage with this system is the time needed to collate, organise, and input the information. Time is also needed to ensure that the information provided is current. It is unrealistic to expect that a single person could manage the collection and input of the data. Selinger (1998) suggests that the upkeep of the Intranet should be delegated to a group of interested members of staff and co-ordinated by the IT manager. This would create a sense of ownership across the whole school and help to encourage both the teachers and the pupils to use IT. This course of action would need to be led by the senior management as it would require the support of the entire school. Selinger's research is valuable to educational practitioners as it provides an overview of how a

secondary school Intranet can be managed. This article is particularly useful as it provides practical suggestions and solutions to management problems that may arise. This study also highlights the fact that senior managers, as well as teachers, need to be aware of the potential that technology can offer to the whole school community.

How useful is the addition of an Intranet to Higher Education? The Department of Pharmacy at the University of Brighton introduced a Pharmacy Intranet as a part of its networked learning strategy. This innovation was in response to the Dearing Report's recommendations that advocated IT training and the development of a communications and information strategy (Sosabowski et al, 1998a p.21). The aim of the Intranet was to provide a range of information and an increased quality of service for students in the Pharmacy department. Its creators hoped that the resources available would

> ...enable the students to take greater responsibility for their own learning and give them the power to fulfil that responsibility.

This means that students will have access to a range of on-line resources that will support their status as independent learners. One advantage of Intranet construction was the fact that many of the resources were pre-existing and were therefore available at low cost (Sosabowski et al, 1998a). The Pharmacy Intranet includes information on courses, learning support material, lecture notes, computer aided learning (CAL) packages and worksheets. This type of resource could be created for similar use in schools. Once a network had been established, it would enable pupils to have access to high quality resources that have been tailored to curriculum needs.

Sosabowski et al (1998a) revealed an interesting result pertaining to the use by students of lecture notes that were available on the Intranet. He suggested that the act of downloading the notes provided students with a feeling of "ownership" of the information and also enabled them to become more responsible for their own learning. In a school environment, providing pupils with an outline of their course, including relevant lesson notes, would give them an opportunity to complete background reading and prepare themselves for forthcoming lessons. This could be of particular value to A-level students.

The Government has stated that it wishes to encourage increasing numbers of pupils to continue with their education after the age of sixteen and also to improve the links between schools and colleges. It is hoped that this will lead to the sharing of resources between institutions and result in greater choice for students (DfEE, 1998c). It will be interesting to see how these links will be promoted, especially when school and colleges may be in direct competition for students. Ideally, institutions would collaborate to ensure that they were offering different courses.

3.6 Institutional context

Every teacher works within the framework provided by the school. This framework provides support for teachers but also places constraints upon them. How does the institutional context affect teachers in relation to their attempts to integrate new technology into lessons? Collins et al (1997 p.90) noted that individual professionals exhibit a range of attitudes towards technology

> Teachers' attitudes to multimedia technology may range from total enthusiasm and commitment to equally passionate rejection of anything related to IT.

If this is the situation then the integration of IT into lessons will be piecemeal, as less enthusiastic staff will be more reluctant to explore and exploit multimedia software. Collins et al (1997) suggest that teachers' enthusiasm for technology is influenced by their experience with it and hands-on experience for teachers with new technology through the provision of training is advocated. This is seen as an "obvious" but expensive course of action. If teachers are confident with using technology themselves, then one can assume that they will be better able to see how it could be used to support pupils. Teacher confidence will also be boosted if there is adequate technical support. Support can also be provided by the librarian who can help to reduce the frustrations that teachers may experience when dealing with multimedia software. These frustrations can be brought about by lack of time to assess new material, inability to order inspection copies and the concern over value for money

(Collins et al, 1997). These are all areas within which the librarian is able and competent to provide information and advice.

The restrictions placed upon teachers by the demands of the National Curriculum have been cited as barriers to the integration of technology into the classroom. As discussed earlier, multimedia technology is suited to supporting student-centred learning approaches. However, Collins et al (1997 p.105) suggest that the

> National curriculum..fits more closely towards transfer or shaping theories of learning which many innovations within IT have not been designed to support.

These theories of learning, as defined by Fox (In Collins, 1997), are prescriptive and view knowledge as a commodity and teaching as a process of moulding learners to a predetermined pattern. This presents a problem for teachers if they wish to enhance the conditions under which learning takes place. The evidence presented indicates that they would need to adopt a more student-centred approach. However, they also need to teach the National Curriculum which is designed to draw on more traditional teaching methods. Robinson (In Adams and Tulasiewicz, 1989) suggests that schools have tended to adopt new technology into existing practises rather than use them as a basis for change. His comment was made in relation to the introduction of audio and video facilities within schools. Like computer technology today, these resources could have extended the possibilities of student-centred learning, but failed to live up to their potential.

Another barrier to the introduction of "child-centred" learning is suggested by Collins et al (1997). Radical change has not resulted from the student-centred theories of Dewey, Freire, Piaget and Vygotsky despite support within the educational establishment. This is because (Collins et al, 1997 p.104)

> ...the real difficulty lies in the potential conflict between so-called 'progressive' teaching approaches and delivering a prescribed curriculum with large classes with scarce resources.

This indicates that given the current situation in which teachers work, it is impractical to adopt a different teaching strategy because of the pressures exerted by a

combination of curriculum, class size and availability of resources. Changing classroom practice presents some challenges for teachers. Introducing a teaching approach which is viewed as innovatory is difficult because of the context within which teachers work. Teachers are under pressure exerted by different groups within the school who demand results. Barnes (In Russell and Munby, 1992 p.30) states that

> Their rewards depend upon visibly meeting these demands: innovative behaviour is as likely to earn criticism as praise.

This places the teacher in a very uncertain position. If efforts by a teacher to improve learning could be criticised, then this undermines the individual's motivation to instigate change. To ensure that innovations are successful they must be implemented on a wider basis than solely in the individual classroom. The whole institution needs to change. Barnes (In Russell and Munby, 1992 p.11) supports this view and states that

> ...without changes in the institutions themselves many innovations are likely to fail.

If teachers are trying to implement new ideas into the classroom, then in order to be successful these innovations need to be supported and practised throughout the whole school. Barnes raises an important point when he highlights the significance attached to teachers achieving good results from their pupils. A school's level of success is measured against the grades achieved by its students and nowhere is this more apparent than in the *National League Tables* that are published by the Government each year. There is huge pressure on individual school managers to ensure that grades either improve or at least remain at a constant level. Innovation and change may be stifled due to the element of uncertainty that arises as a result of introducing new teaching practises.

Fullan (In McLaughlin et al, 1990 p.249) presents three types of change which occur in secondary school. These are

> Type 1(a): Classroom innovation
> Type 1(b): School wide innovation
> Type 2: Institutional change

Changes instituted within these levels have differing impacts on the school. It is important that the adoption of multimedia is endorsed by the whole organisation as described by Fullan below

> Type 2 changes involve a concerted, direct, and sustained attempt to alter organisational or institutional factors themselves. Without direct and primary focus on changes in organisational factors, it is unlikely that types 1(a) and 1(b) approaches will have much of a reform impact, and whatever impact there is will be short lived.

If changes are to be undertaken, and if they are to have a lasting effect, then they must occur at the institutional level. To incorporate multimedia into the classroom, teachers need to adopt a student-centred approach. To be successful, this change of style needs to be supported by the whole school, including management, otherwise it will be, at best, short lived. This will result in technology simply becoming integrated into existing teaching methods and not being used to its full potential. If technical innovations are not accompanied by institutional and cultural change then the innovation will not succeed (Laurillard, 1993). This change, according to Robson (In Adams and Tulasiewicz, 1989 p.244), must occur at curriculum level if schools are to cater for the needs of the learner:

> Until we move from an industrial to post industrial curriculum which is student centred with students' real needs at its heart, we cannot possibly educate our children for their future.

Therefore, there is a need for the curriculum to change and become responsive to the needs of the student. The curriculum needs to support an approach that gives the student more control over his/her own learning and does not inhibit his/her motivation to learn. Collins et al (1997) noted that teachers perceived a need for the school to have an IT policy as it ensured both continuity and progression in this area. A policy provides the school with a defined structure of technological progress. As Laurillard (1993 p.223) states, from her perspective of Higher Education

> The implementation of new technology methods cannot take place without the system around it adjusting to the intrusion of this new organism.

The academic environment needs to be able to respond to both internal and external changes. Laurillard's comment implies that the introduction of new technology into the educational system is unwelcome. This is because it is upsetting the traditional structure that exists. If educational institutions are to survive, and continue to be centres for academic excellence and research, then higher education needs a more, "robustly adaptive mechanism." (Laurillard, 1993 p.223) For educational innovation to be successful it must be accompanied by changes in the structure of the institution. These sentiments can apply equally to schools.

3.7 Conclusion

From the literature reviewed in this Chapter it is possible to draw the following conclusions. The learning cycle contains several factors and in order to be effective a teaching strategy needs to be discursive, adaptive, interactive and reflective. Multimedia and new technology are resources which can be supportive of this approach to learning. To gain the maximum benefit from the use of new technology it is important that the teacher provides pupils with support in the form of guided dialogues or conversations. This enables the learner to formulate his/her own hypotheses and conclusions. This style allows the learner to explore ideas, as opposed to merely accepting information delivered directly from the teacher. The conversational approach also provides the learner with those aspects of the learning cycle which he/she cannot gain purely through the use of electronic media.

The foregoing discussion suggests that the conversational and student-centred modes of teaching can provide the student with an approach to learning which does not inhibit his/her natural motivation to learn, and could in fact enable him/her to become a more effective learner.

Educational change is a complex process and requires input from different levels within the institution, from teachers and pupils through to senior management. The adoption of a new and "progressive" style presents problems for the teacher as they have to work within the constraints placed upon them by the institution. If change is to be successful, and not transitory, then it is the institution which must also change to

provide the structures the teacher needs to implement a new approach. Changes need to occur in the curriculum and the culture of learning within the school. Teachers also need to be supported on a personal level to ensure that they have the skills to utilise both computers and software. Finally, it can be supposed in such a context, support staff including an IT technician and librarian are vital. They provide services which can alleviate existing teachers' frustrations in relation to multimedia technology and also enhance teachers' experiences with IT.

The next Chapter continues the literature review and focuses on effects that introducing multimedia and new technology into education has on library resource management.

4. Management issues

This Chapter examines the effects that the introduction of technology has had on both education and librarianship. There are four primary issues, namely staff support and training, the provision of time to undertake training, the availability of quality products, and information skills teaching to pupils. Secondary issues including expectations of IT and IT management are also examined. Finally, the impact of technology on librarianship is considered.

4.1 Staff support and training

4.1.1 Technology

A survey undertaken in 1996/7 asked teachers in the Leeds education authority to describe how computers had affected students' work. The main differences cited by staff concerned practical issues such as grammar and writing legibility, as opposed to research-based issues. Only two respondents to the survey felt that computers helped pupils undertake detailed research, and only one respondent felt that pupils' use of evidence had been improved (Cuthell, 1998). The results of this study indicate that in the majority of their lessons, pupils have been using computers in a process-based manner. According to an earlier study undertaken by Gardner (1993), IT enhanced the performance of pupils in science but not in mathematics or English. In mathematics and English pupils were mainly using IT in a process-based manner to complete tasks. In science, IT was being placed within a firm knowledge context and resulted in direct learning outcomes. Gardner's research highlighted the fact that it is <u>how</u> IT is utilised within a subject which is vital, and that it is the demands of the curriculum that constrain the integration of IT into education.

In light of this evidence, what strategies can educational institutions implement to incorporate and utilise IT successfully? In the context of Higher Education "The Computers in Teaching Initiative" (CTI) submitted a view to the "Report of the

National Committee of Inquiry into Higher Education" (Dearing Report). The CTI stated that

> ...there is a need for a continued programme of subject-specific advice and support on technology-based educational practice.

This emphasises the importance of providing support for teachers within the context of their subject. In addition the CTI suggests that an integrated strategy should be implemented which

> ...covers information resources, the facilitation of staff/student communication, the development of learning and teaching materials and other content, and the development of effective management of information systems.

The response by the CTI also noted that a major barrier to the integration of IT could stem from a lack of vision by senior managers when implementing change (Martin, 1997). Admittedly, this strategy is aimed at Higher Education institutions, however some aspects could be useful in the management of secondary education. The CTI notes that exploiting the possibilities of IT will require changes in institutional culture, investment into staff development and student induction (Martin, 1997). Managers in all areas of education must be willing to lead this institutional change and provide support mechanisms for both staff and students.

How willing are teachers in Higher Education to adopt computer-based learning? A survey undertaken at the University of Brighton School of Pharmacy showed that it is the younger members of staff who are most likely to be supportive of IT innovations. Ensuring that staff can use the computers available to them within the institution is also an important factor. If staff cannot use the computers themselves, then they are unlikely to recommend the use of software to their students (Sosabowski et al, 1998b). The study is useful as it identifies the barriers that can inhibit the introduction of IT based teaching methods by staff. The research also provides some practical solutions that can be implemented to solve these problems.

For students to benefit from the introduction of IT, the survey revealed that it was essential that staff were provided with training. Teachers need examples of practical

applications of IT that show how it can enhance teaching and learning (Sosabowski et al, 1998b). In both Higher Education and secondary schools, technology has been introduced without the majority of teachers receiving adequate training. This could result in staff who do not try to integrate it into their lessons. This means that the issue of staff motivation may have to be addressed to ensure that learning technologies are more widely adopted (Sosabowski et al, 1998a). In this study data was collected by means of a questionnaire that reflected the attitude of staff towards networked resources. The findings from this research can be of use to secondary school librarians as they may also need to employ strategies to encourage older and less enthusiastic teachers to use computers. The librarian may also need to raise the profile of the resources to staff in general.

How can schools support teachers and librarians? The CTI suggest that pedagogical advancements should be "led by the needs of the students and academics" or in other words, the needs of the users. In schools this means that when pupils use IT in a lesson, that the learning objectives and outcomes need to be clearly stated. This will allow students to gain an insight into the concept or subject being explored. The technology should enable the teacher to enhance his/her teaching of a topic, whilst also meeting the demands of the curriculum. This means that there needs to be

1) Tangible learning outcomes
2) Relevant software
3) Teacher knowledge of the software and technology to be used.

These factors illustrate the three ways in which teachers need support. Firstly, in order to be able to devise tangible learning outcomes, staff require IT training. Teachers who understand technology will be able to use it to achieve their goals. Secondly, teachers require access to software which is relevant to the curriculum. Software producers therefore need to provide quality educational material. This issue is discussed later in the Chapter. Thirdly, teachers need to be aware of the software that is available. It is in this area that the librarian could fulfil a valuable role and advise teachers and recommend products.

4.1.2 Internet / Intranet

The introduction of the National Grid for Learning (Ngfl) has considerable implications for schools. The Government is asking schools to consider the effect that the Ngfl will have on the following groups, namely staff, pupils and the wider community. The order is important and recognises the fact that unless there are trained, competent staff, the Ngfl is unlikely to succeed as a concept. As Turrell (1998 p.10) states in his article on the Ngfl

> ...to ensure ICT literate children, schools need to have ICT literate staff.

Turrell's article is useful as he provides practical advice for teachers on how to harness the potential of the Ngfl and also includes suggestions on how to incorporate IT into schools successfully. Another aspect of the Ngfl is the Government's wish to encourage schools to improve the whole community's access to ICT (Turrell, 1998). This should result in the promotion of ICT to parents, and could be the only opportunity that some of them have to use technology. It is important that parents update their own information skills so that they are able to take advantage of the resources that are available on-line. This could have implications for the librarian who may be called upon to provide training to parents. This may include the teaching of information skills and effective Internet searching.

4.1.3 Libraries and new technology

The introduction of multimedia into the library has changed the nature of the interaction between the librarian and the pupil. Once the pupil is using a CD-ROM the relationship between learner and information provider "...changes to one of technical assistance" (Shoemaker, 1995 p.29). This can create some problems. Shoemaker (1995) suggests that if the librarian observes a pupil using a computer to conduct research that it can have a negative impact on the user's feelings of independence. The help supplied to the user by the librarian can become confined to aiding them with "printing out" or other technological problems. Problems may occur if the user does not understand the verbal instructions or directions provided by the librarian. However, if the librarian takes

control of the mouse this could be interpreted as disempowering the researcher, as information seeking and selecting is literally taken out of his/her hands. Shoemaker's review is pertinent as he provides an evaluation of CD-ROM technology written from a librarian's perspective. His article provides a balanced view of the technology and he concludes that there is a place for both print and non-print resources in the modern library.

Controlling the information that is available in this electronic environment, and especially on the Internet, requires the librarian to develop new skills. The summary of findings from stage one of the NCET's *Libraries of the Future* project (NCET, 1996b) revealed that some librarians appeared to need to control learners' access to information. This shows that librarians need to learn how to manage electronic information effectively by ensuring that they encourage, as opposed to prohibit, the use of resources by pupils. This has implications in the area of study skills and information handling. Before they can conduct independent research, pupils need to be taught how to exploit electronic information and how to undertake successful searches. As an information professional, the librarian would be in a good position to deliver these skills to pupils.

Another problem facing librarians are the preconceptions held by pupils in relation to the multimedia equipment and software in the library. Pupils' ideas of how the computer will respond, and how information is accessed, shape the way in which they approach their research. Shoemaker (1995, p.29) sums up this problem

> Instead of refining their reading skill, students using a CD-ROM encyclopedia tend to think that their work is done when they see their search term highlighted on the screen.

Some pupils believe that using a CD-ROM is easier than using the printed version. Most CD-ROMs employ indexes and content menus and are based upon a similar framework to that used by printed materials. However, pupils may believe that CD-ROMs are "easier" in terms of locating information, as they do not have to physically search through the printed volumes to find it.

One advantage of using a CD-ROM is that searching and locating information is fast. This is because the index reacts almost instantaneously and takes the user to a specified article at the click of a button. However, even though the computer can speed up the physical selection process it does not guarantee that the information retrieved by the pupil is relevant, and often pupils will immediately wish to print out the article that they have found. The problem that the librarian faces is ensuring that the pupil engages with the material before selecting and printing out. This need to print out shows that pupils still rely upon the printed word and, unless the school provides a computer network, pupils will need to take their information back to the classroom to read.

What effects does the introduction of new technology have on Higher Education? When an institution such as a university library introduces the Internet as a new facility for users, five issues need to be considered. These are the attitude of senior management, training and support, infrastructure, promotion and web mediation skills (Flatten 1999). Flatten's article focuses on the culture change that resulted from the integration of networked information in six universities that took place over a period of two years. This article is relevant to this study as it concentrates on how the attitudes of managers can affect the process of introducing and integrating new technology into a library service. Senior managers need to be committed to introducing change if it is to be successfully implemented. Flatten (1999) found that if managers were openly supportive of change, that this influenced other subject heads in a positive and non-confrontational manner. This positive attitude was vital when dealing with professional library staff who, prior to the implementation of Internet facilities, were apprehensive about new developments. It can be concluded that the example set by senior managers can encourage other employees to view changes as being beneficial.

Flatten's study revealed that it was important for managers to provide training and support for librarians. The report showed that it took ten months for staff to become enthusiastic about the changes implemented, and a full year before attitudes had fully matured. The provision of training is an important factor therefore as it allows the individual to have control over, rather than be controlled by, new technology.

Providing staff training is a practical way in which managers can demonstrate their commitment to the introduction of new technology. Flatten (1999) reported that

> The endless requirement to upgrade staff skills followed on from the constant upgrades in IT...Once training began, the need for more training followed.

This highlights the need for staff training and support to be continuous as this will ensure that staff possess both the confidence and skills to use new software and equipment. Flatten (1999) found that staff who had attended training exhibited a positive attitude. Further learning opportunities were generated as staff requested additional training. The social element of the training was seen as one reason for this success. Staff enjoyed being able to attend training sessions with other members of the organisation. It can be concluded that both a reliable infrastructure and access to support are vital if staff enthusiasm for new technology is to be sustained.

4.2 Time to train

If new technology is to be adopted in the classroom, then the perceptions held by teachers need to be addressed and explored. Sosabowski et al (1998b) revealed that teachers and lecturers in Higher Education seem to be unaware of the real benefits that the utilisation of multimedia could provide. He defines these advantages as being the fact that multimedia is able to offer a self-paced and interactive learning environment to the student. Although the recommendations of the survey were aimed at teachers within Higher Education, they are also relevant to secondary schools (Sosabowski et al, 1998b p.30). Recommendations related in particular to:

- staff training.
- focused demand-led training.
- fostering, and responding to student-driven demand.
- changing the perception of IT as a teaching resource.

Staff training has already been noted by Flatten as being vital if new technology is to be successfully integrated into teaching and learning. Schools also need to ensure that staff have the time to acquire training. One strategy which could motivate staff to use IT would be the provision of computers that were available for them to use in their free time. The installation of a computer network would be one strategy that could

encourage pupils and teachers to use IT, as it would enable them to access a range of centrally held resources including CD-ROMs and educational software. Research conducted by Wishart and Blease (1999) supports this view and they found that teaching, learning and enjoyment was improved through the introduction of a computer network.

The study undertaken by Wishart and Blease focused on teachers' and users' attitudes in response to a new computer network. This research is interesting as it links theories of motivation with the actual effects that installing an IT network has on teaching and learning. In order to assess both teacher and pupil attitudes towards the new network and to document any changes in these attitudes, a combination of research methods were employed including the use of both questionnaires and interviews. Wishart and Blease noted that the introduction of a computer network resulted in a change of pupils' learning styles and strategies, as opposed to teachers' teaching styles (Wishart and Blease, 1999). This means that the introduction of new technology is unlikely to result in changes in staff teaching styles.

However, the introduction of a computer network resulted in some positive comments from staff who revealed that they would make greater use of computers if they had improved access, more experience with using the technology, greater free time, and access to subject specific software. As the research only focused on one academic year, further studies would need to be conducted in order to track the development of the teachers' use of the new technology.

The NCET study (1996b) noted that teachers had constraints placed upon their time and that it was difficult for individuals to find the time to use new technology. It is asserted by NCET (1996b p.10) that teachers needed time to integrate IT into teaching practice. This recognises the fact that teachers need to be able to experience and assess the technologies and software available, to be able to successfully integrate them into their subject teaching. The NCET study noted that at the time of the research that the National Curriculum placed constraints upon teachers that made it difficult for them to integrate new technology into their teaching. A member of staff who is unable to use a piece of software is unlikely to have a full understanding of its capabilities.

Untrained teachers would also lack motivation and the knowledge that is required in order to be able to integrate the use of technology into their subject teaching. This in turn restricts the use of computers by pupils during lesson times. It also reduces the opportunity for the librarian to liaise with teachers in order to develop collaborative schemes that involve pupils using multimedia technology in the library.

The NCET (1996b p.13) report also offered a number of suggestions relating to the role of the teacher and librarian. They suggested that it was helpful if "...training is provided to ensure that staff have sufficient familiarity with the technology to have realistic expectations of it, and to take technical hitches in their stride." New technology and software must be able to support and enhance the delivery of the National Curriculum to warrant the time that teachers must spend on learning and incorporating this technology into their lessons. The integration of technology into the classroom can be supported by librarians, especially in the area of information skills and the selection of resources. If a partnership is formed between the librarian and the individual teacher, then the support provided could help to reduce the amount of time that the teacher needs to prepare lessons.

The librarian can support the teacher by recommending software, demonstrating material and encouraging personal use and class use of resources. However, the teacher still needs to spend some time planning the integration of software into lessons. The involvement of the teacher in relation to pupils' use of multimedia is crucial. Davies and Crowther (1995 p.4) state that, in the context of university teaching

> ...it is the role of the teacher to provide the enthusiasm for, and explain the relevance of, using the courseware.

In schools this could be realised if teachers who integrated the use of multimedia technology into lessons, were openly supportive and enthusiastic about its use. They would also need to explain how the software enabled pupils to fulfil specific learning objectives. This paper, written by Davies and Crowther, evaluates multimedia courseware that has been developed for use in Higher Education. The article is of particular interest as it examines the claims that have been made for multimedia technology in relation to the type of learning that it can actually support. They

conclude that as long as the limitations of the technology are recognised, that multimedia could play a potentially significant role in education.

Pupils need sufficient time to complete resource-based projects. If the time allowed for students to complete research is limited by the teacher, then this can result in pupils simply trying to secure a printout of the information retrieved, regardless of whether it is relevant to their task. Perzylo (1993 p.196) notes that the facility for pupils to obtain printouts means that they can

> ...delay making the effort to 'read' and understand the information they..receive

This demonstrates that even if pupils have the skills to utilise the resources, putting them into practice can be unrewarding, if the provision of time to undertake research is inadequate. If pupils do not have the time to assess or select the information retrieved, then this could lead to them obtaining unnecessary printouts and being unable to record information gained from non-textual resources. Perzylo (1993) supports this view and states that learners need to be given "ample" time to navigate through resources. In her article Perzylo analyses a number of studies and draws some interesting conclusions from the literature surveyed. She emphasises that to be truly effective in their use of multimedia pupils need to have a focused line of enquiry and possess adequate searching skills. Like Davies and Crowther, Perzylo believes that multimedia technology has the potential to influence both teaching styles and raise the importance of information skills in schools.

4.3 The quality of multimedia products

The quality of the educational software that is available for purchase can pose considerable resource selection problems for teachers. Nunes and Fowell (1999) suggest that that there is a large discrepancy between educators' perception of the value of multimedia and its actual usage. In order for software to be useful to teachers, it needs to have a specific educational focus and it must meet a particular learning need. Nunes and Fowell examine the type of methodological approach that should be adopted in order to produce multimedia software that is both technologically

and pedagogically balanced. They focus on the constructivist approach which advocates the co-operation between software designers and educators. This paper highlights the complex nature of software design and underlines the importance of the inclusion of educational specialists in the development process.

Bednar et al (1992 In Nunes and Fowell, 1999) suggest that in order for it to be effective, the design of a multimedia product needs to based upon a particular theory of learning. This means that educational CD-ROMs would need to have a solid pedagogical base. The software should include several elements. These are summarised below (Lebow, 1993 in Nunes and Fowell, 1999)

Multimedia software should provide:

1. Relevant instruction through the provision of a context for learning
2. A balance of control of the learning situation with the promotion of personal autonomy
3. The promotion of skills and attitudes which enable the learner to have increased responsibility for their learning.

Ideally, educational multimedia should be the result of a collaboration between educationalists and multimedia developers. This would result in the production of software that would be both well designed and pedagogically sound. It is this type of multimedia product that could be utilised successfully by teachers within educational institutions.

Whalley (1995 p.193) also recognises the importance of quality educational software and he states that it must "actively engage the student within a learning environment." Multimedia packages must therefore present information which is not only accessible and stimulating, but that also engages the user. He reinforces the idea that multimedia packages must have a firm pedagogical base if they are to be useful in an educational setting, regardless of the superficially "glossy" outward appearance (Whalley, 1995). In his article Whalley evaluates the potential that different image types have to engage users and provide them with an interactive experience. Whalley's research is relevant to this study as it provides the reader with the ability to assess the level of interactivity that can be provided by a piece of multimedia software.

One strength of multimedia is that it is particularly suited to the expression of dynamic ideas, as opposed to linear narrative, and therefore is particularly suited to student-driven research and learning (Whalley, 1995). However, Whalley stresses that multimedia presentations need to move beyond the simple "point and click" format if they are to be truly enriching. The product must add an extra dimension to the material that the learner cannot experience by using traditional resources. If electronic media are to provide a "value added" component to teaching and learning, then they need to supply learners with an enhanced learning experience.

Whalley (1995) also comments upon the cycle of disenchantment which can arise in schools if technology fails to live up to the expectations placed upon it by users. In order to successfully integrate IT into the curriculum, it is important that a plan for its implementation is constructed. This needs to consist of a series of realistic and achievable goals that are set within a time scale. Whalley (1995) suggests that previously IT has been viewed as a "panacea" that would automatically solve pupils' learning problems. If it is to be utilised effectively, then IT needs to be regarded as being a tool that can support teaching and learning and not a cure for weaknesses or shortcomings that exist within the school.

Unfortunately the reality of the software available can often be unsatisfactory. Laurillard states (1995 p.185) that

> Too often the multimedia products on offer to education use the narrative mode, or unguided discovery, neither of which serves the learner well, nor exploits the capability of the medium.

This comment shows that CD-ROMs, and related multimedia software, need to have a pedagogical base that supports exploratory learning, if they are to provide students with an environment within which the process of converting information into knowledge can take place. This indicates that teachers need to explore the capabilities of a piece of software to ensure that it is a quality educational tool, before they recommend its usage to students. In her paper Laurillard argues that multimedia systems need to be based on a strong pedagogical framework that supports the guided discovery mode of learning. Her research is interesting as she specifies that the

structure of multimedia systems need to ensure that the learner has the freedom to investigate the data available, whilst also providing him/her with feedback and support.

As librarians often assess CD-ROMs, they would be in a strong position to provide advice and guidance to teachers. This should ensure that useful and high quality software is purchased. A strong working partnership between teachers and librarians is therefore vital. Ideally, teachers would outline their needs in relation to the curriculum, as this would enable the librarian to assess effectively the available software. The choice of the material would then be decided upon by both parties before it was purchased.

A problem noted by the CTI (Martin, 1997 p.xii) was the lack of "...good quality, flexible, robust and transferable products." The CTI calls for investment in technology and the production of quality materials (Martin, 1997 p.xii)

> ...not only to ensure the continued development of communication and information technologies but to produce high quality teaching and learning materials, develop strategies for integrating C&IT into the curriculum, and support staff and students as they acquire the necessary expertise.

This comment reveals that the integration of IT is at the same formative stage within both Higher and secondary education. In both areas of education there is the same need for investment into equipment and training. The fact that the CTI calls for quality resources and strategies for integrating them into the curriculum, mirrors the situation which exists within schools. Teachers who are unsure of how to integrate IT into their subject area would benefit from using resources that provide advice detailing how the software can be utilised to achieve curriculum goals.

What is the experience of teachers within Higher Education? Some Higher Education courses have introduced multimedia and CAL (computer assisted learning) packages. Davies and Crowther (1995 p.3) examined the way in which this courseware had been developed and used in Higher Education. One problem that they encountered was the existence of software that did not have a firm pedagogical base. They commented that the designers seemed to hold the assumption that

> ...effective learning will inevitably occur provided that students are mesmerised by the novelty features inherent in the technology.

Computer software can improve the learning experience in two ways, - by increasing user motivation and by enhancing the learning process. Individuals are motivated by the fact that the software enables them to have control over their learning (Wishart, 1990 in Wishart and Blease, 1999). Users can create their own pathway through the information provided, as there is no "correct" route that they have to follow. Pupils can therefore learn at their own pace (Underwood and Brown, 1997 in Wishart and Blease, 1999 p.26). Enhanced learning can take place when the software provides users with interactive support and allows them to implement concepts they have yet to master fully (Wishart and Blease, 1999).

Davies and Crowther (1995) state that the motivational factors associated with multimedia need to be quantified. They suggest that the entertainment provided by multimedia does not ensure that the students "engage in the subject matter and enter into the learning process." (Davies and Crowther, 1995 p.4). This means that multimedia features may offer only short-term incentives to learning. Learners must be engaged and interested in the tasks that they are undertaking to ensure that they do not become despondent or bored once the novelty of the multimedia has disappeared.

Davies and Crowther (1995) apply Herzberg's motivational theory to multimedia software. Herzberg's theory splits job motivation into two factors: hygiene and motivators. Hygiene factors prevent job dissatisfaction and comprise: company policy, salary, supervision and working conditions. If any of these factors are poor then this can lead to dissatisfaction amongst employees. However, the provision of good hygiene factors do not result in the work-force becoming motivated. The upgrading of a hygiene factor only has a temporary effect and the benefits are soon forgotten by employees. Motivator factors relate to the work undertaken by the individual. Improvements in these factors have positive and long-lasting effects. Motivators can only be present when the hygiene factors are provided at satisfactory levels. They consist of achievement, recognition, responsibility and the job itself (Dixon, 1994 and Eyre, 1993).

Davies and Crowther (1995 p.4) suggest that multimedia features correspond to the hygiene factors in Herzberg's theory. They are not motivators. It is the material itself which is the most important feature as

> ...only if the courseware is intellectually stimulating will this provide the positive motivation to learn.

This comment clearly illustrates the importance of purchasing software that is not simply a collection of multimedia features. If the material is poor then the learner will only be entertained by the software, as opposed to entering into the learning process.

Using CD-ROM information sources in an educational setting can be problematical. Collis (1991, p.34 in Oliver and Oliver, 1996) suggests three areas in which the user can face some difficulties

Disorientation	- difficulty in knowing where one is [in the text].
Navigation inefficiency	- difficulty moving from one point to another.
Cognitive overload	- exposure to information that vastly exceeds that required by the problem or the question.

Novice users can experience disorientation especially when exploring unfamiliar CD-ROMs. Trumball et al (1992 in Oliver and Oliver, 1996 p.24) found that information is retrieved ineffectively through browsing as the user can easily become "lost" in the information available. If the CD-ROM does not have a clear index and does not "map" the information seeker's journey, then the user may find searching difficult or confusing (Oliver and Oliver, 1996). A key factor is training, and Oliver and Oliver (1996) suggest that user performance is likely to improve with instruction.

The investigation undertaken by Oliver and Oliver was designed to enable the researchers to observe the processes and strategies employed by students using multimedia software to answer specific questions. The results are important to librarians as they revealed that the majority of students did not apply the most effective search strategies and that they only had a limited understanding of the text that they had retrieved. It would be interesting to see whether, with continuous instruction and

information skills training, the ability of the pupils in the sample group to construct effective search strategies improved.

4.4 Pupil training and information skills

4.4.1 IT infrastructure

Information literate people possess specific qualities and skills. They also realise when they have an information need. Engeldinger (1998) states that information literate people have the following skills, and that they

> ...know the appropriate places to look for information, and they know the appropriate strategies to use for each of them...[they have] the ability to recognise the information when it is found, and then determine if it is the best, most accurate or most current information available.

Engeldinger states that although teachers wish their students to become information literate, few have built the development of these skills into their teaching. This should be a curriculum-wide responsibility. However, problems can arise if the IT infrastructure is incomplete or inadequately maintained (Engeldinger, 1998). In order to encourage usage of IT, and provide as positive an experience as possible for the user, the IT infrastructure needs to be sound:

> A predictable, stable and dependable infrastructure will encourage use of the resources, learning by students, and incorporation of instructional technology into the curriculum by the faculty.

If teachers are to be encouraged to use IT then the school needs to ensure that the equipment is reliable and that support is available. This infrastructure, according to Engeldinger (1998), consists of six elements. These are:

1. Networks
2. Telecommunications
3. Equipment and hardware
4. Software
5. Information resources
6. Service and training

It is for these areas that the Information Manager in fig. 6 (p.94) would be responsible. The service and training element of the infrastructure would be of particular interest to the librarian. It is in this element that pedagogical concerns are raised. Engeldinger (1998) states that teachers cannot be expected to teach all the information skills required by students, and that therefore a proactive support unit needs to be established. This view supports the ideas presented earlier by Mathieson (1994). It can be concluded that learners should be supported by skilled staff and that this is a role that could be fulfilled by the librarian. Engeldinger argues that in order to promote a positive and productive educational environment an academic institution needs to have a reliable IT infrastructure. Although he is focusing on Higher Education, Engeldinger's article is useful as he provides a set of recommendations that will enable educators to build an IT infrastructure that will support the needs of its community.

To realise this ideal a secondary school would need to be committed to teaching information skills to pupils and able to provide them with access to up-to-date technology. As Engeldinger (1998) notes, if insufficient resources are available then parts, or all, of the infrastructure can become less efficient and less reliable. This means that the school needs to construct a strategic plan for IT that is directly linked to curriculum objectives and goals. To ensure that all members of the school are working together, these goals also need to be shared with the school community.

4.4.2 Information skills in education

Davis (1998) states that pupils need to possess core IT skills if they are to use IT effectively. He also comments that pupils must be free of inhibitions when using new technology. To achieve these goals children would need to have access to computers from an early age. If pupils were able to use computers at primary school, then it is probable that the number of students who feel reluctant to use IT will be reduced.

Information skills need to be taught to pupils from an early stage and Davis (1998 p.6) comments that

> Interpretation skills are now needed, as the child learns to question, cross check and even challenge information retrieved.

Librarians need to be in contact with their "feeder" schools to assess the type and level of information skills teaching which is actually occurring. In this way pupils' experiences can be built upon once they begin secondary education.

Davis (1999 p.6) also calls for a "stronger emphasis on research, study and access skills." He suggests that pupils need to develop thinking skills and problem-solving abilities, if they are to be able to make informed decisions. This means that teachers need to incorporate the technologies that are becoming increasingly important in our everyday lives into the classroom. The teaching of these skills needs to take place within subject areas and become integrated into curriculum targets. Educators need to embrace teaching styles that enable them to explore and harness the potential of multimedia technologies.

The acquisition of skills should be a process that continues at Further and Higher Education. A study undertaken by Barnes (1998) indicates that liaison between schools and Universities would be beneficial, as it would provide a link that could be used to ensure that students' information skills were being built upon and developed to a higher level. The librarians at the University of Massachusetts were involved in an information literacy project that resulted in the adoption of specific goals and objectives. The driving force behind the project was the librarians' desire to enable students to develop a range of relevant information skills. This study is interesting as the university librarians considered that in order to foster links with secondary school librarians, it was particularly important to begin a dialogue with the School Library Media Association.

The formulation of a strategic plan is necessary for the comprehensive delivery of information skills to students. The planning process needs to include the contribution of librarians, computing staff and academic staff, in order to establish common objectives and desired outcomes. The influence of the librarian is important. Barnes (1998) notes that in his study

> As librarians, we were concerned that information literacy was being confused with, and sometimes even subsumed by, computer literacy.

This comment highlights the importance of educators understanding the difference between teaching pupils information literacy skills and teaching pupils to use computer software to undertake practical tasks. Librarians need to be involved in defining information literacy skills in schools. This is a process that highlights the range of competencies which students need in order to assess and process the amount of information that is available.

School libraries should provide pupils with sufficient access to a range of computerised information. Craver (1994 p.142) states that the

> School library media centre (SLMC) must acquire sufficient information-technologies to enable students to learn the concepts and skills required to function successfully in electronic environments.

In order for pupils to be able to learn and practice information skills the library needs to possess an adequate range of resources. Insufficient resources deprive pupils of the opportunity of learning how they can utilise computerised information effectively.

4.4.3 Information skills and the librarian

An important challenge facing the librarian is how to become involved in the planning and delivery of information handling skills. Craver (1994 p.142) believes that the librarian needs to take a proactive stance:

> School library media specialists (SLMS) must assume a leadership role in the promotion and application of various technologies that facilitate teaching and foster the symbolic-analytic skills of students.

This means that the librarian needs to approach subject teachers and demonstrate the importance of delivering an effective and integrated information skills programme. This active role is supported by King (1989 p.47) who states that

> ...such skills are not just 'assimilated' and do not happen by accident..but like all other subjects in the curriculum, need to be carefully structured and taught as part of an ongoing syllabus.

Clearly the concept of an ongoing information skills strategy is advocated by King, who continues the argument to state that such a programme needs to be viewed as a "whole school policy". A structured programme ensures that pupils leave school with the skills they will need for either continuing their education or when entering the work-place. This would suggest that if the Government wishes to create a "learning age", then it must ensure that schools are implementing strategies which deliver these skills to pupils.

In order to encourage the incorporation of information skills within subject areas, the librarian should seek to design resources in collaboration with teachers. These would then be delivered within the context of the subject: (Craver, 1994 p.149)

> SLMS must design resource-based learning units for all subject areas that require students to use symbolic-analytic skills in electronic environments.

The teaching materials must enable pupils to gain the following skills: abstraction, system thinking, experimentation and collaboration (Craver, 1994). Craver's work is useful as she provides a strong definition of the school librarian's role and the specific tasks that the librarian needs to undertake in order to ensure that information skills are developed within the school. Pupils must be skilled enough to employ a search strategy, to select a useful information source and to extract the relevant information. These are skills which pupils need to realise are transferable between subjects.

These skills are not transitory, and an effective information skills programme at school has the potential to satisfy students' present and future information handling needs (King, 1980). The next challenge is to ensure that each pupil recognises the value of these skills. Craver (1994 p.145) states that

> SLMS must use their collections and information technologies to ensure that students and their parents are cognisant of changing employment opportunities and the need for lifelong retraining and education.

Ensuring that pupils value information skills is vital. One strategy which can be employed is to emphasise the importance of information skills in relation to subsequent career development.

4.4.4 Information skills and the role of the teacher

The introduction of multimedia into lessons alters the role of the teacher and therefore requires them to change their teaching strategy (Laurillard, 1995). Davies and Crowther (1995 p.5) suggest that the integration of multimedia software into lessons is successful if the student-centred learning approach is adopted. This approach encourages the individual to take responsibility for his/her own learning and changes the role of the teacher from providing a direct transfer of knowledge to becoming a facilitator of learning. This role of facilitator shares some common goals with those of the librarian, as they both involve the development of user information skills. As has already been discussed, multimedia resources allow the user to choose their own pathway through the information available. This enables the user to direct his/her own learning. If secondary school pupils do not posses the skills they need to synthesise information, then they will not be able to learn efficiently when using multimedia resources. Laurillard (1995 p.185) states that

> The paradox of interactive media is that being a user-control medium the learner expects to have control, and yet a learner does not know enough to be given full control.

Laurillard suggests that because students are unable to take full control of their own learning, it is unrealistic to expect them to set appropriate goals or to navigate through a resource in the most effective manner. She suggests that learners will, "under-specify the problem", become distracted and fail to recognise inconsistencies (Laurillard, 1995). This implies that pupils are unable to function as fully independent learners without guidance. To solve this problem the following three strategies need to be implemented:

1. Allow pupils access to IT resources in their free time, as this is an important part of the familiarisation process.

2. Equip pupils with information skills training to provide them with the tools they need to become successful independent learners.

3. Create learning experiences (exercises/simulations) which develop and reinforce their skills.

As already noted, pupils need time to access resources and to experiment with multimedia software. They also need to be supported effectively by teachers. It is important that children understand the information that they retrieve and Laurillard (1995 p.180) states that

> The CD-ROM-based encyclopaedia does nothing to help with turning the information into knowledge.

Pupils need guidance during the learning process to ensure that the information that they retrieve is analysed and not simply regurgitated and presented as "the answer."

How are CD-ROMs currently used in schools? In her study on the integration of CD-ROMs into schools, Perzylo states that educators at that time were facing the challenge of addressing the important issue of helping learners to learn. She also implied that information skills were "formulating the basis of many schools curricula" (1993 p.191). However, some teachers may believe that these skills do not have to be formally taught, as they can be "acquired" by pupils. This is a worrying attitude and could result in only a piecemeal system of information skills teaching being undertaken in the school. This could mean that the skills taught to pupils in one subject are not reinforced in another.

Teaching information skills is necessary and Oliver and Perzylo (1992 in Perzylo, 1993) noted that pupils do become distracted from their search when using multimedia products, especially when children were presented with both audio and visual information. This study emphasised the need for prior skills training for pupils, in order for them to be able to process information presented in these media (Oliver and Perzylo, 1992 in Perzylo 1993). Information was not recorded by students because they were simply unable to interpret non-textual resources. Interestingly, this study also found that the students themselves felt that some training would be beneficial.

Teachers exhibited a positive attitude towards CD-ROMs in a survey undertaken by Cuthall. Staff noted that pupils experienced increased motivation when using multimedia technology. CD-ROMs were also praised by users for the ease of access they afforded to the information stored. However, teachers were concerned about pupils' lack of editing skills (Cuthell, 1998). These findings can be viewed as encouraging as they show that some teachers who use multimedia resources do share the same concerns as librarians. If the librarian wished to promote the teaching of information skills within lessons, then it is these teachers with which they must liaise and form initial partnerships.

4.4.5 Information skills and the pupil

Some pupils still cannot answer a question that they have been set, even if they find an appropriate article, as they do not read the information discovered before printing it out. Oliver and Oliver (1996 p.38) conclude that

> It would appear that it cannot be assumed even when students have located the correct information in the encyclopaedia that they will be able to recognise and use it.

This comment underlines the need for teachers and librarians to encourage pupils to engage with the material they retrieve. Pupils need to be able to recognise and extract relevant information. It can be concluded that pupils need experience and training if they are to understand how to retrieve information from CD-ROMs.

The research conducted by Oliver and Oliver (1996 p.41) revealed that even though CD-ROMs offer a variety of ways to find information, that the majority of users consistently employed the same search strategy. This means that pupils will use the search method with which they are familiar, whether it is the most suitable for the task or not. This limits the efficiency of the researcher as he/she does not adapt his/her strategy to match the requirements of each search. The design of the search screen also affects the user's choice of search option. Pupils will employ the strategy which they find the easiest to use (Oliver and Oliver, 1996). Unless the user understands that the index does not support, for instance, plurals, then he/she could miss information

that is stored under the singular form. Support and guidance in the classroom is vital to prepare pupils for using CD-ROMs. Oliver and Oliver (1999 p.42) recommend that students

> ...need to be able to consider the forms of information required and be able to judge the most appropriate search strategy from among those available..without adequate instruction users are inclined to use strategies..that are..less suitable than other options.

Pupils need to be made aware of the search strategies which can be employed when using CD-ROMs. This will ensure that they are able to make informed decisions and choose the most appropriate strategy. The study conducted by Oliver and Oliver (1996) is interesting as it highlights the fact that pupils need to be able to understand how the information is stored and organised and have their own mental model of the database, as this will enable them to perform more efficient searches. Previous experience is also an important factor. Oliver and Oliver (1996) state that prior use of software is beneficial for pupils and results in greater experimentation and the deployment of a wider combination of search strategies. It can be concluded that pupils should be provided with the opportunity to gain more experience with multimedia software outside of lesson times.

The "Learning age" is a term used by the Government. According to the Green Paper *The Learning Age* (DfEE, 1998a), an information and knowledge-based revolution will happen in the twenty-first century which will require investment in the creativity and intellect of people in order to develop a culture of "Lifelong Learning". This paper is useful as it provides a broad outline of the Government's agenda for improving the nation's learning skills. The Green paper also acknowledges that there is a lack of achievement especially among young adults at intermediate levels. The document is particularly informative as it lists some of the opportunities that will be made available to all those people who wish to continue to learn. The Government wishes to encourage individuals to continually develop their skills and knowledge, as this will be essential for their long-term employability and personal fulfilment (DfEE, 1998a). In order to achieve these goals the Government plans to implement a number of initiatives which will affect both education and business. This will mean additional numbers

entering Further and Higher education and the continual development of the "National Grid for Learning".

There is suprisingly little information within official publications concerning the role of the library in supporting lifelong learners, either within schools or amongst the general public. The Government has pledged £50 million from the National Lottery Fund to provide digital technology for libraries and there are further unspecified proposals to develop the IT network in public libraries (DfEE, 1998c). This implies that the Government has not recognised the importance of the role undertaken by the school librarian. There are no specific proposals that consider how pupils will gain the skills they will need to become effective lifelong learners. This is worrying and means that the librarian will have to be proactive and persuade school managers to implement initiatives concerning information skills teaching.

Students need to become part of the culture which recognises the value of lifelong learning. In a lecture given by Drake (1996) on the challenges facing librarians in Higher Education she comments that

> Higher Education needs to address the issue of teaching students how to learn and communicating the necessity and desire to continue to learn.

This comment shows that universities need to equip their students with learning skills. It also highlights the fact that some students enter university without possessing these skills. This situation could be avoided if all students were taught information skills at school. Universities could then communicate to students that learning is an ongoing process that can help individuals to realise both their professional and personal aims.

In her lecture Drake highlights some of the changes that are occurring in Higher Education. She raises some pertinent concerns over the use of technology and how to assess its effectiveness as a learning tool and recognises that the emphasis in Higher Education is moving away from the teacher and being placed firmly on the learner. She provides an interesting insight into the increasing role of the librarian in the area of information skills, and highlights the fact that in light of these changes librarians will

need to become more customer orientated and focused on problem solving and individual service needs. The changes outlined by Drake mean that it will be important that schools prepare their students by ensuring that they possess the skills to learn independently.

4.5 Internet information skills

Can students be taught information skills which will help them to interrogate the Internet effectively? It is important to remember that a computer can only facilitate the quest for information, it cannot provide answers. However, it can enable the user to find the information he/she requires to answer an enquiry. Learners who use information technology, and especially the Internet, need to be able to make decisions and judgements concerning the, "quality, reliability and timeliness" (Drake, 1996 p.4) of the information they retrieve.

Undertaking a search is an active process. The skills that are required to search electronic media need to be taught to, and then practised by, pupils. This will ensure that they are able to create valid search strategies and that they can reflect on and review the approaches that they have used. The NCET study noted that to be able to analyse, synthesise and summarise the information retrieved (NCET, 1996b p.9)

> -high levels of skill were needed to analyse and synthesise masses of information.

As discussed earlier, Laurillard (1994) stated that these research processes needed to be included in the learning cycle so that they became part of the research task and not separate from it. Information skills therefore need to be taught in the context of the subject to ensure that they are delivered in a manner that makes them relevant to the pupils. It is vital that students are able to apply these skills and use them to complete research tasks or projects.

In the context of Higher Education the "Information literacy project" at the University of Massachusetts looked at the problem by defining which competencies they thought students would need when they graduated. These were developed by librarians from all

five campuses of the university (Barnes, 1998). The competencies were refined into six aims:-

All students will be able to

- recognise the need for information
- formulate questions based on information skills
- identify potential sources of information
- develop and use successful search strategies
- evaluate information
- use information

Once skills have been defined then the organisation can develop relevant objectives. The study highlighted the importance of including computing staff and teaching staff in the consultation process. Liaison with teaching staff was viewed as being particularly important if courses were to be accessed on the World Wide Web. As students would be accessing sources remotely, then it was considered to be essential that they possessed the skills to utilise the information provided. The project showed that planning across the institution is necessary for the implementation of an effective information skills programme. Liaison between librarians and teachers is vital if the pedagogy of these skills is to be discussed (Barnes, 1998).

Schrock (1998) states that it is "imperative" that both pupils and teachers are able to evaluate web sites, simply because of the vast number that are now accessible. Herring (1999) also feels that this is a vital skill. The quality of material can vary considerably between sites and he suggests that a school needs to agree upon a range of criteria which can be used for evaluating web sites. Schrock (1998) provides practical guidance for users and states that there are three basic areas of evaluation which need to be considered when looking at an Internet site. These areas are navigation and usability, authorship, and content validity. When searching the Internet she states that firstly, important information should be easy to find, secondly, the site should accommodate all types of learners by having a site map and hypertext links, and thirdly, it should be user-friendly. Authorship needs to be clear and should include the author's credentials and a contact address in case the visitor wishes to ask further questions. Schrock (1998) states that the most important factor is assessing the validity of the information available

> Students need to be able to recognise when a web page is a thinly disguised commercial or opinion page or when it is strictly a source of information.

These guidelines are useful as they can be applied by a learner who is viewing a web site for the first time. It is this type of practical help that can be integrated into the curriculum and used by students when interrogating the Internet as part of research-based tasks. Schrock provides some sound advice for both librarians and teachers in relation to evaluating web sites. Her conclusions are based upon the results from lessons she has taught to middle school pupils and she has found that using a rubric is a good way of teaching web evaluation skills to pupils. This article also includes useful links to other web evaluation pages and articles.

The NCET study recognised that information skills were required for the effective use of multimedia and communication technologies by pupils. In relation to pupils' use of the Internet the study noted that (NCET, 1996b p.9)

> ...planning online searches was essential for efficient retrieval.

This comment shows that students need to plan their research strategies before using the Internet, as this would enable them to undertake structured searches. Teachers need to acknowledge the fact that in order to perform a successful search a pupil needs to undertake adequate preparation prior to going on-line. It would be useful therefore, if pupils had access to planning guides and support when they were constructing their search strategies.

The pupils from the schools in the NCET study encountered difficulties when they tried to retrieve information using new technology, and specifically when they used the Internet. The study found that (NCET, 1996b p.9)

- the same skills were used with new electronic sources as with print;
- planning and refining searches was even more important with electronic media;
- retrieving information from the Internet was time-consuming and often difficult;
- the type of information retrieved from the Internet was often unsuitable for curriculum use.

The librarians from the NCET study made direct reference to the importance of evaluation skills in relation to both print and non print materials. Pupils need to be able to apply their skills to help them locate information from both print and CD-ROM resources. This means that pupils need to be taught how to use books, before they use electronic media. This is an efficient and practical method, especially if the number of machines available for pupils to use is limited.

A user needs to possess a range of information skills in order to be able to undertake a search effectively. One strategy devised by a librarian in the NCET study was to provide (NCET, 1996b p.51)

> ...a set of criteria for advising learners on when to give up a hopeless search.

This approach provides pupils with a set of guidelines that they could then use to assess the validity of their search.

As a result of their experiences with the Internet and CD-ROMs, the librarians from the Schools Library Service compiled a list of "key factors" that they suggest a user should possess in order to undertake a successful search (NCET, 1996b p.51)

Key factors for a successful search:-

- very clearly defined research need
- an awareness of associated vocabulary/keywords
- knowledge of associated subject/research areas
- an ability to spell correctly
- an ability to infer and induce
- an understanding of the implications of the internationality of the Net when deciding upon research terms

These factors could form the basis of a search planning sheet for pupils to complete before they used the Internet.

To help users evaluate web sites Alexander and Tate (1998) provide additional guidelines which have been developed at Widener University Wolfgram Memorial Library. They suggest that the traditional criteria of accuracy, authority, objectivity, currency and coverage, which are used to assess printed resources, can be applied to

the evaluation of information found on the Internet. Students are also provided with additional criteria to enable them to evaluate pages that are retrieved out of context, that blend information, and those that are market-orientated advertising and entertainment pages (Alexander and Tate, 1998). This approach is supported in the university through the use of checklists and questions which students need to answer when viewing a web site. Interestingly, the librarians have presented these materials to graduate education students who have been able to use these concepts when working with school pupils. This implies that an integrated instruction programme can benefit school pupils.

In a school this could be achieved through the formation of a cross curricular information skills committee which could be overseen by the information manager. Once skills have been defined, then programmes like those detailed by Alexander and Tate (1998) and Schrock (1998) could be integrated into the curriculum. These materials could also be modified to enable teaching staff to improve their own Internet evaluation skills. If further guidance was required then the librarian could search the Internet to find further sources of practical information.

The article by Alexander and Tate is particularly interesting for a number of reasons. As university librarians they are involved in some teaching of skills to both undergraduates and graduates and this article provides details of their findings. Their experience of teaching students from a variety of subject areas leads them to conclude that their most successful teaching has been when sessions were directly related to course assignments. The value of the materials produced is substantiated by the fact that faculty librarians have referred to them during individual consultations with students and, more importantly, teachers in secondary schools have adapted them to use with their pupils. This article provides some useful practical advice for teaching students Internet skills within a limited time frame.

Sosabowski et al (1998a) believes that usage of the Internet at home will increase. This could have wide-ranging implications for schools. If pupils' access to the Internet grows then providing on-line learning support for students via the Internet and school

Intranet could be a development issue for the future. Sosabowski et al (1998a p.25) states that

> ...Intranet-based resources will have an increasingly important role to play in the pedagogy of the future.

This indicates that the use of information technology will increase particularly at Higher Education level. This means that IT will be used to facilitate the provision of independent resource-based learning to students. Teachers will need to include the use of technology in their teaching. They will also need to provide learners with the information skills that they will require to utilise Internet-based materials. The latter role provides an opportunity for the librarian to oversee information skills training.

4.6 Computers at home

Sosabowski et al (1998b p.27) revealed that if individual teachers have access to a computer at home, then the majority will use it for work purposes. To support teachers, schools could provide them with equipment to use during the school day or with laptops to use at home. This type of scheme would probably help to increase teacher confidence in their use of technology.

A survey of teachers' attitudes by Cuthall (1998) revealed that some staff considered pupils to be disadvantaged if they did not have a computer at home. Pupils with machines at home have a greater opportunity to familiarise themselves with both software and the more practical aspects of computing, such as keyboard skills, than their peers who do not have access to a computer. Learners who do not have suitable facilities at home are also disadvantaged by the introduction of CD-ROM/book combinations (Sosabowski et al, 1998b). To gain any benefit from the CD-ROM, the learner must have access to the relevant computer equipment.

The NCET study also acknowledged that pupils who had access to a computer at home did have an advantage over their counterparts who did not. In the NCET report it was agreed that although any increase in an individual's information skills could not be measured, pupils who had machines at home were more familiar with the practical

and technical aspects of using computers. These skills are useful and they could reduce the time that an individual takes to identify the location of navigation and function keys when using new software (NCET, 1996b).

4.7 IT management

The challenges facing Higher Education can mirror those found in smaller establishments, including schools. Mathieson (1994) highlights some problems and inefficiencies in IT management which can arise. If universities have a piecemeal approach to the organisation of IT, then it is unlikely that they will be able to realise its full potential (Mathieson, 1994). A problem associated with IT is its relatively high cost. Organisations are faced with increasing demands from a growing number of users. Mathieson (1994) advocates the installation of networks to link users as further growth is easier to manage and computer expense can be planned. He believes that this is an attractive approach to computer management. However, this approach requires the institution to build in the need to update computers on a regular basis into the planning and budgeting cycle. This concept relies upon institutions recognising that they will need to constantly make investments into IT in order to develop their IT capabilities. The existence of a central IT policy would be of use to the librarian as it would end the uncertainty connected to computer development and maintenance within the library.

An important part of the integration of the Ngfl in schools is the linking of the ICT plan to the financial management of the school. This means that planned improvements can be included in the school budget. In this way schools are encouraged to cost each objective and provide financial support for their plans (Turrell, 1998). ICT projects can only succeed if they are supported financially. At present, resources aimed at teachers and senior managers are available in the Ngfl's "Virtual Teacher Centre" . One option available to schools is the on-line questionnaire whereby an ICT action plan is formulated for the school, based on the replies. Such a plan is also vital if the Internet is to be successfully utilised and integrated into the curriculum (Turrell, 1998).

The NCET study highlighted the importance of recognising the contribution and expertise of the whole range of staff within schools including teachers, librarians, IT co-ordinators and assistants (NCET, 1996 p.13). If senior management recognises the different area of expertise that each individual possessed, then they would be in an ideal position to suggest both joint ventures between different members of staff, and also to support the existing ventures, co-operative partnerships and relationships that have already formed within school. This environment could encourage individuals who wish to work together in new ways and could result in these staff being able to exploit new media successfully. The NCET report (1996 p.13) suggests that senior management needed to

> ...see the library as a whole school issue, with a key contribution to make to the aims of the institution.

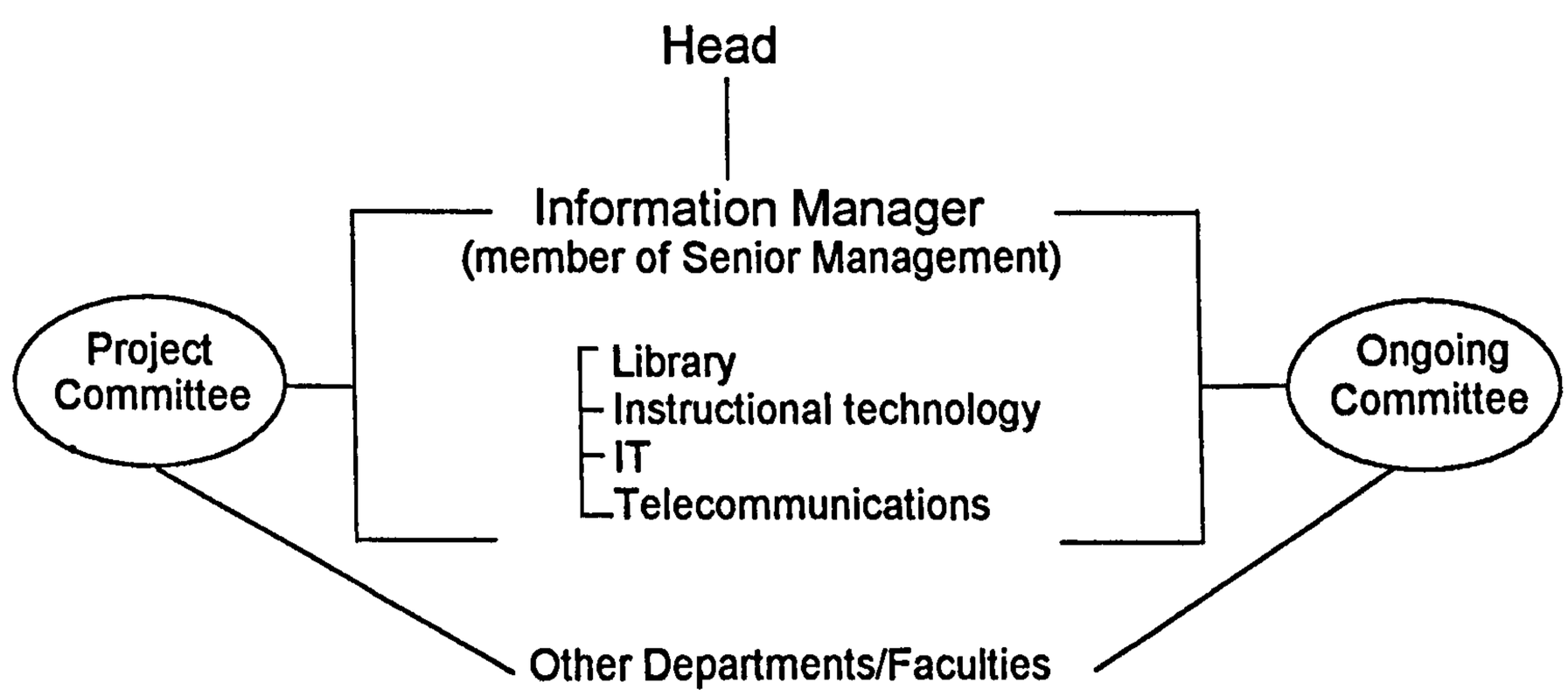
If the role and expertise of the librarian is recognised and supported, then there would be an opportunity to instigate real change on a whole-school level, in terms of the integration and utilisation of new technology by both teachers and pupils. To be successful this process of integration would need to be supported financially and the library would need a budget that enabled all aspects of resource provision, including hardware, software, and on-line charges to be funded (NCET, 1996 p.14). These costs would need to be supported at the whole-school level to reflect the commitment of the management. The school would also need to ensure that there was a mechanism in place that would ensure that the resources were maintained and regularly updated. In this way the library could plan its expenditure on electronic media. Whole-school support would enable developments to be undertaken and new initiatives adopted.

In his article Mathieson considers how a university should be organised to harness the full potential of IT. The research is pertinent to this study as although he focuses on the Higher Education sector, the principles and strategies discussed are relevant to a secondary school setting. Mathieson (1994) recommends that the institution's chief IT officer should report directly to the head of the university, as IT inhabits a central role within the organisation's structure. The role of this co-ordinator is to provide a long-term perspective of IT development. The equivalent post within schools is the IT co-ordinator. This person normally combines the IT role with that of teacher, and is

not usually a member of senior management. If the school views IT as an important factor, then it needs to be included in long-term strategic plans, with the IT co-ordinator providing a link between users. This means that the IT co-ordinator needs to communicate with both teaching and support staff, to ensure that all users are well-informed and therefore supportive of new initiatives. It is important that the co-ordinator does not operate autocratically as this management style prohibits discussion.

To guarantee that co-ordination across the institution occurs, Mathieson (1994) recommends an integrated IT management approach. This approach suggests that a school's IT manager should also be a member of the senior management. The original organisational chart presented by Mathieson for Higher Education can therefore be modified to produce a structure which is relevant for schools (fig. 6).

(fig. 6) Schools' organisational chart based on Mathieson's model for a university (Mathieson, 1994 p.176)



The chart shows how the manager can co-ordinate IT across the institution through the use of committees. Replicated in a secondary school environment, these groups would include representatives from the entire school community. The IT group could also offer practical help and support to teachers as it would contain skilled individuals. This type of structure could encourage, as Mathieson suggests, the establishment of self help groups and the creation of in-house courses, both of which place a firm emphasis upon user development. Within schools this could lead to the organisation of

an IT INSET day, after school support and/or the purchase of instructional materials which staff could use in school or at home. This type of approach could encourage more staff to become involved with IT and help to boost their IT skills.

Securing the involvement of key individuals within the institution will ensure that a wide range of personnel are given an opportunity to provide input into the decision-making process. This involvement needs to be "real" and not simply symbolic if it is to be successful. (Mathieson, 1994). The skills and knowledge of these personnel can aid the effective management of IT within the institution. Each establishment would need to provide a forum where interested staff could meet and discuss IT. In this way the enthusiasm and skills of these staff could be harnessed. This would require the formation of an IT steering committee. This group could examine the existing provision of IT and how it has been integrated into the classroom. This forum could also allow the librarian to raise the issue of information handling.

4.8 The importance of the library to teaching standards

The Follet Report, which assessed information provision within Higher Education, stated that the library service was one of the most important factors in terms of teacher support (Follet, 1997). The report is valuable as it concludes that library facilities are a key factor that enable the provision of quality teaching. The same could also be said to be true for school libraries. The Report highlighted the importance of effective communication between teachers and librarians, and stressed that teaching staff have an obligation to inform librarians of their own and their students' needs. If the library does not know which resources to promote, or the type of support needed by students, then it will be unable to provide an effective service. There is a need for systematic planning and the report recommends that

> The library as a resource base for independent learning should be a partner in course delivery, and it's management co-ordinated with the general planning of teaching and learning within the institution.

This suggests that the librarian should be an active member of academic course planing and delivery, as this would result in the availability of both effective materials and

support for staff and students. This would also provide librarians with a forum to discuss any pertinent issues with teaching staff. This recommendation could be implemented in a secondary school environment by ensuring that the librarian is included in curriculum discussions and that there is a mechanism that provides the library with current course information and plans.

The Follet Report (1997) places a high priority on the following recommendation and suggests that quality control assessments should

> ...take systematic and explicit account of the quality of library and related services in the assessments of teaching quality.

This recommendation clearly shows that there is a strong belief that the services and facilities offered by the library can affect the quality of the teaching within the institution. This is an important statement as it shows that the library needs to be assessed in relation to teaching. This recommendation needs to be adopted by secondary schools as library provision can vary enormously between institutions. The significance of the library and the role it plays in supporting and helping students to succeed academically, needs to be recognised nationally. School libraries need to be funded and developed if they are to realise their full potential. This is especially important in relation to the management of computers and new technology.

4.9 Promoting library services

Promotional activity is a vital factor for raising the awareness of students. In schools the librarian would probably concentrate on promoting individual discs, as the majority of pupils are more than happy to use the computer, as opposed to books, and in fact some are more inclined to use CD-ROMs. In this respect the librarians need to concentrate on how the discs are used as opposed to ensuring that they are used.

Flatten (1999) suggests that the librarian's skills in Web mediation and other services need to be promoted in order to provide a distinction between the library and the computing department. For the school librarian this could mean promoting access to the Internet and emphasising the role of the library as an information centre. The

library needs to undergo a cultural change to reflect the availability of web services (Flatten, 1999). Providing signage to reflect the integration of the Internet into the library was noted by Flatten as being an important step. A new service also needs to be promoted by the institution in a high profile manner. In order to stimulate usage of new technology, service procedures and staff training need to be developed in tandem. Library staff who have received the relevant training, will then be able to assist users if they encounter any problems.

4.10 Librarianship, technology and change

What effect will information technology have on the role of the librarian? One change is that the librarian will need to focus on the learning requirements of the users, as opposed to the management of a local stock of physical resources (Drake, 1996). The library will have to become more "customer" orientated and provide an environment that encourages lifelong learning by actively supporting, "learning, teaching, research and personal growth." (Drake, 1996). Services will need to be tailored towards the learning needs of the individual. One service that the librarian could offer would be the recommendation of web sites. This would involve the librarian using his/her professional judgement to assess individual sites for the customer. Drake (1996) suggests that developments in technology will result in the decreasing need for users to physically visit a library. The need to supply a large physical collection will be superseded as libraries will concentrate on fulfilling the information requirements of each customer on an individual basis.

The integration of new technology into the library will mean that certain aspects of the librarian's job will need to change. For the individual librarian this could mean that he/she will need to target a specific subject and concentrate on increasing his/her knowledge of networked information in that area. This could result in an information service that has a group of on-line specialists who are able to support the needs of a wide range of users (Drake, 1996). In addition to providing web mediation services, librarians will need to become more knowledgeable in the area of electronic copyright as journals, multimedia sources and databases become increasingly web-based. Drake (1996) also suggests that cataloguers will need to develop new skills to include the

description of intellectual content or "meta data" that will aid users in their retrieval of information. This represents a shift away from the cataloguing of physical objects.

Drake (1996) states that, in essence, the library service needs

> ...a new breed of librarian who understands and integrates technology, information and learning into one model.

This indicates that it is not only teachers who need to change, but that librarians also need to reassess their provision of services in order to ensure that they can meet the needs of the lifelong learner. This requires not only a sound IT infrastructure, but also the provision of relevant services and customer care. Librarians, like teachers, need to embrace new technology and integrate it into their existing models of teaching, learning and service provision.

The Follet Report raised the need for libraries to provide suitable accommodation, that allowed students to work singly or with others, and that also enabled them to house the growing range of non-print materials. The report notes that this may mean that the library will need to redefine the available space (Follet, 1997). This is an interesting point that is also relevant to secondary school libraries. As pupils are being encouraged to become independent learners, the demand for access to non-print material will increase. The library will need to respond by providing a suitable environment that supports technology-based collaborative learning. The library also needs to ensure that those students who require a quieter environment can be accommodated. However, implementing major changes could prove to be challenging for a library which has both limited space and funding.

Young asserts that the pervasive influence of technology and computers is creating a cultural change within society (Young, 1999). Technology has a profound influence on the way that information is perceived and used. Currently there is a move away from linear information that is based within a firmly structured hierarchy, to a more "fluid" concept of information that is ordered by the user and has no "correct" navigable path. Young (1999 p.114) states that

> We seem to be hurtling towards a postmodernism characterised by this decentered, fragmented, fluid, opaque, and non-linear cultural context.

This cultural change is being experienced by librarians as they adopt and integrate electronic media. The firm rules and guidelines that have characterised the modern age are now being superseded by a new set of values, some of which are noted below: (Turkle in Young, 1996 p.114)

Modern	Post-modern
linear	interactive
printed text	multimedia
unique identity	relationships
concern for history and preservation	hypertext
national	global

This list clearly shows the changes which are taking place in a society that is gaining greater access to digital technologies and related services. Printed texts are being superseded by multimedia information. The linear approach is giving way to the interactive as increasingly the user is able to create his/her own unique pathway and therefore determine the relationship between each piece of information.

This change to a more fluid information environment means that resources and activity cannot be controlled by the librarian in the same way that physical collections can be managed. Young (1996 p.115) suggests that a new approach is required and some of the trends in the post-modern library are listed below:

From:	**To:**
fixed, permanent, formatted text collections	fluid and transient multimedia resources
locally owned permanent collections	holistic, integrated networked systems
centralised collections and services	distributed, decentralised global access

These shifts note a move away from the traditional structure of the library, to a service which provides on-line mediation for the individual customer. In this way the traditional library structure will need to evolve. Young (1999) asserts that this change is imperative if librarians are to embrace the electronic age. This means that new solutions must be found to solve problems such as the format of cataloguing records,

citations, space allocation, copyright and investment created by electronic information. New standards need to be devised that incorporate the demands of this form of information.

The school librarian faces the same problems. However, most of the school library management software allows the incorporation of on-line references into the existing catalogue format. Librarians can also use technology to support whole-class projects by providing teachers with useful web sites and on-line addresses, in addition to supplying traditional print resources. Other issues, such as space allocation, copyright and investment, are more formidable. Librarians who face restrictions on space and IT funding, may find it impossible to implement these changes.

An important change highlighted by Lanham (in Young, 1996 p.118) is that librarians must seek to

> ...consciously construct human attention structures rather than assemble a collection of books according to commonly accepted rules.

This concern mirrors the findings detailed earlier by Flatten (1999) who stressed the importance of developing staff training in tandem with the marketing of new electronic services. These "attention structures" need to ensure three things: that users realise that new services exist, that they understand how these facilities can be accessed, and that they are able to access the support provided. To support users of digital information librarians will need to function as "knowledge navigators" or "cyberspace organisers" (Young, 1996 p.124).

Librarians of this post-modern age also need to add value to the information required, by providing users with consultation and interpretation services (Young, 1996). This could take the form of Internet resource evaluation, for example.

Craver's work is relevant to this study as she provides a practitioner's perspective on the problems and challenges that face school librarians. She highlights the pressures that school libraries face in terms of user demand (Craver, 1994 p.149)

> School library media specialists (SLMS) must organise and manage their media centres to meet the changing social and information needs of their users.

Craver suggests that use of the library will increase during non-lesson times, as well as before and after school. This raises the issue of access to library facilities and staffing arrangements. The issue of supervision will need to be decided if the library is to extend its opening hours. The role of the library during this extended time would also need to be considered, in terms of whether its function was to support homework and resource based learning for pupils, or whether it was to satisfy their recreational needs.

Another dilemma which librarians will face is that of "access" to resources, in contrast to "holdings". With the increase in computerised and on-line materials, and the facility to access other libraries' catalogues, the librarian will be faced with making decisions concerning the format of information. The librarian will have to decide whether to purchase either a hard copy or on-line access. As the number of information sources that are suitable for pupils increases, it is probable that user-demand will also increase. As catalogues from other libraries become more accessible, school libraries will need to consider the logistics and financial implications of inter-library loans, if student demand is to be satisfied.

Finally, the librarian will need to integrate a different range of formats and references into cataloguing systems. The changing nature of information will need to be synthesised by librarians, who will then have to decide upon the services they need to supply to support the user. Libraries will need to provide a service which enables users to locate all the information that is relevant to their enquiry, in whatever format it may exist.

To meet these challenges librarians will need to adapt and respond to the professional changes that will result from the integration of new technology. At the same time, established skills and knowledge cannot be readily discarded. A problem facing librarians is the continuing need to provide physical book resources whilst also adapting to an electronic library environment (Craver, 1994). This integration of electronic media will require the librarian to be resourceful (Craver, 1994 p.132):

> Organising and managing the collection will be a demanding part of SLMS professional activities in the future. The impact of new technologies..is going to redefine the nature and composition of a collection and alter its direction.

As has already been noted, the integration of new technology will result in a change in the composition of the traditional collection away from physical resources. The way in which the collection is organised and managed will also change. Consequently the services provided will also evolve. The librarian will therefore need to be proactive and embrace change to ensure that in the age of electronic information, the role of the information specialist does not become obsolete.

This Chapter has shown that there are many management issues relating to the introduction of IT into schools. The provision of training and the time for both learners and staff to undertake this training are crucial factors. The availability of quality products to support the teacher in the delivery of the curriculum is also a pertinent issue. How these resources are integrated into the classroom and the library have implications for teachers and library managers. The discussion has revealed that both organisations and individuals will need to embrace change if multimedia technology is to be successfully and effectively integrated into education processes.

4.11 Conclusion

This literature review has analysed a range of relevant studies and articles to provide background information on three key areas. These Chapters have focused on the technology available to schools, teaching methods and IT, and the effect that the introduction of multimedia technology has had on library practices.

Analysis of the literature has revealed that in order to realise the full potential of multimedia and new technology, changes in both teaching and library management practises will need to take place. The studies that have been examined have focused on the effect that multimedia technology has had on the learning experience and how it can be used to stimulate and motivate the learner. Research has also identified that a student-centred or active learning approach to teaching can enable the teacher to

exploit the benefits that multimedia technology has to offer. Most importantly the review has identified that a gap in the literature exists in relation to the management of multimedia technology in secondary schools from the librarian's perspective. Very few of the studies identified included opinions or experiences of a secondary school librarian and the majority of studies concentrated on either the learning outcomes of the students or the impact that IT and multimedia has had in Further and Higher Education libraries. The literature has also revealed some key issues in relation to the exploitation of multimedia technology. These include the quality of multimedia products, user training and information skills. All of these issues will be explored in this study.

The studies examined in the literature review provide some useful examples of the methodological approaches that have been used to assess the effect that multimedia technology has had on teaching and learning. These studies have informed the researcher and enabled the formulation of a valid methodological approach for this piece of research. The following Chapter provides a description of the research tools used for this study and includes a rationale for their selection.

5. Methodology

Rationale

In choosing a set of research tools it is useful to reflect upon the methods used by other researchers. The literature surveyed in Chapters 2-4 has revealed that a mixture of research tools are often employed and that many studies use a combination of, for example, interviews, questionnaires and observations, in order to gather both quantitative and qualitative data. An advantage of this approach is that the consistency of the findings generated by each method can be checked. It is for these reasons that the researcher chose to use a combination of research tools for this study.

The methodology was also influenced by the geographical nature of the study and the use of a survey questionnaire was employed as it was considered to be the most effective and efficient research tool for collecting data from three different counties. This enabled the researcher to contact a total of 217 schools. It was important to conduct a survey of the neighbouring counties to ensure that the findings generated by different data sources within the same method were consistent.

Three methods of data collection were chosen to ensure that a reliable view of the situation was acquired. A questionnaire was constructed to enable the collection of quantitative and some qualitative data that could be used for statistical analysis. This format enabled the researcher to collect information on a wide variety of topics concerning CD-ROM and Internet management within the school library environment. In order to qualify and increase the reliability of the responses gathered from the questionnaire, qualitative data was collected through the use of Focus Groups and Interviews. These approaches enabled the researcher to seek more in-depth responses from the respondents in relation to the management of multimedia technologies within the school library environment. These methods also fulfilled the desire of the researcher to understand the experiences and attitudes of school librarians in relation to this area of study. The responses to a range of questions relating to both internal and external factors that affect the management of multimedia technology were

gathered using a questionnaire. The discussions in the Focus Groups and Interviews focused on wider issues and broadened the scope of the investigation. The Focus Groups allowed a cross-section of the respondents to meet and discuss various issues concerning the management of multimedia technology. This format also provided the participants with a forum that allowed them to interact with one another and relate their own personal experiences to their peers.

Questionnaire construction

Guidelines on questionnaire construction and layout were followed (Rothwell, 1993 and Hunt, 1995) to ensure that a user friendly document was created. The initial questionnaire was long and contained questions that focused on CD-ROMs and then progressed on to the Internet. Each set of responses were coded to enable later analysis. This questionnaire was piloted on a sample of librarians outside the geographical area that was covered by this research. It was then refined and redesigned in the light of the responses received. The overall length was reduced and set out in two parts. Part one focused on the use of CD-ROMs and the second part concentrated on the Internet. This resulted in the time needed to complete the questionnaire being reduced, as librarians who did not yet have an Internet link could disregard the second part. The questions using a semantic differential scale were reduced to five points, from the original seven, as the difference between each scale point was deemed as being too small to provide useful results. The number of questions on the completed questionnaire totalled 115, with 66 relating to CD-ROMs and 49 focusing on the Internet.

Open ended questions were limited to two. This ensured that the time needed for the completion of the questionnaire by the respondent, and the subsequent analysis by the researcher, was kept to a minimum. The interview process enabled further discussion on aspects of resource management. Questions which required ranking to show preferences were not used as Rothwell (1993) showed it to be an inefficient and inconvenient method for the respondent; and complex for the researcher to analyse the results. Some dichotomous questions, for example question 36 which asks "Do you

have a booking system for CD-ROMs in lesson times?" were included where appropriate.

Two forms of scaled answers were used. The Likert Scale is a useful method as it reveals the respondent's attitude on a subject. The respondents are presented with named points on a line. They then select the point that corresponds to their view on the subject in question. The Semantic differential uses a numbered scale which is marked at each end. This type of question was included as it is easy for the respondent to understand (Rothwell, 1999). The scale can be marked by a single word or phrase and the number of points on the scale can vary between five and ten. Five points were used for this type of question in the questionnaire. The questions using the Likert scale do not have mid points whereas those using the Semantic differential do include a mid point. This balance is needed in order to prevent respondents from always being forced to express a point of view. This situation is undesirable as it can cause feelings of resentment to occur and the respondent may then provide inaccurate answers (Rothwell, 1993).

Questionnaires were sent to school librarians in Nottinghamshire in March 1997. From a total of 75 institutions the response rate was 60%. Further questionnaires were sent out to Lincolnshire and Derbyshire in September 1997. From a total of 71 secondary schools in each county the response rate was 49% from Lincolnshire and 38% from Derbyshire. Schools to which questionnaires were sent were identified using published league tables as a source. Non-responding schools were not further contacted as the survey was designed to be anonymous.

Analysis

The arrangement of questions into thematic topics on the questionnaire provided the framework for data analysis. The data for individual questions was examined and indicated that some reponses were more favoured than others. This raised the question: are the results reflective of a general trend in the population of librarians, or just the result of random sampling? To answer this question the data was subjected to

the Chi-squared test. This form of significance testing provides the researcher with a tool for estimating the precision of the data gathered. Lindsey (1999 p.158) states that

> Statistical significance is a measure of the reliability of an observed relationship.

This type of test works on the assumption that the population sampled can be approximated by a normal distribution. A null hypothesis, whereby each of the possible responses to a given question is equally likely to be chosen, is formed. Reichmann (1970 p.225) explains that a null hypothesis

> ...postulates that..between two samples, there is no really significant difference and that such difference that does occur is attributable only to random sampling errors.

Under this hypothesis the expected frequencies of each category can be calculated to be the average frequency of the observed data. The Chi-squared value is then calculated and compared with tables of the Chi-squared distribution to check its significance. The significance value is expressed as a percentage and appears on each table of results in Chapters 6-9 and in this study a percentage level of 5% or below is considered to be significant. A significant value leads to the rejection of the null hypothesis and the acceptance of the alternative, that trends in the data are significantly different to the expected results. The percentage values used have been calculated using actual responses to a question including those librarians who did not answer. Some tables have been included that show a significance level of greater than 5%. This means that although the results in themselves are not statistically significant, the distribution of answers is sufficiently interesting to warrant further examination or comment.

When the results from the Nottinghamshire and *"Other"* data were compared, the same type of significance test was used. The techniques of contingency tables for nominal data and Kolmogorov-Smirnov for ordinal data were employed to reveal

whether statistically the samples were the same or different. If the results were not significant then it can be concluded that similarities do exist between the data sets.

For the purpose of analysis the points on the semantic differential scale have been described by the following terms; 1 - always or strongly agree, 2- often or agree, 3-sometimes or neither agree nor disagree, 3, seldom or disagree and 4 never or strongly disagree.

Correlation

In many cases it is important to establish whether the answers to one question are related to those of another. To perform a valid correlation between questions, a method in keeping with the type of data collected must be used. This study compares questions where the responses have been captured in an ordered set of categories. However, these categories do not have a definite numerical value associated with them, other than the ordinal numbers "1st, 2nd, 3rd, 4th or 5th". This type of data is ordinal and so may not be tested using Pearson's product moment correlation coefficient on the actual response values themselves, since such a measure would only have meaning for interval data. The ranks for each question to be tested must first be correlated, and then the correlation performed using these ranks.

Typically for ordinal data, Spearman's rank correlation coefficient would be applied. However because of the high proportion of tied ranks in the data this is not possible. Tied ranks have occurred because the number of possible responses to a given question is limited to 2, 4 or 5 categories. To overcome this problem Pearson's coefficient can be applied to the ranked data. The resulting number has been shown to be the equivalent to the true value of the Spearman statistic (Rees, 1995). The significance of the correlation is then checked using tables for the Spearman correlation coefficient. The significance of the correlations is based on a one-tailed test because the expected links are of a positive nature. For this study the critical regions greater than 10% are rejected because the possibility of a type I error is unacceptable. A type I error is made if the null hypothesis is rejected when it is actually true.

Interviews and Focus Groups

The librarians who had indicated on their questionnaire returns that they were willing to participate in follow-up research were invited to attend Focus Group meetings. Those individuals who were unable to attend the Focus Groups were interviewed individually. As the majority of these librarians worked term-time only it was more convenient for them to be interviewed at their school during the Summer term 1997. The interview questions were based on discovering the librarians' own experiences, but also required them to reflect upon the outside influences that could affect their role within school. Some of the subjects covered in the questionnaire were discussed in greater depth. All the individual interviews, apart from one, were carried out in the interviewee's respective libraries and lasted approximately 60 minutes.

Focus Groups were undertaken during the Summer holidays in 1997. This provided the researcher with data that would not only compliment, but could also be used to compare with, the responses gained from the individual interviews. Obtaining a balanced view of the subject discussion was considered to be vital. Kreugar (1994 p.11) states that "..people do influence each other with their comments." and that discussions can result in the individual changing their opinion. According to Stewart and Shamdasani (1990 p.15), Focus Groups are useful for

> 1. Stimulating new ideas and creative concepts.
> 2. Generating impressions of products, programs, services, institutions, or other objects of interest.
> 3. Learning how respondents talk about the phenomenon of interest which may facilitate quantitative research tools.

Another advantage of this method is that it uses a socially oriented procedure in a natural environment, where the inhibitions of the participants are often relaxed and Kruegar (1994 p.6) states that

> ...a focus group is a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive non-threatening environment.

As the information is not collected in a vacuum, it is less likely to embody the preconceived ideas of the interviewer. This should provide results which have a high

face validity. This method also provides the researcher with the flexibility to explore unanticipated issues (Kreugar, 1994 p.34).

The Focus Groups consisted of those librarians who had indicated on their returned questionnaire that they would be willing to participate in follow up discussions. Conducting Focus Groups enabled the majority of the respondents to take part in this section of the research. The Groups were assembled by location and five Groups met in different school libraries around the county. The number of participants ranged from two to eight. Groups consisted of small numbers to give the participants an opportunity to discuss the issues. The possibility that this could lead to fewer ideas being generated, as noted by Kreugar (1994), was taken into consideration. However, due to the compact nature of the groups, the discussions were uninhibited and often lively. This relaxed atmosphere encouraged all the Group members to participate in the debates. The discussions lasted for approximately 60-90 minutes each. The researcher acted as the moderator/interviewer for all of the discussions and each session was recorded. Each group member was given a sheet with the list of the areas to be discussed. The same question outline was used for the Focus Group interviews as for the individual interviews. The list of discussion areas and the actual questions asked during the Focus Groups and Interviews are detailed in Appendix C.

The librarians in the Groups all knew each other and this enabled conversation and discussions to begin freely. Each member of the Group was willing to share ideas and offer his/her own perspective and this enabled animated and constructive discussions to take place. Kreugar (1994) suggests that groups including people who regularly interact could cause problems of inhibited disclosure or include responses based upon past experiences, however this was not evident from the discussions undertaken in this study. The topics for discussion often required the librarians to recount their experiences with new technology and the effect it has had upon resource management.

The method used for analysis of the Focus Group and interview data has been based on an adaptation of the Constant Comparative Method (Glaser & Strauss, 1967) and naturalistic inquiry (Lincoln & Guba, 1985) as suggested in Vaughn et al (1996). The transcripts of each discussion group have been reduced to data units that have then

been catergorised and coded under different themes. These themes have been created by the researcher.

Strengths and weaknesses of the research process

Every methodology has its strengths and weaknesses. The strengths and weaknesses of the methodology employed to undertake this study are detailed below.

Weaknesses

The results from the completed questionnaire revealed some weaknesses in the design of the survey. The original coding applied to some of the questions was found to be unsuitable and questions 1-5 and 8-10, for example, had to be analysed by using a dichotomous scale. This type of error was due to the inexperience of the researcher and did not affect the validity of the results.

Only two response options were provided for questions 112-115 and this proved to be inadequate as only 50% of the respondents in Nottinghamshire answered these questions clearly. On reflection this situation could have been avoided had a greater range of response options been provided.

One weakness that could be attributed to the interview as a research method is the possibility of researcher bias. However using both Interviews and Focus Groups enabled the researcher to check the consistency of the data gathered for this study.

The selection of three counties in the same geographical region means that any conclusions drawn from this study are only applicable to this area. However, Nottinghamshire, Derbyshire and Lincolnshire are reasonably typical of shire counties in terms of general character and school provision. To validate further the results of this research the study would need to be repeated in other areas of the country.

Strengths

The decision to undertake the use of both Focus Groups and Interviews resulted in all the respondents who had indicated on their questionnaire that they wanted to participate further, being included in the study.

The sample population of school librarians in the Nottinghamshire area responded well to, and were supportive of, the Interview and Focus Group approach.

The research tools used to conduct this study were both complementary and supplementary in that the data collected by one research tool served to re-enforce and validate the results obtained by the other methods. This enabled the researcher to draw some convincing conclusions.

Overall, the researcher felt that the research experience was successful. The combination of research tools enabled the reduction of possible errors and bias in the collection of data, and furnished the researcher with reliable and valid results. The researcher was also fortunate in that the librarians who participated in the study were both enthusiastic and forthright in their approach.

6. Data analysis: Nottinghamshire

Significant data has been gathered from Nottinghamshire librarians. The attitudes of individual practitioners in relation to CD-ROMs have been analysed and the results reveal that trends in school library management practices exist within the county. Both the results and the analysis of the data are presented in this Chapter. All answers have been tested for significance using the Chi-squared test (Chi^2). The significance level of the distribution of answers for any one question is included on each table and questions that have a Chi-squared value of 0.5% are considered to be particularly significant. Correlations have been performed using the Spearman's rank correlation coefficient. For some questions a table of results is included and shows the actual number of respondents who replied to each option and the percentage equivalent. "9" has been used to represent non-respondents. The Chi-squared value provides a means of identifying those questions whose distribution of results are both interesting and unexpected and therefore require further explanation.

The number of CD-ROMs in the library varied considerably between individual establishments and ranged between one and 70 discs. Only one library did not have any CD-ROMs. In terms of the whole-school collection, 13 librarians did not know the number of resources held. This could mean either that there is a high number of discs in the school or, that subject teachers buy software to use solely within the department. The total number of CD-ROMs within schools varied considerably. The lowest number was four. Another school reported that they had more than 80 discs. These results highlight that differences exist between individual schools in relation to CD-ROM provision. This could be attributable to financial constraints or spending priorities within schools. Although CD-ROM technology has been available for many years some schools are only on the verge of providing this resource to pupils. Similar results were also identified more recently by Wishart (1999). She found that the number of CD-ROMs held by the schools in her sample ranged between 2 and 16. It can be concluded that inequalities in the provision of resources still exist between individual schools.

6.1 Resource management

How information about CD-ROM holdings is displayed was the focus of questions 1-4 (Table 1). To provide meaningful results questions 1-4 were analysed using a dichotomous scale. It was decided that if librarians ticked the teacher's column then this would also include the pupils column. Instead of analysing these questions as a series, each question was tested separately using Chi-squared on a yes/no basis. Slightly more than half of the respondents (58%) have a list on display in the library. This result is not in itself significant and suggests that deciding to display a list of CD-ROMs in the library is dependant upon the individual librarian. 26% of respondents have a list on display in the staff room (question 2) and only 12% have a list on another notice board (question 3).

Table 1: How do the following groups of people know which CD-ROMs are available?

Qu no.	Yes	No	Total	Yes %	No %	Total %	Chi^2
1) List on display in library	25	18	43	58.1	41.8	100	28%
2) List on display in staff room	11	32	43	25.6	74.4	100	0.5%
3) List on a notice board	5	38	43	11.6	88.4	100	0.5%
4) Ask librarian	15	28	43	34.9	65.1	100	5%

The answers reflect that using lists as a means of raising awareness is not favoured by librarians. 35% of respondents indicated that teachers and pupils had to ask the librarian for information on CD-ROM holdings. This raises the question, how do users know which CD-ROMs are available? Do pupils rely on teachers to recommend resources during lessons? Question 26 (page 124) asked whether CD-ROMs were specified by teachers. The results revealed that just under a third (32.6%) do not react in a consistent manner. This could indicate that teachers are not aware of current stock holdings. Producing publicity materials about CD-ROMs could help to raise the awareness of both teachers and pupils. Promotion of resources could also be achieved through the display of new or specific items of interest.

Librarians may decide against producing separate lists of holdings if the icons of installed discs are displayed on the desktop of the computers that are available for pupils. However, one problem of relying on this method is that the user needs to be in

the library in order to view the icons. This means that non-users would be unaware of the library stock if additional promotion did not occur.

The respondents were asked whether they provided written instructions for use of individual disks (Table 2). The majority of answers were split between point 3 (some) and point 4 (none). This result was unexpected and shows that the majority of librarians do not think that CD-ROMs require formal instructions (Table 2).

Table 2: Do you provide written instructions for individual CD-ROMs?

Qu 6	1) All	2) Most	3) Some	4) None	9) No Answer	Total	Chi^2
no.	2	5	16	19	1	43	
%	4.7	11.6	37.2	44.2	2.3	100	0.5%

This could indicate that the CD-ROMs held have been well designed and that, therefore, librarians consider additional instructions to be unnecessary. This conclusion is supported by the results from question 29 (page 126) which reveal that librarians believe that pupils find CD-ROMs easy to use.

Those librarians who did provide instructions were asked whether this information was available next to the computers (Table 3). The results were distributed in an interesting pattern. Over a quarter chose point one (all) and a fifth chose point 4 (none). It can be concluded that these librarians either have the instructions for all their CD-ROMs on display or none of them.

Table 3: Are instructions readily available?

Qu 7	1) All	2) Most	3) Some	4) None	9) No Answer	Total	Chi^2
no.	12	1	4	9	17	43	
%	27.9	2.3	9.3	21	39.5	100	1%

If the instructions are not on display this indicates that users need to ask the librarian for them. This, in turn, suggests that these librarians believe that not all users will require additional instructions.

6.2 Promotion

This section of the questionnaire aimed to determine how much time librarians and teachers take to familiarise themselves with new CD-ROMs. Questions 8-11 were analysed separately for teachers and librarians (Table 4).

Table 4: How much time do librarians/teachers take to familiarise themselves with new CD-ROMs?

Librarians

Qu no.	8) <30 mins	9) Up to an hour	10) 1-2 hours	11) >3 hours	No Answer	Total	Chi²
no.	15	14	9	1	4	43	
Total	34.9	32.6	20.9	2.3	9.3	100	0.5%

Teachers

Qu no.	8) <30 mins	9) Up to an hour	10) 1-2 hours	11) >3 hours	No Answer	Total	Chi²
no.	24	8	3	0	8	43	
Total	55.8	18.6	7	0	18.6	100	0.5%

The table shows that just over a third of the librarians will spend up to half an hour learning about a new disc and a further 32.6% will spend up to an hour. It is interesting to note that a fifth of librarians are willing to take between 1-2 hours to learn about a new disc. This reflects the importance that these librarians place on knowing their resources. This length of time is different for teachers. Over half of the librarians perceived that teachers generally spend up to half an hour on new materials. This result could reflect the fact that teachers lack the time to look at new resources. This suggests that librarians and teachers have different attitudes towards familiarising themselves with new resources. This result was not unexpected as the librarian needs to place a high priority on becoming familiar with new discs in order to be able to promote them to teaching staff.

The fact that librarians spend a relatively short time familiarising themselves with CD-ROMs indicates, either that they find new CD-ROMs relatively easy to learn or, that they can only spare a limited amount for this activity. The first theory is supported by the results from question 28 (page 125) which reveals that librarians believe that they successfully integrate CD-ROMs when undertaking enquiry work. This is a reassuring result as it suggests that librarians are confident in using and recommending CD-ROMs to pupils.

Questions 13-14 asked librarians whether pupils request to use specific CD-ROMs. The questions were split into different year groups to see whether a pattern existed for the various age groups. Table 5 shows the results for these three questions.

Table 5: Do pupils request to use specific discs?

Years 7-9

Qu 13	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	Chi^2
no.	9	25	3	0	6	43	
%	20.9	58.1	7	0	14	100	1%

Years 10-11

Qu 14	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	Chi^2
no.	15	16	8	0	4	43	
%	34.9	37.2	18.6	0	9.3	100	1%

Years 12-13

Qu 15	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	Chi^2
no.	12	15	3	0	13	43	
%	27.9	34.9	7	0	30.2	100	1%

It is reassuring to note that the proportion of pupils who always request discs is similar for all years, peaking at 34.9% for years 10-11. The fall in requests for years 12-13 could be due to the standard of the available resources. Pupils undertaking A-levels/GNVQs require a detailed level of information and the CD-ROMs held may be more suitable for pupils lower down the school. It is encouraging to note that librarians feel that all pupils will request to use specific disks, although the frequency of the requests are not included in these results.

6.3 Acquisition

There are many factors that influence librarians' purchasing decisions. A series of questions were designed to ascertain how librarians discover what new CD-ROMs are on the market. From the evidence it can be seen that librarians regard information from publishers as a significant source for finding out about new CD-ROMs. The results from question 16 (Table 6) show that 18.6% of respondents chose point 1 and 44.2% chose point 2, highlighting the fact that the majority of librarians "often" use publishers to gain information on new products. This interpretation is reinforced by the fact that no respondents chose either point 4 or 5.

Table 6: Do librarians use publishers' information to find out about CD-ROMs?

Qu 16	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi²
no.	8	19	12	0	0	4	43	
%	18.6	44.2	27.9	0	0	9.3	100	0.5 %

These results were expected and suggest that publishers produce information which is both pertinent and user friendly.

Large exhibitions such as the BETT (British Education Training and Technology) and LIS (Library Information Show) attract many information professionals. However, how many librarians regard these events as prime sources for finding out about new products? Is the exhibition format a useful source for providing this type of information? It appears from the results of question 17 that librarians sometimes use exhibitions as a source for finding out about new CD-ROMs. However, there is no indication of either a positive or negative preference (see table 7). Only one respondent indicated that he/she always uses exhibitions as a source of information. This suggests that although exhibitions are used by some librarians, the majority do not use them consistently.

Table 7: Do librarians use exhibitions?

Qu 17	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi²
no	1	9	15	5	5	8	43	
%	2.3	20.9	34.9	11.6	11.6	18.6	100	0.5%

This result was unexpected and could reflect the relatively infrequent nature of exhibitions and the librarians' inability to attend these events. The two large events mentioned above are both staged annually and in the first half of the year. The market for CD-ROMs is prolific and hence exhibitions can only cover those CD-ROMs available at that time. Producers also use these exhibitions as an opportunity to "launch" new products and often concentrate upon the promotion of these items as opposed to marketing older titles. The results show that librarians do not use exhibitions especially for finding out about new developments in CD-ROM publishing.

Do librarians use and value reviews about CD-ROMs? Table 8 shows that 48.8% of librarians chose point 2 for question 19. This suggests that nearly half of the

respondents "often" use reviews for finding out about new CD-ROM products. This indicates that librarians read literature to gain insight into individual discs. This is an interesting point which shows that librarians like to be able to assess a product and its usefulness through reading about others' experiences and evaluations of the resource. It would be useful therefore, for the Nottinghamshire Education Library Service (ELS) to adopt a reviewing process to support librarians, as they could produce independent and objective reviews of new materials. ELS is an organisation which exists to provide stock loaning services, support and advice to school librarians at a county level. To receive support schools have to buy into the service. Not every county has an ELS.

Table 8: Do librarians use reviews to find out about CD-ROMS?

Qu 18	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	5	21	14	1	0	2	43	
%	11.6	48.8	32.6	2.3	0	4.7	100	0.5%

The questionnaire also sought to discover whether, in relation to acquisition, librarians used other colleagues as a source of information. It might be expected that other librarians would be a good source for obtaining first hand opinions on new products. From the data, (Table 9) it can be seen that the majority of respondents use other professional librarians to find out about new CD-ROMs. However, the results also show us that this approach is not consistent with just under a quarter of respondents unlikely to use other professionals' advice at all.

Table 9: Do librarians use other professionals?

Qu 19	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	5	13	12	6	4	3	43	
%	11.6	31.2	27.9	14	9.3	7	100	10%

This trend of limited communication is supported by the results from question 23 which asks whether the librarian shares his/her evaluation with other professional librarians (Table 10). Although 30.2% of librarians do always share their evaluations, one would have expected this proportion to be higher, especially when the relative professional isolation of the librarian is considered.

Table 10: Do librarians share the evaluations of discs with other librarians?

Qu 23	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	13	9	8	3	5	5	43	
%	30.2	22.9	18.6	7	11.6	11.6	100	10%

It is disappointing to note that 7 librarians seldom or never share their evaluations with other library professionals. At a time when the number of CD-ROMs on the market is increasing at a fast pace, these respondents are failing to tap into a rich source of information concerning the actual performance of discs within schools. As library managers hold a key role in terms of purchasing new discs, it is vital that informed decisions are made.

The questionnaire also sought to discover whether librarians use the specialist members of the teaching staff as a means of discovering new CD-ROMs (see table 6). The evidence from the questionnaire reveals that the impetus for selecting new materials on CD-ROM does not usually stem from teaching staff. From the table it can be seen that just under a quarter of the respondents chose the mid point and 30.2% of respondents chose point 4. This indicates that these librarians seldom ask or use other members of staff for information on new CD-ROMs in any consistent manner. This was a suprising and unexpected result.

Table 11: Are other members of staff used to find out about CD-ROMs?

Qu 20	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	3	11	10	13	2	4	43	
%	7	25.6	23.3	30.2	4.7	9.3	100	5%

However, librarians do share their evaluations of new discs with teaching staff. The results of question 22 show that 65.1% of librarians always share their evaluations (Table 12). This highlights the fact that this activity has a high place on the librarians' agenda. It is also encouraging to note that all the librarians included in this study have conveyed their assessment of discs to staff at some point.

Table 12: Do librarians share evaluations with teaching staff?

Qu 22	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	28	7	5	0	0	3	43	
%	65.1	16.3	11.3	0	0	7	100	0.5%

Testing a CD-ROM before purchase enables a librarian to assess the resource in terms of relevance to the curriculum, the level and depth of information included and the design of the disc. The results from question 21 revealed that librarians prefer to see discs in action before they purchase (Table 13). 37.2% of the respondents "always" try to see discs prior to purchase and a further 30.2% state that they "often" try to see a CD-ROM in advance. This illustrates the importance of librarians being able to test out new materials to see for themselves as it enables them to decide whether a disc warrants inclusion into the existing collection. This implies that retailers who send out discs on approval or provide demonstrations are more likely to be used by librarians.

Table 13: Do librarians try to see discs in action before purchase?

Qu 21	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	16	13	6	4	1	3	43	
%	37.2	30.2	14	9.3	2.3	7	100	0.5%

Having discussed the factors that affect purchasing decisions it can be concluded that librarians view both publisher information and product reviews as very important sources of information for finding out about new CD-ROMs. However, the results also show that most librarians consult a variety of sources during this process. The importance placed upon outside professional advice depends upon the individual. It was not suprising to discover that within schools the majority of librarians are communicating and sharing their evaluations of CD-ROMs with teaching staff. Involving teachers is one way in which the process of raising awareness could be undertaken.

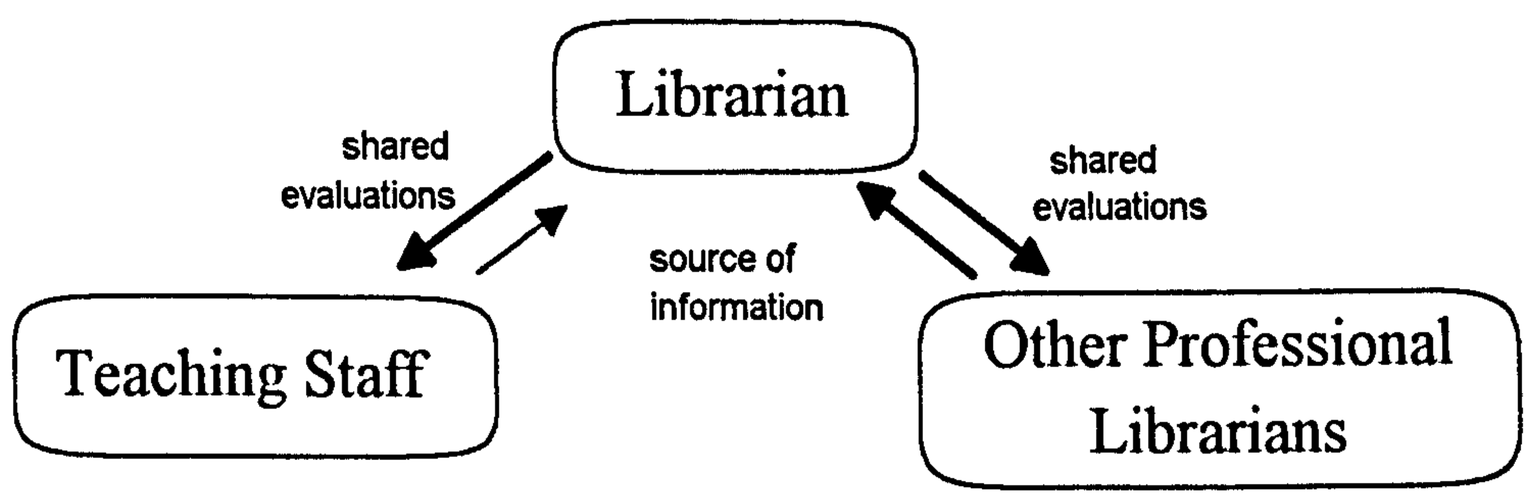
From the results it can be seen that those librarians who use teaching staff to find out about new CD-ROMs also use other librarians as a source of the same information. In the same way it can be deduced that those librarians who do not communicate with teaching staff are also not in communication with other librarians.

Evidence was found to support the theory that those respondents who use other professional librarians for finding out about new CD-ROMs also share their evaluations with those librarians. However, it was disappointing to discover that when the responses were correlated, there was no evidence to suggest that those librarians

who shared evaluations of discs with teachers also used teaching staff as a source of information for finding out about new CD-ROMs.

These correlations are particularly useful and enable the construction of a librarian's communication network in the area of acquisitions (fig. 7). The diagram shows that those librarians who use other professionals as a source of information, will also share their evaluations with the same group. It also shows that librarians often share their evaluation of discs with teaching staff but do not often use them as a source of information for finding out about new CD-ROMs. Clearly, the individual zeal of the librarian will dictate the frequency of communication between these groups.

(fig. 7) The librarian's communication network concerning CD-ROM aquisition and evaluation.



This information flow from the librarian to the teacher is advocated by Herring (1999 p.15) who states that raising teacher awareness in relation to the existence of useful CD-ROMs is part of the role of the librarian.

6.4 Copyright

The advent of relatively inexpensive printers and printing consumables has meant that printing out reams of information from the content of CD-ROMs is now possible. Questions 24 and 25 were concerned with how the librarian advised pupils in regard to observing copyright (Table 14). It was suprising to discover that only 7 of the respondents had a written notice about copyright. As this figure is low (16.3%), one would expect the librarian to provide verbal advice or warning to pupils. Question 25 (Table 15) asked librarians how often they reminded pupils about copyright when they printed out information. None of the respondents chose point 1 (always). This could

be due to lack of time, especially if frequency of use is high. However, 44.2% chose point 5 (never).

Table 14: Do you provide a written notice concerning copyright?

Qu 24	Yes	No	9 No Answer	Total	Chi^2
no.	7	34	2	43	
%	16.3	79	4.7	100	0.5%

Table 15: When pupils use CD-ROMs to print out, do you remind them about copyright?

Qu 25	1 (Every time)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	0	6	9	7	19	2	43	
%	0	14	20.9	16.3	44.2	4.6	100	0.5%

It can be concluded that librarians do not place a high priority on the issues surrounding the copyright of electronic information. If there are no guidelines available in the library then this could lead to pupils inadvertently copying large volumes of information without considering copyright issues. The improvements in information technology also mean that pupils are able to transfer information directly on to floppy disc. Once again this raises issues concerning copyright. If the librarian is not reminding pupils about copyright when they are printing out then there is a worry that these issues will be completely forgotten when information is downloaded on to floppy discs. Pupils could unwittingly be guilty of copyright infringements for which the school could be liable. The school, therefore, needs to ensure that they do not become liable if their pupils break the law. This contrasts with the situation regarding photocopying where copyright information is often available next to photocopiers.

6.5 Curriculum

How CD-ROMs are integrated into the curriculum is a key issue for both librarians and teachers. Data from question 26 (Table 16) shows that over a quarter of teachers often specify discs during lessons. Just under a third of librarians chose point 3. This indicates that a substantial number of teachers do not react consistently one way or the other and that they only sometimes plan topics or questions around the availability of the information on a CD-ROM.

Table 16: Is the use of CD-ROMs in lessons specified by teachers?

Qu 26	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	4	12	14	7	2	4	43	
%	9.3	27.9	32.6	16.3	4.7	9.3	100	1%

Analysis of the data shows that a link exists between the incidence of teachers specifying the use of discs in lesson time and requests of CD-ROMs by pupils in years 7 to 11. If a teacher specifies the use of a particular disc during lesson times then there is some evidence to suggest that pupils will then use this CD-ROM in the library. This link highlights the importance of the librarian sharing evaluations of discs with teaching staff, as discussed earlier. A well-informed teacher is more likely to use CD-ROMs in lessons.

In most schools the library houses the main CD-ROM collection. The survey sought to discover whether any subject-based bias existed in CD-ROM collections. The majority, 81.4% (35) of librarians answered "No" to question 27 (Table 17). It can be concluded, therefore, that the CD-ROM collections in Nottinghamshire schools do not favour individual subject areas. This result was unexpected and indicates that the librarians in the study have built up balanced collections that do not favour any particular subject area. This could be because there is no demand within school for specific subject collections.

Table 17: Is your CD-ROM collection geared towards any particular subject area?

Qu 27	1) Yes	2) No	9) No Answer	Total	Chi^2
no.	3	35	5	43	
%	7	81.4	11.6	100	0.5%

Although this is an encouraging result, it does not reflect either the number of products that are available for purchase or the attitude of individual subject staff. These factors also influence purchasing decisions. If there is no interest from staff in CD-ROMs, then the librarian may be less inclined to purchase new resources. Also if high quality CD-ROMs are not available the librarian will be unable to make any purchases. Issues relating to financial constraints and the purchasing power of the librarian will be discussed later in this Chapter.

The evidence supports the viewpoint that CD-ROMs are now an accepted information source in the school library and are used by the majority of librarians. Most of the respondents, 58.1%, chose point 1 or 2 for question 28 (Table 18) which was concerned with how librarians integrated the use of CD-ROMs during enquiry work. None of the respondents chose point 5 (never). This means that librarians feel confident in using CD-ROMs as a tool for answering enquries.

Table 18: Do you feel that you successfully integrate CD-ROMs when answering enquiries?

Qu 28	1 (Always)	2	3	4	5 (Never)	9	Total	Chi^2
no.	9	16	11	4	0	3	43	
%	20.9	37.2	25.6	9.3	0	7	100	0.5%

This result is encouraging as it highlights the fact that librarians believe that they are able to utilise electronic media alongside the more traditional resources held in the library. Correlating the responses to this question with those relating to the perceived ease of use of CD-ROMs, (question 29), demonstrated that librarians who believe that they successfully integrate the use of CD-ROMs when answering enquires also believe that CD-ROMs are easy to use. This means that it is important that adroit acquisition decisions are made. If this is a carefully considered process then the librarian is more likely to feel confident about integrating the use of CD-ROMs into the library when answering enquries.

The respondents were asked whether they thought that pupils found CD-ROMs easy to use (Table 19) and more attractive than books (Table 20). The results for question 29 were grouped towards the positive end of the scale, with 18.6% of respondents choosing point 1 and 39.5% choosing point 2. None of the librarians thought that CD-ROMs were "never" easy to use. This result is reassuring as it indicates that librarians believe that a high proportion of pupils find the CD-ROMs available in the library are easy to use. This would in turn indicate that most CD-ROMs in current use are relatively user-friendly for the majority of pupils.

The fact that librarians believe that CD-ROMs are easy to use reflects well upon both educational publishers and product designers. Moreover, it illustrates the importance of librarians evaluating a CD-ROM before purchase to ensure that it is easy to use.

Table 19: Do librarians think pupils find CD-ROMs easy to use?

Qu 29	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	8	17	13	2	0	3	43	
%	18.6	39.5	30.2	4.7	0	7	100	0.5%

The answers to question 30 were also very positive. A large majority of respondents thought CD-ROMs were more attractive than books, with just under a third of them stating that this was "always" the case. Neither point 4 nor 5 was selected. This could mean that it is the actual format of CD-ROMs which entices pupils to use them.

Table 20: Do librarians think that pupils find CD-ROMs more attractive than books?

Qu 30	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	14	18	9	0	0	2	43	
%	32.6	41.9	20.9	0	0	4.7	100	0.5%

The results support the theory that pupils believe that using multimedia makes learning more exciting. The fact that librarians have observed that pupils find CD-ROMs more attractive than print material confirms that it is the medium that motivates pupils to use this resource. This result was not unexpected.

The next question sought to reveal whether librarians believed that the format used for searching on CD-ROMs was sufficiently straightforward so as not to require any formal planning of searches. The results show that most librarians believe that CD-ROMs are intuitive and do not require formal or written search strategies, with 44.2% of respondents choosing point 1 or point 2 for question 31 (see table 21). The range of products used by librarians are available to both the home and education market and include encyclopaedias, such as *Encarta* or *Hutchinsons* and subject specific discs, including *The human body* and *Aspects of religion.*

Table 21: Do librarians think that CD-ROMs are intuitive?

Qu 31	1 Strongly agree	2	3	4	5 Strongly disagree	9 No Answer	Total	Chi^2
no.	5	14	12	8	0	4	43	
%	11.6	32.6	27.9	18.6	0	9.3	100	0.5%

The view that CD-ROMs are intuitive is supported by the results of the next question (Table 22). 93% of librarians do not have pupils undertaking formal search sheets. Only 2 respondents use any formal preparation. These results are not surprising as the

librarians have already indicated (question 29) that they believe that CD-ROMs are easy to use.

Table 22: Do pupils undertake formal search preparation for use on CD-ROMs?

Qu 32	1) Yes	2) No	9) No Answer	Total	Chi^2
no.	2	40	1	43	
%	4.7	93	2.3	100	0.5%

However, completion of search sheets by pupils could help them to focus on the information which they need to find. In practice this is not the strategy chosen by librarians. One explanation could be the fact that pupils are often given a limited amount of time within which to complete research. Filling in search sheets could therefore be viewed as an impractical task. However, this problem could be overcome if the system was supported by teaching staff. Teachers could ensure that pupils filled out a form before undertaking research in the library. Unfortunately, one drawback is that this system creates a large volume of work for the librarian as he/she would have to process the forms.

6.6 Environment

This set of questions elicited similar responses from the majority of librarians. When asked whether the location of multimedia was important 81.4% of librarians chose point 1 (strongly agree) which implies that they carefully consider where to locate machines in the library. None of the respondents disagreed with this point. For question 34, 65.1% of respondents strongly agreed that the location of machines can affect the frequency of use. These answers are encouraging as it suggests that librarians are aware of the importance of locating a CD-ROM computer in a position where it can be utilised effectively. For question 35, 74.4% of respondents stated that the location of multimedia can encourage use, a statement with which all of the librarians agreed.

6.7 Access

Ensuring adequate and timely access to resources is important and a series of questions in the survey focused on booking systems. Just over half, 51.2%, of the respondents

use a CD-ROM booking system in the library. Questions 36-42 asked these respondents about their system. For the majority of schools, 81.8%, the booking system can be used by both pupils and teachers. This means that, potentially, all members of the school can have access to a computer in the library. The next question asked librarians to indicate when pupils could book machines. Respondents were asked to circle all of the relevant time periods. Table 23 shows the combinations of answers that were chosen.

Table 23: When are students able to book machines?
1=lesson times; 2=dinner;3=break;4=after school; 5=before school.

Qu 39	1& 2	1& 4	2 & 3	2 & 4	1,2 & 3	1,2 & 4	1-4	1,2,4 & 5	All	9	Total	Chi^2
no.	3	2	1	2	3	2	4	3	1	1	22	
%	13. 6	9.1	4.6	9.1	13.6	9.1	18.1	13.6	4.6	4.6	100	0.5 %

There were a wide variety of responses. The most popular combination of options included lessons (1) and dinner time (2). This shows that booking systems are used extensively during the main part of the school day. The advent of "homework clubs" and "after school clubs" could mean that demand for CD-ROMs increases and that subsequently booking records would need to be extended during this time. Booking CD-ROMs after school is represented in six of the answer groupings and the results show that fourteen librarians are already continuing to use their booking system after the school day has ended. The advantage of this system is that pupils who have booked a CD-ROM computer are secure in the knowledge that they have guaranteed usage of this resource at a given time. Providing pupils with this opportunity enables them to plan their work in advance.

Question 42 asked those librarians who have a booking system whether they thought it was the best way of ensuring equal access to resources (Table 24). Only 3 respondents strongly agreed that this was the best method, with the majority, 16, opting for the "agree" option. Interestingly 3 respondents chose point 3 (disagree). These respondents seem to employ a system which they do not believe is the most equitable. This could be because they have limited resources and have therefore been forced to adopt a method that promotes sharing.

Table 24: Does a booking system provide the best means of equality of access?

Qu 42	1) Strongly Agree	2) Agree	3) Disagree	4) Strongly Disagree	9) No Answer	Total	Chi^2
no.	3	16	3	0	0	22	
%	13.6	72.8	13.6	0	0	100	0.5%

It can be generally concluded that those librarians who employ a booking system are satisfied that it is a fair system. Allowing both pupils and teachers to use the system promotes the ethos that all users should have an equal opportunity to use the available facilities.

6.8 Censorship

CD-ROMs, like books, have a fixed content. The user only has access to information that has been included on the disc. Considering that most librarians prefer to see discs in action before purchasing (question 21), one would have expected the majority of respondents to have agreed with the statement in question 43 (Table 25).

Table 25: The process used to select CD-ROMs means that censoring is unnecessary.

Qu 43	1) Strongly Agree	2) Agree	3) Disagree	4) Strongly Disagree	9) No Answer	Total	Chi^2
no.	5	26	7	0	5	43	
%	11.7	60.4	16.3	0	11.7	100	0.5%

Three fifths of the respondents "agreed" with the question so it can be concluded that these librarians do not feel that there is any need to censor the information on the CD-ROMs in use in the library. However, 5 respondents "strongly disagreed", suggesting that they actively "vet" the information available to users. It is interesting to speculate whether the distribution of answers would change now that CD-ROMs have the ability to link on to Internet sites. The new edition of *Encarta* has this capability. This linking process means that the user can access information which is unknown to the librarian. One outcome of this progress in technology could be that librarians need to spend more time exploring the capabilities of discs. The librarian would need to consider whether the computer can support the Internet, whether the sites are valid and finally, that the recommended links are suitable for school pupils to use.

6.9 Value and quality assessment.

This set of questions asked librarians whether they used any of the following methods to assess the quality of individual CD-ROM discs: tally, survey or informal questioning (Table 26). The results for both pupils and teachers were found to be particularly significant.

Table 26: Value and quality assessment.

Qu nos.	44) Tally	45) Survey	46) Informal questioning	9) No Answer	Total	Chi^2
Pupils	12	3	19	9	43	
%	28	6.9	44.2	20.9	100	0.5%
Teachers	5	1	20	17	43	
%	11.6	2.3	46.6	39.5	100	0.5%

Informal questioning was the method favoured by librarians when performing value and quality assessments with both pupil and teacher CD-ROM users. This result was not unexpected as this method is quick and easy to undertake and provides a good source of qualitative data. Comments can be taken from users directly after they have used the CD-ROM. This should provide reliable data as any problems that the user may have encountered will still be fresh in his/her mind. This method also enables the librarian to gauge the effectiveness of CD-ROM discs. The other assessment methods allow the librarian to gather quantitative data but require more formal preparation. It was not suprising to discover that the number of respondents who have used surveys is therefore relatively few. Twelve respondents stated that they had undertaken a tally of use with pupils. This method, although easy to undertake, can only reflect total usage. A tally enables the librarian to assess the popularity of a resource but it does not elicit personal comments from the user. This method does not help the librarian to assess the quality of discs.

6.10 Finance

Who has the authority to buy CD-ROMs is an important issue. Asked how often they buy discs, the majority of respondents indicated that it was either "always" (34.8%) or "often" (44.2%). Only 2 respondents "never" purchased any discs (Table 27).

Table 27: Are CD-ROMs purchased by the librarian?

Qu 47	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	Chi^2
no.	15	19	1	2	6	43	
%	34.9	44.2	2.3	4.7	13.9	100	0.5%

Over a third of respondents always purchase resources. This suggests that other than perhaps, through verbal recommendation, when it comes to purchasing discs there is little co-operation between the library and subject departments. In these libraries it can be concluded that the librarian holds the responsibility for selecting appropriate discs. Question 48 asks how often individual subject departments purchase CD-ROMs (Table 28).

Table 28: Are CD-ROMs purchased by the subject department?

Qu 48	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	Chi^2
no.	3	4	21	0	15	43	
%	7	9.3	48.8	0	34.9	100	0.5%

From the table it can be seen that almost half of the respondents indicated that subject departments "seldom" purchase discs and only 4 librarians stated that departments "often" buy discs. These results were not unexpected and show that purchasing discs is clearly an initiative that is driven by the librarian. The role that teaching staff play in the purchase of material seems to be minimal. This conclusion is also supported by the results from question 20 which shows that teaching staff are not consistently used as a source of information for finding out about new CD-ROMs. If teachers buy discs then this could indicate that they have access to multimedia facilities within their department. This is a situation that would restrict access to resources as pupils would be dependant upon the availability of a teacher to supervise the use of the computer.

How can the librarian interest subject teachers in multimedia? One way is to purchase resources jointly (Table 29).

Table 29: Are CD-ROM discs purchased jointly?

Qu 49	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	Chi^2
no.	1	11	14	2	15	43	
%	2.3	25.6	32.6	4.6	34.9	100	0.5%

It is encouraging to see that 25.6% of respondents often undertake joint purchases. Buying resources in conjunction with departments enables the librarian to raise

teachers' awareness of the products that are available. Actual purchase of materials will provide a financial impetus for staff to use the disc as the department will have invested in the resource. This process could lead to increased levels of communication between the library and the departments. Improved communication may have an effect on the balance of the CD-ROM collection and lead to an increase of purchases for a particular subject area. Although the librarian endeavours to create a balanced CD-ROM collection, one reason why holdings do not favour a particular subject could be due to a lack of input from subject staff.

How money is allocated for CD-ROMs will dictate the purchasing power of the librarian. Table 30 shows the options that were chosen by the respondents in response to question 50.

Table 30: How money is allocated for purchasing new CD-ROMs.

Qu 50	1) Separate IT fund	2) Library Budget	3) Ad-Hoc	2) Library Budget & 3) Ad-Hoc	2) Library Budget & 4)Specific bids	9) No Answer	Total	Chi^2
no.	3	26	5	1	6	2	43	
%	7	60.5	11.6	2.3	14	4.6	100	0.5%

The majority of librarians fund CD-ROM purchases from their own budget (point 2). This is to be expected as it has already been seen they make the major purchasing decisions. Six respondents formulate specific development bids. This is in conjunction with and in addition to the library budget allocation. This shows that some librarians have access to additional funding sources, although this survey cannot show how successful these bids have been. It is important that librarians have the flexibility to use money from the library budget to enhance the CD-ROM collection. Librarians do not want to be in a position whereby they are forced to rely on bidding for funds in order to buy CD-ROMs. Bidding for funding is an uncertain process as a positive outcome is not guaranteed.

6.11 Training

The results for questions 51 and 52, which asked respondents whether they had provided any INSET training on CD-ROMs, were evenly spread and not statistically significant. This indicates that the provision of training varies between institutions.

For questions 53-56 the respondents were asked about the attitude exhibited by teaching staff towards CD-ROMs. It was interesting to discover that questions 53-55 all had similar response patterns. They reveal that a teacher who is "technophobic" also displays little interest in CD-ROMs and sees them as a low priority. The results (Table 31) showed that 44.2% of librarians often encountered technophobia amongst staff. This figure reflects the current attitude of teaching staff as perceived by librarians. It would be interesting to see whether this changes over the next few years especially considering the Government's wish to improve teacher IT competencies.

Table 31: Have you encountered technophobia amongst teaching staff towards CD-ROMs?

Qu 53	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	1	19	13	4	3	3	43	
%	2.3	44.2	30.2	9.3	7	7	100	0.5%

In a school with a higher proportion of younger teachers one would expect a lower incidence of technophobia as staff should be more familiar with computers and software.

The responses for question 54 (Table 32) show that the majority of respondents have chosen either points 2 (often) or 3 (sometimes). Although the option "sometimes" (point 3) attracted a slightly higher response rate. This could indicate that teachers are interested in CD-ROM software but feel unable, or apprehensive, about using it.

Table 32: Have you encountered little interest from teaching staff towards CD-ROMs?

Qu 54	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	3	13	16	3	3	5	43	
%	7	30.2	37.2	7	7	11.6	100	0.5%

The fact that 30.2% of librarians have often encountered little interest from staff may signify that teachers are unaware of the benefits of using CD-ROMs in their lessons. It could also indicate that staff have not included the use of multimedia technology into their lesson plans. To increase staff interest in CD-ROMs librarians need to undertake awareness raising activities and to promote existing resources. This course of action is supported by question 55 (Table 33). The results show that over a third of librarians believe that staff "often" (point 2) consider CD-ROMs as a low priority. The same number of respondents also chose point 3.

Table 33: Do teaching staff consider CD-ROMs as a low priority?

Qu 55	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	2	16	16	0	3	6	43	
%	4.6	37.2	37.2	0	7	14	100	0.5%

If staff do not consider CD-ROMs to be important then they are unlikely to include them in their teaching. This theory is supported by the results from question 26 which showed that teachers react in an inconsistent manner and only sometimes include CD-ROMs when planning their lessons. These results could indicate how teachers prioritise their workload including marking, lesson planning and administration as opposed to CD-ROM training.

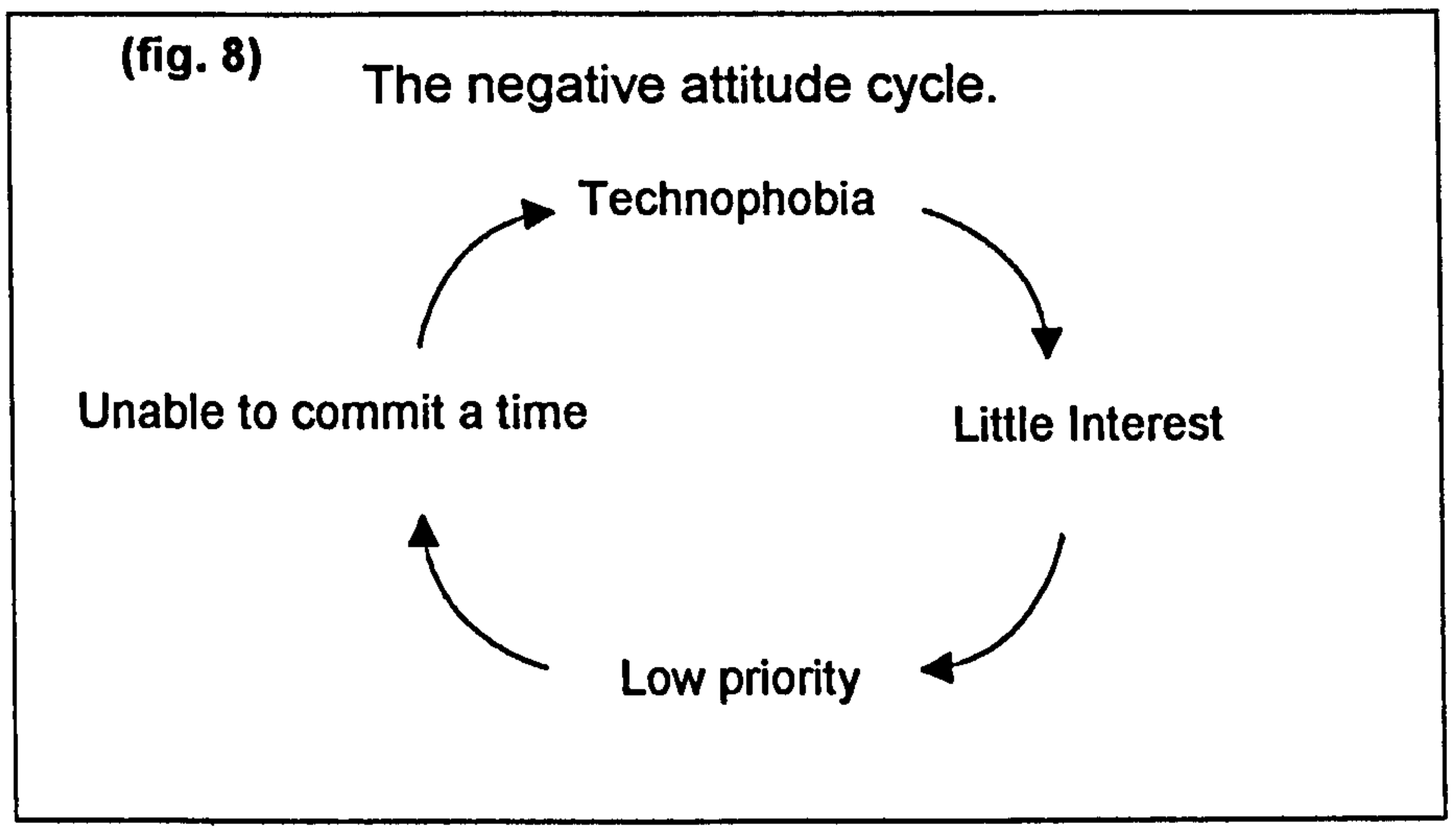
The final question in this set asked whether librarians perceived staff as being unable to set a specific time aside for learning about and using CD-ROMs. Over half of the respondents said that this was "often" (point 2) the case.

Table 34: Are staff unable to commit time for CD-ROMs?

Qu 56	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	4	24	9	1	2	3	43	
%	9.3	55.8	20.9	2.3	4.7	7	100	0.5%

This result is concerning as it indicates that even interested teachers are unable to explore the potential of CD-ROMs because of constraints on their time. If teaching staff display these attitudes then it could be an indication of general apathy towards CD-ROMs and related technology. If no effort is made to change these perceptions

then teachers could become trapped within a cycle of negative attitudes towards CD-ROMs (fig. 8).



To combat this cycle, the librarian needs be proactive and ensure that relevant members of staff are made aware of the multimedia resources that are available in the library. If the value of CD-ROMs is demonstrated to teachers by the librarian then this could persuade individual members of staff to explore these resources for themselves.

Suprisingly, the librarian's perception of teacher attitudes did not alter the more CD-ROMs were bought in conjunction with departments (question 49). Correlations revealed that the purchasing of CD-ROMs, either by the librarian (question 47), or by the subject department (question 48) or jointly (question 49), did not effect the librarian's perception of teacher attitudes (questions 53-56) which remained poor. This result was unexpected and reveals that joint purchasing of resources does not necessarily improve the commitment or involvement of teaching staff in relation to CD-ROMs. It can be concluded that additional measures are needed to encourage staff into the library to use CD-ROMs.

It has been shown that librarians perceive that many teachers exhibit a negative attitude towards CD-ROMs. It is not suprising, therefore, that 41.9% of staff "seldom", and just over a fifth "never" show pupils how to use CD-ROMs in the library (Table 35).

Table 35: Do teachers show pupils how to use CD-ROMs in the library?

Qu 57	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	Chi^2
no.	0	7	6	18	10	2	43	
%	0	16.3	13.9	41.9	23.3	4.6	100	0.5%

One explanation of this result could be that teachers view this role as being best undertaken by the librarian. Independent use of resources by pupils could also affect the results. If pupils are using the library as individuals or in groups then the teacher may not necessarily accompany them into the library. The librarian would therefore be the member of staff who would show pupils how to use the resources.

Librarians believe that it is important that teaching staff know how to use CD-ROMs (Table 36). Nearly two thirds of the respondents chose point 1, agree.

Table 36: Is it important that staff know how to use CD-ROM discs?

Qu 58	1 (Agree)	2	3	4	5 (Disagree)	9 No Answer	Total	Chi^2
no.	28	10	4	0	0	1	43	
%	65.1	23.3	9.3	0	0	2.3	100	0.5%

In order to achieve this goal, librarians need to be proactive and target those staff who are reluctant to commit their time to learning how to use discs. Those teachers who know how to use CD-ROMs will be more familiar with their contents and as a result will be able to use them to support their teaching. Responses to question 59, which focused on the importance of teacher training (Table 37), revealed a similar pattern of results. The majority of respondents, 74.4% choose point 1 (agree).

Table 37: Training teachers how to use CD-ROMs is important?

Qu 59	1 (Agree)	2	3	4	5 (Disagree)	9 No Answer	Total	Chi^2
no.	32	4	5	1	0	1	43	
%	74.4	9.3	11.7	2.3	0	2.3	100	0.5%

These results indicate that although teachers do not often show pupils how to use CD-ROMs in the library, librarians believe that it is important for staff to know how to use the discs. This means that the librarian must break the cycle of negative attitude (fig. 8, p.135) exhibited by some teachers through the promotion of resources and by raising staff awareness. This has implications for the librarian's time management and

the implementation of these ideas will have to be incorporated into his/her existing schedule.

6.12 Personnel and technical support

A significant factor in the successful delivery of information is the reliability of the technology and questions 63 and 64 were concerned with the provision of technical support. Question 63 showed that 11 schools have a designated IT technician (point 1) who will provide support in the library.

Table 38: Who has responsibility to provide technical backup?

Qu 63	1 IT technician	2 Member of staff	3 Yourself	1&2 IT technician Member of staff	1&3 IT technician Yourself	2&3 Member of staff	All	9 No Answer	Total	Chi²
no.	11	9	6	1	8	3	2	3	43	
%	25.6	21	13.9	2.3	18.6	7	4.6	7	100	1%

This is an encouraging result. The librarian who has access to a technician is more able to concentrate upon professional tasks. In eight schools the librarian and the technician share the responsibility for providing backup. This could result in a situation whereby the librarian only has limited access to the technician and is forced to attend to minor IT problems him/herself. Nine schools have a member of the teaching staff as the sole provider of technical assistance. This arrangement could be unsatisfactory especially if a problem occurs when the member of staff responsible has teaching commitments. This could result in the librarian once again attending to day-to-day technical problems. If the librarian has to provide ongoing technical support then this could inevitably affect the level of service provision. This topic is discussed further in the Focus Group analysis (Chapter 10).

Respondents were asked whether the amount of technical backup they received influenced their attitude towards purchasing new technology. A quarter of respondents felt more inclined to purchase (point 5) if some sort of backup was available. It was interesting to discover that the results indicated that the amount of technical backup available does not affect the librarian's purchasing decisions (Table 39).

Table 39: Does the amount of backup at school influence your attitude towards purchasing new technology?

Qu 64	1 (Less inclined to purchase)	2	3	4	5 (More inclined to purchase)	9 No Answer	Total	Chi^2
no.	2	7	15	5	11	3	43	
%	4.6	16.3	34.9	11.6	25.6	7	100	0.5%

This result could mean that those librarians who do not have any technical support do not let it deter them from purchasing technology. However, the alternative situation is undesirable as if librarians do not purchase new material then they run the risk of being "left behind" technologically and may be unable to offer pupils the range of resources available in other comparable institutions.

Question 66 asked whether library staff were encouraged by the librarian to become familiar with new technology. Twenty eight of the thirty respondents who replied that they had some form of assistance, indicated that they encouraged library staff to familiarise themselves with new resources.

Table 40: Are library staff encouraged to familiarise themselves with new technology?

Qu 66	1) Yes	2) No	3) N/A	9) No Answer	Total	Chi^2
no.	28	2	12	1	43	
%	65.1	4.7	27.9	2.3	100	0.5%

This result was expected. To ensure that library staff provide the best support possible to both pupils and teachers, it is important for the whole team to be conversant with the equipment available.

Analysis of the Nottinghamshire data has provided some insight into how librarians manage their multimedia resources. The results have revealed how the librarian communicates with the teaching staff and with other professionals in relation to CD-ROMs. The next Chapter takes these results and compares them with those obtained from Lincolnshire and Derbyshire.

Findings from Nottinghamshire statistics

The results from the Nottinghamshire questionnaire are summarised below and provide a picture of the situation that existed within these libraries at the time of the study, in terms of the multimedia resources available and how they were managed. The results have also provided a list of suggestions that could be implemented in a school library.

Resource management

- Providing written instructions for CD-ROMs is not favoured by the majority of librarians.

Promotion

- Librarians, as opposed to teachers, spend more time familiarising themselves with CD-ROMs.

Acquisitions

- Librarians use and value CD-ROM reviews.

- Librarians do use other professional librarians as a source for finding out about CD-ROMs but in an inconsistent manner.

- The impetus for buying CD-ROMs does not usually stem from teachers.

- Librarians usually share their evaluations with teaching staff.

- When selecting CD-ROMs for purchase, librarians usually consult reviews, publishers information and other librarians to provide reviews and recommendations of useful software.

Curriculum

- Teachers only sometimes plan topics or questions around the availability of information on CD-ROMs.

- There is some evidence to suggest that if teachers specify the use of discs in lessons, then pupils will ask to use the disc in the library.

- CD-ROM collections are not usually biased towards one particular subject.

- Librarians are confident in using CD-ROMs as a tool for answering enquiries.

- The majority of librarians believe that pupils find CD-ROMs easy to use and more attractive than books.

- Librarians do not produce search sheets for pupils to fill in when using the CD-ROM.

Environment

- The location of the machines is important and can affect frequency of use.

Access

- Half of the Nottinghamshire librarians in this study use a booking system that can be used by both pupils and teachers.

Censorship

- The majority of respondent, believe that censorship of CD-ROMs and associated material is unnecessary.

Value and quality assessment

- Informal questioning of users was the preferred method for assessing resources.

Finance

- The majority of librarians are responsible for purchasing CD-ROMs for their schools and a quarter are involved with joint purchasing of resources.

- The majority of librarians fund purchases from the library budget.

- Joint purchasing of CD-ROMs between the library and subject department is undertaken in some schools. This strategy involves teaching staff in purchasing decisions and this may provide them with an impetus to use the software.

Training

- The librarians' perceptions of teacher attitude was shown to form a negative attitude cycle (fig. 8) consisting of the following factors: technophobia, teachers unable to commit time familiarising themselves with CD-ROMs, teachers viewing CD-ROMs as a low priority and teachers showing little interest in CD-ROMs.

- Teachers do not usually show pupils how to use CD-ROMs.

- Librarians consider it important that the teaching staff know how to use the CD-ROM discs.

Personnel and technical support

- Technical backup can have a positive influence on the librarians' attitude to buying CD-ROMs, although lack of assistance does not necessarily mean that librarians' will not buy resources.

- Library staff are encouraged to familiarise themselves with new technology.

Teachers' use of technology

- Teachers need to be provided with the opportunity to access IT.

- Librarians need to raise the awareness of and offer support to those teaching staff who are perceived as displaying negative attitudes towards CD-ROMs (fig. 8).

- Librarians consider it important for teachers to know how to use CD-ROMs. Teachers are then better able to integrate these resources into their teaching.

- There is a need to promote CD-ROMs and new technology to raise teacher awareness and hence ensure that the software is used.

Librarians' use of technology

- There are implications concerning the librarian's time in relation to the monitoring and evaluation of CD-ROM links onto Internet.

- The importance of an IT technician, to ensure support for both the teacher and the librarian is highlighted.

Suggestions:

The evidence indicates that it would be beneficial for the library to:

1. Produce a list of CD-ROM holdings.
2. Promote CD-ROMs to the school community.
3. Promote CD-ROMs to teachers.
4. Display a copyright notice aimed at pupils concerning information from electronic sources.

7. Data analysis: Inter county comparisons

The results from the Lincolnshire and Derbyshire questionnaires were combined to form a set of data for comparison with the Nottinghamshire results. The set contained 27 schools from each county, producing a total of 54 schools, a valid number on which to perform statistical tests. In this analysis this set of schools is referred to as "*Other*". The results from the questions producing ordinal data were tested using the Kolmogorov-Smirnov technique to see whether statistically, the samples were either different or the same. If the result was not significant (n/s), then it can be concluded that the data sets are similar. In this way it can be said that the results found in Nottinghamshire mirror those found in its two neighbouring counties. Nominal data was tested using the Chi-squared technique (Chi^2) in the form of contingency tables.

The Kolmogorov-Smirnov test showed that most of the results from Nottinghamshire had a similar distribution to those found in the *"Other"* group. However, there were a few anomalies either between the whole distribution or for individual points. The results from the *"Other"* data set are discussed below.

The difference in the provision of resources between schools in the *"Other"* group was very pronounced, and ranged from four libraries that only had one CD-ROM to one school which had over 170 discs. Whole-school CD-ROM holdings ranged from 2 to over 200 discs. There were some respondents who did not know how many discs were held in school. This implies that discs are kept in places other than the library. Looking at the results from both groups it can be seen that the amount of CD-ROM resources held within the library and the whole-school differs from institution to institution. This is to be expected given that not all schools are in the same financial position or at the same stage of technological development. Different schools will also have individual development plans and priorities. However, it is interesting to compare how each institution manages its resources, an area where conclusions can be drawn.

7.1 Resource management

The distribution of answers for question 6 revealed that over half of the *"Other"* librarians (57.1%) do not provide written instructions for their CD-ROMs, compared with 44.2% of respondents in Nottinghamshire. This shows that a large proportion of librarians from both groups do not believe that CD-ROMs require additional instructions. Question 7 asked whether those librarians who provide written instructions place them next to the computer. The results for the *"Other"* group showed that there was a fairly equal distribution of answers for options 1 (all), 3 (some) and 4 (none). These results were not as clear cut as those for Nottinghamshire and suggest that it is the individual librarian who decides how many guides to display next to the machine. One consideration could be both the number of discs that are available in the library and the number of computers that can be used to access the discs. Placing instructions for every disc next to a computer could be impractical for a library with a large number of machines. However, if instructions are kept in a general folder pupils might be discouraged from using them because they have to locate both the folder and the correct instruction sheet. The librarian could decide, therefore, to either display guides for popular discs or for those discs which he/she regards as being difficult to use.

7.2 Promotion

The amount of time that teachers spend learning to use new CD-ROMs seems to be fairly consistent. In both sets over half of the respondents take up to half an hour to familiarise themselves with a new CD-ROM (Table 1). This indicates that teachers from both groups behave in the same manner. Slightly more teachers in Nottinghamshire, than in *"Other"*, spend 1-2 hours with new CD-ROMs. This could be explained by the individual temperaments and inclinations of teachers and/or the availability and standard of equipment in different institutions.

Table 1: How much time do teachers take to familiarise themselves with CD-ROMs?

	Qu. nos.	8 <30 mins	9 up to an hour	10 1-2 hours	11 >3 hours	No Answer	Total	K-S
Notts	No.	24	8	3	0	8	43	
	%	55.8	18.6	7	0	18.6	100	
Other	**No**	**28**	**10**	**2**	**0**	**14**	**54**	
	%	**51.9**	**18.5**	**3.7**	**0**	**25.9**	**100**	**n/s**

The responses of the *"Other"* librarians to the same questions showed that over half (53.7%) spend up to thirty minutes with new CD-ROMs. This shows that librarians in the *"Other"* sample spend marginally less time with new CD-ROMs than their counterparts in Nottinghamshire. The proportion of respondents spending up to an hour with CD-ROMs is approximately the same for both groups (Notts 32.6%; Other 38.9%). However, only 5.5% of librarians in the *"Other"* group stated that they spend between 1-2 hours, compared with over a fifth of librarians in Nottinghamshire. This indicates that even though the general distribution of results is similar, there are some differences between the time librarians spend learning new software. The fact that *"Other"* librarians spend less time with new CD-ROMs could mean that they place a lower priority on this activity than librarians in schools in Nottinghamshire.

Questions 13-15 (Table 2) focused on whether pupils requested to use specific discs in the library.

Table 2: Do pupils request to use specific discs?

Years 7-9	Qu. 13	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	K-S
Notts	No.	9	25	3	0	6	43	
	%	20.9	58.1	7	0	14	100	
Other	**No**	**14**	**21**	**3**	**1**	**15**	**54**	
	%	**25.9**	**38.9**	**5.6**	**1.8**	**27.8**	**100**	**n/s**

Years 10-11	Qu.14	1) Always	2) Often	3) Seldom	4) Never	9) No Answer	Total	K-S
Notts	No.	15	16	8	0	4	43	
	%	34.9	37.2	18.6	0	9.3	100	
Other	**No**	**13**	**27**	**5**	**0**	**9**	**54**	
	%	**24**	**50**	**9.3**	**0**	**16.7**	**100**	**n/s**

Nottinghamshire librarians responded that almost 60% of pupils in years 7-9 often request discs whereas in *"Other"* that level is just below 40%. This undergoes a reversal in years 10-11 where it would seem that *"Other"* pupils request discs more

often that pupils from Nottinghamshire. Although statistically the differences between the two distributions are not significant, the results imply that Nottinghamshire and *"Other"* librarians target different year groups. This could mean that the librarian successfully promotes CD-ROMs to pupils in years 7-9 in Nottinghamshire whereas the librarians in the *"Other"* group successfully target years 10-11. This promotion of resources could be affected by teaching staff. There is evidence to support this viewpoint from the results of question 26. Although there is a lower percentage of teachers who "always" specify discs in *"Other"*, the percentage of those who "often" use discs is higher for *"Other"* than for Notts; 40.7% and 28% respectively. This difference could account for the apparent greater awareness of pupils in years 10-11.

This pattern continues in the sixth form, but to a lesser extent. There is a slightly higher percentage of Nottinghamshire pupils than *"Other"* who "always" request discs (27.9%; 20.4%) however the pattern is reversed for those who "often" request discs, (Notts 34.9%; Other 46.3%). Overall, this would suggest that by the time pupils reach the sixth form they are less likely to request discs than pupils lower down the school. This is especially true for *"Other"* where the results show that almost 15% of sixth formers never request discs. This could be because either the material is not available at the appropriate level, or that sixth formers have freer access to resources and so therefore do not need to ask for them.

7.3 Acquisition

The proportion of librarians who use publishers as a source of information to find out about new CD-ROMs is similar for both sets of data, although Nottinghamshire respondents use them slightly more often (Notts 44.2%; Other 38.9%). This result supports the suggestion that publishers are used as a major source of information on new products. Exhibitions are used less often, the results for question 17 for *"Other"* support those found in Nottinghamshire and even suggest that they are less popular with respondents from the *"Other"* data set because 14.8% never use them, compared with 11.6% in Notts. 37% of respondents from the *"Other"* data set did not answer the question at all. This implies that these librarians do not find exhibitions useful and indicates that many do not visit them at all. This result was suprising and it can be

concluded that these respondents do not visit exhibitions specifically to find out information on CD-ROMs. The results from question 18 show that although more of the *"Other"* librarians (Other 16.6%; Notts 11.8%) always use reviews, overall a greater proportion of the Nottinghamshire librarians tend to read literature to find out about new products.

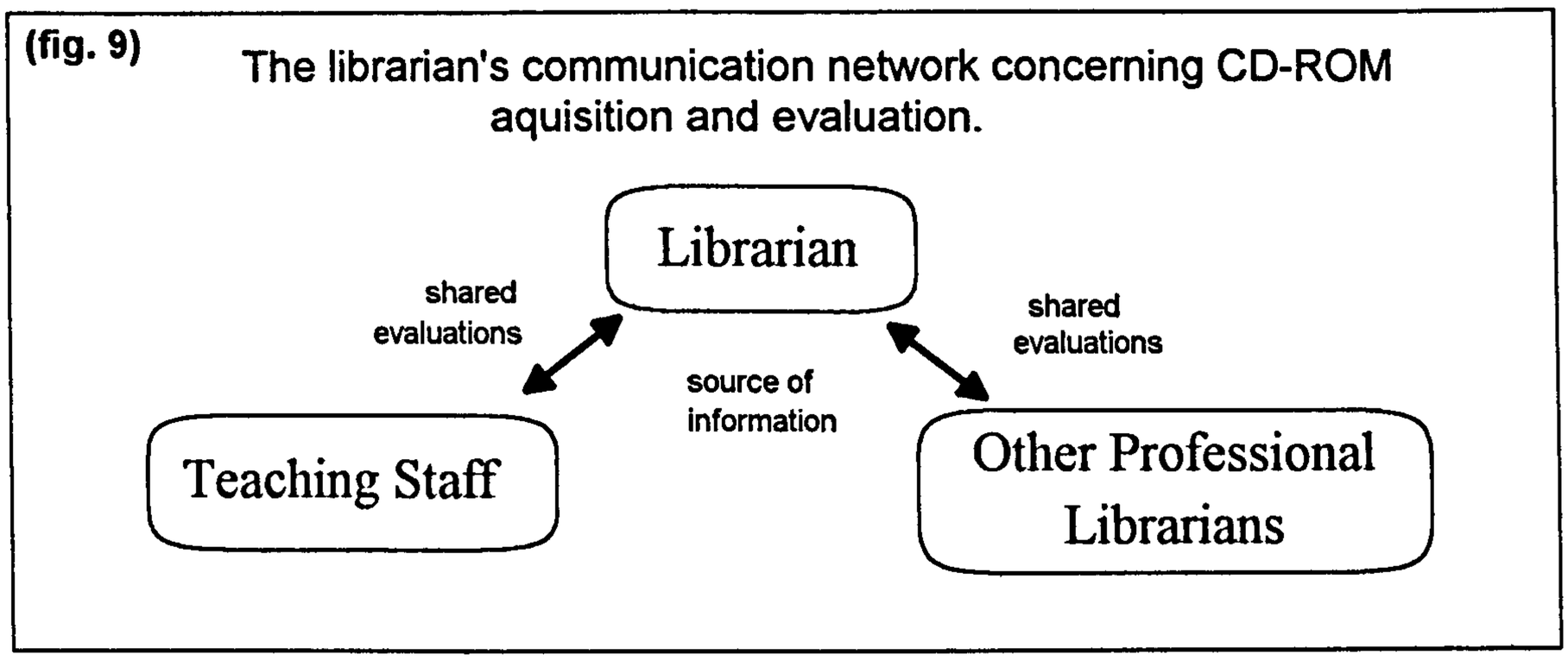
The results show that Nottinghamshire librarians tend to consult more external sources of information to find out about new CD-ROMs than the librarians in the *"Other"* data set. This in turn raises the question, will the data show that librarians in *"Other"* prefer to consult internal sources? Question 20 asks whether the librarians use other members of staff as a source of information (Table 3).

Table 3: Do librarians use other members of staff to find out about new CD-ROMs?

	Qu. 20	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	K-S
Notts	No.	3	11	10	13	2	4	43	
	%	7	25.6	23.3	30.2	4.7	9.3	100	
Other	**No**	**7**	**24**	**11**	**0**	**0**	**12**	**54**	
	%	**13**	**44.4**	**20.4**	**0**	**0**	**22.2**	**100**	**n/s**

The results reveal that although the distribution of answers between the two data sets is not significantly different, librarians from the *"Other"* group do consult staff more than the librarians in Nottinghamshire. Almost double the amount of the *"Other"* respondents use staff as a resource always or often. Interestingly, librarians from both sets use other professional librarians as a source of information to a similar extent.

In the *"Other"* data set the same relationship that was discovered in Nottinghamshire exists between the librarian and other library professionals and the librarian and teaching staff. This supports the Nottinghamshire model of a librarian's communication network (fig. 7). However, correlations of the *"Other"* data revealed a significant link between question 20, finding out about new CD-ROMs from other members of staff, and question 22, sharing evaluations with teaching staff. Therefore, if librarians in the *"Other"* group use other members of staff as a source of information about CD-ROMs, they also share their evaluations with them in a more consistent manner. This in turn strengthens the link between the librarian and teaching staff presenting the revised model below (fig. 9) for the *"Other"* data set.



This model shows that for the *"Other"* data set strong communication exists between the librarian and teaching staff and the librarian and other professionals. It also demonstrates that the librarian can share his/her knowledge with colleagues both inside and outside of the school. As this is a two-way process, it should result in the librarian becoming well informed in this area.

Nottinghamshire librarians prefer to see discs in action before they buy, with nearly 70% choosing either point 1 (always) or point 2 (often) (Table 4). However, it was suprising to discover that librarians from the *"Other"* group seem less concerned with previewing discs.

Table 4: Do librarians try to see discs before purchase?

	Qu. 21	1 (Always)	2	3	4	5 (Never)	9 No Answer	Total	K-S
Notts	No.	16	13	6	4	1	3	43	
	%	37.2	30.2	18.6	9.3	2.3	7	100	
Other	**No**	**11**	**13**	**12**	**12**	**3**	**3**	**54**	
	%	**20.4**	**24**	**22.2**	**22.2**	**5.6**	**5.6**	**100**	**n/s**

There could be several reasons why this difference exists. *"Other"* librarians may feel that they are too busy to devote the time needed to assess new CD-ROMs. They also may not be in contact with suppliers who offer an inspection service. The fact that the distribution of results for the *"Other"* group are evenly spread indicates that seeing the discs in action before purchase is a decision that is made by the individual librarian. The greater input from teaching staff, noted earlier in the *"Other"* group, could also contribute, insofar as a recommendation from staff could be comprehensive enough to form the basis for a purchasing decision.

Sharing evaluations of discs with teaching staff occurred in both of the data sets. This confirms the results revealed in Nottinghamshire which showed that librarians do share their evaluations of new CD-ROMs with teaching staff. This is an encouraging result as it shows that communication between librarians and teachers is consistent across all of these counties. However, the results from both the groups show that some respondents have limited communication with other professional librarians. This means that librarians can still be relatively isolated in terms of receiving input from other library professionals. Links between school librarians need to be strengthened therefore, to ensure that expertise can be shared across a wider forum. The Education Library Service could help to alleviate this problem and provide a vital link between different institutions by creating opportunities for professionals to meet and discuss new developments.

7.4 Curriculum

Analysis of the Nottinghamshire data revealed that over a quarter of teachers "often" specify discs during lessons. In the *"Other"* group this figure was 40.7%. This difference is to be expected and is probably due to the greater proportion of staff who are involved in the selection process. This evidence supports the idea that those librarians who share evaluations of CD-ROMs with teachers can increase the use of the discs in lessons by teachers.

Correlations in the data show that when teachers specify CD-ROM discs in lessons pupil requests are affected in a positive manner across all year groups. This link does not occur in Nottinghamshire. This shows that for the *"Other"* group the actions of the teacher can affect pupil usage of CD-ROMs.

A link was also found to exist in the *"Other"* data set between the librarians' perception of technophobia in teachers and whether they specify the use of discs in lessons. The results lead to some unexpected conclusions. Correlation shows that even if a teacher specifies discs in his/her lesson, the librarian may still perceive him/her to be technophobic. This link is present in the Nottinghamshire data but at a lower significance level. This was an unexpected link and could indicate that teachers might

know the names of discs, but have never actually used them. This is supported by the results of question 57 where the majority of teachers do not show pupils how to use CD-ROMs in the library. If this is an accurate reflection of the situation, then it must be addressed by ensuring that either teachers become more confident and familiar with the technology or that they formally refer pupils to the librarian when CD-ROMs are being used in their lessons.

Librarians from both groups feel able to integrate the use of CD-ROMs when answering enquiries. They also believe that the discs are easy to use. Slightly fewer respondents from the *"Other"* group believed that CD-ROMs were more attractive than books (*Other* 25.9%, Notts 32.6%) but overall the findings from Nottinghamshire were supported. This result was expected and means that although both sets of respondents consult different sources when choosing new CD-ROMs, they are relatively confident both in the pupils' ability to use the discs and in their own ability to use CD-ROMs in conjunction with other resources in the library. The fact that pupils find CD-ROMs more attractive than books suggests that they would use them in preference to books. This implies that using CD-ROMs as a resource in lessons would encourage pupils to complete research. It is important, therefore, that pupils are able to select relevant discs and access the information they require. This has implications for information skills teaching.

The success the *"Other"* librarians believe they have in integrating CD-ROMs into enquiry work (questions 28) is linked with their perception of how easy pupils find CD-ROMs to use (questions 29). This connection also exists for Nottinghamshire librarians. The results for these two questions were similar for both groups. Librarians who suggest that a pupil uses a CD-ROM to answer his/her enquiry believe that, in general, he/she will have no problem in using the disc. It can be concluded that the librarian is confident that pupils will perform a successful search. It is interesting to compare the response that the librarians provide when discussing pupil attitudes towards printed encylopaedias and other reference works. The librarians' comments indicate that the printed version is viewed by pupils as being harder to understand than its CD-ROM counterpart.

When asked whether they thought CD-ROMs were intuitive (question 31) librarians from the *"Other"* group were slightly less positive than those from Nottinghamshire. Only 5.5% chose point 1 (strongly agree) compared to 11.6% in Nottinghamshire. This shows that a lower proportion of librarians from the *"Other"* group believe that CD-ROMs are intuitive. Interestingly 5.5% (3 respondents) in the *"Other"* data set chose point 5 (strongly disagree) which suggests that these librarians strongly believe that pupils need guidance when using CD-ROMs. Of these three respondents two actually employ some sort of search preparation. However, the majority of respondents (96.3%) do not require pupils to undertake any formal preparation for using CD-ROMs. This confirms the Nottinghamshire results and it can be concluded that the majority of librarians regard the CD-ROMs in their collection as being easy to use.

7.5 Environment

The location of multimedia machines is clearly an important issue to librarians and it was not suprising to discover that the results from the *"Other"* group closely matched those obtained from Nottinghamshire. This was especially true for question 35. Librarians believe that the location of computers in the library can affect usage. This implies that the layout of the library is carefully considered by librarians.

7.6 Access

Just over half of the respondents in both data sets use a booking system for their computers. A high proportion of librarians (46.4%) in the *"Other"* group stated that staff were the main users of the computer booking system (question 38). This matches the replies obtained from Nottinghamshire where a similar proportion (42.8%) of respondents also chose this option. This result is encouraging as it implies that once a booking system has been introduced that the staff will use it. This means that access to computers can be controlled. Results from the *"Other"* group also confirmed the findings from Nottinghamshire for question 39 and the most popular times for booking computers was shown to be during lessons and dinner time.

When asked whether they thought a booking system provided equality of access, the response from the *"Other"* group closely matched the results from Nottinghamshire. Respondents from both groups agreed that by using a booking system, equal access to resources could be achieved. This shows that librarians who use this method are confident that it is both a successful and fair system. This was an expected result.

7.7 Censorship

Question 43 asked librarians whether they thought that it was necessary to censor the contents of their CD-ROMs. The results indicate that a higher percentage of the *"Other"* respondents (24%) believe that CD-ROMs need censoring, compared with 16.3% of Nottinghamshire librarians. This figure could be due to the fact that fewer of the *"Other"* librarians see discs in action before they purchase and are therefore less confident about the contents. It is unlikely that *"Other"* librarians censor discs because they have the capability to interface with the Internet, as only a small number of schools in the *"Other"* data set had an Internet link. The majority of respondents agree that censorship is unnecessary. This is a positive result as it means that once a pupil has mastered how to use the disc, the resource can be used independently by students.

7.8 Finance

There was a significant difference in the distribution of results between the two data sets that related to the purchase of discs. For question 47 the majority of *"Other"* librarians, 55.6%, stated that they "often" buy discs compared with 44.2% of Nottinghamshire librarians. This shows that a smaller proportion of Nottinghamshire librarians have the sole responsibility for the purchase of discs.

Table 5: Are CD-ROMs purchased by the subject department?

	Qu. 48	1) Always	2) Often	3) Seldom	4) Never	9 No Answer	Total	K-S
Notts	No.	3	4	21	0	15	43	
	%	7	9.3	48.8	0	34.9	100	
Other	**No**	**2**	**21**	**15**	**1**	**15**	**54**	
	%	**3.7**	**38.9**	**27.8**	**1.8**	**27.8**	**100**	**5%**

The results for question 48 (Table 5) showed that the highest proportion of answers for the *"Other"* group focused on point 2, "often", as opposed to point 3, "seldom", for Nottinghamshire. This shows that a greater number of subject departments in the *"Other"* group buy CD-ROMs than those in Nottinghamshire. This could be a reflection of the higher teacher awareness of CD-ROMs that is apparent in the *"Other"* group. This is a factor which itself could be attributable to a difference in the way multimedia machines are deployed in the school. If teachers have more access to machines during lesson times, then their familiarity and confidence with the technology will increase.

A similar distribution of results between the two data sets was evident for question 49. Slightly more respondents in the *"Other"* set indicated that they "always" (3.7%) or "often" (37%) buy CD-ROMs jointly with subject departments. Overall, this is a positive indication that communication between the librarian and subject departments is successful. There is a large number of "9's" or "no answers" in both sets (Other 38.9%; Notts 34.9%) and this could denote that a suprising number of these librarians never buy resources jointly.

The results from the *"Other"* group showed that the purchase of CD-ROMs, either by the librarian, or the teacher, or jointly, did not alter the librarians' perception of teacher attitude. This confirmed the Nottinghamshire results. This means that those librarians who purchased CD-ROMs in conjunction with the teaching staff, did not view staff as more interested in CD-ROMs generally. This suggests that to improve perceived teacher attitude, the librarian would need to employ additional strategies to encourage teachers to interact with CD-ROMs. Purchasing discs which are relevant to individual departments would help the librarian to raise teacher awareness. Specific discs would also provide a focus for teacher training.

7.9 Training

Providing INSET training for teachers on CD-ROMs does not seem to be a priority for *"Other"* librarians and 53.7% have never provided any training. This is in sharp contrast with respondents in Nottinghamshire where only 25.5% have never provided

training. This means that, overall, *"Other"* librarians have provided fewer structured INSET sessions than their Nottinghamshire counterparts. This is also true for library staff. Over half of the respondents have never provided library employees with formal training. This lack of training could be explained by the teachers prioritising departmental business over training sessions in the library.

Suprisingly, the results gathered from the *"Other"* group for questions 53-56 , which focused on the perceived attitudes of teachers towards CD-ROMs, did not prove to be significantly different to those collected in Nottinghamshire. This indicates that teachers from the *"Other"* group could also be experiencing the same cycle of negative attitudes which was evident from the Nottinghamshire results. This indicates that even though the teachers from the *"Other"* group were willing to suggest new items for purchase, that this does not have a positive effect on the librarian's perception of teacher attitude. A subtle difference occurred in question 53 which was concerned with technophobia among staff (Table 6). The results show that the respondents in the *"Other"* group perceive teachers to be slightly less technophobic than those from Nottinghamshire, although the difference is minimal. Slightly fewer respondents in the *"Other"* data set believed that teachers were technophobic.

Table 6: Have you ever encountered technophobia amongst staff towards CD-ROMs?

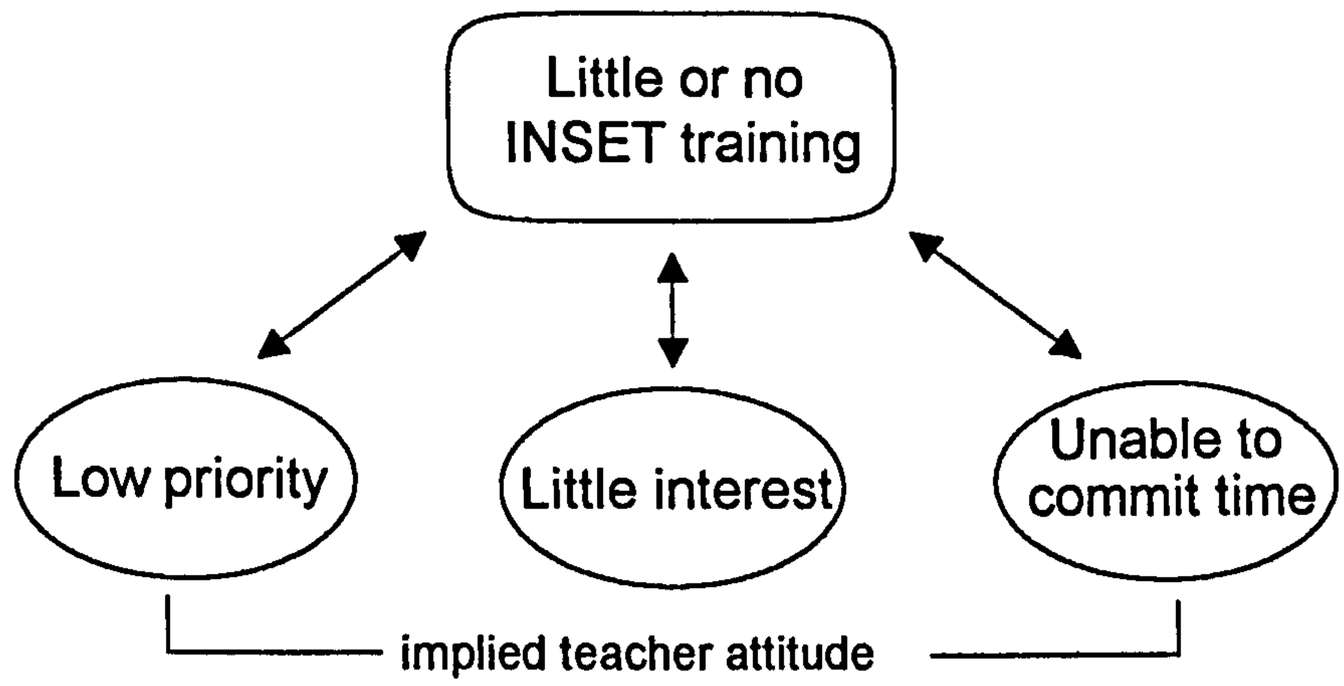
	Qu. 53	1) Always	2) Often	3) Sometimes	4) Seldom	5) Never	9) No Answer	Total	K-S
Notts	No.	1	19	13	4	3	3	43	
	%	2.3	44.2	30.2	9.3	7	7	100	
Other	**No**	**1**	**21**	**15**	**7**	**5**	**5**	**54**	
	%	**1.8**	**38.8**	**27.7**	**13**	**9.2**	**9.2**	**100**	**5%**

Respondents from both groups perceive staff as exhibiting the same level of interest in new CD-ROMs, which is a suprising result. As more staff from the *"Other"* data set specify discs in lessons (question 26) than Nottinghamshire teachers, one would have expected them to be more interested in new CD-ROMs in the library. One explanation could be that it is only a small group of teaching staff who are always interested in new CD-ROMs. Clearly to improve the situation, librarians from both groups need to employ some general awareness-raising strategies.

The idea that showing pupils how to use CD-ROMs is the role of the librarian and not the teacher is endorsed by the results from the *"Other"* group, for question 57. The majority of respondents (37%) replied that teachers "seldom" showed pupils how to use CD-ROMs in the library and that 26% never showed pupils at all. This corresponds with the findings from Nottinghamshire. It is important therefore that librarians are confident users of CD-ROMs as they are required to provide the link between the software and the pupil. However, librarians would still like teachers to be able to use the resources themselves. The majority of librarians in both data sets indicated that training teachers was an important issue. This training, as has already been noted, does not take place in a formal manner. If only piecemeal training is being undertaken then achieving this aim could be difficult. The librarian needs to be proactive and flexible enough to provide training that fits in with a teacher's busy schedule. This course of action means that the librarian would be taking practical steps aimed at changing the negative attitudes held by some teachers towards CD-ROMs.

A link was discovered between the provision of INSET (question 51) and the attitudes of teachers towards CD-ROMs (questions 54-56), as perceived by librarians in the *"Other"* group. Correlations revealed that where little or no INSET training has been provided by librarians, teaching staff are perceived as having little interest in CD-ROMs (question 54). It also showed that if librarians believe that teachers place a low priority on CD-ROM related issues, then they provide less INSET training for staff (question 55). Finally, if librarians view teachers as being unable to commit time to working with CD-ROMs, then they do not provide INSET training (fig. 10).

(fig. 10) The relationship between the provision of teacher training by the librarian and perceived teacher attitude.



The relationship between the factors in fig. 10 could work in either direction, that is, because the librarians believe that the teachers have little interest in CD-ROMs they do not provide INSET training. In the same way the teachers might not be not interested in CD-ROMs because little or no training is provided. It can be concluded, therefore, that the attitudes of teachers affect the provision of training. If teachers feel pressurised by the existing demands on their time, trying to persuade them to spend more time with new technology could be difficult. This situation also occurs in Nottinghamshire. What the results cannot show is whether increased provision of training would lead to a more positive perception of teacher attitudes among librarians. This diagram can be viewed as a natural progression from fig. 8, "The negative attitude cycle" (Data analysis: Nottinghamshire, fig. 8), as it shows that negative attitudes from staff can inhibit IT development. This means that at a whole-school level, new technological innovations would not be successfully integrated into the curriculum.

7.10 Personnel

Librarians' attitudes towards technical backup is similar for both groups. Question 64 focused on the influence the amount of technical support had on purchasing decisions. The mid point was chosen by 29.6% of the respondents in the *"Other"* group. This result means that the amount of support available to the librarian does not adversely affect the majority of respondents' attitudes in relation to new technology. Only 9.3% of *"Other"* respondents, compared with 25.6% of Nottinghamshire librarians, stated

that the amount of technical support affected them in a positive manner. Interestingly, a higher percentage of *"Other"* respondents, compared with Nottinghamshire librarians, felt less inclined to purchase new technology because of the level of support they received. This would suggest that a greater proportion of *"Other"* librarians are negatively influenced by the amount of technical support that they receive. This is an interesting result as the responses from the *"Other"* group show that over half (57.7%) have a specific IT technician who is solely in charge of providing technical assistance. This is twice the proportion reported in Nottinghamshire. The fact that this assistance does not affect these librarians' purchasing decisions is unexpected and could suggest that the backup they receive is unsatisfactory. One explanation could be that the technician has responsibility for other areas in addition to the library. This would mean that he/she may not always be available to solve problems as they occur. Another reason could be that the school management have not placed a high priority on improving the existing provision.

The analysis of the results from the *"Other"* data set shows that for the majority of questions, the findings from the Nottinghamshire librarians have been supported. The next Chapter analyses the responses of the Nottinghamshire librarians to the Internet.

Comparison of Statistics

The results from the *"Other"* data set provide a picture of the situation that existed within this set of school libraries at the time of the survey. These results have been compared with the data gained from the Nottinghamshire librarians and both the similarities and differences between the findings are summarised below.

Resource management

- Neither group provides users with accompanying written instructions for CD-ROMs.

- Promotion of a resource to different year groups could have a positive effect on the number of pupils who request to use it in the library.

Acquisition

- Both sets of librarians use publishers as their main source of acquiring information about CD-ROMs.

- A greater proportion of librarians from the *"Other"* data set use teaching staff to find out about new CD-ROMs than in Nottinghamshire. However, both groups use other professional librarians as a source of information on new products to a similar extent.

- There is less emphasis on seeing discs in action prior to purchase for the *"Other"* group, than among Nottinghamshire librarians.

Curriculum

- For the *"Other"* group, a higher proportion of teachers often specify discs in their lessons and a link exists to show that this has a positive effect on pupil requests in the library.

- Both sets of librarians are able to use CD-ROMs to answer enquiries and believe that CD-ROMs are more attractive than books.

- Both groups of librarians view CD-ROMs as being intuitive.

- The majority of teachers do not show pupils how to use the CD-ROM.

- Librarians consider it important that staff know how to use CD-ROM discs.

Personnel

- Both groups of librarians agreed that the availability of technical back up did not affect their decisions to buy new software.

- Library staff are encouraged to familiarise themselves with new technology in both groups.

Environment

- Both groups view the location of CD-ROMs as being important and as having an effect on usage.

Access

- Half of the respondents from both groups use a booking system.

Censorship

- The majority of librarians in both data sets think that it is unnecessary to censor the contents of CD-ROMs.

Finance

- Joint purchasing of CD-ROMs, between the library and subject area, occurs to the same extent in both groups. The purchase of CD-ROMs solely by subject areas, however, is more prevalent in the *"Other"* data set than in Nottinghamshire.

Training

- Nottinghamshire librarians have provided more INSET training that the librarians in the *"Other"* data set.

- The results from both data sets show that some teachers could become trapped within a cycle of negative attitudes towards CD-ROMs.

- According to both sets of results the majority of librarians believe that showing pupils how to use the CD-ROM is the role of the librarian, not the teacher.

- Librarians from both groups agree that they would like teachers to be able to use the CD-ROM resources.

- In the *"Other"* group there is a link between librarians' provision of INSET training for teachers on CD-ROMs and perceived teacher attitudes (fig. 10). The relationship between the factors in fig 3 could work in either direction, that is, because the librarians believe that the teachers have little interest in CD-ROMs they do not provide INSET training. In the same way the teachers might not be interested in CD-ROMs because they are not provided with INSET training. This link does not occur in Nottinghamshire.

Personnel

- There is a similar attitude towards the importance of technical support in both groups.

Librarians' attitudes towards CD-ROMs

- Both groups of librarians believe that CD-ROMs do not require additional instructions.

- When answering enquiries, librarians are confident that pupils will be able to navigate through the software suggested.

- Librarians see CD-ROMs as being easy to use.

- Showing pupils how to use CD-ROMs is the role of the librarian.

Communications

- The results from both groups of librarians support the impression that limited communication exists between professional librarians. Links between school librarians need to be strengthened, therefore, to ensure that expertise can be shared across a wider forum. This problem could be alleviated by the Education Library Service (ELS) as it provides the opportunity for professional librarians to meet.

- Librarians do communicate their evaluations of CD-ROMs to teaching staff.

- Teachers may not be fully aware of the extent to which CD-ROMs recommended to pupils are used by those pupils.

Promotion of CD-ROMs

- Having CD-ROM discs that are relevant to the curriculum makes the task of raising teacher awareness easier for the librarian.

Suggestions:

The evidence indicates that it would be beneficial for the librarian to:

1. Strengthen links between him/herself and other school librarians to ensure that expertise can be shared across a wider forum.

2. Share evaluations of CD-ROMs with teachers as this can raise their awareness sufficiently to increase the use made of CD-ROMs in lessons.

3. Encourage teachers to incorporate CD-ROMs into their lessons, through training and promotion, rather than simply relying on joint purchases of software, between the library and subject area.

4. Adopt a flexible approach in relation to teacher training and arrange sessions that fit in with an individual's timetable.

8. Data analysis: Internet questionnaire Nottinghamshire

Fourteen Nottinghamshire librarians responded to the Internet questionnaire. The response rate implies that, at the time of the survey, only a small proportion of the librarians who had returned the main questionnaire had a working Internet connection. Some groups of questions have been analysed as a series, for example questions 74-78, which focus on the librarians' role in relation to the Internet. The table of results in this section show all the combinations of responses that were selected by the respondents. This approach was chosen as it reveals the full extent of the librarian's role in relation to Internet management. The Chi-squared test (Chi^2) was used to test the results for statistical significance.

Connection by telephone line to the Internet was the most popular method used in Nottinghamshire and was used by nine schools. At the time of the survey none of the respondents had an ISDN connection. This was probably due to the fact that ISDN lines are initially more expensive than ordinary telephone lines as they require special installation. Using a telephone line is a quick and easy way to connect one computer to the Internet. If schools wanted to increase the number of machines that could access the Internet, then one solution would be to install a computer network. However, this requires substantial investment from the school in terms of both hardware and staff training. As hardware becomes relatively less expensive one would expect schools to install networks in the future. Question 71 (Table 1) reveals that at the time of the survey only two school libraries had the Internet running on more that six machines.

Table 1: How many machines run the Internet?

Qu. 71	1) 1 machine	2) 2-3 machines	3) 4-5 machines	4) >6 machines	9) No Answer	Total	Chi^2
No.	9	2	1	2	0	14	
%	64.3	14.3	7.1	14.3	0	100	0.5%

The fact that the majority of schools only run the Internet on one machine is not entirely unexpected. There are two possible explanations for this result. It could reflect that the provision of equipment in the library is poor and that the Internet can only be supported on one machine. Alternatively, it could reflect the fact that the Internet is a new resource and still in its infancy. Schools need time to evaluate new

resources to ensure that they offer value for money. It would be unwise for schools to make significant investments too soon as there is a risk that the technology could become redundant or be superseded by a superior model. It is probable that schools may only look to increase pupil access once the Internet has become an established resource.

The survey revealed that the majority of librarians go on-line everyday (Table 2). This is encouraging and shows that they are making regular use of this resource. It also means that librarians are gaining experience and building up their levels of expertise with the Internet. Librarians need to allocate time to become familiar with search engines and to develop their searching techniques. This should ensure that they can provide effective guidance for new users. However, the amount of time needed to become familiar with the Internet and to assess web sites, does need to be taken into consideration by the librarian.

Table 2: How often do you go on-line?

Qu. 72	1) Everyday	2) Every other day	3) Once a week	9) No Answer	Total	Chi^2
No.	10	0	2	2	14	
%	71.4	0	14.3	14.3	100	0.5%

From the results of question 73 it can be seen that although librarians use the Internet everyday, the majority only stay connected up to an hour (Table 3). This has three possible explanations. It could mean that, either the librarian does not need to use the Internet for many enquiries, or that he/she can quickly find the answer needed, or that he/she is cautious about the amount of time that is spent on-line.

Table 3: How long do you stay on-line?

Qu. 73	1) Up to an hour	2) 1-2 hours	3) 2-4 hours	4) 3-4 hours	9) No Answer	Total	Chi^2
No.	10	1	2	0	1	14	
%	71.4	7.2	14.2	0	7.2	100	0.5%

Alternatively, it could indicate that the respondents simply give up the search after a certain length of time. Deciding how long to stay on-line could be a problem if the computer is also used for accessing other resources, such as CD-ROM software. This sharing could limit the amount of time that the machine is available to both pupils and staff who wish to use the Internet. The librarian also has to consider the financial

implications of each search as using a telephone connection involves paying a connection charge per minute on-line. This places pressure on the user to conduct cost-effective searches. This uncertainty could deter some schools from installing the Internet as school managers may be wary of supporting a resource which has such variable costs.

Correlations were performed to see whether the length of time librarians stay on-line (question 73) affects their evaluation of the Internet (questions 112, 114 and 115). The results showed that those librarians who did not stay on-line for very long (up to an hour), thought that it was easy to find useful information. This suggests that these librarians are conducting successful searches that yield useful results. This is an encouraging result. It also implies that these librarians do not become side-tracked by the high level of returns that are produced by some enquiries and that they can also sift through the results successfully. This indicates that these librarians would be able to teach both pupils and staff how to formulate and execute searches and how to locate relevant information.

These librarians also believe that the Internet provides value for money. This is probably due to their success in using this resource. It can be concluded that the Internet is providing librarians with useful information. It was interesting to discover that the respondents' opinions of the relevance of the Internet in relation to the curriculum, was not affected by the length of time they spent on-line. This reveals that the librarians' evaluation of the Internet is based on their assessment of individual sites.

The respondents were asked to identify which of the following roles they undertake in relation to the Internet: undertake searches for staff (74); show staff how to use (75); regularly download information for staff (76); show pupils how to use (77); answer enquiries (78) (Table 4). Overall, the distribution of combined answers was not statistically significant with only two respondents indicating that they fulfil all of the roles suggested. This shows that the number of roles that the librarian undertakes is dependent on the individual and circumstances. However, the answers do show that 10 respondents (24.4%) teach staff how to use the Internet (question 75). This is encouraging as it indicates that the librarian is offering training, although it does not

reveal how many staff take advantage of the service. This type of activity is valuable as it provides the librarian with an opportunity to raise the awareness of teaching staff in relation to new technology. It also enables them to demonstrate their technical skills and knowledge. Another member of the teaching staff or an IT technician may fulfil this role in schools where librarians do not provide this service.

Table 4: What is your role in regards to the Internet?

Qu. no.	All	74,75 & 78	74,75, 76 & 78	74, 77 & 78	74,74, 77 & 78	75 & 77	75, 76, 77 & 78	75, 77 & 78	9) No Answer	Total	Chi²
No.	2	1	1	1	1	2	1	2	3	14	
%	14.4	7.1	7.1	7.1	7.1	14.4	7.1	14.4	21.3	100	18

74 = Undertake searches for staff 76 = Regularly download information for staff
78 = Answer enquiries. 75 = Show staff how to use 77 = Show pupils how to use

Half of the respondents show students how to use the Internet. This can have the positive effect of increasing the status of the librarian within the school community as this places him/her in a teaching role. This can be important when considering the role and image of the library and how it is perceived by both staff and pupils. This finding was also reported by Wishart (1999 p.172) who noted that increasingly the role of teacher and librarian were merging. One Nottinghamshire respondent answered that his/her only role in relation to the Internet was to undertake searches for staff. One possible explanation could be that there is another member of staff who shows teachers how to use the Internet. Alternatively, it could indicate that teaching staff are not making any enquiries into using it themselves.

The results have already shown that the majority of schools only have one machine that is linked to the Internet. This raises the question, "How accessible is the Internet to pupils within the school?" (questions 87-90). It was interesting to discover that the distribution of results did not provide any significant combinations of the following options; independently (87); as part of a class/group (88); only with a teacher (89); at lunch time (90). This suggests that schools operate individual systems and allow pupils to access the Internet in a manner which they feel is appropriate. None of the options were particularly favoured by the respondents although, independent use was slightly higher, with five schools (26.4%) choosing this option. It will be interesting to see whether this distribution of answers changes as the Internet becomes more common

within schools. It is to be hoped that independent access becomes more prevalent, thus allowing more pupils to undertake their own research. Improvements in filtering software may help to facilitate change. However, increased pupil independence would need to be supported by adequate information skills training to ensure that effective searches were undertaken.

Questions 79-86 were designed to reveal which subject areas used the Internet. Once again the distribution of answers was not significant. This means that Internet use in schools is not dominated by one subject department, and that pupils from most subject areas are exploring the Internet. This can be viewed as a positive result as it indicates that teachers throughout the school are becoming involved in using the technology, either themselves or with their pupils.

Results from the CD-ROM questionnaire indicated that the majority of Nottinghamshire librarians do not use preparatory search sheets. It was not suprising therefore that the results from questions 93 and 94 (Table 5) revealed that the majority of respondents (92.9%) do not use search forms for the Internet either. Only one respondent indicated that they provided search sheets for both staff and pupils. This is an interesting response in view of the relative complexity of Internet searching. The amount of returns a user can be presented with can be enormous and can result in the user becoming distracted from his/her original search. A pupil may also become frustrated if he/she is unable to locate a relevant web site from those suggested. The use of search sheets would therefore be a useful way of focusing the mind of the user on his/her task.

Questions 91 and 92 (Table 6) revealed that only two librarians have a search guide for pupils and staff. These answers reflect the results of question 87-90. If the majority of pupils are not allowed to use the Internet independently, then consequently the need for search sheets is diminished.

Table 5: Do you have a search form for the Internet (Pro forma)?

Qu. nos. 93&94	93 (For staff)	94 (For pupils)	93 & 94 (For both)	9 No Answer	Total	Chi^2
No.	0	0	1	12	14	
%	0	0	7.1	92.9	100	41%

Table 6: Do you have a search guide for the Internet?

Qu. nos. 91 & 92	91 (For staff)	92 (For pupils)	91 & 92 (Both)	9 No Answer	Total	Chi^2
No.	0	0	2	12	14	
%	0	0	14.3	85.7	100	13%

Using a booking system for Internet use (question 95) was not a popular choice with the respondents. Half of the librarians did not use a booking form. Although this question did not have a particularly significant distribution, the results reveal that access to the Internet in most schools is not controlled in any formal way. This result was unexpected and implies that current demand is being successfully managed and that users are able to gain access as and when they wish.

The results for questions 96-99 (Table 7) which were concerned with pupils' access to undesirable information, were not suprising. Nine schools included constant supervision as one of their options. Only three out of the nine used this option exclusively. Others preferred a combination of methods with seven schools choosing two or more options. No one combination was more popular than another. These results were expected. The fact that undesirable information is available on the Internet means that schools will need to ensure that pupils do not have the opportunity to misuse this resource. Supervising pupils diminishes their ability to discover inappropriate materials. One disadvantage with this system is that a member of staff would need to supervise the searches that were undertaken by pupils. If Internet access is via the library, then this suggests that it would be the librarian who carries out most of the supervision. This has time management implications for the librarian.

Table 7: How do you deal with pupils access to undesirable information?
96=password; 97=protection by service provider; 98=supervision; 99=no browsing

Qu. nos. 96-99	96 & 97	97 & 98	98 & 99	96, 97 & 98	96, 98 & 99	97	98	9) No Answer	Total	Chi^2
No.	1	2	1	1	2	1	3	3	14	
%	7.1	14.3	7.1	7.1	14.3	7.1	21.5	21.5	100	22%

The results from question 100 (Table 8) show that pupils in years 12-13 use the Internet the most. This result was not unexpected and is probably due to the fact that pupils in this age range possess the necessary ability level to perform structured searches on the Internet. Sixth formers will probably require less of the teacher's or

librarian's time when undertaking research as they should be more able to cope with sifting through a large number of web sites, than would a younger pupil.

Table 8: Which age group of pupils uses the Internet the most?

Qu.no. 100	Year 10	Years 12 & 13	Years 7, 8 & 12	Year 8	Years 9, 10, 11 & 12	9) No Answer	Total	Chi^2
No.	2	6	1	1	1	3	14	
%	14.3	43	7.1	7.1	7.1	21.4	100	0.5%

In the future, one would expect that once the Internet has become an established resource, which is available over a network, that a wider range of pupils would access information in this way. However, it is important to remember that unless training is provided, then using the Internet could become a fruitless exercise for the majority of pupils.

The results from question 75 have already revealed that a quarter of librarians show staff in their school how to use the Internet. When respondents were asked how this teaching takes place, seven librarians included "ad-hoc" training in their responses (Table 9). This indicates that training is provided as and when required. However, this is not suprising given that the responses for the CD-ROM questionnaire showed that teachers are often unable to commit themselves to a particular time due to the pressures of work. This means that the librarian has to provide training that fits in with the individual teacher's schedule.

Table 9: How has staff training taken place?

101= Ad hoc; 102= During class time; 103= Through faculties; 104= Browse

Qu. nos. 101-104	101 & 104	101, 102 & 104	101, 103 & 104	101, 102, 103 & 104	101	103	104	9 No Answer	Total	Chi^2
No.	1	2	1	1	2	3	1	3	14	
%	7.1	14.3	7.1	7.1	14.3	21.5	7.1	21.5	100	22%

Two schools use teachers to deliver user education (questions 105-107, table 10). For one school it is the sole method of delivery. This could mean that in the majority of schools teachers do not possess either the necessary skills or the expertise to deliver user education. This is a situation which is unlikely to change until pupils are required to use of the Internet as part of the curriculum. Teachers would then have to learn how to use this resource in order to fulfil the requirements of the courses being taught.

Table 10: How has user education taken place?

105= Through teacher 106= You teaching groups 107= Pupil browsing 108= Worksheets

Qu. nos. 105-108	106, 107 & 108	105, 106 & 108	105	106	107	9 No Answer	Total	Chi^2
No.	1	1	1	2	4	5	14	
%	7.1	7.1	7.1	14.3	28.6	35.8	100	0.5%

However, it is to be hoped that enthusiastic staff will be motivated enough to consult the librarian, or IT specialist, for further information and training. Although, this approach could result in the librarian only seeing those members of staff who are particularly interested in technology.

The results show that user education is not teacher-led and in four schools the only method used is "pupil browsing" (Table 10). Students are expected to learn from their own experiences of using the Internet. This is worrying as these pupils are being asked to evaluate their own performance without being provided with any formal guidance from a teacher or librarian. If no instruction is provided then pupils would probably continue to carry out unsuccessful and inefficient searches. It is vital that pupils know how to construct successful search strategies and how to evaluate web sites. This is a situation which the librarian could change by becoming involved with pupil usage of the Internet and by providing structured advice and guidance. Using worksheets as a method for providing user education was not popular; only two of the respondents stated that this approach was used in their school. This is not surprising considering that the majority of pupils who have Internet access are 6th Formers who are probably using it to undertake independent research.

The difference in the perceived level of enthusiasm exhibited by staff and students towards the Internet was very noticeable. Only one respondent (7.1%) replied that teachers were "very" enthusiastic about the Internet (Table 11), compared with 7 (50%) who said the same of pupils (Table 12).

Table 11: How enthusiastic are staff?

Qu. no. 109	1 (Very)	2 (Quite)	3 (A little)	4 (Not at all)	9 No Answer	Total	Chi^2
No.	1	5	3	1	4	14	
%	7.1	35.7	21.5	7.1	28.6	100	22%

Table 12: How enthusiastic are pupils?

Qu. no. 110	1 (Very)	2 (Quite)	3 (A little)	4 (Not at all)	9 No Answer	Total	Chi^2
No.	7	1	2	0	4	14	
%	50	7.1	14.3	0	28.6	100	1%

However, over a third of librarians thought that teachers were "quite" enthusiastic. This result is encouraging and implies that teachers would like to use the Internet but perhaps do not have the time to explore its potential. The enthusiasm attributed to pupils is not suprising and it has already been shown that they prefer to use CD-ROMs as opposed to printed material.

In the majority of the schools surveyed, Internet access is paid for from a main school budget as opposed to the library budget (Table 13). This is an important factor and certainly affects the way in which librarians view the resource. Other library resources, such as printed materials and CD-ROMs, have a fixed cost and can be budgeted for but the Internet is different as it has variable costs. It would be difficult for the librarian to estimate the amount of time both departments and individuals would want to use on the Internet. Problems could also arise if costs were higher than expected. If expenses were met solely by the library budget the librarian may either be forced to reduce spending on other resources or, it is possible that access to the Internet may be rationed. A centrally funded Internet budget is preferable as it allows for greater flexibility and also indicates whole-school ownership of the resource.

Table 13: Who pays for Internet use?

Qu. no. 111	1) Library budget	2) School budget	1 & 2) Both	9) No Answer	Total	Chi^2
No.	1	8	1	4	14	
%	7.1	57.2	7.1	28.6	100	1%

The final four questions (112-115) were aimed at ascertaining whether librarians thought that the Internet was a useful resource. The way the answers were phrased on the questionnaire affected the respondents' replies. Only two options were provided; "completely agree" and "completely disagree". This proved to be inadequate as many of the respondents indicated that their opinion fell in between the two. These answers have been counted as range 1-9 or "don't know".

The respondents were asked whether they thought that it was easy to find information on the Internet (question 112). Only 50% of the respondents answered the question clearly. The responses were shared almost equally between the two points, with slightly more respondents agreeing (28.6%) than disagreeing (21.4%) (Table 14).

Table 14: Do you think that it is easy to find information on the Internet?

Qu. no. 112	1) Completely agree	2) Completely disagree	9) No Answer	Total	Chi^2
No.	4	3	7	14	
%	28.6	21.4	50	100	70%

This result was not unexpected and suggests that searching on the Internet does not provide a uniform experience. The user needs to practise the formulation of searches and also needs to learn the techniques which are appropriate for different search engines. This is very important, as in order to find information the user may need to consult more than one search engine. The user also has to be able to select and reject materials and remain focused on his/her task. These are skills which have to be practised and developed by pupils. It is likely that as the Internet grows search engines will improve, making it easier for younger pupils to conduct successful searches. The high level of "no answers" for this question could indicate that many librarians have had insufficient time to form a considered opinion on this issue.

The majority of respondents agreed that pupils need constant supervision when using the Internet (Table 15), an opinion that was revealed earlier in the CD-ROM questionnaire (questions 96-99). Supervision of users is currently necessary to prevent pupils from accessing undesirable materials. The continuing development of Internet filtering systems, search software and the introduction of school Intranets could mean that, in the future, pupils will require less supervision.

Table 15: Do you think that pupils on the Internet need to be supervised constantly?

Qu. no. 113	1) Completely agree	2) Completely disagree	9) No Answer	Total	Chi^2
No.	8	1	5	14	
%	57.2	7.1	35.7	100	2.0%

Despite the difference of opinion expressed over the ease of use of the Internet, the majority of respondents (57.2%) believe that it provides value for money (Table 16). Only one respondent "completely disagreed".

Table 16: Do you think that the Internet provides value for money as a resource?

Qu. no. 114	1) Completely agree	2) Completely disagree	9) No Answer	Total	Chi^2
No.	8	1	5	14	
%	57.2	7.1	35.7	100	2.0%

This result is encouraging and indicates that librarians understand the potential that the Internet has to enhance and complement the existing resources in the library. As pupils are enthusiastic about using the Internet allowing them to use this resource could be a way of encouraging them to undertake independent research.

How relevant is the Internet to curriculum needs? (question 115). Although the overall distribution of results was not significant, over a third of the respondents thought that the Internet was relevant to the curriculum. Over half of the librarians (57.2%) did not respond to this question. This could reflect the rather eclectic nature of the Internet at present, in that some sites are of a high quality whilst others have less integrity and authority. To be relevant to the curriculum sites need to be specially focused towards pupil learning objectives. It will be interesting to see what impact the "National grid for learning" will have on schools. There are many possibilities for the development of the Internet. The government may decide to encourage commercial producers and schools to produce "school friendly" sites. Alternatively, they may decide to help teachers by providing lists of web sites which have been evaluated for use by schools. This type of initiative would complement the information that is already available on the "National grid for learning" concerning CD-ROMs.

The results of the Internet questionnaire reveal that, at the time of the survey (1997), this resource was still in its infancy. A high proportion of schools only have Internet access on one machine, although it is encouraging to note that the majority of librarians go on-line everyday. Supervised access for pupils is both supported and practised in the majority of schools. These results have been compared with those gained from Lincolnshire and Derbyshire and the next Chapter discusses these findings.

Internet questionnaire for Nottinghamshire

The results of the Internet questionnaire are summarised below.

Resource management

- At the time of the survey, the majority of schools only had one computer connected to the Internet via a telephone line.

- Constant supervision was preferred when allowing pupils to have access to the Internet.

- Becoming familiar with search engines and assessing Internet sites has time management implications for the librarian.

- The majority of librarians believe that pupils need constant supervision when using the Internet.

Curriculum

- Librarians usually go on-line everyday and stay connected for up to an hour.

- All subject departments use the Internet and they do so for a similar duration.

- Nottinghamshire librarians do not provide pupils with guides on how to use the Internet.

- Nottinghamshire librarians do not require pupils who use the Internet to fill in preparatory search sheets.

- Teaching pupils how to use the Internet boosts the librarian's image within the school community.

Access

- A fifth of the librarians use a booking system for Internet access.

- The majority of pupils who use the Internet in this study are in years 12-13.

Finance

- The Internet is usually funded centrally as a whole-school resource and not from the library budget.

Training

- Librarians need to adopt a flexible and proactive approach when training teachers to use the Internet.

- Librarians perceive teachers to be less enthusiastic than pupils in relation to the Internet, although the majority of staff are viewed by the librarian as being "quite" enthusiastic.

- Librarians believe that teachers would like to use the Internet but they acknowledge the fact that, due to workload demands, members of staff do not have the time to explore this resource.

Value and Quality Assessment

- Those librarians who stay on-line for up to an hour view the Internet as being both easy to use and as offering value for money.

- The majority of librarians believe that the Internet is offering value for money.

9. Data analysis: Internet *"Other"* and Nottinghamshire

The results from the *"Other"* data set have been examined and compared with the responses from Nottinghamshire (Notts) librarians to see if any similarities or differences exist between the two groups. The questionnaires were analysed using the Kolmagorov-Smirnov technique for ordinal data and contingency tables for nominal data. If the results are not significantly different statistically (n/s) then it can be concluded that the data sets are similar. Analysis of the results from both groups has revealed that, for the majority of questions, the responses from the *"Other"* group support the trends discovered in Nottinghamshire.

The most popular method of connecting to the Internet in the *"Other"* group was by using a telephone line. The fact that the majority of schools in both groups use this type of connection suggests that it was the easiest way of getting on-line at the time of the survey (1997). It is also the method that most home users employ.

At the time of the survey the majority of schools in both data sets ran the Internet on a single machine (Table 1). The *"Other"* group had a slightly higher percentage of schools who had one machine connected to the Internet than in Nottinghamshire (79% *"Other"*; 64.3% Notts). In the *"Other"* group there are no schools which had more that six machines with Internet capability. This indicates that most schools are limited to a single connection that is accessed by both staff and pupils.

Table 1: How many machines run the Internet?

	Qu. 71	1) 1 machine	2) 2-3 machines	3) 4-5 machines	4) >6 machines	9) No Answer	Total	Sig Level
Notts	No.	9	2	1	2	0	14	
	%	64.3	14.3	7.1	14.3	0	100	
Other	**No**	**15**	**3**	**1**	**0**	**0**	**19**	
	%	**79**	**15.7**	**5.3**	**0**	**0**	**100**	**n/s**

This result was expected as adopting new technology requires investment into both equipment and user training. The Internet's use as an information resource needs to be evaluated in terms of its relevance to the curriculum and whether it offers value for money. Until it has been proved to be a valuable resource in which to invest, schools will probably only opt to have one connection. The number of machines with Internet

connections will also depend upon the standard of the existing hardware and software in each school. If a school with stand-alone computers wished to increase pupil access to the Internet, then the installation of a computer network system would have to be considered. This has financial implications; both the software and appropriate staffing would need to be funded. It can be concluded that, at the time of the survey, access to the Internet would only be provided to pupils at "richer" schools.

The majority of the respondents from both groups go on-line every day and the results for question 72 (Table 2) were not significantly different statistically. A higher percentage of Nottinghamshire respondents chose option 1 (everyday) than in the *"Other"* group. This suggests that Nottinghamshire librarians either have a high level of motivation to use the Internet, or fewer obstacles to going on-line than the respondents in the *"Other"* group. However, it is encouraging to see that once this facility is available to librarians that the majority frequently use this resource. High usage implies that librarians are enthusiastic about utilising the Internet.

Table 2: How often do you go on-line?

	Qu. 72	1) Everyday	2) Every other day	3) Once a week	9) No Answer	Total	Sig Level
Notts	No.	10	0	2	2	14	
	%	71.4	0	14.3	14.3	100	
Other	**No**	**10**	**2**	**3**	**4**	**19**	
	%	**52.6**	**10.5**	**15.8**	**21.1**	**100**	**n/s**

In both groups the majority of respondents go on-line for up to an hour (Table 3). Slightly more respondents from the *"Other"* group stay on-line between 1 and 2 hours (option 2). Most respondents therefore stay on-line for up to an hour regardless of how often they go on-line, or how many machines they have in the library. This implies that this is the optimal length of research time for librarians. However, there could be other outside influences which affect the length of time spent on-line. The librarian may lack the time to use the Internet for longer than an hour, or he/she may only have limited access to the computer.

Table 3: How long do you stay on-line?

	Qu. 73	1) Up to an hour	2) 1-2 hours	3) 2-4 hours	4) 3-4 hours	9) No Answer	Total	Sig Level
Notts	No.	10	1	2	0	1	14	
	%	71.4	7.2	14.2	0	7.2	100	
Other	**No**	11	4	1	1	2	19	
	%	57.8	21.1	5.3	5.3	10.5	**100**	n/s

A link between spending a short time on the Internet and stating that it was easy to find information occurred in both groups. It can be concluded therefore, that librarians are proficient in executing searches and locating relevant information. The link between time spent on-line and believing that the Internet provided value for money also occurred for both groups, although it had a higher significance level for the *"Other"* respondents than for Nottinghamshire librarians. Overall, this result is encouraging and it implies that librarians are cost-effective users of the Internet.

Correlating the *"Other"* data revealed a link between the time spent on-line by the librarian and how relevant he/she thought the Internet was to curriculum needs. Those librarians who spent less time on-line thought that the Internet provided relevant sites. This implies that these librarians conduct both well-formulated and successful searches. This could be due to the fact that they have used the Internet in response to specific enquiries, as opposed to simply browsing for information. The short amount of time spent on-line suggests that these librarians have only used the Internet when they were certain that the answer was available, and that they have not simply used it in preference to a more suitable printed resource. Because these librarians have targeted their use of the Internet, they have been successful in locating relevant information. One respondent stated that she viewed the Internet as being able to

> Supply information which is unavailable elsewhere.

This comment reveals that although some of the material on the Internet could be available in other published formats, for this librarian it provides him/her with a convenient method of accessing information which is <u>not</u> held in the school library.

Librarians in both Nottinghamshire and *"Other"* undertake very similar roles with regard to the services they provide in relation to Internet use (Table 4).

Approximately the same proportion of librarians undertake each of the specified roles in both groups. However, the combination of roles fulfilled by Nottinghamshire and *"Other"* librarians are slightly different.

Table 4: What is your role in regard to Internet use?

	Qu. 74-78	74	75	76	77	78	9	Total	Sig Level
Notts	No.	6	10	4	9	9	3	41	
	%	14.6	24.4	9.7	22	22	7.3	100	
Other	**No**	9	11	6	15	12	3	56	
	%	**16.1**	**19.6**	**10.7**	**26.8**	**21.4**	**5.4**	**100**	**n/s**

74 = Undertake searches for staff 76 = Regularly download information for staff
78 = Answer enquiries 75 = Show staff how to use 77 = Show pupils how to use

For the *"Other"* group 26.3% undertake all of the roles compared with 14.4% in Nottinghamshire. This means that a higher percentage of *"Other"* librarians provide a wider range of services to staff and pupils. Only one librarian in the *"Other"* group only shows pupils how to use the Internet, and does not offer any of the other services. This is, however, an exception as the remainder of the respondents provide at least two services to either staff or pupils.

The Internet provides the librarian with an opportunity to increase the services offered to the school community. Librarians can exploit the Internet in two ways. Firstly, they can find information that can help teachers to deliver the curriculum and secondly, they can locate resources which would be useful for pupils who are either undertaking project-based research or who simply wish to explore a subject further. In this way the librarian can provide a service which will enhance the experiences of both staff and pupils. This, in turn, will increase the value of the library to the school community and enhance the status of the librarian.

The librarians were asked to specify which subject areas use the Internet (Table 5). The results for both groups were very similar and they show that teachers and pupils from all subject areas use the Internet to some extent. This result is encouraging.

Table 5: Which departments use the Internet?

	Qu. 79 -86	79 Eng-lish	80 Sci-ence	81 Busin-ess	82 Huma -nities	83 Creative Arts	84 Maths	85 Design	86 Others	9 No Answer	Total	Sig Level
Notts	No.	8	7	5	7	4	2	4	4	4	45	
	%	17.7	15.6	11.1	15.6	8.9	4.4	8.9	8.9	8.9	100	
Other	**No**	10	9	8	8	7	2	4	7	1	56	
	%	17.9	16.1	14.3	14.3	12.5	3.6	7.1	12.5	1.7	**100**	n/s

Allowing pupils to have independent access to the Internet seemed to be popular with schools in both groups, as approximately a quarter of the schools provide this facility (Table 6). Being able to access the Internet independently gives pupils more freedom to use the resource when it is convenient to them. It also enables pupils to manage their research time more effectively. If the Internet is situated in the library, then it is probable that pupils would be supervised by the librarian. This has time implications for the librarian as monitoring the Internet could entail more active supervision than that which is currently necessary for CD-ROMs. However, this could change if the CD-ROM included links to the Internet.

Table 6: Can pupils access the Internet?

	Qu. 87-90	87) Indepen-dently	88) As part of a class	89) Only with a teacher	90) At lunch	9) No Answer	Total	Sig Level
Notts	No.	5	4	3	3	4	19	
	%	26.4	21	15.7	15.8	21	100	
Other	**No**	10	8	16	9	2	45	
	%	22.2	17.8	35.6	20	4.4	**100**	n/s

Allowing pupils access to the Internet only with a teacher (option 89) is more popular with the *"Other"* group (35.6%) than with Nottinghamshire librarians (15.7%) (Table 6). This means that the onus of supervision is taken away from the librarian and placed with the teacher. A slightly higher percentage of schools in the *"Other"* group allowed pupils to access the Internet at lunch times (Other 20%, Notts 15.8%). This suggests that supervision is available during this time, although the question does not reveal who undertakes this role. It could be difficult for the librarian to supervise Internet access during lunch time, especially if this is already a busy period. However, supervision is an important element of Internet management as it acts as a deterrent against pupils accessing unsuitable material (see questions 96-99).

Providing specific search guides and search forms for the Internet was not a popular option and a high proportion of respondents from both groups did not answer this question at all (Table 7 and Table 8). This result was suprising and it implies that the searches being undertaken by staff and pupils are not being recorded. This raises the question, how are librarians monitoring the level of success that users have with their searches? The results could be interpreted as meaning that librarians do not feel the need to monitor pupil searches closely, preferring to offer "ad-hoc" help as required. Alternatively, the lack of search guides could indicate the fact that this resource is relatively new and that the librarians have had insufficient time to compose a useful guide.

Table 7: Do you have a search guide for the Internet?

	Qu. 91-92	91) For staff	92) For pupils	9) No Answer	Total	Sig Level
Notts	No.	2	2	12	16	
	%	12.5	12.5	75	100	
Other	**No**	3	2	16	21	
	%	14.3	9.5	76.2	**100**	n/s

Table 8: Do you have a search form for the Internet (pro forma)?

	Qu. 93-94	93) For staff	94) For pupils	9) No Answer	Total	Sig Level
Notts	No.	1	1	12	14	
	%	7.1	7.1	85.8	100	
Other	**No**	1	2	16	19	
	%	5.3	10.5	84.2	**100**	n/s

Using a booking system was not a popular method of managing pupil access to the Internet in the library (Table 9). This is interesting and somewhat suprising considering that the majority of schools only have access via one machine. It could mean that teachers and pupils either verbally liaise with the librarian before wishing to use the resource, or that they simply "turn up" when they wish to go on-line. This implies that demand does not currently warrant the imposition of a booking system to manage access to the Internet.

Table 9: Do you have a booking form for the Internet?

	Qu. 95	1) Yes	2) No	9) No Answer	Total	Sig Level
Notts	No	3	7	4	14	
	%	21.4	50	28.6	100	
Other	**No**	5	12	2	19	
	%	26.3	63.2	10.5	100	n/s

How schools prevented pupils from accessing "undesirable" information was the focus of questions 96-99 (Table 10). The respondents in Nottinghamshire favoured option 98 (constant supervision). The *"Other"* group supported two options; "constant supervision" and the "level of protection supplied by the service provider". This means that schools in this group also rely on the filtering service provided by the computer software in addition to providing in situ supervision. This type of software works by stopping pupils accessing sites that contain certain blocked words or phrases. One disadvantage with this system is that the computer will prevent pupils from accessing educational sites because they contain filtered words, for example sex education sites. The results show that independent learners in both groups are encouraged to stay focused on their task when searching by ensuring that they are supervised, as opposed to enforcing a specific "no browsing" rule.

Table 10: How do you deal with pupil access to undesirable information?
96=password; 97=protection by service provider; 98=supervision; 99=no browsing

	Qu. 96-99	96	97	98	99	9) No Answer	Total	Sig Level
Notts	No.	4	5	9	3	3	24	
	%	16.7	20.8	37.5	12.5	12.5	100	
Other	**No**	1	11	11	2	2	27	
	%	3.8	40.7	40.7	7.4	7.4	100	n/s

Nottinghamshire librarians have a greater proportion of respondents who have password protection than the *"Other"* group. This could be due to a difference in the software used.

Pupils in years 11, 12 and 13 had the highest level of access to Internet in the *"Other"* group (Table 11). This differs slightly to the Nottinghamshire data where years 12 and 13 were the most prominent users. The results do, however, confirm the trend that older pupils use the Internet more frequently than younger pupils. This result was not unexpected and can be explained by the increased information needs of pupils

studying GCSEs, A-levels and GNVQs. As stated earlier, it is probable that usage by older pupils is easier to manage. These pupils should possess a higher level of information handling skills than younger students, although this would depend upon the extent of the training and support that had been provided during their earlier school life.

Table 11: Which pupils use the Internet the most?

	Qu. 100	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	9) No Answer	Total	Sig Level
Notts	No.	1	2	1	3	1	8	6	3	25	
	%	4	8	4	12	4	32	24	12	100	
Other	**No**	2	4	2	5	8	9	8	2	40	
	%	5	10	5	12.5	20	22.5	20	5	**100**	n/s

If pupils are allowed to use the Internet from year 7 then it is to be hoped that they will gain the necessary skills to become effective users by the time they need to conduct more in-depth research in the sixth form.

Staff training was shown to be statistically different in the way that it was undertaken by respondents in both groups. "Ad-hoc" training was shown to be popular in Nottinghamshire,- nearly 30% of respondents chose this option. The librarians in the *"Other"* group appear to rely on "ad-hoc" training to an even greater extent (Table 12). Over half of the respondents use this method, and the majority of these do so exclusively. Providing staff with the opportunity to browse (option 104) was the only other option librarians from this group chose. Unlike the Nottinghamshire respondents, none of the librarians in the *"Other"* group use "class times" or the "faculty structure" to train staff. This could be a case of semantics for option 103 as some schools may not operate in faculties. Faculties comprise of several subject areas. A humanities faculty could, for example, consist of history, geography, religious studies and economics. However, as none of the respondents chose this option, this indicates that providing training in faculties is not (on the whole) a popular method. These results show that librarians favour a more "unstructured" approach to encouraging teachers to use the Internet and that training is directed towards individuals as required. Again, as teachers' time is at a premium, forcing staff to attend training sessions could be counter-productive and could discourage rather than inspire staff to use Internet resources.

Table 12: How has staff training taken place?

	Qu. 101-104	101) Ad-Hoc	102) Class time	103) Through faculties	104) Browsing	9) No Answer	Total	Sig Level
Notts	No.	7	3	5	6	3	24	
	%	29.2	12.5	20.8	25	12.5	100	
Other	**No**	11	0	0	6	4	21	
	%	52.4	0	0	28.6	19	**100**	5

If staff are offered training on an optional basis, how are the pupils taught to use the Internet? (Table 13). It is interesting to note that 27.8% of Nottinghamshire librarians did not respond to this question, suggesting that either user education takes place in ways different to those listed, or that it does not take place at all. It is encouraging to see that both groups supported option 106 (the librarian in a teaching role). This indicates that librarians' expertise with technology is recognised by teaching staff. Half of these respondents combined option (106) with either teacher support (105), or pupil browsing (107). Being involved with teaching allows the librarians to demonstrate their expertise with new technology and this creates a positive image of the librarian among both teachers and pupils.

Table 13: How has user education taken place?

	Qu. 105-108	105) Through teacher	106) You teach	107) Pupil browsing	108) Worksheets	9) No Answer	Total	Sig Level
Notts	No.	2	4	5	2	5	18	
	%	11.1	22.2	27.8	11.1	27.8	100	
Other	**No**	**7**	**6**	**6**	**0**	**4**	**23**	
	%	**30.4**	**26.1**	**26.1**	**0**	**17.4**	**100**	n/s

How enthusiastic do librarians feel teachers are towards the Internet? (Table 14). A number of respondents did not answer this question,- 4 librarians (28.6%) in Nottinghamshire and 2 librarians (10.5%) in *"Other"*. This is suprising and indicates that these librarians do not know how teaching staff feel about this new resource. However, the majority of respondents from both groups seem to be split between option 3 (quite) and option 4 (a little). None of the *"Other"* respondents felt that their teaching staff were "very" enthusiastic about the Internet. Overall a higher proportion of respondents in the *"Other"* group, compared to Nottinghamshire, perceived staff as exhibiting some enthusiasm for the Internet. In general, these results suggest that librarians will have to work hard to promote the Internet among teaching staff. This

could perhaps be achieved by targeting subject areas and demonstrating the relevance of the Internet in relation to specific parts of the curriculum.

Table 14: How enthusiastic are staff?

	Qu. 109	1) Very	2) Quite	3) A little	4) Not at all	9) No Answer	Total	K-S
Notts	No.	1	5	3	1	4	14	
	%	7.1	35.7	21.5	7.1	28.6	100	
Other	**No**	**0**	**9**	**6**	**2**	**2**	**19**	
	%	**0**	**47.4**	**31.6**	**10.5**	**10.5**	**100**	n/s

The librarians' perceptions of the enthusiasm of pupils towards the Internet is apparent from the results of question 110 (Table 15). Over half of the respondents from both groups chose option 1, "very enthusiastic". Some librarians from both Nottinghamshire and *"Other"* did not answer this question. This implies that these librarians may not know how pupils feel about the introduction of the Internet. This is worrying as it could indicate that these librarians are particularly isolated in their schools. The fact that pupils are keen to use the Internet could be something that the respondents could exploit, as it presents the librarian with the opportunity to promote the services offered by the library to a wider audience.

Table 15: How enthusiastic are pupils?

	Qu. 110	1) Very	2) Quite	3) A little	4) Not at all	9) No Answer	Total	K-S
Notts	No.	7	1	2	0	4	14	
	%	50	7.1	14.3	0	28.6	100	
Other	**No**	10	7	0	0	2	19	
	%	52.7	36.8	0	0	10.5	100	n/s

In terms of financing the Internet the *"Other"* respondents replied overwhelmingly that it was paid for out of the main school budget (Table 16). This is an encouraging result. If the Internet is centrally funded then this shows that it is supported at a whole-school level and is not viewed as simply being an additional resource in the library.

Table 16: Who pays for Internet use?

	Qu. 111	1) Library budget	2) School budget	1&2) Both	9) No Answer	Total	Sig Level
Notts	No.	1	8	1	4	14	
	%	7.1	57.2	7.1	28.6	100	
Other	**No**	1	15	0	3	19	
	%	5.3	78.9	0	15.8	**100**	n/s

The series of questions 112-115, which focused on the librarians' perceptions of the Internet, suffered from the same high level of "no answer" for the *"Other"* group as for Nottinghamshire. This was not suprising and confirms the theory that the majority of respondents in both groups would have preferred to have been given a wider range of options from which to express an opinion.

The results for question 112 (Table 17) show that a large proportion of respondents from both groups did not answer. This could be due to the fact that the Internet is a new resource and they had yet to formulate an opinion on this issue. However, over a quarter of respondents from both groups agreed that information was easy to find. This suggests that librarians are undertaking successful searches. This was not a statistically significant result but it does reflect the fact that the experience in Nottinghamshire is similar among *"Other"* respondents.

Table 17: Do you think that it is easy to find information on the Internet?

	Qu. 112	1) Completely agree	2) Completely disagree	9) No Answer	Total	K-S
Notts	No.	4	3	7	14	
	%	28.6	21.4	50	100	
Other	**No**	**5**	**6**	**8**	**19**	
	%	**26.3**	**31.6**	**42.1**	**100**	n/s

Question 113 asked whether the respondents thought that the Internet needed constant supervision. This question had a higher percentage of answers from both groups than the previous question. The results show that there is a definite opinion among librarians that supervision is necessary (Table 18). This response is not surprising considering the results of question 98, which show that because schools need to ensure that pupils are not accessing unsuitable material, supervision of the Internet is the safest option. The fact that the majority of librarians do not believe that it is easy to find information, is a firm indication that pupils will need guidance to enable them to

search the Internet effectively. Perhaps when the Internet becomes more established and a greater number of people have access to it at home, users will become more accustomed to dealing with large amounts of information every time they undertake a search. Currently users can be bewildered by the amount of web sites that are found by a search engine in response to an enquiry. Searching the Internet is explored further in the Focus groups and Interviews.

Table 18: Do you think that pupils on the Internet need to be supervised constantly?

	Qu. 113	1) Completely agree	2) Completely disagree	9) No Answer	Total	K-S
Notts	No.	8	1	5	14	
	%	57.2	7.1	35.7	100	
Other	**No**	**13**	**1**	**5**	**19**	
	%	**68.4**	**5.3**	**26.3**	**100**	**n/s**

When the respondents were asked whether they thought the Internet provided value for money, the Nottinghamshire librarians were more positive than the *"Other"* group with 57.2% replying that they thought it was good value (Table 19). Just over half of the respondents in the *"Other"* group (52.6%) did not answer this question. However, the majority of those who did answer also agreed that the Internet offers value for money. This is an encouraging result as it shows that the Internet is viewed in a positive light by librarians. This supports the idea that librarians recognise the potential of the Internet as an information resource. It is to be hoped that the introduction of the "National Grid for Learning" will increase the value of the service to schools as this site is specifically aimed at teachers.

Table 19: Do you think that the Internet provides value for money as a resource?

	Qu. 114	1) Completely agree	2) Completely disagree	9) No Answer	Total	K-S
Notts	No.	8	1	5	14	
	%	57.2	7.1	35.7	100	
Other	**No**	**6**	**3**	**10**	**19**	
	%	**31.6**	**15.8**	**52.6**	**100**	**n/s**

The low response rate to the final question, which asked librarians to rate the relevance of the Internet to the curriculum, could reflect that respondents at the time of the survey were unable to answer the question definitely one way or the other (Table 20). As the Internet grows it is to be hoped that the Government will promote the development of educational sites and the "National Grid for Learning" could be one

way of providing schools with information and links to Internet sites that meet specific curriculum targets. It is uncertain whether this type of initiative would be driven by the Government or by individual users of the "National Grid for Learning".

Table 20: Relevant to curriculum needs?

	Qu. 115	1) Completely agree	2) Completely disagree	9) No Answer	Total	K-S
Notts	No.	5	1	8	14	
	%	35.7	7.1	57.2	100	
Other	**No**	**6**	**2**	**11**	**19**	
	%	**31.6**	**10.5**	**57.9**	**100**	**n/s**

The Internet was still a relatively new resource in schools at the time of the survey and the answers to this last series of questions shows that the majority of respondents had not made up their minds in relation to the value of the Internet as a resource in the school library.

The results show that at the time of the survey that librarians believed that the Internet required a high level of supervision and this situation is unlikely to change until the quality of filtering software, for example, is improved. If pupils were to have greater access to the Internet they would also need to possess effective searching skills. This means teaching of information skills, and especially the searching of electronic information, needs to be taught within schools. It is also useful to remember that the potential use of the Internet relies upon the content of the web sites available and the value that teachers and pupils place on the Internet can only increase if they have access to material that is relevant to the curriculum. The next Chapter analyses the results from the Focus Group discussions.

Comparison of statistics for the Internet questionnaire

The results from Nottinghamshire and the *"Other"* data set have been compared and the similarities/differences are summarised below.

Resource management

- In both groups the Internet was connected using a telephone line and, more often than not, was only available on one machine.

- Both groups preferred to supervise pupils' use of the Internet and respondents from the *"Other"* group also rely on the protection provided by their service provider to restrict user access to "unsuitable" sites.

- Most librarians from both groups go on-line every day.

- The Internet is paid for centrally from school resources for librarians from both groups.

Curriculum

- In both groups the librarians usually spend up to an hour on the Internet.

- For the *"Other"* group three subject areas within the respondents' schools had high usage of the Internet.

- Librarians from both groups do not require pupils who use the Internet to fill in preparatory search sheets.

- Users from both groups are not provided with Internet search guides.

- In both groups pupils in the higher years (years 12-13) have the greatest access to the Internet. Year 11 is also included in this range in the *"Other"* group.

- In both groups those librarians who stay on-line for up to an hour view the Internet as being both easy to use and value for money.

- The Internet provides the librarian with the opportunity to increase his/her role in terms of offering services to staff and pupils.

Access

- The percentage of librarians who use a booking form for users is similar for both data sets.

Training

- Librarians are involved with teaching pupils how to use the Internet. Both groups agreed that this was a positive role as it allowed the librarian to demonstrate his/her expertise to teachers and pupils.

- The results show that the librarian needs to have a flexible approach to teacher training. As teachers' time is at a premium, forcing staff to attend training sessions could be counter-productive and could discourage rather than inspire staff to use the resources.

- Librarians from both groups perceived teachers as being "quite" enthusiastic about using, or learning to use, the Internet.

10. Focus Groups

The following section provides a discussion of the findings of five Focus Groups that were held in schools across Nottinghamshire in 1997. Each Group contained between two and eight librarians and this provided each member of the Group with the opportunity to participate in the discussions. All of the Groups were led through the same series of topics (Appendix C) and the transcripts from each Group were then analysed and split into units. Each section contains contributions from members of the different Groups.

10.1 Using CD-ROMs

10.1.1 Products and purchasing

The librarians raised some interesting points concerning the problems that they faced in terms of the usage and purchase of CD-ROMs. One librarian commented on the benefits of using CD-ROMs, as opposed to accessing the same information via the Internet. She was very positive about CD-ROMs

> The joy of them - you don't have to queue up to get on them, you're not going to crash. They're there; they're yours.

The participant highlights the fact that with a CD-ROM all the information is easily accessible and that the pupil can use it straight away, whereas on-line information relies upon the speed of the modem, the number of people using the system and the reliability of the technology,- all of which can vary and equate to a longer search time for the user. The fact that the word "joy" is used in the above comment shows that this librarian is enthusiastic about the CD-ROM format. A librarian from the same Focus Group related that she had made an enquiry concerning the *Encyclopaedia Britannica* Internet site, which at the time of the study required a subscription to be paid per pupil. The librarian viewed this fee as being "extortionate" for a large school. In the light of these cost considerations this librarian believed that the CD-ROM would be an economic alternative that could be used in school libraries. *Britannica* is now concentrating upon marketing its electronic and on-line resources and has made the

encyclopaedia Internet site free for all users. Librarians are also able to purchase the CD-ROM if they wish.

Developments in technology means that most encyclopaedia CD-ROMs including *Britannica, Encarta* and *World Book* are producing software that provides further links to information that is posted onto the Internet. This means that in order to make full use of the resource an Internet link is desirable. One librarian had noted that CD-ROM prices had already begun to fall "dramatically," although overall, costs could rise if a subscription to the accompanying on-line information is taken out. This illustrates that cost of resources is an important consideration for the participants.

A positive aspect of purchasing CD-ROMs that was mentioned by one participant was that those discs which supported curriculum subjects could help to "take some pressure off the stock", especially if whole year-groups were studying the same topic. This comment is interesting as it shows how librarians use CD-ROMs to supplement information provided by other resources. Because CD-ROMs are always available in the library, unlike other materials which can be loaned, the librarian can ensure that information will also be available outside lesson times. In addition, the ability to extract information from the disc means that more that one pupil should be able to use the resource in a lesson.

As expected one participant commented that one of the benefits of using certain CD-ROMs was that pupils could use the word processor to cut and paste sections from the encyclopaedia and then edit it as they wanted

> I think that's the advantage with *Encarta* with it's own built-in word processor because you can drop it there and start altering words.

This is a useful facility as it enables pupils to include extracts from CD-ROM articles as part of their finished work, rather than printing out huge chunks of information and then copying the appropriate pieces into their books. However, in both cases it is essential that either the librarian or class teacher reminds pupils of the importance of acknowledging their sources.

A greater number of pupils would be able to access the CD-ROMs if the discs were available on a network. However, it is important to remember that the librarian may encounter some difficulties when new technology is first installed. One participant was cautious about relying too heavily on networks, having experienced difficulties and unreliability in the past

> ...you need to be on the network, but you also need to keep a couple of stand-alone machines as well because from what I have experienced..so far the CD-ROMs don't work that well on networks.

This suggests that librarians would be wise to keep some stand-alone machines in the library on which they could run other discs. This would mean that, firstly, access to less widely used information could be provided and, secondly, it would ensure that pupils could access CD-ROMs if the network was unavailable. However, if schools do install networks then software manufacturers need to ensure that their discs can be run on these systems, otherwise librarians may encounter problems when trying to install software. An added concern for the librarian could be cost, as most publishers require additional payments if the buyer wishes to network a CD-ROM. Using some CD-ROMs on stand-alone machines therefore would be a cost-effective solution. However, this strategy would restrict the number of pupils who could access the discs at any one time.

The librarians were asked whether the CD-ROMs that were available for purchase were relevant to the curriculum? One librarian complained that CD-ROMs had become "...tailored to the home market" as opposed to education. This suggests that schools may be forced to purchase material that has not been specifically designed for pupils to use. This view was supported by a librarian in another Focus Group who stated that when subject teachers do suggest discs they would like purchased, that the CD-ROM

> ...tends to be something that they're interested in as a fringe thing and you say, "Well how is that going to be used in the curriculum?"

The comments on the lack of curriculum orientated CD-ROMs were not completely unexpected in light of the Stevenson Report (1997) which recommended that the Government needed to encourage the development of educational software.

Two librarians noted that discs could be ordered on approval. This means that librarians can load CD-ROMS on to their own machine to "...see how they work." This is an important consideration as it enables the librarian to assess the material and make informed decisions as to whether a disc is suitable for purchase. Having a disc on approval could also allow teaching staff to become more actively involved, as they could be provided with "hands on" experience with the software. This could be beneficial to the library, as heads of academic departments are more likely to agree to provide funding to purchase materials that they have viewed.

10.1.2 CD-ROM interface design and multimedia features

The fact that CD-ROMs are not simply text based is part of their attraction, however how much do pupils really gain from these extra facilities? Research undertaken by Wishart (1999) revealed that 10% of the teachers in her study viewed the multimedia aspects of the software as enhancing their delivery of the curriculum. The audio-visual features of the resources were directly linked to student motivation, and were seen as being one of the rewards of using CD-ROMs. However, one Nottinghamshire librarian commented that the CD-ROM could only be considered as being multimedia if users learned how to use the video and audio features. This is an important point as unless users actually interact with and use the non-text based features, then CD-ROMs can be viewed as simply being books that are available on the computer. One librarian stated that she thought that some of the graphics on *Encarta* were useful as they could aid a pupil's understanding of a particular topic. She stated that

> ...something like *Encarta* when they play the electricity [animation] - the actual language is difficult in the writing but if they actually watch that, they do actually take something in of the understanding of it.

It can be concluded that graphics can be useful if they afford the user a better understanding of an idea or process. This view was supported by another participant from the same Group who added that the graphics seemed to be appreciated more by "less able children" who found the text difficult to understand. However, she also noted that pupils often played audio and video clips in "preference to the information."

The multimedia dimension of CD-ROMs therefore can be viewed as a "double edged sword" as these features can easily be misused by pupils who can become more interested in watching and listening to multimedia clips than in completing their research task.

The librarians were asked whether the design of CD-ROM user interfaces had caused any problems for pupils? Two participants had noted that pupils would use certain discs in preference to others. This was a problem as *Britannica* on CD-ROM was viewed by the librarian as being "...brilliant if you really want to find something out." but was not being chosen by pupils because "it's not so pretty to look at." This implies that some students are rejecting a source simply because it fails to be as visually exciting as another product. This finding is worrying, especially if the product contains high quality information, but not suprising. The same type of problem was mentioned in a different Focus Group where it was noticed that pupils were choosing to use *Encarta* rather than *The chronicle of the 20th century* simply because it was a resource with which they were more familiar. The librarian commented that

> ...there was equally as valid information on *The chronicle of the 20th century* but because the search technique was totally different, they couldn't be bothered to work it out.

In this case the CD-ROM was not being chosen simply because pupils were unfamiliar with the way in which the search engine operated. This comment was not unexpected as having to cope with an unfamiliar search screen can place more pressure on pupils who are already working within tight time deadlines. If all CD-ROMs employed the same basic searching structure then perhaps pupils would be less intimidated and more able to use new discs. It is important therefore that pupils have access to resources in their own time as this will allow them to become familiar with the design of the search engine and the navigational tools. One participant felt that it would be helpful if manufacturers used the same approach to searching

> ...if there was a standard way of searching it would be much easier for them because they would know whatever disc they came to it would have the same sort of techniques to use because really they've got to learn each disc independently.

This response encapsulates the problem as each time a new disc is purchased all users, both staff and pupils, have to relearn how to conduct a search. The time implications for this process are further increased if resources are limited. One librarian noted that pupils at her school had encountered problems when they had first used *Encarta* 1997, after they had been used to using the 1995 version. The librarian reported that some of the pupils had said "This isn't *Encarta*." This means that because of the changes that have been made to the user interface, pupils will need to invest some time in relearning how to access information.

10.1.3 Pupil attitudes towards CD-ROMs

As expected the librarians from the Focus Groups agreed that pupils are enthusiastic about using CD-ROMs. However, one librarian pointed out that some pupils only use CD-ROMs

> ...where they don't want to look at books at all, they will simply, immediately ask to go on the CD-ROM..they feel themselves very lucky if they have beaten the rest of the crowd by getting in first.

This comment illustrates that pupils do value CD-ROMs and view them as being an important information sources. However, it also highlights the fact that some pupils can become too reliant on one particular resource and one librarian comments that pupils can have a "fixation" with a particular disc and demand to use it.

A study undertaken by Wishart (1999) revealed that teachers also perceived that pupils were motivated to use CD-ROM resources. Why are CD-ROMs so popular with pupils? Some pupils may prefer to use this resource as it does not require them to engage with the material, as they can simply print out any information that they find. However, one librarian stated that this is not a successful technique, -

> ...they've been asked to find a piece of information and they've just seen a title on the head and thought, "Oh great I'll print this out"..and they haven't even bothered to read it and in fact it's not what they were asked to do.

This means that although CD-ROMs can enable the pupils to find information quickly, the user still needs to read and assess the material that he/she locates.

Some pupils feel the need to take away a print-out after using a CD-ROM and one participant commented that

> They have to have something concrete don't they? The fact that they could be writing in their books is not the same thing as clutching a piece of paper..they've got to have this thing to take back with them.

The discussions showed that several of the librarians perceived that pupils disliked writing down information. One librarian said that if the printer had been turned off, then the pupils would respond by saying that they needed a longer amount of time on the CD-ROM in order to be able to write down the information. This would mean that fewer pupils would be able to access the resource during that particular lesson. The librarian concluded that she felt "stuck between" both options. Another librarian stated that "...they are very loath to read off a screen" and simply want to print out the information. This finding is also supported by Wishart (1999).

Pupils may rely on print-outs as it provides them with something tangible to show to the teacher to prove that they have been working. As schools improve their facilities and install computer networks, pupils may feel less obliged to obtain hard copies of information as they will have the ability to paste information into their working document. This would mean that they could store the information they have found either on a floppy disc, or on their network area.

10.1.4 Class use of CD-ROMs

If classes are booked into the library to use the resources, some of the librarians stated that they will prepare the computers and load certain CD-ROMs before the pupils arrive. One participant said that she would load two encylopaedia discs, *Hutchinsons* and *Encarta*, as she could then encourage users to look in both of these sources

> ...I'll say, "Look at that and then move across to another machine."..and they'll swap and mix and match, you can do that if you have groups.

This is an effective strategy as it enables the librarian to select and load the most appropriate CD-ROM for the class to use. It also allows her to promote the ethos of using more than just one source to pupils. This approach works well with a class, as all the pupils are researching the same topic. This librarian does not allow each pupil to have an individual print-out and students are encouraged to engage with the information, as opposed to simply forming a queue to use the CD-ROM.

Another participant worked with the head of IT to ensure that, before pupils came to the library to use the *Hutchinsons* encyclopaedia, they had received some instruction on how to use it. This is an important consideration and it was suprising that this strategy was only employed by one librarian. As a result of the pupils receiving prior training, the librarian was able to concentrate on helping students with information seeking activities, rather than becoming side-tracked and having to teach them the mechanics of using the equipment and basic navigation skills.

10.1.5 Time limitations

The length of time pupils have to use library resources during a lesson was identified by librarians in one Group as being problematic. One participant noted that lessons that lasted for 35 minutes meant that the pupils had just enough time to come into the library and get a book. They also agreed that the lack of time meant that pupils felt pressured into obtaining evidence that they had been undertaking research, as opposed to using the time available to explore the resources. One librarian commented that this situation was further compounded in her library due to lack of resources and she stated that

> ...if we had more facilities they [pupils] might say, "Well I'll spend more time browsing and finding out how to use this."

The librarians also felt that this lack of time meant that pupils were unable to utilise all of the facilities that were available on the CD-ROM. Time limitations also meant that the librarian was unable to show pupils how to make the best use of the resources. This is a crucial issue as it means that in order to make the optimum use of the

resources in the library, pupils would have to learn how to use the CD-ROMs in their own time. One participant had found that

> ...some of the keen ones come back and try again at lunch times.

This places the onus of learning to use the software firmly on the pupil. It also means that those pupils who had computers at home with the same or similar software have an advantage over other pupils whose only contact with computers was at school.

10.1.6 Librarians' perceptions of teaching staff and CD-ROMs

The librarians' comments relating to the attitude of the teaching staff towards IT raised some interesting issues. One participant stated that "a lot of our staff are positively frightened of computers." This is a problem and it suggests that some teachers probably have little experience of using electronic resources. This means that they would be unlikely to recommend these resources to pupils or be able to suggest the most effective method for utilising the software available. This lack of experience can also lead to the setting of homework which is difficult for pupils to complete in the way that the teacher desires. One participant provided an example

> ...one member of staff always uses *A Christmas Carol*..[and used to] set some homework for the pupils to find out about Dickens, but the teacher would get frustrated as pupils would hand in photocopies of information..[so] I came up with, "Why not 10 facts then?" [Pupils] then have to read the information before completing the task.

This simple change to the homework task shows how it can be modified to ensure that pupils have to engage with the material they find, instead of being able to simply hand in a print-out about Dickens that they have downloaded from the computer. However, it is important that liaison between teachers and the librarian occurs in order to ensure that pupils use CD-ROMs in a productive manner.

The fact that some teachers had access to a computer at home was proving to be beneficial for one participant, who stated that teachers were beginning to have "more of an appreciation of what they're sending children in to do." One Focus Group raised

the issue of teaching staff and IT. One participant felt that it was unreasonable to expect teachers to learn new technology in school and they stated that

> Since they bought lap tops or computers for staff to use in their own time, things have got a lot better..it's a very slow job..they can't be expected to do their sort of normal job..and then take on board this extra stuff.

The finding was not unexpected as having a computer at home would allow a teacher to use it in his/her own time and to "build up his[/her] own confidence" as he/she will be able to prepare resources or lessons at home. Wishart (1999) found that 62% of teachers in her study had access to a computer at home and that the majority were self-taught. This means that research tasks that have been designed by these teachers ensure that pupils interact with the information they discover, rather than allowing them to be passive users. It can be concluded that those teachers who are more familiar with computers and CD-ROMs should be able to set appropriate library-based research activities.

In order to encourage teachers to use computers, one librarian stated that having a technician was vital

> ...where there is good technical support it's a very different story, but I think in schools where there isn't any technical support, then staff are very reluctant.

Providing teaching staff with technical support means that if teachers experience any difficulties then they are able to call upon the technician for assistance. This is especially important if the individual teacher does not feel confident with computers. Ensuring that there is a qualified member of staff available, could encourage staff to use computers and also help to increase their level of confidence with the equipment.

One librarian mentioned that in his/her school a teacher from each department attended the IT study skills group. This means that as each subject area is represented, information should be conveyed to every member of staff. However, this participant felt that this was not always the case as it

> ...depends very much on whether he filters information down..very often it doesn't get down because the one person who attends the meeting is the one who's keen on IT anyway.

This means that those members of staff who are unfamiliar with IT or who are simply not interested in using it, will probably remain unaware of the issues that have been discussed in the meetings. This means that the librarian has to try to raise the awareness of those staff who do not use computers, whilst also encouraging those teachers who are interested in technology to develop their use of the IT resources in the library. In practice this means that the situation can arise whereby there are

> ...a couple of staff who are always using the CD-ROM, [but] five, six or seven staff never go near it.

This statement was supported by all of the members in this Focus Group. A participant in another Group felt that some teachers may be unwilling to change their teaching styles to incorporate IT, as they were content to continue with their existing teaching practises. The problem facing librarians is how to motivate teachers who do not want to use technology. One solution would be to encourage teachers who are interested in new technology by offering them support and advice. These successful relationships could then be used by the librarian to demonstrate to other members of staff the benefits that such a partnership could offer.

The selection and purchasing process for CD-ROMs was also raised in the Focus Groups. In one school the librarian liaises with staff to find out which resources they would find useful. The librarian stated that the IT co-ordinator

> ...asks if I'll get in contact with the department heads..and talk about it..if they actually like it I order it on approval and we actually run it and have a look at it in the library.

The partnership between the librarian and the IT co-ordinator ensures that teachers are involved in the selection of CD-ROM resources. Other librarians also talk directly to staff. One participant stated that she usually tries to "negotiate half and half deals" for the payment of the resource. This is a useful strategy as if departments contribute towards the cost of discs then this should ensure that they are actively involved in the selection process and more importantly that they will use the CD-ROM once it has

arrived because "they've got a vested interest." This was supported by another participant who felt that in order to develop the CD-ROM collection, ensuring that subject departments covered some of the cost was "the only way to do it." However, librarians need to ensure that the discs they buy do not become part of the subject area's departmental collection and are therefore unavailable to pupils on an open access basis. One participant noted that once they had purchased the *Castles* CD-ROM

> ...the history people wanted to take it off me and keep it for when they did their work and I said to them, "Well when you want to do your work, you book and come down here and visit the library.

In the above situation the librarian encouraged the teacher to bring their class into the library to undertake research. This means that those pupils who are waiting to use the CD-ROM, will be able to access other resources during the lesson.

A problem that the librarian may face is not knowing whether CD-ROMs have been purchased independently by individual departments. One participant who had experienced this situation commented that

> ...unless you actually know what CD-ROMs they're actually running in a different part of school and how it's used, it's sometimes quite difficult to give them the information.

In order to solve this problem it would be useful therefore for the library to have a current list of departmental CD-ROMs and software holdings to enable the librarian to direct pupils to the most relevant resource within the school. The list would have to be updated in order for it to remain current, but once it has been established it should avoid the possible duplication of resources.

10.1.7 Future expectations: CD-ROMs

In relation to CD-ROM discs, the participants held a variety of different opinions on the role that this medium would play in the future. One librarian thought that her school would probably purchase a CD-ROM server and network software in the future, to enable pupils to access discs from all of the computers. However, she also

felt that the high cost would prohibit this from happening in the near future. This comment is important as it reveals the differences that exist between educational establishments in the provision of IT equipment, as some schools have yet to network their computers, whereas others have well-established networks. The main priority for this librarian was to provide greater access to CD-ROMs for all pupils. Other participants speculated upon the "shelf life" of CD-ROMs. One participant said

> ...I feel that CD-ROMs will become old hat, that we'll all be on-line and the CD-ROMs will all be on-line and it will all go into one.

This comment was supported by a participant in another Group who commented that she had already been told that CD-ROMs would become obsolete, and that information would be accessed over the Internet. Two participants felt that CD-ROMs would be "about for a while" and that the format would be used and supported in the near future. One librarian suggested that the domestic market would ensure that there would be a demand for discs, although she thought that the products may become geared towards games rather than information.

The cost of CD-ROMs and the associated hardware was raised by one librarian who thought that

> ...discs will become cheaper, so the actual products themselves will become cheaper and more available because you can balance them with the cost of hard copy.

This librarian believed that as the price to develop and manufacture discs falls, the cost of purchasing a CD-ROM will be equal to that of the printed version. This librarian also believed that there would be greater emphasis on on-line information in the future, as problems including accessing the Internet via a telephone line and multi-user access would be addressed. It was not suprising to discover that the majority of the librarians realised that CD-ROM technology would be superseded. The participants were also aware that CD-ROMs were not being fully utilised in schools at the time of the study because of lack of equipment and available technology.

Concerns over the financial implications of on-line information were raised by five participants. One librarian thought that an increasing number of schools were

considering having Internet access, but that the problem of cost still existed and consequently influenced the decision-making process. Another participant felt that keeping up with technology was already a problem, and that the ability of schools to keep pace with change would depend upon the amount of money that was provided by the Government to support IT.

Two participants felt that librarians tended to wait before purchasing new technology, in order to ensure that they bought established systems. This means that money would only be invested into useful equipment, and not on models or machinery that quickly became out of date or were discontinued. One participant thought that librarians were becoming less "dazzled" by new technology as they were more aware of the risks of investing money. However, this line of thinking was rejected by another participant who felt that this approach was old fashioned

> I don't think that is feasible now, I think you have to..get what is the latest thing and only plan for the next year or two.

These comments indicate that these participants have different approaches to purchasing new technology. Both strategies have their strengths and weaknesses and reflect the careful balancing act that schools have to undertake in relation to investment into IT and multimedia software. Buying the latest equipment may be expensive, but if the school does not keep up with new technology then they will find that their existing systems will be unable to support new software and will eventually become obsolete.

If accessing information from the Internet becomes more popular in the future, then this may have some implications for library opening hours. It was interesting to learn that one librarian felt that the normal school day would be unable to support adequate use of the Internet by pupils. Another participant stated that

> ...in the short term future, and I've got this at work, there's a demand for the school library to be open longer.

Both participants felt that if the CD-ROM collection continued to grow and pupils had greater access to the Internet, then the demand generated by pupils to use the library would increase. The librarians noted that some pupils already used the library until

4.30pm in order to complete homework. More importantly they also felt that in the longer term, as the use of on-line facilities become more common place, the "way people learn" would change. This would mean that the structure of the taught courses would also need to change as the technology would enable students to have more control over the time and the pace of their studying. This comment shows that this participant feels that radical changes need to take place in the future because of the effect that on-line communication facilities will have on education. Another participant in the same Group agreed that opening hours of the library may have to increase especially if the school were offering courses to adults in the evenings.

This shows that even though the librarians held differing opinions concerning the changes that they will face in the future, the majority believed that the importance of on-line information to schools will increase. The participants acknowledged that technology was constantly improving but were unsure whether schools would be able to keep pace with the developments.

10.2 Information skills

10.2.1 Selecting a resource

Librarians from two Focus Groups found that often pupils would expect the CD-ROM that they were using to contain relevant information regardless of the research they were undertaking. One participant stated that this reliance on the CD-ROM was highlighted when a pupil wanted to research the Chesterfield Canal using a general encyclopaedic CD-ROM disc. She stated that she had to

> ...point out to them that those are..American discs and the info that's going to be on the Chesterfield Canal on something that is produced in the States is going to be nil.

This suggests that pupils are unaware of the limitations of the discs, and that they do not realise that they have to choose their information source carefully. In this case it would be useful to try and provide pupils with an overview of the contents or limitations of certain products, especially those they often use for research. This

briefing could easily be given by their teacher before research is undertaken. It could provide pupils with useful guidance, especially as some pupils can misinterpret the motivation of the librarian if he/she tells them to use an alternative resource. Pupils can become frustrated as they feel that the librarian is trying to stop them using a resource. One librarian who experienced this response felt that sometimes the only solution was to let the pupil undertake the search

> I think sometimes it's the only way to get it through to them that you're not lying, "You don't want me to go on the computer do you?", "No, it's not on there, but if you don't believe me have a go and come back in 10 minutes and tell me what you have found" and they'll come back muttering.

If pupils do have a "fixation" with IT, then the only way to prove to them that CD-ROMs do not always have the answer is to let them undertake a search. The most important factor is to ensure that support is available to the pupil if, and when, it is needed. However, this could be a difficult strategy for the librarian to employ if there is a high demand for a limited number of machines, although it could be a helpful exercise if a pupil is determined to use the resource regardless of the advice offered by the librarian. One librarian commented that when pupils conduct research into one of the "home front" topics on Russia, that they are often surprised at the lack of information on CD-ROM and she stated that

> ...there was virtually nothing in *Encarta* on Russia and they are always amazed by this, that they can find whole books on the shelves but they go to *Encarta* and there's just nothing.

This is a useful point as it is this type of experience that can help pupils to understand the importance of selecting an appropriate resource to match their needs. It can also highlight to pupils the fact that one resource, however useful it has been in the past, will not always contain the required answer. One participant who supported this ethos said that she thought

> ...that they must learn those sorts of skills..when it is the right time to use the CD-ROM and when it isn't and not appropriate to use it at all.

This reinforces the argument that information skills need to be an integral part of the curriculum. Pupils need to be able to make informed decisions relating to their selection of resources when undertaking independent research.

Another method employed by librarians who had support from teaching staff, was only to allow pupils onto the computers once they had tried using other sources. In this way access to the CD-ROMs is controlled and it also ensures that pupils use at least two different sources for their work. One participant stated that pupils in her school have to reach a certain standard that is set by the teacher before they are allowed to use the computers. The computers are therefore only used to augment and enhance the information that the pupils have found from other sources. This strategy can help pupils to realise that sometimes the information they require is available in a book. One participant stated that pupils need to learn that "...the computer isn't the answer to everything." Although one participant did note there was a positive aspect to a pupil often using a specific product, as they will be able to decide whether or not it is a good source of information. This is an interesting point as it emphasises the importance of choosing and purchasing quality products that are both relevant to the pupils' needs and also provide a good range of information.

10.2.2 Using different sources

If pupils do want to use the CD-ROM what strategies can librarians employ to encourage them to use a variety of sources? One participant simply said "We remind them." Another librarian reported that some pupils enjoyed looking for information and she stated there were a few who were very keen and

> ...actively go out and get information from lots of different sources, there's almost an element of competition there.

This is encouraging and indicates that these pupils actively seek out and validate the information that they retrieve. This approach should result in the production of a balanced piece of research by pupils. This is a key concept and it is this collection of information that needs to be promoted by staff to pupils. However, one participant feared that some teachers "don't have the idea of the concept of different sources."

This concern was supported by a librarian in a different Group who stated that some teachers would specify sources, but that others simply told pupils to "find three facts" and did not insist that a variety of different sources were used.

An interesting exercise that one librarian undertakes with pupils is to encourage them to apply the same criteria that are used for book evaluations to CD-ROMs, for example looking at the date that the CD-ROM was published. In this way pupils can begin to assess the CD-ROM disc against a set of predefined criteria. Other participants noted that they encouraged pupils to use other materials by simply placing a time limit on the usage of the CD-ROM. There were a range of experiences in relation to whether the librarian should try to balance pupils' usage of print and non-print materials. One librarian stated that "I don't think I've ever tried", whereas another agreed with this principle and stated that

> ...because children are so biased towards using computers I think we deliberately go the other way and actually say..use the books first.

The fact that only some of the librarians in the Focus Groups take an active role and encourage pupils to use more that just the CD-ROM as a source of information was an unexpected result. It is important that pupils are made aware of the variety of information sources that are available, as it ensures that they gain practical experience of extracting information from different resources. It is to be hoped that as pupils move through the school that they will be able to choose the resources that are appropriate to their information needs. However, this will need the librarian and teachers to work together and plan tasks that enable students to use a variety of sources. Teachers must be made aware that, as one participant recounts, telling pupils to "get one book and sit down" implies that they will only need to use one book, rather than a combination of resources to complete a research task.

10.2.3 User education

Librarians in all of the Focus Groups were concerned about the development of information skills. This was important for one participant who perceived that because of the pervasive nature of technology, pupils would benefit from becoming familiar

with as many applications as possible. Delivering these skills was revealed to be more problematic, especially if their importance was not recognised by teaching staff or, as one participant highlighted, if teachers thought that these skills "don't need to be taught." The librarian in this example responded by showing the teacher in question, through the setting of resource-based tasks, that the pupils did not posses adequate information skills. This is a very important concept as, in order to move forward and address the teaching of information skills to pupils, the librarian needs to ensure that teachers are actually aware that a problem exists.

Are the IT skills that pupils learn being utilised throughout the curriculum? One participant felt very firmly that this was not the case and that pupils did not transfer skills from one subject to another because

> ...a lot of subject departments want things in different ways..this is the way you do it in English and very basically they are not encouraged to see it as any cohesive whole.

If this is true for IT skills, then the information skills learned by pupils in one subject may not be built upon or referred to in another subject if no cohesive information skills programme exists. This is a key point that can cause frustration for librarians who are trying to encourage pupils to use the same skills whenever they come into the library. However, one participant feared that IT skills were viewed in the same way as library skills had been, in that they should be carried out in a separate lesson and not integrated into the work that pupils complete as part of the curriculum. Therefore if pupils are being taught how to search a CD-ROM they need to be provided with the opportunity to practise this skill in lesson times when they are actually undertaking a piece of work.

The librarians also felt that basic information skills needed a greater profile within the curriculum. In order to take advantage of CD-ROMs and the Internet, the librarians agreed that students need to possess basic skills that enabled them to identify and select relevant information and not simply write or copy it all out. This finding was not unexpected and is supported by Wishart (1999). She discovered that pupils who are not taught information skills do not find using the CD-ROM to be a motivating

experience. The importance of being able to select information was reinforced by one librarian who said that a pupil who had been studying World War II had simply printed out the whole article that had amounted to approximately 30 A4 pages. Making sure that pupils know exactly what they wish to find out from the CD-ROM is an important prerequisite for its use, and this type of guidance and support needs to be provided by the teacher.

It was suprising to discover that two participants in the Focus Groups thought that often pupils did not select information or use a variety of different resources due to "laziness" and one librarian felt that pupil attitude

> ...boils down to laziness, they can't be bothered to come after school or in their lunch hours..or they'll tell a teacher - oh the library hasn't got any information when in fact it's them who are too idle to come and use it.

The other participant, who was in a different Group, suggested that pupils had to be encouraged against being "idle" as she had experienced that some pupils had often wanted a "short cut" to the information. The responses to a study undertaken by Wishart (1999) also revealed that librarians perceived pupils as exhibiting signs of laziness in relation to information selection. As pupils are limited by time in lessons, it is essential that they can come back and use the library facilities in their free time. As they become more confident with a resource, they should be more able to use it during lesson times, and as one librarian commented, "It's suprising how much is learnt at lunch times!"

Break times can be periods where the librarian is able to provide ad-hoc information skills teaching to pupils, especially in relation to the selection of resources, as this time is relatively less pressured for the pupil. This approach does require the librarian to devote their time to individual pupils, and this could be unfeasible if break times are busy and there is no support available. Alternatively, the librarian could employ pupils to help their peers undertake searches on the CD-ROM. However, it would be important to ensure that these pupils were reliable and they possessed the skills and abilities to provide effective support and guidance. This strategy is already employed in some schools in both lesson and break times. It can be a positive experience for both

the pupil and the learner. One participant commented that if a pupil is having problems, then

> I say to a child who does know how to use it, "Oh would you just go up and show them" and they really do quite enjoy it.

This is a useful approach as it also frees the librarian to attend to the needs of other pupils in the library. In lesson times one librarian used the method of teaching a pair of pupils how to use the CD-ROM. This pair of students was then expected to teach the next couple of pupils. The chain continued until the knowledge had been cascaded to the whole class. This is an effective strategy to employ. Another participant nominated one child and taught him/her how to use the software and then asked him/her to provide a demonstration for the rest of the class. The librarian remarked that this method had also helped to boost the confidence of the child who is nominated. She also noted that with this strategy it was important to choose a pupil who was "reliable" and who would not "muck around and be silly."

Developing a whole-school approach to information skills was seen by one Group as being a huge task. One participant felt that it should not be the sole responsibility of the librarian, and she stated that

> ...I think you have got to have the support of senior management and a team of people who want to do it, and the school have got to want to do it.

Although this sentiment was supported by the other participants, it emerged that the reality in schools was different. This finding was not unexpected and one participant stated that the delivery of skills throughout the school could be patchy, as it often depended upon whether the teaching staff in the subject areas were IT literate. This means that teachers need to become skilled computer users themselves in order to be able to teach these skills to pupils. However, as the questionnaire has already showed, the librarians perceived that teachers lack both the time and enthusiasm to explore IT resources. It is to be hoped that as teachers become skilled IT users, that the teaching of information skills at a whole-school level will be adopted. One librarian felt that with the installation of a second PC network in the school, there would be more scope to "teach them the skills and [help them to] see that they are transferable." Another

librarian thought that it would be difficult to ensure that information skills were "consistent across the whole of the school." This is a fundamental problem for school librarians as in order to be able to use multimedia resources effectively, pupils need to have the opportunity to build up their expertise and understand how to select information correctly and use a range of resources, both electronic and printed. The study conducted by Wishart (1999) confirms that few schools have implemented a whole-school information skills policy, even though it was first recommended that they should adopt this practice in 1981 by the British Library and Schools Council working group (Marland, 1981).

10.2.4 Librarians' experience of information skills in school

Participants in two of the Focus Groups commented that pupils who used electronic sources for research, often had no concept of how the information will look on screen, or in what format it would be presented. This is an interesting finding and one librarian noted that when some sixth form pupils had been using the *Britannica* CD-ROM that they had inadvertently printed out an index of article summaries, as opposed to the information they needed because

> ...they weren't skimming and scanning, they weren't actually reading what the thing was and they had no idea what the information was going to look like.

The other members of this Focus Group agreed that in general pupils did not read the information that was displayed on the screen and as a result can print out irrelevant material. This shows that even for older pupils, the results of undertaking a search on a CD-ROM can be confusing. This implies that pupils throughout the school would benefit from receiving some instruction that would enable them to interpret the results of a CD-ROM search. This concern with sixth form pupils was noted in another Group where one librarian explained that she was trying to secure lessons with pupils so that she could teach them "..to be confident about searching the catalogue." This finding is also supported by Wishart (1999). Teachers in her study cited that pupil difficulties with searching and selecting information on CD-ROM hindered their teaching.

Strategies to manage this problem had been employed by two librarians in one of the Focus Groups. One participant was trying to encourage pupils to save information onto floppy disc as she had noted that increasingly pupils were required to use DTP packages for the presentation of their work. She said that

> It makes much more sense to my mind to have kids with a disc in their pocket that you save stuff on than printing stuff off, which they then snip up and throw away.

It is a simple process for pupils to insert or incorporate the information that they have saved on a disc into their work. This is a useful strategy as it could also relieve the pressure placed on CD-ROM machines that can occur during class use of the library. Pupils could copy and save information on a disc and then view this text on another computer, where they could then select the relevant passages to include in their work. The approach employed by the other librarian required pupils to "go back and rephrase the question" in order for them to be able to "understand the answer." Pupils who had clarified their research needs were then more able to analyse the information that they had found. Although this solution is more reactive than the first, it does require pupils to carefully think through the questions that they are asking.

10.2.5 Searching the Internet

At the time of the Focus Groups not all of the schools had access to the Internet. The discussions of the Internet included theoretical ideas from those librarians who did not have a link, to more practical issues from the participants who did have access to this resource.

The implications of teaching pupils searching skills was raised by one participant who commented that

> The only trouble...is that it makes your job more difficult..trying to teach search skills for the Internet. The report from the SLG [School Libraries Group] said that he [the author] thought that this was the biggest problem we'd got to face.

This is a key point as teaching pupils to search the Internet requires them to use higher order skills and search strategies. To ensure that they had the time to devote to pupils who were undertaking a search, some participants used a booking system to allocate Internet use. This is useful practical advice and one participant stated that a booking system gave them a chance to "organise" themselves in advance. Another librarian said that a booking system meant that she had time to "..get something done" for the pupils before they used the Internet themselves. This could range from book-marking interesting sites or undertaking searches to check that information was available. It also meant that the librarian could guide the pupils through sample searches during their session.

One participant stated that, as the Internet worked on a similar principle of using keywords and indexes, pupils' ability to conduct a search depended upon the core information skills that they possessed. The librarian noted that

> ...if they can't use a book, they can't use the Internet, it's as simple as that because it's text driven.

This participant felt that if pupils cannot skim and scan a book, that they will encounter difficulties when using the Internet, as for every search the user is presented with a high volume of text. This was an expected response as if users have not thought about the keywords that they will use, then they may become distracted by the other information on the screen, such as adverts or irrelevant links. One participant believed that there was only so much that could be taught to the user

> ...to a certain extent you can skill them up on basic research skills, show them what it looks like..what a search engine does..then beyond that they've got to experience it for themselves.

Ensuring that pupils possess basic research skills should prepare them for the progression from books onto the Internet. One librarian thought that the Internet was too much of an "Aladdin's cave" for pupils to be able to locate useful information within a thirty five minute lesson and she was concerned that pupils may become distracted when using this resource. This shows that it is important for pupils to gain experience with performing searches, in order for them to become competent users.

Other participants were prepared to let pupils use the Internet, but only in a structured manner. One participant felt that because there was an element of cost connected to Internet use that it meant that she could not "afford to let people make mistakes." This is a difficult situation to manage, and to ensure that the searches of inexperienced users are efficient, a high level of support and supervision is required. This has time management implications for the librarian, especially if he/she is the sole provider of support. Less confident users, could be discouraged from using the Internet if too much emphasis is placed on the importance of conducting cost effective searches. Some pupils may feel that they lack the ability to use this resource.

One participant wanted to be able to provide links to useful Internet sites via the library web page

> One way, I think, I'll do it in the future is create our own web page on disc which will have links to useful bits.

This idea is similar to setting up an Intranet. This is a locally-based Internet service that is run in-house and provides links to selected sites that have been downloaded and stored on the server. Using this facility is an inexpensive method of allowing pupils to experience the feel of the Internet without the associated costs. Pupils would also be unable to access irrelevant information. This type of project is exciting as it enables the librarian to expand his/her role into the area of web mediation. It is encouraging therefore that this librarian is trying to provide pupils with the ability to exploit the Internet at least on a basic level as searching this resource requires the pupils to have an understanding of complex logic.

The quality of the information that is available on the Internet concerned one participant who stated that

> ...you don't always get quality information off the Net do you? If people are getting access to anything and everything, then the amount of junk they're getting is quite high.

This is an important issue and it requires pupils to be able to evaluate the material that they find. One participant was concerned that pupils can often download any item that contains a reference to their topic. It is due to this type of problem that one participant

could not envision being able to train the majority of pupils sufficiently for them to make effective independent use of the Internet. The participant stated that

> At the moment I can't see the situation where we can ever turn the Internet over to pupils and say right, there are the skills you need, off you go.

She feels that currently the situation means that pupils who use the Internet need to be provided with support and guidance. Due to the range of material available on the Internet and the skills that users need to perform effective searches, this response was not unexpected. In two schools pupil guidance to the Internet took the form of the provision of pre-selected Internet addresses. One librarian stated that this was beneficial, as

> ...they've got something there straight away without having to go through the whole rigmarole of searching.

This system is useful as it would enable the pupil to access relevant information immediately. This means that students should not become frustrated due to the fact that they cannot find a useful site. If time is limited, accessing information at the beginning of a lesson through using a pre-selected site may then allow the pupil to try his/her own search for additional material.

In one school, to stop pupils accessing undesirable information, the filtering software entitled *"Net Nanny"* which polices the users access to Internet sites, has been purchased. This software is used in conjunction with a parental agreement form that is signed by both pupils and parents. The form states that users have to take responsibility for the information that they access. The librarian explained that the pupils

> ...know as well that they can be closed down after 30 seconds if they try to access undesirable information.

Using specially developed software is one way of monitoring pupils' access to Internet sites. The librarian concedes that although it is not completely reliable, it is a step in the right direction. The contract scheme is a strategy that places the responsibility for the material accessed by the student from the teacher or librarian to the pupil. It also

provides the supervisor with a legitimate reason for denying or even banning the user from having access to the Internet. The employment of these strategies by schools is not unexpected as previous comments show that the librarians do not believe that the majority of pupils possess the skills to interrogate on-line resources effectively. Herring (1999) noted that some schools have adopted AUP's (acceptable use policies). This is an agreement, like the contract scheme mentioned above, that is signed by the pupil, who promises to abide by a set of rules drawn up by the school. This is a strategy that could easily be adopted by most schools. The American Library Association has opposed the use of filtering software because it limits the amount of information that is available and thereby restricts the users' freedom of access to information. However, in schools restrictions and rules are necessary in order to protect minors from accessing unsuitable information.

Even though these strategies were available, the librarians were still concerned with the possibility that pupils could gain access to undesirable information and one participant commented

> ...I just put in the words "National", "portrait" and "gallery" and among the hundreds of hits..there was quite a few, about 30, one of which was "erotic nude self portrait" there was "Gay and lesbian group of erotic and nude self portrait."

The above comment shows that innocent search terms may be input by the user and produce web sites that are inappropriate for school pupils to access. This suggests that a balance is needed between access to on-line information and web sites which have been pre-selected.

Teachers' use of the Internet was commented upon by two librarians. One librarian stated that staff at her school did use the Internet and that some teachers came in early to ensure that they could gain access to information that they could then use in afternoon lessons. However, this means that in order to use the Internet, staff have to be able to come into school early in order to undertake searches and download the results. Another librarian had found that teachers exhibited less enthusiasm

> ...they are not prepared to do an awful lot of searching..they're willing to browse down it if it is a question of 30 sites, but if you give them the Internet as a whole, well they just play about with it, but they give up very easily.

This participant was aware that teachers have limited free time and that searching the Internet can be time-consuming, especially if the user is inexperienced and applies an unsuccessful search strategy. This is an important point and this study has already shown that these problems have been encountered by librarians who had been trying to encourage teachers to use CD-ROMs. Presenting teaching staff with a useful web site or a short-list of useful sites, either on paper or stored on the computer as a favourite site, could be one way of encouraging staff to use this resource themselves. Teachers could be further encouraged if they knew that the librarian was available to provide support if and when necessary.

The second comment about teachers was from a participant who was concerned with the setting of research projects. Access to the Internet does not automatically mean that the user is guaranteed to find useful and valid information for every topic. The librarian stated that teachers needed to find out which information sources were available before they set research tasks. This is a key point and it is important that teachers do not simply assume that the answer can be found on the Internet or that it will be easy to find. Teachers have to remember that having access to a wide range of information could still mean that pupils experience difficulties with finding relevant materials.

The discussions from the Focus Groups showed that the librarians felt that although the Internet provided a wealth of information, that the pupils needed to possess basic research skills before they could undertake effective searches. Wishart's study (1999) revealed that although the majority of librarians undertake ad-hoc teaching of information skills, it is not always clear who is responsible for this area within the school. This situation also exists for the majority of Nottinghamshire librarians. The librarians also stressed that these skills need to be extended if the complexities of Internet searching techniques are to be mastered. This means that it is crucial that

information skills are built into the curriculum, in order to ensure that pupils can interrogate both printed and electronic media effectively.

10.3 The Internet in the library

Considering the amount of information that is available on the Internet it was not suprising that the librarians agreed that providing access to this resource in the library would have a major impact on the service. One participant stated that

> ...I think the Internet, it's opening up so..much to so many. I'm sure that it's going to make a big alteration in school libraries.

But what sort of impact will it have? The same participant was also experiencing problems with the hardware that was available in the library. The only machine in the school that had a modem was in the library and users had already complained that it was too slow. One participant replied that she downloads information, as it

> ...takes away a lot of the difficulties, but they're not getting the interaction with the on-line stuff.

This solution ensures that users are supplied with the information they need, however one disadvantage is that it does not provide the information seekers with any experience of using and searching the Internet for himself/herself.

The issue of time was also raised in relation to the librarian. One participant related how she had refused to have an Internet connection in the library unless she was provided with extra help, as she felt that she had no time to devote to learning and supervising it

> ...we haven't got the staff time to spend teaching a) ourselves and b) the pupils how to do it..I said, "I am at saturation point, I cannot take on anything else and I'm not prepared to without help, if I get help, fine."

This is an important example as it shows how senior management may expect the librarian to adopt and incorporate the Internet into the library, without providing him/her with extra help or training. This librarian comments that the school committee

had been surprised that she had felt this way. She thought that they had probably not considered the amount of extra work that having an Internet link in the library would generate for the librarian. It is important to remember that in addition to the time needed for the librarian to learn how to use the software, he/she will also have to teach pupils how to use the Internet to undertake useful searches.

The cost of the Internet was raised by several participants. As Internet searching requires the use of a telephone line, some school managers can be worried about the possibility of receiving huge bills. They want to be able to provide access to the Internet at as low a cost as possible. However, it was not suprising that most librarians thought that charging for access was not a realistic option, and as one participant enquired

> ...how can you charge somebody who's got to find something for their curriculum needs and use the Internet?

If students had to pay for on-line access, then this would challenge the ethos of free state education. However, one participant pointed out that some pupils already pay for use of some services including the photocopier. Two other participants stated that in their schools the pupils do pay for accessing the Internet. In one of these schools the sixth formers were going to be charged for all their on-line time, whilst in the other school pupils who exceeded their allocated time would be charged for any extra use. One participant felt that pupils would not pay as students would view the ability to access the Internet as being a service that the school should provide as part of every pupils' education. One participant felt that the parents of the pupils at their school would probably not be able to pay. These comments highlight the fact that charging for Internet use is a complex problem, as by introducing a charging system the school is restricting pupils' access to information purely by cost. This is an important issue that needs to be addressed by school managers.

Schools that decide not to implement a charging system need to allocate sufficient funds in order to meet the running costs of providing an Internet link. In one school the bill is paid centrally and not from the library budget. However, in another school the Internet had been withdrawn because the bill was considered to be too high by the

person who oversaw payment. The librarian felt that the level of the bill had been due to sixth former use, as she had noted that they had often become distracted, and had not always used the Internet to undertake focused research. This is a key issue and this example shows that usage of the Internet needs to be closely monitored, especially if the administrators are concerned about the cost of providing this service. One librarian felt that the pupils viewed the Internet as being a novelty rather than an information source

> ...we're all assuming that they are going to use the Internet heavily which they will initially but I think it will hopefully settle down the way CD-ROMs generally do, that it's just going to be used as a tool.

This means that schools should expect higher telephone bills during the introductory phase of the Internet. It is to be hoped that after an initial flurry of activity that usage would level out. This is a reasonable assumption especially if the Internet is adequately monitored and supervised by staff, as this will ensure that it is used appropriately.

10.4 Intranets

If the school does not allow pupils to access the Internet independently, then one solution would be to provide an Intranet service. This would enable pupils to gain experience in a similar environment, but without the fear that they could access undesirable information. One librarian thought that this would be a useful resource, especially if a large number of pupils needed to access the same information. However, one school that had started this process had encountered some problems in relation to downloading sites on to their Intranet and the librarian raised an interesting point

> ...there are so many other sites linked, it will download a certain amount but then you've got to follow up a reference to see if it's worth downloading and go through another procedure.

This highlights the amount of work and time that needs to be devoted to setting up and maintaining this resource. The links to a chosen site need to be explored and evaluated before a decision can be made as to whether they should be downloaded. Issues of copyright also need to be considered. The librarian commented that she did not think

> ...that it will be as easy as we first thought and it might not solve all our problems.

This comment shows that setting up an Intranet can be a complicated task that requires web sites to be carefully pre-selected. One participant said that it was the IT co-ordinator who managed their system

> ...if we come across a site which we think ought to go on the Intranet we just write out the web site and pass it on. He's very flexible, we've put all sorts of things on there.

This means that once teething problems have been addressed, then an Intranet can be used to provide the pupils with access to a host of useful sites.

There were some negative comments from two of the participants who were concerned with the limiting nature of an Intranet. One librarian commented that she was

> ...a bit averse to Intranets, it smacked to me of project box, here's a box, it's all the information you need, and we're trying to get them used to looking at other places.

This is an interesting point that shows how the Intranet can be viewed as an electronic form of providing materials for a project collection, whereby the pupils are provided with pre-selected information that they may not question or evaluate. This type of information source could also lead to pupils restricting their research to the information that is available on the Intranet, instead of interrogating other resources. The idea that the Intranet was limiting was also supported by another librarian. It can be concluded that a fundamental problem with an Intranet, as opposed to the Internet, is that an environment is created that restricts pupils as they can only access pre-selected material. Users of this system cannot conduct their own searches to obtain further information. This concern is echoed by Herring (1999) who notes that if pupils only have access to downloaded sites, then they lose the benefits associated with undertaking their own searches.

If an Intranet is introduced then it is important that pupils are reminded that other relevant materials are available, and that they should consult a variety of resources as part of their research process. Herring (1999 p.46) notes that librarians have a special part to play in raising the awareness of the school community to the resources that are available. He states that

> Part of the role of the modern school librarian's job is to make their users - all school staff and pupils - aware of what information resources, both print and electronic, are available in the school library or via the school's Internet connection.

This means that the librarian has a positive role to play in the dissemination of information to the whole school. The librarian needs to ensure that whether or not pupils choose to use all the sources available, they are at least aware of their existence.

10.5 IT policy

Seven of the participants replied that they had attended IT committee meetings in their schools. Some participants felt they had been able to provide more input than others in relation to the IT policy. It was suprising to learn that the IT committees that two of the librarians had been involved with, no longer existed. One participant stated that their IT committee had "run its life" as it was simply designed to establish a policy. This participant now attended IT meetings only when they were relevant to the library. Another participant stated that their IT group had only met once in two years and she felt that she had had "very little contribution." She was now concentrating on writing an Internet policy as the access point was in the library. However, this did not involve other members of staff. A key point made by another librarian was that although she was a member of the IT group, she was unable to attend because it met when she was running an after-school club. Only one participant seemed to have a positive view of the school's IT group and she said that her

> ...place there has never been questioned, my advice is quite often taken.

From these comments it would seem that the school librarian's attendance at meetings, and his/her influence over decisions depends upon the individual school. The discussions in the Focus Groups revealed that, on the whole, the librarian does not

have a great deal of input in this area. This view was confirmed by one participant who was not a member of an IT group in her school, and she stated that she thought that

> ...the policy has been written by the Deputy Head Teacher..but I haven't any direct influence other than telling him what I'm doing so that he's aware of it.

This situation is less than ideal as it does not encourage discussions to take place. The onus has been placed on the librarian who has to ensure that the Deputy Head Teacher is made aware of her concerns and opinions regarding IT. The librarian in this example is hoping that things will change to allow decisions to become more inclusive. Another participant stated that although she attended a meeting, the situation was still unsatisfactory

> I'm on the IT committee but we've only met about three times and it..doesn't really seem to have a great deal of influence, the senior management decides the way they want to go.

From this librarian's point of view, the problem stems from financial constraints and the fact that the library is not seen as a priority in terms of funding. Another participant also agreed that funding was a deciding factor and that it was the members of senior management who usually determined the amount to be invested in IT.

Ofsted was mentioned in relation to IT policies, as schools are required to have a formal ICT policy document as part of the inspection process. The route one school had taken was for each department to construct its own policy, as opposed to having a specific committee

> I've got an IT policy for the library and each department's got its own little bit of IT policy.

This means that each department has to show how IT will be used in the delivery of their subject. The librarian also has to create a policy for the library. One problem that can result from this approach is that discussion will be lost, as staff will not have a forum within which to voice their opinions or concerns. However, if a policy that has been constructed by a group of staff is forwarded to managers, one librarian stated that

there was a possibility that they would not "understand what you are talking about anyway." It can be concluded that one or two of the committee members would need to explain the reasoning behind the decisions to the management team. It is important that the staff believe that the managers are technologically well informed, and another librarian stated that

> The people who make budgeting decisions in school don't understand the technology and don't use it..if you're asking them to try and understand how a CD-ROM impacts on learning, they don't.

This suggests that librarians need to educate and inform managers about the role that technology plays in the library, to ensure that the implications of any IT policies are fully understood by the decision-makers.

One participant questioned the value of having an IT policy if it was not read and understood by the whole staff, and she commented that

> We've got an IT policy, but somebody was remarking to me the other day that our school is brilliant when it comes to policies..but it doesn't mean anything because nobody takes any notice of them or knows what they are.

This is an interesting point and if policies are not supported or read by the whole staff then they can become merely cosmetic and of little real use. Policies should be a result of serious debate and should reflect the opinions of a group of representatives from across the school. Only if the IT policy is respected by all staff can the issue of IT in school begin to be addressed. The library's inclusion in a valued IT policy is official acknowledgement by senior management of the importance of the library.

10.6 Ofsted

Few librarians felt that the **Ofsted** inspection process had resulted in any improvement in the provision of IT in the library. One participant said that the Inspectors had been very interested in the IT equipment and that they had been very impressed with the CD-ROMs and had commented that the library was well-run. It was suprising to discover that this good report had not helped the librarian who stated that

> In some ways it's a backwards step..to maintain it I need funding to upgrade, having got a big tick and a gold star, well that's done and post-**Ofsted** we don't have to think about it now do we, thinks management..So it has good points and bad points.

The feeling that the **Ofsted** Report often provided no help to the librarian was supported by comments from other librarians in the Focus Groups. One librarian said that she got one small mention in the Report that was

> ...positive in what it said, it just didn't say very much.

She was both surprised and disappointed by this result as a high number of Inspectors had visited the library, and resource provision had appeared to have a high profile with the inspection team. This suggests that the Inspectors who have visited some schools do not know how to assess the resources and services provided by the library. One librarian was surprised by the reaction of some of the inspectors to the CD-ROMs

> ...they were very impressed with the CD stuff and access within the library to the extent that maybe none of them had ever seen a CD-ROM before.

This is a worrying statement and suggests that some Inspectors are unaware of the range of IT resources that are available in most school libraries. Despite the Inspectors' enthusiasm, the resulting report did not ensure that this provision of IT would continue at the same level

> ...there is no wording in the document that this provision remains at a good standard by making sure money is invested in it, so there's nothing that's come out of **Ofsted** that's actually going to help maintain services.

This evidence shows that even when Inspectors state that the library is well resourced, the comments made by the team will not necessarily reflect the fact that funding is needed if the existing standards are to be maintained. This means that the librarian is not given any extra support that he/she can then use to help him/her secure extra funding or resources.

Some of the librarians found that their opinions on the library had been included in the Report. One participant said that the assessment of the library had been undertaken using approximately four lines, and that her comments had been written down "almost word for word." This shows that these Inspectors have simply relied upon her evaluation of the service. For another librarian, the comment she received in the report was as follows

> The caretakers are making a really good job of keeping the school tidy and the library staff have made an improvement in the library facilities.

These comments indicate that during an Inspection the library may not be fully or comprehensively inspected. The above comment clearly shows that, in this example, developments in IT and related services have not been appreciated by Inspectors. The statement above was the only written response that the librarian received, even though she had had one formal interview and two teaching observations. This level of response does not do justice to the work undertaken by the librarian and does not recognise the role that the librarian fulfils in relation to IT and multimedia technology. This lack of formal acknowledgement could undermine the librarian's position within the school. Another participant noted that **Ofsted** was more interested in "IT in the curriculum rather than as a tool for information." This means that the focus of the inspection was not targeted on the services provided by the library.

Not all the comments from the participants were negative, and for two of the librarians the inspection had proved to be beneficial. After **Ofsted** one establishment decided to engage the services of one of the Inspection team on a consultative basis. This resulted in the school approving a plan to network the whole institution, including the library. In another school, within a month of the Inspection the library had gained two more CD-ROM machines. The Report had noted that

> ...the only place computers were used apart from the IT room..was the Learning Resources Centre and any spare computers should be moved up.

It can be concluded that the use of an **Ofsted** Report to the librarian depends entirely upon the scope of the comments that are directed towards the library. The Focus

Group discussions showed the majority of librarians have been disappointed with the process and results of an inspection.

10.7 IT co-ordinator and the librarian

The librarian's relationship with the IT co-ordinator in a school can be very important, as it can provide him/her with practical support and equipment for the library. The Focus Group discussions showed that most librarians have to work hard to maintain this relationship. One problem noted by two participants was that it was difficult to find time to meet with the co-ordinator due to lack of time,

> The difficulty is when you've got a department head as IT co-ordinator, there isn't an awful lot of opportunity to talk to them.

Another participant said that in her school because the Deputy Head was also the IT co-ordinator, it was especially difficult to find time to talk to him. One advantage of this situation was that due to the Deputy's lack of time, CD-ROMs were passed straight to the library. This was proving to be beneficial as it was resulting in the library gaining some new resources.

A different situation existed for another participant who felt that she had to make the effort to be "pally" with the IT co-ordinator as otherwise "he probably wouldn't be interested." This has meant that this librarian has had to work hard to raise the profile of the library with the IT co-ordinator. This is not an ideal situation.

Some librarians viewed the management style of the IT co-ordinator as being autocratic. This issue was raised in one Group, and one participant commented that

> ...he's very supportive and on a one to one we get on really well, but he is autocratic.

This choice of management style could be due to the fact that the IT co-ordinator has the greatest in-depth knowledge of the technology and is the "expert" in school. However, it is probable that most of the staff have some IT knowledge that they have gained from using technology, either at home or in school. This means that those

members of staff who, like the librarian, use computers every day, would be able to play an important part in any IT group. One librarian stated that the IT co-ordinator

> ...controls everything, but we manage to do our own thing and tell him afterwards.

This is an important point as it shows that this librarian can circumnavigate the IT co-ordinator when she deems it to be necessary, however it also highlights how potential support and advice is also lost because the librarian realises that the IT manager is unlikely to be receptive to her suggestions concerning technology. So although an autocratic manager can be supportive, the librarian can only receive this support if the co-ordinator agrees with the suggested plan. One librarian stated that her IT co-ordinator did not seem to trust her ability in terms of selecting and purchasing CD-ROMs. This meant that he was "quite happy" to provide her with support. It can be concluded that the support provided by the IT co-ordinator can depend upon whether he/she believes that the librarian is competent with technology.

One participant described the meetings that she had with her IT co-ordinator as being some sort of "on-going nag session" as she felt that she was always having to ask for more technology to be placed in the library. In this example the IT co-ordinator has not always supported the library. She stated that she still felt

> ...this sort of pull between us in that he thinks I want everything for the library, which I don't, I just want the library to be equal with the rest of the school.

This is a problem that can arise if the library does not have the same level of equipment that is provided for the rest of the school. It can cause a rift between the librarian and the IT co-ordinator as the librarian will continue to raise the same demands. This librarian may also feel as though she is not receiving enough support from the IT co-ordinator.

10.8 Technical problems and support

An important finding revealed by the Focus Groups was that many of the librarians have had to develop their own basic IT skills in order to be able to cope with the

introduction of new technology into the library. One librarian stated that she was self taught when it came to using PC's and that she had learned mainly through trial and error

> I just had to sit there and twiddle buttons and press things and see what that did.

The type and availability of technical support is therefore very important to librarians. A problem faced by two of the participants was the level of support they received from the IT co-ordinator in school. One librarian stated that

> ...the IT room is just next door to me but you know that, at the time, that person is teaching [and] I don't like going to disturb him.

This shows that IT support can be difficult for the librarian to access if the IT co-ordinator has teaching responsibilities. This means that the librarian cannot obtain the help that he/she needs on demand. This in turn could lead to the library operating less efficiently.

The limited expertise of the IT co-ordinator was also noted as being another problem

> ...the IT co-ordinator is strictly an Acorn [computer] man, and right from the very beginning I've been very PC orientated, so he doesn't really want to know.

This comment was greeted with laugher from the other members of the group and with the phrase "Join in the chorus." This situation was familiar to other librarians in relation to their own IT co-ordinator. It also illustrates the fact that some IT staff have not updated their skills and so are unable to meet the demands that existed in the library.

Responses from the librarians indicated that technical support was very important in the day to day management of library resources, and that good support could provide tangible benefits for pupils. One librarian stated that

> [name of librarian] [has] just had a technician and she says her life's changed beyond a doubt. Even things like paper jams, things like that, he's there and he shows them. The kids are getting a better service

> because he actually shows them how to print..save to disk and things which she said because of pressures of time she wouldn't do. She would say, "You can't print to disk, and that's it.". She says they're getting so much better service now because he's actually doing all of that.

This statement shows that having technical assistance available in the library can enhance the services provided as a technician can teach pupils how to accomplish simple tasks. This reduces the pressure on the librarian, who is then released to attend to other users in the library. One participant stated that technical help is beneficial because

> ...you can then concentrate on the skills that you're actually trained to do rather than sort of fiddling about just trying to put something right that you don't really know what you're doing.

This statement is important as it illustrates that there are clear boundaries between the role of the librarian and that of the technician, and that having a skilled member of staff to deal with technical problems will result in the creation of a more effective service. However, the reality is that some librarians may have to acquire these skills and become multi-skilled because a technician is unavailable.

10.9 IT provision in the library

What is the situation regarding the provision of IT in the library, and how do librarians see themselves in comparison to other departments? One librarian sums this up by stating that "we're all at a different level." This an important point that underlines the fact that every school is an individual establishment with different priorities. The discussions showed that the provision of computers differed between schools; where one school had two computer rooms with 16-17 machines for whole groups, another would have the same rooms filled with 30 machines. This means that in the latter school, pupils in a class situation would not have to share computers.

Obtaining the funding to buy a computer was one problem that had been encountered by the participants. How did the librarians ensure that the machines in the library did not become out of date? One participant summed up the situation by saying that

> ...software keeps coming out requiring more and more power and memory and everything else, and you're limited by what you've got.

This shows that librarians are concerned about the amount of money that is needed to ensure that the equipment remains up-to-date. Computers have to fulfil all the needs of the students,- from accessing information to desk-top publishing. One librarian noted that students were becoming more demanding

> ...they do expect more, they expect schools to have the latest technology.

One solution that was mentioned was the leasing of machines, as this would enable the school to update equipment as, and when, it was necessary. This is a scheme that would work well for establishments which have made financial provision for updating computers, as it requires a constant input of money to meet the cost of the leasing agreement.

One participant commented that equipping the library with IT resources needs to be viewed as an evolutionary process. She believed that the management often viewed buying IT equipment as simply a "one-off payment". Librarians can become frustrated at being unable to purchase CD-ROMs because the machines cannot run the software. However, one librarian pointed out that her school was careful when it came to investing in new equipment because the school was aware of the rapid rate of change

> We're becoming much more cautious about jumping into things early on because I think quite a lot of us have got our fingers burned over various things.

As expected this shows that purchasing decisions need to be carefully considered, as schools do not wish to invest in equipment that will quickly become obsolete. This could explain why schools are not at the forefront of technology because, apart from the financial implications, they need to ensure that their investment is sound. However, if schools do not continue to invest in, and update, their technology, then their existing equipment will become out-of-date.

One participant noted that a problem in her school was the fact that a mixture of PC's and Apple Mac computers were available, a situation that she described as being a "real hotch potch." This created some difficulties as some CD-ROMs could only run on one type of machine.

All the participants agreed that updating IT was expensive, especially if the school had invested in Acorn computers and was thinking of changing to PC's. This is a two-fold problem as the school would not only have to meet the expense of refitting a computer room with PCs but, as one participant said

> If pupils learn to word process on the Arc, it's completely different on the PCs.

The librarian alluded to the fact that although computer skills are seen as transferable, when pupils are faced with a different processing environment they can become confused and lost. She stated that

> ...when they are faced with Windows 3.1 [as] opposed to Windows 95 - it looks quite different, that can throw them entirely.

Therefore, if the school does update its equipment pupils will have to relearn how to use it. This is a problem that can also occur between different editions of the Microsoft *Windows* operating software. One librarian who has a PC in the school's library, did not allow pupils to use it for word-processing because she felt that it would result in her having to devote a lot of time to teaching pupils how to use the programme.

Another participant mentioned that they had paid for upgrades for the library machines from the library budget in order to ensure that they kept up with new developments. The librarian felt that the library was the last area on the list for development by the IT department, and she stated that

> ...they keep saying, "Well you're next" and get you on to the network, well...the money will run out, so we try to keep fighting to keep in line.

She felt that the library should be a priority simply because the resources were being used to support the whole curriculum, however she noted that this factor was not considered by the IT department.

This point was highlighted by one participant who mentioned it in relation to after school study clubs. She stated that it

> ...is a big thing that they [pupils] are able to come in and use computers after school for homework purposes, I think that anything they put forward like this can only be good for IT in schools.

Providing access for pupils to computers after school can only raise the profile of the library and highlight the need for good equipment. This is especially important if the school has focused on providing equipment in subject areas as opposed to in the library. For one librarian it has meant that the library has been overlooked and become the "poor relation" when compared with subject areas. Another participant also felt that it was difficult for the librarian to have a strong voice because the library was not in a

> ...corner to say our faculty wants this, we are a whole-school community thing.

The provision of a computer in the library benefits all the students as every pupil in school will have access to it. Ensuring that CD-ROMs are kept and used in the library could be one method the librarian could use to highlight the need for better equipment. One librarian has not given his/her library's CD-ROMs to the IT department because the library is not yet part of the network. This means that the pupils would be unable to access any of the discs given to IT from the library. Possessing a CD-ROM computer has been useful for another participant who stated that the History department had bought some software for the library because it had the facilities to run it.

Providing an environment that is secure is another challenge that librarians face. Ensuring that pupils do not "meddle" with equipment can be difficult and was the main reason why one participant had been unable to obtain computers for use in the library. The management decided that they would be more secure in the sixth form room. She commented that she thought

> ...that the main reason was superintending what was happening, and they thought it would be much easier to ensure nothing was interfered with if it was in the sixth form block rather than in here.

The solution for one participant was to put a lock on the computer as she noted that some pupils can now alter computers with "ease" and can "end up mucking around." However it did mean that because of the lock she could not "get into it half of the time." It is important to remember that some pupils do have the knowledge to circumnavigate security measures, so it is vital that the librarian has the knowledge to solve general problems and implement minor system alterations. Ensuring that pupils are supervised when using computers is also an important consideration.

10.10 IT and ELS

A large proportion of librarians within Nottinghamshire buy into ELS. It supports it's members in both the north and south of the county, although the main base of operations is in the south. Professional librarians within the service provide support and guidance for individual librarians and on a countywide basis. The service arranges termly meetings for all its members at school libraries around the county.

The participants were asked to describe the services that they thought ELS should provide, that would help the librarian to support the use of IT in the curriculum. One Group was interested in the role that ELS played in the co-ordination of IT training for librarians. One participant had recently attended a course that had enabled her to learn more about the Windows operating system. She had found it to be "extremely useful" especially because she had been using Acorn computers. The Group also mentioned the Internet user groups that had been formed. One participant stated that she had felt unable to attend meetings because they had been "miles away." The distance was felt to be a problem for some librarians especially if they had other commitments, such as child care. Overall this Group felt that ELS was unsure of its role in regards to IT and one participant commented that she suspected that

> ...there's a bit of a knee jerk reaction on their part in that they see this as an area where they are losing bits of us...moving away from printed material they're not sure what their role is.

Other Groups did not raise this point and felt that ELS was providing some useful services especially in terms of raising their awareness of new developments. One participant commented that ELS were able to provide up to date information, due to the fact that a representative from the Service attended all the exhibitions and then disseminated relevant information to the librarians. The routes of communication that the Service provided between the members was also seen as a benefit as it allowed the "exchange of information and ideas." One participant felt that it was the responsibility of all the members to provide input into this system, as this ensured that the service provided was "effective", and that new developments and expertise could be shared.

The wide range of CD-ROMs that are available on the market means ELS has an important role to play in providing advice to librarians on new purchases. Three participants from different groups found the ELS CD-ROM reviewing service to be useful

> They've just compiled a CD-ROM list which is going to be very helpful..it gives advice about the usability and the age group and that will be of great assistance.

There was only one participant who used other sources for reviews of CD-ROMs. This could have been due to the fact that they were situated a long way from the base and found it difficult to visit the centre. However, the majority of the participants viewed this service as being a useful assessment tool that provided them with a review that they could trust. Participants stated that they were confident that ELS provided both independent and impartial advice.

As expected being part of the ELS network was mentioned by participants as being beneficial, as members could contact each other and ask about CD-ROM holdings. This was possible as ELS had undertaken a survey and from the results, had produced a list of CD-ROMs that were held by each school. This list had then been circulated to all the participating librarians. One participant felt that the service would be improved

if information concerning software suppliers could be provided as this would enable the librarian to obtain resources more economically.

Two participants from different Focus Groups commented that they had found the services offered by ELS in relation to the Internet to be useful, especially in the early stages of setting up a link. One participant stated that

> I've not got it yet but I went to one of their introductions to the Internet sessions and that was very useful to see it working and what was available.

This comment shows how the librarian is able to assess the Internet for herself during a session held at the ELS base. The other participant found that being able to have access to an Internet link away from the school library environment had been useful

> ...it's quite useful to be able to use that Internet system or get them to show you how to use it because you're never interrupted.

The fact that this librarian could have uninterrupted access to the Internet was an important factor, as learning how to use this resource could be difficult for the librarian during the school day due to the demands on both the librarian's time and for the Internet.

The positive response from the participants concerning ELS showed that the librarians valued the services and support that was provided. This shows that they play a vital role in the co-ordination and provision of information concerning CD-ROM software and multimedia technology. Providing backup to individuals was mentioned as being a useful service. The members who were situated furthest away from the Nottingham base seemed to feel less satisfied than those librarians who were closer. This implies that ELS will have to ensure that all of its members feel that they are receiving the same level of service regardless of geographical location. ELS needs to provide a differentiated service to schools, as each institution is developing its IT and multimedia capabilities at a different rate. The Internet users group, for example, will need to be able to address the concerns of existing members as well as those librarians who are new users. An ideal situation would be the creation of a forum where librarians could

exchange ideas and discuss any new IT developments that are taking place in their own schools.

10.11 Sponsorship

Equipping the library or school with new technology requires funding, and one way in which schools can obtain extra money is through sponsorship. The discussions showed that school librarians have had a variety of experiences in this area. One participant stated that she had had some PCs "given" to her from a firm that was replacing their stock, but that the deal had been arranged through a personal contact rather than a particular scheme. Another participant reported that she had not had much success with finding sponsorship from companies and that she had written to many firms without receiving any response. However, the librarian had been able to obtain money through an arrangement whereby funding was made available for the purchase of a computer on the basis that it would also be used to serve the community in the evening. Librarians within this Focus Group suggested that this type of funding was possible because the library in question was a joint use library and therefore purchases could be made that would benefit both the school and the community.

The education outreach worker seemed to be the driving force at one school

> ...he's actually after getting sponsorship..He's already got 10 firms interested..Certainly in the last couple of years nothing has happened but under a change of headship - it's something we're going to push for - I'm going to push for.

This comment is interesting as it shows that it is also the ethos of the school that dictates the amount of sponsorship that is sought. This librarian was clearly keen on being a part of any partnerships that were developed. This is important as the library has ongoing IT needs and could benefit from the provision of extra equipment, although it is equally important that the library is not used as a "dumping ground" to house older out of date machines that firms no longer need. One library had a beneficial partnership with the Metal Box company, due to the school having pre-existing links with the firm. The library had gained new CD-ROMs and were also receiving Internet training. This shows how a partnership with business can lead to an

increase in resources and equipment in the library. However, the librarians felt that establishing links with businesses was not easy and required support from the whole school and especially from the senior management. Two participants remarked that their schools were not involved with any sponsorship schemes and for one participant this was because the "boss has been quite against it." In the other establishment the problem was due to a lack of personnel as "nobody's wanted to do it." These two comments clearly illustrate that for sponsorship to occur, senior managers need to be proactive and "somebody" within the school structure needs to be willing to go out into the community and obtain commercial backing.

Other schemes in which some schools have participated involved the collection of vouchers. These schemes that have been run mainly by supermarkets, enable the school to exchange tokens for computer hardware, software or equipment. Another participant had received additional funding from the *Prince's Trust* to help her set up a homework club. This had enabled her to purchase a computer as the library was to be the base for the club. This shows that obtaining commercial funding can be challenging and that unless the management support the concept of sponsorship, then obtaining money from outside sources will be impossible. The discussions from all of the Focus Groups revealed that only a small minority of librarians had obtained or used outside funding, although many had participated in the voucher schemes set up by supermarkets. This finding was not unexpected and the responses from the librarians showed that obtaining sponsorship relied upon the zeal and commitment of individuals within schools, and that the success of these projects depended solely upon these members of staff.

10.12 Expectations

The librarians stated that the expectations of both pupils and parents, in relation to computers had increased in recent years. One participant agreed that pupils were probably "..more demanding and expecting" but she stressed that this was not a bad thing as it meant that they were aware of the capabilities of the computer and what they could achieve by using it. One librarian stated that during a parents' evening she had had a lot of enquiries from parents who had asked her to recommend CD-ROM

resources that they could purchase for their child to use at home. She stated that suddenly she had been expected to be an "expert" on CD-ROM software. However, this type of enquiry is useful as it can provide the librarian with an indication of the number of pupils who have computers at home. One participant in a different Focus Group suggested that parents based their expectations of the computers at school on their own experiences of using computers at work, particularly in regard to the Internet. She stated that parents

> ...see it as a tool they use the same as a fax machine, so why shouldn't their children have it at school.

Another librarian's comment showed that a pupil's reaction to the equipment in the library was dependent upon his/her own experience of computers. She stated that

> ...some of the kids have never seen a CD-ROM so they're quite impressed. Other ones are, "Oh this is rubbish" so, yes, there's that certain problem there of expectation.

This comment shows that the pupil's background is very important, as it influences his/her attitude in relation to the computers that are provided at school. Pupils who can access equipment at home will be able to exploit these resources in their own time to complete homework. The level of pupil expectation will be governed by the catchment area for the school and whether the majority of pupils have access to a computer at home. One participant noted that generally their pupils were "very snobbish" about the resources that were available in school. As home use of computers and the Internet increases, then one would assume that pupil expectations of the facilities that should be provided at school will also rise. This has already happened for one librarian who stated that

> I haven't got the Internet, some of the kids have got the Internet and they've got...faster machines than I have, so they're coming in with an expectation of what they've got and I don't meet it.

This means that pupils can expect school machines to be at least the same as, and probably superior to, their machine at home. However, if pupils do have equipment at home, when the school updates its computers or software, then these pupils will already be familiar with the updated format. This suggests that those pupils who do

not have access to a computer at home will need to spend time at school updating and expanding their IT skills and knowledge.

10.13 Pupils with computers at home

Participants in the Focus Groups believed that pupils who have computers at home have an advantage over those pupils whose only contact with computers is at school. This finding was also reported in the NCET (1996b) study. One librarian was aware that the availability of computers in pupils' homes created an inequality at school and stated that

> ...some children have all the facilities that you can imagine and even more than we make available in school and parents who are very supportive, but other children have so little.

The above statement also acknowledges the role that the parent plays in not only providing equipment and software, but also in guiding and supporting their child's education at home. This means that the school not only needs to provide hardware and software for pupils to use, but also has to ensure that support is available to those pupils who do not have access to a computer at home. One librarian encourages those pupils who have the same software at home to let those pupils who do not have access to a computer to complete their work in school time. She asks pupils

> "Would you mind not using it [*Encarta*], so somebody who hasn't got a machine can actually have a go on it here?" and they say, "Yeah, all right, I'll do it at home."

However, the extent of the advantage that those pupils who have computers at home actually have, was questioned by some of the librarians. Whether pupils actually used the educational software to which they had access was raised and one participant stated that

> ...although some people say those kids are advantaged..you wonder to what extent they are and a lot of them..are literally using them for games.

One Focus Group decided that although home computers did not necessarily result in the children improving their information skills, it did give them the practical skills that

they needed to use the machines at school. This is important as it means that those children who have access to a computer at home are also more able to cope with the technical side of using the computer for example, loading a disc or printing out information. One participant felt that the improved confidence of some pupils could lead to others who were less familiar with the computers becoming lazy

> ...I would think that those kids who have a computer at home are the ones that dominate..and the others sit back and watch and never learn how to do it.

However, this perceived increase in confidence with computers does not mean that pupils have gained the skills they need to interrogate CD-ROMs successfully. One participant remarked that those pupils who had *Encarta* at home stated that they were able to use it for research, but the reality was different and when it "actually comes down to it they don't know." An approach used by one librarian was to ask the pupils if they have used a particular CD-ROM before. In this way those pupils who have not used the discs can be immediately identified and supported. Participants from two Groups agreed that out of the children who had a PC at home, the majority had access to the *Encarta* disc, and one librarian stated that she did not have the disc at school precisely because it would be duplicating resources rather than extending the pupils' experiences and knowledge. This is a sensible decision, but the librarian needs to be sure that most of the pupils do have access to this particular disc at home.

10.14 Physical resource management: managing demand

How librarians cope with pupil demand for CD-ROMs, especially when resources are limited, is the focus of this theme.

10.14.1 Maximum number of pupils

The majority of librarians stated that CD-ROM computers could most successfully support two users. Only one participant thought that up to four pupils could work together on one machine and several participants stated that pupils often argued and "squabbled" if more than three were using the computer. One librarian made a

distinction between lunch time and classroom situations and suggested that lunch breaks were harder to supervise because the time was not structured in the same way as for lessons

> In a classroom situation you can take them in pairs. You can say, "Right, come and work in pairs." but in the free-for-all you have at lunch time, it's very difficult.

Another participant reported that teachers in her school often sent more pupils in to the library than it was physically possible to accommodate. She stated that staff "send groups of about six, but it doesn't work at all." This comment indicates that some teaching staff are unaware of the problems that can be caused by larger numbers of pupils crowding around the CD-ROM.

10.14.2 Access to computers

The participants in the Focus Groups had different strategies for managing pupil demand for the computers. One strategy that had been implemented in a large school, was the use of a booking system

> ...because it is such an enormous school, I do have a booking system, and I do try to make it that if a child has already been on once that week, then that's it - they'll have to wait until next week.

This comment is interesting as it reveals that although this approach should in theory allow all pupils to have equal access to the computers, the librarian still has to "police" the system to limit the number of times that an individual can use a computer during a week. More importantly it also means that pupils can only complete one piece of research per week using the CD-ROM, unless they are organised enough to do several searches during their session. Another participant had found a booking system to be ineffective and she stated that

> I have tried that in the past, but it breaks down because I'm concerned that it's always the really enthusiastic children that arrive. It's always the same ones. Some of the shy ones hang back - they don't get the opportunities.

This participant had found that timid pupils had tended not to use the system and that the computers had been dominated by the more self confident pupils. It can be concluded that the introduction of a booking system does not automatically solve the problem of how to provide each pupil with equal access to the CD-ROMs. If a booking system is used, then it needs to be carefully monitored by the librarian to ensure that equality of access is maintained. One solution is to ensure that any restrictions placed on pupils accessing CD-ROMs are used by the librarian and teachers as an opportunity for students to use more traditional resources and practise their information skills. This is the method employed by one librarian who actively guides pupils towards printed encyclopaedias before they use the CD-ROMs.

A restriction noted by one participant was the problem of the length of the lesson in comparison to the class size. She stated that

> The biggest problem we have is in a one hour lesson, if you've got thirty pupils and they all want to use the CD-ROMs during that lesson, the first lot can be on for about fifteen minutes and by the time that we've got to the end of the lesson, a lot of pupils haven't had time to look at it.

Classes containing around thirty pupils were also a problem for two other participants. One librarian stated that she did not introduce CD-ROM resources to the class as a whole, as the high number of pupils would mean that a demonstration was impractical. However, another participant who did encourage class visits managed the demand for CD-ROMs by rotating the resources between the users

> ...we tend to show them what is available on CD-ROM or on the Internet, or whatever, during the course of that lesson or visit, with a small group of perhaps two at a time, while the others are actually searching the shelves, and we just sort of keep it on a rotating basis and pass them on.

By splitting the pupils into smaller more manageable groups, the librarian is able to work with a larger class and also ensure that each group uses a combination of resources, both traditional and electronic. However, it is important to remember that in order to be effective this strategy requires pupils to possess adequate information skills as they need to be able to undertake independent learning activities. One benefit

of having whole class visits to the library is that a teacher will be available to supervise the pupils. This enables the librarian to concentrate on providing guidance for those pupils who are using the CD-ROMs.

To combat the problem of a high pupil to computer ratio, one participant used the following strategy:

> We developed a timer system which X [another librarian] did. She bought one of those kitchen timers.

This strategy was deemed to be successful with the pupils because

> ...it makes them concentrate on what they're doing because they know that they've got a limit, so instead of messing about looking for things they don't really need, they just get on with it.

These comments show that pupils <u>will</u> work within well defined boundaries. The timer reminds both the librarian and the pupil when the "turn" is over. This strategy is successful as the pupils know that everyone gets the same amount of time on the computer. The librarian who used this method said that the majority of the pupils respected the system

> You have no arguments, they just get up and go. We do have some kids who turn the timer around so you have to watch it.

However, this comment shows that she still has to ensure that some pupils do not reset the timer. One drawback is that this method assumes that all pupils will be able to extract the relevant information in the given time. This system cannot recognise the difference in ability levels between the pupils. To ensure that this system does not discriminate against some pupils, the librarian may have to award certain pupils with a greater length of time on the computers. Another possible approach would be to ensure that groups of mixed ability were formed as this would enable pupils to support each other. This solution would require prior discussions teacher concerned as pupils would need to be put into groups before they used the library.

10.14.3 Use of printers

What strategies do librarians employ to control pupils' use of the printer? One participant thought that it was unreasonable to expect pupils to try and reproduce pictures or a graphic from the screen themselves. However, she stated that she was "certainly" stopping them from printing out the text. Another participant was able to control the volume of printing that took place by leaving the printer empty. Paper would only be provided if the librarian was satisfied with the validity of the request. As previously stated, the ideal situation would be for pupils to select and download information on to disc or directly into their work, however the fact that the librarians are employing these strategies suggests that at the time of the study that this did not occur.

The participants were concerned with the extent that pupils used the printing facility. One participant commented

> ...there is an increase in demand..and kids, quite honestly, can be lazy using them...it gets printed off, much the same as if we had a photocopier and I could just photocopy from books.

This shows that some pupils are <u>not</u> evaluating the information they find before they print it out. This means that some pupils may not interact with material that they find on the computer. The participants were concerned that pupils may misuse the print function and one librarian viewed this facility as being "bad news". The Focus Groups discussions suggested that if left to their own devices, pupils seemed to succumb to the temptation of printing out all the information that was available on the topic that they were researching. This means that the real benefit of using the CD-ROM is being lost, as the pupil is not utilising the functions that allow them to select the passages that are relevant to their enquiry.

How do librarians manage this problem? Two participants had quite simple approaches. One participant commented that "I don't really let them print" whilst the other librarian said that "My tack is to say the printer doesn't work". However these solutions remove the problem rather that solve it. One librarian took a different stance

> ...we're having to...limit them to two pages or say take notes or what about books.

Limiting the physical amount that pupils are able to print out, forces them to select the information they need. This should mean that they have to engage with the material before they decide to print out. The participant noted that when the alternatives to printing were suggested, that pupils were less than enthusiastic and that the exclamation "ugh!" had been the response from some individuals. This suggests that once pupils have used CD-ROMs, that they can then lack the motivation to use traditional sources.

Software which restricted the user's ability to print was used by one librarian. However, she commented that it

> ...causes too many other problems..so I usually disable it.

The librarian mentioned that although it had been useful in the past, due to technical problems it no longer provided a viable solution. Unless these problems are solved, the installation and maintenance of new technology may have serious time implications for the librarian if he/she is required to monitor the existing equipment. This in turn can create problems as library staff could be unwilling or unable to devote more time to managing computers. One librarian is unsure as to what will happen when the number of PCs in the library is increased. At the moment she can "keep tabs" on the printing and she is able to prevent pupils from printing out multiple copies. However, it may be impractical to continue with this approach when the number of computers increases.

One librarian replied that recently she had experienced a pupil wanting to print out some information from the CD-ROM, but before she allowed the pupil to print she decided to go to the classroom to find out exactly what was being taught. As she discovered that the whole class were studying the same topic, she allowed the pupil to print out the complete article. This approach meant that the whole class, with some guidance from the teacher, could use the article and select the facts that they needed to use. The teacher could then photocopy the relevant material for all of the pupils. This

meant that the librarian could help one pupil find information and provide him/her with a print-out in the knowledge that it would be analysed in the classroom.

In relation to the printing out of information, some of the participants stated that problems could be caused due to the instructions given by the teacher to the class. It was not suprising to discover that if a teacher has told pupils to use a certain resource, then this can lead to a whole class wanting to use the same disc to print-out a specific article. One participant noted that

> ...we'll get them printing multiples of things and I'll say, "Well you've got 6 or 7 copies of this floating around in the classroom already, do you really need another one? But they will insist because their teacher has sent them to...get a printout.

This situation can lead to a conflict between pupils and the librarian if the printing of multiple copies is halted. Refusing to allow a pupil to print out a copy of an article because the librarian knows that there are several copies in the classroom, will only serve to annoy that particular pupil. The student may feel that he/she is being unfairly discriminated against, especially if the pupils who have already obtained a print-out do not share the information. If the librarian suggests that the pupil should take notes from the screen, then one participant stated that she had experienced some students who had simply "written it out word for word." Most importantly this means that the pupil has not engaged with the text or "got what he/she wants from it anyway." This means that the teacher needs to be aware of the effect that his/her recommendations in the classroom will have on the information gathering activities of the pupils in the library.

However, the librarian was also aware that if more than one pupil was using the library, it was impossible to provide them all with individual attention. This means that

> ...you are less sure what they are printing out.

These examples show how librarians may have to perform a balancing act, as often they are in the position of trying to support both classes and individual users. This can result in some users receiving less attention than others.

The comments from the Focus Groups indicate that there are many issues facing the school librarian in relation to the management of the electronic information resources that are available in the library. This Chapter has sought analyse these issues, and provide a picture of the situation that existed within secondary school libraries in relation to multimedia resources at the time of the study. The views of the librarians who were interviewed individually are examined in the next Chapter.

11. Interviews

The five school librarians who were unable to attend the Focus Group sessions were interviewed individually in their own libraries, and asked to respond to a set of questions similar to those used in the Focus Groups (Appendix C). The Interviews took place in Summer 1997. The responses from all of the interviewees were then analysed and their comments collated into various units. The results of the Interviews are discussed below.

11.1 Using CD-ROMs

11.1.1 Products and purchasing

One interviewee stated that she believed that how software was selected was an important issue

> ...you've got to select your CD's very carefully and you do need to know what your teachers are expecting.

This comment shows that understanding the information needs of the pupils is important, as it enables the librarian to select relevant resources. Communicating with teaching staff is vital therefore as it ensures that the librarian is familiar with forthcoming research topics.

When deciding which CD-ROMs to purchase for the library, one interviewee felt that the recreational aspect of the technology was an important feature and she stated that

> ...if they [pupils] are coming in at lunch times to use the computers I've got to provide sufficient software that is fun but educational as well.

This is an interesting point that was only raised by one librarian. Her stock included some of the interactive Dorling Kindersly titles such as *Dinosaur Hunter* and *Earth Quest*. These types of CD-ROM are attractive and designed to be "fun" for the user. The value of buying these CD-ROMs is that they can be used by the librarian to attract pupils into the library during break times. This means that, the librarian could increase

the number of pupils who used the library by purchasing CD-ROMs that cater for the pupils' recreational as well as academic needs.

Possessing adequate funding to purchase discs was another issue that was raised by the same librarian, who felt that her purchasing power was low. She felt that a decision needed to be made by the management in her school, in order to clarify who was responsible for buying CD-ROMs; the librarian or the heads of subject areas. This is a crucial decision as if purchasing CD-ROMs is decided to be the responsibility of the librarian, this would provide her with justification for asking for additional funding. This librarian felt that the library should stock

> ...something like an atlas programme and general information CD-ROMs, but I think very specific CD-ROM's..should be purchased by the department.

If library funding is insufficient then a possible solution would be to ask the subject departments to either wholly fund a resource or pay a proportion of the price. This would mean that the library would not have to shoulder the whole costs of the purchase and that the subject area would be actively involved with purchasing stock that was relevant to their area.

All the interviewees stated that guiding pupils towards the resources that were the most appropriate for their enquiry was a very important aspect of their job. One librarian commented that the nature of the enquiry and the length of time that the pupil had to find an answer, were also motivating factors. She stated that she would select a printed dictionary, as opposed to loading a CD-ROM, to find the meaning of a word for a pupil as she found that the process was quicker. In reference to the O.J.Simpson trial this librarian stated that she

> ...decided that they would be better looking at the *Times*, because there had been lots of press coverage for that..So I think that's part of it as a librarian you have to steer them in the right direction.

Guiding pupils to relevant resources means that they should be able to find useful information quickly.

Two interviewees felt that discovering the information needs of a pupil enabled them to direct that individual to a suitable CD-ROM

> ...a lot of them, if they've got something complicated in the first place, will come and ask you, and I can say..."There's a lot of information on the computer, why don't you go and use *Encarta* or whatever.

This interviewee felt that providing guidance was important especially for pupils at the lower end of the school as they may not be aware of the scope of the resources held by the library. Guiding pupils towards the most appropriate resource, should result in those pupils whose information needs requires them to use the CD-ROM, to gain access to a computer. However, this also means that the librarian would need to be aware of the research that was being undertaken on every computer in the library. This is a task that would become more difficult the greater the number of machines that were available.

One librarian tried to encourage pupils to continue with a search if their initial choice of resource was unhelpful, although she admitted that she found it

> ...easier to get the encyclopaedia off the shelves than to load the CD-ROM and go through it with them.

This comment suggests that this librarian may lack the confidence to use the CD-ROM resources available. She would probably benefit from devoting some time to using the CD-ROMs, until she felt confident enough to use them to answer enquiries. This is a key point as librarians need to interrogate the CD-ROMs in the library for themselves in order for them to be able to recommend the most suitable resources to the pupils, otherwise this could result in a situation whereby the librarian only recommends printed sources to pupils, even though a more appropriate CD-ROM is available.

One interviewee noted that she used displays as a means of raising the awareness of the school community to both new and existing CD-ROMs. She mentioned that currently the Eyewitness *Dinosaurs* CD-ROM was on display as it was the latest addition to the library. This is a useful strategy which could easily be adopted by librarians. It would be especially effective if the display board was situated outside of the main library as it could encourage pupils and staff to visit the library and try the new resource.

11.1.2 Pupil attitudes

Two of the interviewees believed that one of the reasons why pupils wanted to use CD-ROMs was because they found them more attractive than books

> ...I find certainly with *Encarta*, the look of it, they are drawn to what's attractive, rather than what they've got to do.

This shows that pupils can become distracted from their original task by the extra facilities that are available on the CD-ROMs. The other interviewee understood why pupils became distracted and stated that

> ...I can see that most pupils would actually think it's much more exciting to use a computer than to use *World Book* and to be fair I'd have to agree with them..on CD-ROM there's interesting graphics, it's moving, it's going to be more fun.

This librarian acknowledges that compared with books, CD-ROMs are attractive. This is an interesting point and it is important to remember that CD-ROMs are designed to offer that user an enjoyable and multimedia experience.

The convenience of using the CD-ROM was commented on by one interviewee who stated that

> ...it's the speed isn't it? They do what they want on the CD-ROM, print it, perfect, and somebody else can come along.

The librarian noted that pupils could use the CD-ROM to find information, print it out and then take it back to the classroom, or use it in the library. This left the resource free for the next person to use. The librarian commented that using a printed encyclopaedia required more effort, as a pupil may have difficulty in locating the volume he/she needs if it has not been put back in the correct place by the previous user. The pupil would also need to either take notes by hand or photocopy the relevant pages. This could be difficult especially if a photocopier is not provided in the library. It can be concluded that the practical benefits of providing a resource on CD-ROM could motivate the librarian to purchase a resource in the electronic as opposed to the printed format.

One interviewee stated that although break times were used by some pupils to go on the CD-ROMs, she was not convinced that during this time their search skills were being improved

> ...the students who want to find out what to do come in to the library at break time. That isn't necessarily improving them, I mean it's improving their range..but I'm not sure if they've got much in the way of CD proficient.

This indicates that pupils who use CD-ROMs in their free time, can become more familiar with the scope and content of different resources. However, it is vital that this experience does not replace the formal teaching of search skills to pupils. The same interviewee raised an important point and stated that pupils might possess the skills to be able to print-out information from *Encarta* without necessarily understanding the resulting material. The librarian summed up by saying that even though a pupil may obtain a print-out, in reality the search has failed if the pupil cannot use the information that he/she has retrieved

> ...but is that any worse than them thinking they've succeeded and then realising, when they come to read it, that they've got something [that] they don't understand.

This shows that it is crucial that pupils understand the text that their search has retrieved, and that they also possess the ability to identify relevant pieces of information within the material they have located.

It was suprising to discover that one interviewee believes that pupils were more likely to ask for advice if they were having difficulties with the computer, than if they were unable to find a book and she commented that

> ...whether it's the fact that computers are a little bit newer and they know other people have problems using computers. I think they feel a bit shy to ask about the shelves.

The librarian felt that the location of the computers could affect the frequency of pupil requests for assistance. In her library they were situated near the counter which meant that pupils did not have to get up and search for the librarian as she was on hand to provide support.

11.1.3 Time limitations

The length of lessons was seen as a problem by one interviewee, who felt that there was not enough time to teach pupils how to use the CD-ROMs

> You haven't got time in lesson times - you do it yourself without really telling them what steps you're going through.

In order to allow as many pupils as possible to have a turn on the CD-ROM, the librarian found that she tended to locate the information herself for certain individuals. This meant that for some pupils, having the opportunity to undertake research during lesson times did not always mean that they were gaining direct experience of using the CD-ROM. For these pupils having access to the CD-ROMs during break times, was maybe their only opportunity to use the resources independently. It was encouraging to discover that another interviewee hoped to be able to overcome this problem by running a set of information skills lessons in conjunction with the English department. She commented that

> ...some of it will be English work biased towards the library like project work etc. and that's the sort of platform [on which] you can get information skills across.

Over several weeks the new intake of pupils will be provided with the opportunity to learn and then practise their new skills. To ensure that pupils continue to use and improve the skills that they have learned during the project, it is to be hoped that they will be reinforced through the setting of resource-based work throughout the year.

11.1.4 CD-ROM interface and multimedia features

One interviewee commented that the inclusion of music on CD-ROMs had greatly enhanced the pupils' experience of learning. She had used the CD-ROM to look at different types of guitar and she stated that the pupils had

> ...enjoyed the fact that there was sound on it and they could listen to the guitar playing a piece of music..you wouldn't get that from a book.

This is an interesting point as it demonstrates how CD-ROMs can bring certain aspects of learning alive because they can add an extra dimension to the research. This example also shows that pupils were able to benefit from using the multimedia features on this resource as they were provided with the opportunity to exploit them in a structured manner.

Four interviewees commented upon the use of hypertext links by pupils. Opinion was divided; two librarians stated that pupils did know instinctively how to use the links, whilst the others felt that they needed to draw pupils attention to this facility. One librarian commented that

> They see writing in red and they immediately think, "Oh right you can click on that." and that's really something I've never had to explain, they just seem to do that automatically.

This comment shows that the use of coloured text is effective and that pupils at her school found it easy to follow the links between documents that were available. However, a different interviewee commented that

> I haven't noticed them using that particular bit, not unless I've actually pointed it out to them..I can't honestly say I've seen them reacting to the colours at all.

This is an interesting point and it shows that in another school the fact that hypertext links existed in the text was not immediately obvious to the pupils. This difference in experience could mean that the ratio of pupils who have computers at home is higher in one school than the other. It could also reflect the fact that pupils may have more access to computers in one school than another. It can be concluded that to ensure that all pupils were aware of this facility, it would be beneficial for the librarian to highlight features such as hypertext links in written guides that could be placed next to the computers.

As hypertext links are used in most CD-ROMs, it is important that users understand how they work. Providing basic instruction would be one strategy that would ensure that all pupils had the same level of knowledge. The librarians agreed that because there was a wide range of experience amongst pupils when they started school, that

running introductory and familiarisation sessions in the library was a valuable service to offer. If a greater proportion of pupils have access to computers at primary schools, for example, then in future these lessons may no longer be necessary.

The interviewees were asked how they felt about the fact that the user interface design often changed when a CD-ROM was updated. Two librarians noted that this could be a problem. One librarian when discussing encyclopaedias, wished that the basic procedures would remain the same

> ...the thing that struck me when I went from *Encarta* 1995 to *Encarta* 1997 was how do I print? Where's the menu for printing or copying?..I just wish they would stick with it especially when they all have something in common.

This librarian believes that if regular features such as "print", "copy" and "paste" were the same in each edition, then it would be easier for the user to use the new CD-ROM. However, the fact that the interviewee laughed during this comment suggests that she is aware that this is unlikely. The librarian commented that a new user interface had caused problems for less able students, and that when she had tried to help a user, she had experienced problems with describing the input box on the CD-ROM

> ...you're going to get a box that you can type in and it might be called "find" or it might be called "search" or it might be called "look for", "browse", but if they haven't got the literary skills then they haven't got all these words, so some of them are going to fall at the first fence.

This finding was not unexpected and shows that if the CD-ROMs available in the library have a variety of different user interfaces, then the less able child may suffer as a result.

The use of preferred search terms, keywords and particularly spelling was raised by another librarian as being problematical

> ...now if you type in guitars in the "find" box, you don't get guitars, whereas if you type guitar in you do get guitar.

This shows that some pupils may require assistance from the teacher or librarian to highlight the fact that in some CD-ROMs the plural form will not retrieve the desired

information. However, this interviewee also noted that if the child has poor literacy skills, that he/she would also face problems with using the printed format. In order to provide them with the understanding of how searches worked, the librarian's strategy was to liken the CD-ROM "finder" to a book index and explain to the pupils how the CD-ROM located the article. She felt that although this could be time-consuming, this was an effective method.

Another interviewee used an interesting strategy and evaluated CD-ROMs by using the software herself to complete a piece of research

> I always try to do as much as I can without looking at the instructions.

This is a useful approach as it enabled the librarian to test the CD-ROM to see how intuitive the searching and other features were for a new user. The librarian noted that this strategy emulated the way that pupils used CD-ROMs, as she noted that often they did not look at instructions before "having a go." If the librarian encountered problems during the test-run, she was then able to prepare and provide instructions for pupils.

It was suprising to discover that one interviewee felt that CD-ROMs did not need to have a uniform design as she believed that the tools used for searching were usually quite easy to locate. She stated that

> *Encarta*'s got a 'find' box and the same with *World Book*, because of the nature of the encyclopaedia they always usually have this find box across the top which the children automatically seem to go into.

This shows that in this librarian's experience, pupils have instinctively used the "find" box when they have been undertaking research. She notes that although other CD-ROM resources such as the *Times* and *Sunday Times* are slightly more complicated, an "intelligent" child would be able to understand how to use them. She stated that when she had explained the function of search boxes to pupils in the past that she had been "talking to children who knew already." This suggests that the pupils in this school are familiar with computers and confident users of CD-ROMs.

These responses indicate that CD-ROM user interface design can cause problems for pupils who have poor literacy skills, although it needs to be remembered that these pupils would probably also encounter problems when they used printed materials.

11.1.5 Future expectations: CD-ROMs

There were mixed views and opinions concerning the future of CD-ROM technology. One librarian felt that CD-ROMs would be superseded

> I think on-line information will move forward and CD-ROMs will become obsolete, we're seeing it now.

It was suprising to learn that only one interviewee felt that on-line information was becoming more accessible to pupils. This was probably due to the fact that she worked at the CTC, an institution that had invested substantially in new technology. It will be interesting to see whether other schools follow this model and decide to increase pupil access to on-line information sources.

One interviewee did not believe that many school libraries would have a network of computers installed

> ...I can't see many school libraries having 12 Internet points..CD-ROMs coming into their own where you can put different CDs on to different machines and all the pupils can use them.

In light of the technology that is already available to schools, this comment was unexpected and shows how the difference in the provision of technology can affect employees' perceptions of possible future technological developments. Some schools already have a network installed, whereas other libraries are still relying on stand-alone CD-ROM computers. It is important to remember that unless the library is valued and supported financially, then the librarian will have difficulty in providing pupils with access to new technology.

Another interviewee felt that one important feature of CD-ROMs was that physically they were more durable than books. The librarian stressed the importance of ensuring

that both books and technology worked in tandem within the library to enhance the experience of the learner, as opposed to creating the situation whereby computers were used extensively, but that the books were under-utilised. She commented that she believed

> ...that there is a role for IT in libraries to be developed and I would hope that in five years' time we won't just have one link and one computer.

This comment reflects that this interviewee is at the early stages of developing the technological capability of the library. At the time of the interview the library only had one computer. This again illustrates the differences between the provision of IT in one school compared with another. At this school pupils will face more competition to gain access to the computer than they would if they attended another school within the same county. This is troubling. It means that pupils from another school with more computers in the library have an advantage over those pupils who only have access to one machine. As there are no statutory requirements for the school library, it is unlikely that this inequality between establishments will be addressed.

One interviewee felt that one disadvantage of having computers in the library was that pupils used them for recreational purposes. Unlike a previous participant from the Focus Groups, this librarian did not feel that the pupils were learning through "play", and noted that

> ...there is always going to be that leisure facility..I just wish that in schools you could get over to the students the fact that the machines can help them with their work.

This librarian is concerned that if the number of machines available in the library increases, then the pupils would not use them for work or research, but for leisure purposes. This negative attitude suggests that this interviewee has had bad experiences of pupils misusing IT in the library. One solution, that was noted in the Focus Groups, was to provide software that is both educational as well as being attractive to users. It is also important that the librarian has control over the resources in the library and the software that pupils can access. If there is a piece of software on the computer that is purely for leisure purposes, then perhaps this librarian should ensure that it is only

available during break-times. To encourage academic use of the computers, the librarian could also use a booking system to ensure that those pupils who wished to undertake research were given priority over those who simply wanted to use the equipment for recreational purposes.

Another interesting problem that was noted by a different interviewee was the difficulty of monitoring user success with computerised information sources. The librarian stated that she did not know

> ...if it is easy to check if someone is coping with finding their way if they're all sat there in front of screens.

If the number of machines increased, this librarian is unsure how she would be able to identify those users who were experiencing difficulties. It would be useful for this librarian to have access to a network of professional librarians with whom to share this concern. Those librarians who do house more computers in their library could then share their experiences and offer advice. If more computers were added to the library, it is to be hoped that pupils would ask for help if they were unsuccessful with their search.

11.2 Information skills

11.2.1 CD-ROM resources

All the interviewees believed that teaching information skills to pupils was very important and, like the participants in the Focus Groups, they agreed that in reality most of the teaching took place in a piecemeal manner. One librarian who taught pupils how to use printed information sources believed that they needed to master these skills before they progressed to using CD-ROMs. She stated that

> ...you would have to get their skills on using encyclopaedias honed in first and perhaps use..CD-ROMs and *Encarta* as a boost towards the end.

This is a useful strategy as it means that these pupils should have the ability to construct a search before they use the CD-ROM.

One interviewee, who taught information retrieval skills to year 8 pupils, commented that the students were

> ...quite good at using the computer and computing skills and searching for information.

However, she stated that problems could arise if pupils failed to utilise their information skills and did not consult facilities such as the index when using the CD-ROM. This is a key point that reinforces the need for pupils to be provided with the opportunity to practise their information skills within the curriculum.
The guidance provided by one interviewee was ad-hoc and only with a small number of pupils

> ...usually six students at a time to a particular CD-ROM [who] work through the science-based work sheet..So research skills tend to happen as the need arises.

Another interviewee conducted structured lessons for year 7 pupils in the form of a library project that required them to use a range of different skills. However, the librarian was not sure of the impact that these lessons had on the quality of the students' work, as she felt that she was teaching these skills in isolation. The lessons did not continue into year 8. It was suprising and discouraging to learn that one librarian only had a single lesson with year 7 pupils. She hoped that the experience would encourage pupils to return to the library. She stated that

> ...once they've used [the CD-ROM], they do come back and they pass the word around, and then hopefully it snowballs.

The formal lesson acts as a "taster" and the librarian hopes that it will encourage pupils to return in their own time, to explore further the capabilities of the resources. One problem with only providing one induction lesson is that it may be that only the interested pupils return to the library. This means that some pupils may not gain any experience of using the resources. There was only one interviewee who continued teaching pupils information retrieval skills in year 8 and this took place within IT, as opposed to specific subject lessons.

However, trying to ensure information skills are taught in the curriculum has been a problem for one interviewee, who stated that

> It's something that I have tried so many times and so many different ways in the last 15 years, but basically study, information, or whatever skills you call them, they are not [considered to be] important; and I don't know that [this situation will change] until teachers realise that it does make students more efficient.

This is a key issue and this librarian was aware that pupils would benefit from information skills training, but had been unable to gain support from her teaching colleagues. The librarian needs to demonstrate the benefits of adopting a whole-school approach to information skills to school managers, although this could be difficult to achieve unless partnerships with teaching staff are formed. This means that the librarian needs to be even more proactive and dynamic in the presentation of his/her ideas to senior staff. It can be concluded that although the interviewees do undertake some form of information skills teaching, there is no evidence that any of the establishments have adopted a whole-school policy.

One librarian who taught information skills to year 7 pupils did so within P.S.H.E lessons, however the librarian did find that the lack of time was difficult to overcome

> I think that constraints on time is a big thing, making sure each pupil is using information in the best way. We're teaching them in the library to extract the information; how they use the information extracted has got to be in co-operation with the teaching staff.

The librarian raises a key point and notes that she can only control the information that a child gathers, ensuring that the information is used correctly is the responsibility of the teacher. Liaison between the librarian and the teacher is therefore very important as plans can then be made that ensure that pupils make the best use of the library. Ideally this planning process needs to take place well in advance to ensure that the library has the necessary resources available. This partnership is essential if the librarian is trying to encourage teachers to think about how pupils use the library.

One interviewee actively collects information for specific projects to enable her to prepare the resources before the class comes into the library

> ...what I try and do, if I know a group are coming in to do research, is put in those CD-ROMs where I think it's more likely they will find the information.

This preparation of resources should enable the pupil to concentrate upon finding information, rather than selecting the most appropriate resource. This could result in a positive information retrieval experience and a boost in confidence for the user. The librarian also noted that how the pupil conducted the search was crucial. To be effective the pupil has to learn to recognise how his/her search is proceeding and whether it needs to be refined

> ...the first thing is knowing what to look for and knowing how to either make your search more specific or in some cases go on with it..[or] to realise that the information you need might not be there.

These are complex skills and the librarian can provide valuable advice on the best strategy to adopt. However, this approach is time-consuming and supporting 30 individuals in a class would be difficult for the librarian to achieve without co-operation from the teachers.

One way of addressing this problem would be to use pupils as teachers. This would involve some of the pupils in the class helping their peers. This practice already occurred in IT lessons in one school

> ...when they've finished..they just go round and see someone who's having problems and start helping him/her and it's transferring their knowledge.

In this example this approach has been employed in a mixed-ability class and those pupils who finish the work are then encouraged to help others. Another librarian noted that using pupils in this way can be very beneficial for both the pupil and the librarian

> ...a child that is computer literate is very eager to show everyone else what he/she can do, so if you can get that to extend to the things that you want, like using CD-ROMs, then you are on to a winner.

The evidence would suggest that the librarian can achieve positive results by harnessing pupils' enthusiasm and expertise on the computer. The system can also

benefit those pupils who feel intimidated or who do not respond well to adult instruction.

One interviewee indicated that in her experience, if CD-ROMs are available on a network then pupils can become very proficient technical users. The librarian stated that she felt the pupils knew "how to use *Encarta* completely." The only problem that she had encountered was in relation to the pupil's ability to select search terms

> ...they sometimes don't know where to look for it and sometimes it's trial and error and they just type in anything to see what comes up.

This is an important point that suggests that pupils who have prepared a list of keywords prior to their search would be able to locate relevant information on the CD-ROM. Teaching pupils how to identify their search terms would enable them to undertake successful searches. This could help to avoid the situation whereby the pupil wrongly concludes that there is no information available.

11.2.2 Balance of usage

How do librarians encourage pupils to use more than one source when searching for information? All five interviewees agreed that pupils tended to used CD-ROMs, as opposed to printed material. One interviewee thought that this was due to the fact that pupils found it hard to apply their information searching skills to both electronic and printed materials

> ...they find it difficult, from the computer to the books, they can't associate the two.

This is an interesting comment and could explain why some pupils use one resource exclusively. It highlights the fact that pupils need to be shown that the process they use to locate information within a CD-ROM, can also be used to locate information in books and vice versa. Another interviewee commented that

> ...they're frightened of looking up an encyclopaedia..they equate hard-back book with hard reading..but I think that is where they obviously rely on the visual and that's where computers come in..they're confident.

CD-ROM encyclopaedias are physically easier to interrogate than their printed counterparts and the results from a search are displayed very quickly. This is an important point as pupils may view a printed resource as being harder to use as, in order to be able to locate the volume that contains the information they require, they need to interpret the references in the index volume. A CD-ROM encyclopaedia will automatically find the information once the user has chosen a subject or article from the index presented on screen. The time taken to find information is therefore reduced. Because pupils do prefer to use the CD-ROM, it is essential that they understand how the information is ordered and stored and how it can be retrieved. This should also mean that they become more confident users of non-computerised sources. However, one interviewee noted that despite information skills lessons, pupils still preferred to use the CD-ROM

> They tend to gravitate towards the CD-ROM. I sometimes think that they find it easy to use, even though we have sessions on how to use the encyclopaedias they still say, "Which one shall I look at Miss?"

This in an interesting point as it highlights the situation that pupils can face if the encyclopaedia is pre-loaded on to the computer, or if only one encyclopaedia is available. The pupil does not have to select the most appropriate resource, but can simply utilise the software already on screen. A pupil who decides to use printed materials can find that he/she has to choose the most appropriate resource from the selection available. This means that less confident pupils could opt to use the CD-ROM as they already know that a suitable resource is available. This factor becomes less important if the school is networked and the pupil has a wider choice of CD-ROMs from which to choose. If pupils do prefer to use the CD-ROM, then ensuring that the resources that are available are of a high quality becomes even more important.

Another interviewee found that pupils would not use printed sources and would wait to use the CD-ROM if the computer had to be set up. This is an important point as it emphasises the fact that teachers need to play an active role to ensure that pupils do not simply rely on the CD-ROM for information. It was interesting to discover that one interviewee suggested that she did not necessarily think

> ...that teachers always appreciate the use of sources for information.

This librarian encourages pupils to construct a bibliography for their work as this reflects the range of materials they have used, but she acknowledges that this practice is not reinforced elsewhere in the school. It can be concluded that in order for the skills that pupils learn and use in the library to be valued they need to be an integral part of their work and not just exercises that are undertaken in the library.

11.2.3 Internet and searching

In the City Technoloy Collge the Internet was utilised by pupils from all year-groups. At the time of the Interview the Internet was not available in the library, although the librarian planned to have a link installed in the near future. She said that in her school, the pupils were initially shown how to access web sites by entering web addresses before searching the Internet was explained. Access outside lessons was monitored by a teacher who ran an Internet club. These activities mean that, when it is available, these pupils should be able to make effective use of the Internet in the library. As the pupils will be familiar with the process of conducting a search, this should allow the librarian to concentrate on helping them to refine these skills. However, the librarian would still need to monitor the pupils to ensure that they remained focused on their research tasks.

Librarians who were less familiar with the Internet had encountered different problems. One interviewee who had limited on-line experience raised an interesting point and she commented that

> ...it's trawling through those menus that takes time [if]..the librarian can't find what she wants, I don't know who has got a chance.

If the librarian is unable to assist users with their searches then the service that he/she is able to provide will be unsatisfactory. The librarian therefore needs to familiarise himself/herself with the Internet and gain some experience of locating information. If the librarian cannot provide adequate assistance to pupils who are using the Internet then this could also damage his/her credibility within the school. Installing an Internet

link in the school holidays when the librarian can use the resource without interruption, is one strategy that could prevent this situation from occurring. Technical support is also crucial as it means that should the librarian encounter any problems, help would be available. However, it is important to remember that in some schools, technical support may not be available in the holidays. In this case the librarian would need to use other professionals or ELS as an alternative source of support and advice.

A problem that one interviewee reported that she had encountered, was the large number of "hits" that a search could return

> ...I was looking for something for one of the maths teachers the other day..and it was tessellation and Roger Penrose..Now we turned up something like 10,000 documents.

This example shows that after inputting relevant keywords for a search, a user may be faced with a high number of possible web sites, and it is this wealth of replies that can cause confusion for a new user. This is a key issue as pupils who use the Internet may become frustrated if guidance is not provided. However, this librarian did not know how she could have further refined her search. This gap in expertise is one that could be filled by ELS, as they would be able to provide the librarian with written support on searching techniques and other practical aspects of Internet use. Once the librarian becomes a confident user, then he/she will be able to provide pupils with the support and guidance they need. One interviewee commented on a search that she had undertaken on the Internet to find McDonald's

> ...we had McDonald's the painters in Idaho, we had McDonald's the garage, did we ever get McDonald's the burger chain? No we didn't...I said, "I'm going to phone up McDonald's in Mansfield to find out where head office is."

This example highlights the importance of having a clear idea of how to conduct a search. This enquiry would have benefited from the user knowing the location of the head office so that the geographical area could either have been included in the search or used to sort through the list of returns. In this instance the librarian had realised that to obtain the information, it was easier to phone through to a local branch of the company. It is useful to remember that the user could also have prepared him/herself

for the search by trying to locate a relevant web address. Users should be encouraged to prepare their search strategy so that they are able to pursue a different approach if their first search is unsuccessful. This requires the user to have some experience of using the Internet, an ability to consider keywords and an ability to sift through the results. It is these aspects of Internet use that need to be taught to both teachers and pupils.

Finally the same librarian noted that citing information from the Internet presented some difficulties

> ...when I looked at some papers from the Department of the Environment, it's not all that clear where the information has come from.

This is an important point and this comment shows that the librarian needs to know how to record documents that have been located on the Internet in order to be able to construct valid bibliographies. This information then needs to be passed on to the pupils. This is another aspect of Internet use upon which ELS could provide support and advice.

11.3 Internet in the library

The librarians raised some concerns in relation to how the Internet would be integrated into the curriculum and how it would be managed in the library. The decision to have the Internet in the library was forced on to one librarian who stated that

> The decision was made by senior management, I wasn't consulted in any way, I was just told it was coming.

For this librarian there was no choice as to whether a link would be installed in the library. This was the only interviewee who had experienced this situation; all of the other librarians had been consulted. One interviewee explained her reaction to the Internet

> I almost shied away from it at one point and then the Head of IT got it, he's talking about linking it around school..which should be very good if we can have it around the library without me having to pay for it.

Although this interviewee did not originally plan for the library to have access to the Internet, she was eager to have an access point in the library if it would be funded by the school and not taken out of the library budget. This is an interesting comment that implies that one of the reasons this librarian "shied" away from the Internet was probably due to financial constraints. This librarian had considered charging for Internet access but thought that parents would feel that providing access to this resource was the school's responsibility. Charging for access is problematical precisely because the Internet can be used as an educational resource, although a large proportion of the material available is not aimed at the educational market. One interviewee suggested that different types of usage could be charged for accordingly and commented that

> I wouldn't want to see a situation where the 6th form were charged to go on the Internet for finding information for their course. However if pupils and staff want to go on it out of classroom hours..I don't see a problem with asking them to pay for that use.

This would suggest that if the Internet is used for non-educational purposes then there is a legitimate argument for charging. However, to enable teachers to become familiar with the technical and navigational skills required, it would be important to allow them to experiment with this resource. One librarian noted that she thought that it would be necessary to limit the areas in the Internet within which pupils could undertake a search, to ensure that they did not access undesirable information. The interviewee suggested that one solution would be to provide an after school-club, as this would ensure that pupils' access to the Internet was supervised by a teacher.

The conditions under which the pupils were able to use the Internet, was raised by three interviewees. All three felt that supervision was necessary and in light of the results of the Internet questionnaire, this finding was not unexpected. One interviewee noted that

> I don't want it on open access because once you're back's turned you find somebody on, they're messing about.

If the Internet link was not supervised then this interviewee felt that the resource could be easily abused. This sentiment was echoed by another librarian who was aware that undesirable information was available on the Internet. She noted that

> ...somebody has to be in control of what information they can look up.

It was interesting to discover that this librarian did not wish to have sole responsibility for the Internet at her school because she felt that her technical skills were inadequate. One solution to this problem would be for the school to provide the librarian with adequate training, to ensure that she felt confident and competent enough to successfully manage an Internet link in the library.

The Government has also allocated funding in the form of the New Opportunities Fund (VTC, 1999b), for both teachers and librarians to undertake training to support their usage of IT. However, it will be left to the individual schools to decide how the training will take place and the priority it has within the school. After completing some training it is to be hoped that teachers will then be able to utilise the resources that are available on the Ngfl. It will be interesting to see the effect that these training schemes will have, and whether schemes will translate into an increase in the usage of both multimedia technology and the Internet within classrooms.

Another interviewee felt that pupils would be tempted to try to access undesirable information from the Internet. She stated that

> ...I'm constantly aware that kids who see naked bodies on TV still find it extremely exciting to look at pictures in a book.

She felt that it was important that the school was seen to be operating in a "healthy" way and protecting pupils from accessing unsuitable material. This interviewee believed that a teacher should be present when pupils were accessing the Internet, to ensure that they remained focused on their task. One way to reduce the possibility of pupils accessing undesirable information is to ensure that only those pupils who have to complete subject-based work are allowed to use this resource for undertaking research. This is also a method for managing demand.

One librarian commented that high demand was a problem

> ...having one machine with the Internet isn't going to help us if 90 people want to use it first break, you've got to sift out genuine enquiries.

The method that the librarian was going to employ would require users to fill out a form and also provide an evaluation of their search. This method should ensure that genuine users have the opportunity to access the Internet as the librarian can screen the forms to ensure that only curriculum-based tasks are being undertaken. For this scheme to work the librarian would need to ensure that the pupils filled out the forms properly and did not provide information that was either too basic or too general. These forms could then be used by the librarian to assess the success of the searches that had been undertaken.

11.4 IT policy

When the interviewees were asked about IT policies, all the librarians stated that it was important that one existed. Their responses indicated that each institution was at a different stage in relation to the planned and actual use of IT in school. The response from the CTC librarian revealed that the school and the library had formalised their approach to IT

> We've got a college IT policy and obviously I've adopted that for our departmental policy..there's an IT steering group that deals with IT policy. I don't really have much influence on that.

However, this model seemed to be an exception. One interviewee stated that at the time of the interview, there was no IT policy in her school

> I keep telling them they should write one..I want to be included and I want him to include the library.

This comment shows that some schools have yet to incorporate IT into their planning and development process. The librarian was enthusiastic about being involved in an IT group as she realised that the library, as an IT resource base, needed to be included in a school development plan to ensure that it benefited from any improvements that were

sanctioned. Being a member of a committee is vital for the librarian as it ensures that the library has a voice and that the IT needs of this area are considered. However, until a group is formed the librarian can do little more than raise her concerns with the relevant staff.

One librarian had a more positive outlook. She knew that an IT policy existed within the school but she had not been involved with its formulation. The librarian was aware of the IT needs in the library and stated that

> ...I have a policy of my own at the moment within my department, how computers are used and what they are used for.

The IT policy and the usage of library resources document was written for inclusion in the library handbook, as required by **Ofsted**. The policy concentrated on the issues of pupil access to computers and the availability of machines to pupils during the day. However, she had not incorporated the aims of the whole-school IT policy into her own library document. This could be achieved by adding a general reference to the whole-school IT policy.

Another librarian who felt isolated, commented that she had

> ...asked the head of IT, "Are there meetings I can come to?" He did the policy very much on his own.

If the IT co-ordinator does not encourage any sort of discussion or debate then this can cause some problems for the librarian. If the librarian has no forum to attend then it could be difficult for her to raise library IT issues. This is an important point as this may lead to the librarian being unaware of IT developments that are taking place in school. It can be concluded that building links between the library and IT department can be difficult if the IT co-ordinator is unavailable or unwilling to include the library in discussions involving IT provision.

The final interviewee felt that her school had lost its direction in terms of IT development, and her comment reflected this uncertainty

> ...we certainly did appear a couple of years ago to have a strong IT policy and knew where we were. Whether or not we have an IT policy and whether this has changed..?

This librarian was no longer sure of the direction that the school was taking in relation to IT. This is discouraging and suggests that this school needs to create a committee devoted to planning IT within the school that includes a cross section of both teaching and support staff. The school needs to evaluate the performance of the equipment and software, how IT is being utilised in the school, and recommend changes that they would like to implement in the future. In terms of financing IT developments, one librarian was concerned over how schools in general are forced to budget. The interviewee noted that

> ...when everything has to compete for a place in the budget then it is difficult to look at things from perhaps the long-term..getting cohesion into a budget when you don't know from one year to the next..it's very difficult to bring in a strategy.

As budgets are allocated for just one year then this could make it difficult for schools to implement a long term IT strategy. If schools are unable to save or allocate enough money for purchasing or upgrading their existing resources within one financial year, then planning improvements for the following year may be impossible. In order to keep up with the pace of technological change, regular investment needs to be made in IT. This means that how schools plan and manage their budgets may have to be reviewed.

11.5 Ofsted

Four of the interviewees were in agreement that the **Ofsted** inspection had done little or nothing to improve the IT situation in the library. One interviewee stated that a false impression about how the library was normally used had been created, as the teachers had chosen not to book classes into the library during the inspection week. If there were fewer classes in the library then the demand for resources would have been reduced, and the usual conditions within which pupils had to work would not have been revealed to an Inspector. This can be frustrating for the librarian if he/she sees the Inspection as an opportunity to highlight the problems that arise from having

limited resources. If this shortfall is mentioned in the final Report then it would provide the librarian with some evidence that he/she could use when requesting extra equipment or funding.

This librarian had been interviewed by one of the Inspectors, but she felt that it had not been particularly constructive. She commented that she had

> ...more or less told them what was wrong with the library hoping they would bring it up..but it didn't go any further than that.

This shows that some libraries have been assessed by Inspectors who do not seem to appreciate the role that the library can play within the school. The librarian also noted that the inspector did not seem "overly interested" in the IT in the library. This is an important point and means that the role of IT in the library in this school had not been evaluated or assessed during this Inspection. The librarian noted that the library's role in providing support to individual subject areas within the context of curriculum delivery had been examined, but that this had not included the use of IT. She stated that

> ...they treated IT as something very much separate, somebody else was doing it, they were looking about IT within subjects but they didn't necessarily connect it with the library.

To ensure that the role of IT in the library is recognised, clear links need to be established with academic departments. Any planned use of the library that has been undertaken by pupils, needs to be evident in the documentation of the departments concerned. This would require the librarian to liaise with department heads and teaching staff to ensure that the use of the library and IT resources are documented at a departmental level. This can then be used by the librarian during an inspection as evidence of class use of the library.

The use of IT within the subject areas was commented upon by **Ofsted** in another school and the Report suggested that IT should be incorporated into most subjects. However, it was disappointing to discover that these comments did not mention the library and therefore it had no effect on the provision of resources in the library. The Inspector who visited the library had watched some sixth formers using the Internet.

However, the librarian felt that this did not provide an accurate representation of IT use in the library because the link had only been installed for a week. She stated that

> ...nobody knew what they were doing..he wouldn't have been able to report that it was a bonus to them.

This comment again shows that inspectors may not be assessing the normal role played by the library during an Inspection week, especially if, as in this situation, a resource is new and unfamiliar to pupils. To appreciate how resources are utilised within the school an Inspector would need to spend enough time in the library to observe how pupils used the equipment.

Lack of time was a factor that was raised by one interviewee who stated that the Inspector who was meant to visit the library "...had so many lessons he just didn't get round." This made it impossible for the librarian to inform the Inspection team of any progress or problems that had occurred in the library. Conversely, another interviewee had all the Inspectors visit the library, however this did not result in any changes in IT provision after the Inspection. These comments would suggest that **Ofsted** is more concerned with the use of IT within subject areas, as opposed to examining how the IT in the library is utilised by pupils. The experience of these librarians show that in the final Report, comments relating to the library can often be brief regardless of the number of Inspectors that had visited the library. The librarians' comments suggest that in order for the library to be properly inspected, the focus of the **Ofsted** Inspection needs to change. It can be concluded that greater emphasis needs to be placed on assessing the usage and provision of the IT and multimedia resources that are available in the school's library.

11.6 IT provision in the library

A problem mentioned by three librarians was a lack of equipment and software. The fact that the computers in the library were used by the entire school meant that there was a great deal of pressure that was placed on these resources. As the computers were in demand from both pupils and teachers, the time available for the librarian to

use a machine was restricted. One interviewee found it difficult to find time to devote to using the computer. She stated that her

> ...problem is that it is very difficult to find additional time to fit in on the computer.

This means that this librarian was unable to increase her confidence and expertise on the computers during the school day. Her solution was to purchase a personal computer to use at home. A study undertaken by Wishart (1999) revealed that 43% of the librarians that she had surveyed also had access to a computer at home. This suggests that having a computer at home is important, as it enables the librarian to acquire additional computer skills. This librarian also empathised with pupils who had an initial fear of using the computer, as she had experienced this situation herself. Her solution was

> ...to let the kids use them as they like, *Encarta* and other CD-ROMs which have music and graphics etc. so it's quite exciting to use it, then you tend to learn.

This librarian's own experience with computers meant that she was keen to encourage new users to "play" and experiment with the software, in the hope that they would be able to build up their confidence and experience. For her the key issue was that the pupils were able to use the computer. She stated that

> I think we've got to encourage the kids to use it for all sorts of things in the hope that when they do want to use it they are able.

Three of the librarians commented on the problems that were caused by having a mixture of hardware in school. All of these schools had invested in Acorn computers. One interviewee stated that obtaining a PC was difficult due to the "ad-hoc" nature of computer allocation and because historically the school had supported Acorns. Changing to PCs had not been easy for another interviewee due to a lack of technical support

> ...the only person in the school who has been able to give me any help, apart from the students, is one of the Deputy Heads and he's just so busy..we desperately need a technician.

This librarian is in a difficult situation and her comment shows that she receives little practical support in school. This is an important point as in order for the library to be able to run new software a new computer had been purchased, however she noted that she had not received any formal training on how to use it. It can be concluded that the introduction of a new computer will have time management implications for the librarian, as initially he/she will probably take longer to solve any problems that occur.

One librarian believed that the school had a "responsibility" to provide computers that were available for pupils to use during the school day. The librarian was also aware that the location of the computers within the library was important. She stated that problems could arise if several pupils crowded around a computer, as they could distract other library users. One solution that had been implemented in the library was to place the machines in a separate area and to provide a master cut-off switch that was controlled by the librarian. She commented

> One way to get hold of that, was to have a switch in the library office that switches on the computers and switches them off..so now they come in and ask and say, "I'd like to use such and such a CD."

If the number of computers are to be increased then the librarian needs to consider the implications of this action. Appropriate strategies could then be implemented upon the arrival of new equipment, as opposed to simply reacting to problems as they arise. It was encouraging to learn that consulting with professional colleagues had enabled her to identify possible problems that could occur due to the proposed IT changes in the library. This is a sensible approach, as another librarian who has experienced a similar situation would be able to offer relevant advice and support.

11.7 IT and INSET

IT INSET training only occurred at the City Technology College, where staff were able to use INSET days at the beginning of the academic year to complete their basic IT certificate. None of the other librarians had experienced or provided any IT training. Wishart (1999) found that 57% of the librarians in her study had covered IT in their formal qualifications but her study did not acknowledge the need for staff to

have access to a continuous training programme. The Nottinghamshire librarians stated that they required IT training, as they felt that it would ensure that they were able to fulfil the technical role of their job.

The librarian from the CTC was also unique in that she was a qualified IT teacher and therefore her need for technical support was reduced. She was also able to attend courses on IT. The other interviewees replied that they were self-taught and had not attended any formal training courses.

11.8 IT and ELS

One interviewee thought that the Education Library Service (ELS) was in a good position to provide support for librarians in relation to new technology. She stated that she thought

> ...that shared experience is going to be important particularly if you've had a bad experience..I suppose in matters of policy as they're getting an overview..they ought to be able to help us share practice and..what to avoid.

This is an important point and to ensure that it continues to provide a relevant service, ELS needs to be able to support this librarian by supplying her with information and good practice guides relating to both CD-ROMs and the Internet. This means that this librarian would then be able to use this material to help her make informed decisions. Another interviewee felt that ELS were not sufficiently "proactive" in the services that they offered. She suggested that

> It would be nice to actually be able to borrow CD-ROMs occasionally to use, rather than having to go up to Glaisdale which is quite a trek.

This librarian was mainly concerned with the time implications of learning and using new technology. If discs could be sent to schools, then the time that she would have spent in travelling could be devoted to assessing the disc. However, one disadvantage with this strategy would be that the librarian would not have access to the professional support or technical advice that was available at the base. It is important to remember

that if librarians want ELS to provide them with useful and valuable services then they need to ensure that the Service is aware of their needs and preferences.

The role of ELS in supporting and guiding the librarians' purchase of stock was only commented on by two of the interviewees. One librarian mentioned briefly that ELS did influence their purchasing decisions, but did not elaborate further. The second interviewee provided a more detailed answer and made two points. The first centred around the geographical position of the school in relation to the ELS base. The interviewee commented that

> ...because of our geographical situation from Glaisdale we haven't actually been this year, now it is trying to fit in a visit at the end of September and then we could look at CD-ROMs.

This librarian stated that ELS had been useful in the past, but they thought that its future role was uncertain because of the inconvenient location of the Nottinghamshire base. This means that the librarian will have to rely upon written and telephone support, as opposed to viewing and testing the discs that are held by ELS. This comment echoed the views and concerns that were raised in the Focus Group. To reassure this librarian ELS needs to address this interviewee's perceptions of isolation. This suggests that ELS has a greater influence over those librarians who are geographically closer to the main base than those in the North of the county.

11.9 Sponsorship

The discussions revealed that in the Interviewees' schools IT sponsorship arrangements existed in two forms. The first form consisted of an agreement with a business that provided money or equipment for the school. The second form was a token collection scheme, whereby tokens could be exchanged for equipment. The Technology College (CTC) was the institution that had received the most sponsorship from outside firms. The librarian stated that they

> ...get sponsorship, it's from outside companies -we first opened in 1989 and we had lots of sponsorship then, I think they still do input now.

When compared with other schools in Nottinghamshire, the CTC can be viewed as a relatively new institution. It is a different type of establishment as it concentrates on providing pupils with an education that focuses on the exploitation of technology within the curriculum. It is interesting to note that this type of school has opted to pursue sponsorship in order to manage the cost of providing IT. This could be because the management in this school does not have a history of being funded solely by the Government. In this respect, it is probably more responsive to new business partnerships and more able to create financially beneficial opportunities for the school than a more established institution. Another interviewee stated that her school had received some computers

> ...it's some company who upgraded their computers and they decided that they would get rid of some of their older computers and it was a contact put together and they've donated 20 PC's.

This comment shows how this school has formed a useful partnership and been able to secure additional equipment. However, these computers are older machines that have been discarded because they have been superseded by newer models. Schools must be cautious about accepting older equipment as it may already be outdated. Before accepting older machines, the librarian needs to ensure that they can support the desired software.

One interviewee who had been able to add a colour printer to the resources in the library, by participating in a token scheme, was not convinced that the schemes were value for money

> ...I really think it's a bit of a rip off, the amount you have to spend to get one token; the number that you need for one printer.

Token schemes can be useful to the librarian, if the school can collect enough vouchers and exchange them for a useful item. However, these schemes are clearly designed to encourage pupils, staff and parents to shop at a certain retail outlet. Some members of the school community may also disagree with the ethos of the schemes. The school management therefore needs to decide which offers they can accept and which they consider to be too commercial for an educational establishment.

Finally, another interviewee had participated in a scheme that had provided the school with the equipment to use the *Which University* programme for three years free of charge. The librarian stated that they

> ...enrolled for it, they provided a modem and computer..we are actually in our first year of buying the computer off them at a 'knock down' price.

This example is interesting as, in return for trialing a piece of software, the school has been able to take advantage of a buy-back scheme and purchase equipment for a reduced price. The librarian has also gained the experience of piloting new technology that due to cost, the library would not usually be able to purchase. The interviewee involved with the scheme stated that before entering into any agreement, the librarian needs to be aware of all the implications of the trial in terms of the time it will take to administer and monitor, the time needed for familiarisation with the equipment and the time required for user training.

11.10 Expectations

One interviewee remarked that library users had influenced her decision in relation to CD-ROM purchasing. She had considered buying *Encarta* for the library because it had been suggested by both pupils and a member of staff

> ...one of the kids mentioned it, which made me think, "Should I have *Encarta*?" and then I had the science teacher ask if we had *Encarta*..so yes I was influenced by users.

This interviewee noted that she investigated the disc before finally deciding to buy the product, but the fact that she had made enquiries was a direct result of the requests made by pupils. However, not all the comments received from pupils were positive or helpful. Some interviewees had experienced negative feedback concerning the quality of the computers from the students

> They are continually telling me that my machines are crap or that they are too slow..I don't think that they appreciate that ours have got a lot more information.

This librarian felt that the pupils did not appreciate the resources that were available to them and were simply comparing the technical capabilities of the machines in the library with the computers that they had at home. The librarian acknowledged that pupils expect the library equipment to be at the "cutting edge," and that the reality falls short of this high standard. This is an important point and this situation can be difficult for librarians to manage as pupils may decide not to use the equipment because it is slow. The librarian therefore needs to demonstrate to pupils that the software available is of a high quality and relevant to their work. If the CD-ROMs installed on a machine require a higher specification of computer, then the librarian may encounter dissatisfaction from the users as the existing hardware may be unable to support multimedia features, such as video clips.

The librarian from the Technology College had not encountered many complaints from pupils as the school provided high quality equipment. She stated that

> ...I think that most of our software is up to date anyway and I think a lot of what we have here, they've got at home as well..I think that we are fairly up to date with what we've got.

Pupils in the Technology College have access to modern equipment and software. These pupils are provided with IT training in school and also have access to CD-ROMs from networked computers in the library. The integration of IT into the curriculum has a high priority and both staff and pupils are encouraged to maximise its potential. All staff are also working towards gaining basic competence in IT, by undertaking an accredited course. The interviews showed that this establishment was unique and that other schools did not place such high importance on the provision and use of computers.

The librarians were asked what they believed the parents expected in relation to the provision of IT in the library. Open evenings were mentioned by one interviewee who, during such an occasion, had experienced a parent enquiring about software that he could purchase for his daughter to use. The fact that computers are becoming more prevalent in the home suggests that increasingly librarians will be asked questions about computers and software. This can be viewed as an opportunity for the librarian

to demonstrate the high quality and range of the educational software that is available to the pupils in the library. Another interviewee noted that she had found that it was the pupils who were more demanding that the parents. She stated that

> ...parents are still quite pleased when they come around school and they've got prospective pupils with them - they're pleased that we've got computers there, they think it's a bonus. Children expect that..and they also expect you to have the latest technology.

This comment shows that those parents who have either bought machines for their children or use computers at work, will have a different opinion of the resources that are available at a school, to those parents who do not use or own a machine. It must be remembered that technology is not available to everyone at home. It is important that the integration and development of computerised and multimedia resources in the library accommodates the differing levels of experience and expertise of the users. Meeting these objectives is a formidable task.

11.11 Facilities at home

Three of the interviewees believed that those pupils who had access to a computer at home had an advantage over those who did not. One interviewee stated that in the year 7 classes at her school, approximately a third of the pupils had been identified as having a home computer. This was an important statistic as those pupils who did have a computer at home benefited as they were able to complete the information technology part of the P.S.H.E course. Due to a lack of resources at school, the other pupils were unable to undertake this part of the course. One interviewee thought that pupils with home computers were

> ...a lot better, in the fact that they come in and they've got the knowledge and they..retrieve information a lot quicker..they're better advantaged.

If a pupil can use a computer at home then they will probably be at ease with using the equipment at school. One interviewee felt that it was easy to spot those pupils who had machines at home

> A lot of kids who are on the computer have one at home and you don't want the others to be left out as I think the gap is very noticeable.

This means that the problem that the librarian faces is how to ensure that all users are able to gain access to computers and multimedia resources at school. This is especially relevant for those pupils who do not have access to a computer at home.

11.12 Physical resource management: managing demand

11.12.1 Maximum number of pupils around a computer

All of the interviewees replied that the optimum number of pupils that could use a computer successfully was two. This was purely a matter of logistics for one interviewee as the computers were located in a small room. This meant that an uncomfortable working environment was created if there were more than eight pupils in the room at once. Another librarian mentioned that the Internet had been demonstrated to a whole class using a special projector. This had enabled 15 pupils to view exactly what was happening on the teacher's computer screen. She noted that although this method required plenty of forward planning, it did result in a large number of pupils being able to be taught how to use a particular piece of software. This approach also requires the teacher to be able to set up and operate the system. This option would only be available to staff in those schools that had purchased the appropriate equipment.

11.12.2 Booking system

Three of the interviewees operated a booking system. Two of these systems enabled pupils to book during break times and during lessons. The other interviewee only allowed teachers to book computers during lesson times. The latter interviewee found it helpful to know when a class would be arriving, as she could then prepare the resources in advance.

Another interviewee believed that a booking system ensured that access to the computers was fair

> ...especially at lunch time for the same people who hog the computers all the time.

Once a pupil has made a booking, then he/she has guaranteed access to a computer for a certain period of time. This enables the pupil to plan his/her research and use of the computer in advance. In this way the use of a booking system can be said to provide pupils with equality of access to the computers.

11.12.3 Printing

One librarian stated that she had to devote a large portion of her time attending to printer related problems

> I do feel that sometimes I'm just going backwards and forwards loading the printer and I'm being IT support teacher as well as librarian.

This comment shows that this librarian needs to be able to solve printing problems if and when they arise. This situation could be eased by the presence of an IT technician as the librarian would then be able to concentrate on supporting the pupils as an information professional, as opposed to predominantly satisfying their technical needs.

Another interviewee was in a very different situation and had not encountered any printing problems

> ...because the printer that we have got, which is very old, isn't compatible with the computer that we've got at the moment.

This comment was followed by the interviewee laughing and shaking her head in disbelief. The fact that the pupils cannot obtain printouts from the computer due to poor equipment indicates that in this library there has been insufficient investment into technology. This finding is discouraging as it suggests that in this school the library is not viewed as an important IT resource base.

The conditions at the City Technology College (CTC) presented a different picture again. A large number of networked computers were available to pupils throughout

the college, including the library. Printing out did not cause a problem for the librarian and she stated that

> They do the work here and print it out elsewhere so I don't really deal with that side - I only deal with helping them do the actual work in here.

This would seem to be an ideal solution, as it means that a technician is not needed in the library because all of the printing is sent through to a separate area. This enables the librarian to concentrate upon providing the users with the support they need to undertake research. This solution was unique to this institution. Access to networked computers also meant that these pupils had the opportunity to integrate the information that they have discovered on the CD-ROMs, into their own work. This means that overall, less printing should need to take place.

The introduction of technology has created a variety of challenges for library managers and the concerns raised and conveyed by these librarians at interview are similar to those revealed in the Focus Group discussions. This shows that the problems faced by librarians are similar throughout the county of Nottinghamshire. The previous discussions have also highlighted some of the strategies that have been implemented by these librarians in order to create an environment where multimedia resources are more effectively utilised and managed.

12. Conclusions and Recommendations

The study set out to answer two core questions that required the collection of both statistical information and the perceptions of librarians. This led to the design of a methodology that gathered both quantitative and qualitative data from librarians across three neighbouring counties. The conclusions of this study were drawn from the results of the surveys, from the Focus Groups and Interviews and from the literature review.

12.1 Methodology

Some conclusions can be drawn in relation to the effectiveness of the methodological design of the study. The choice of research tools was informed by the literature review and this study has tested the validity of this approach.

The study has shown that using a survey is useful for covering a wide geographical area. This research tool also meant that specific areas of interest, in this case CD-ROMs and the Internet, could be targeted. Thematic construction of the questionnaire proved to be a useful approach as it provided the respondent and the researcher with a clear framework of the subject areas that were being explored. The study showed that construction and design of the survey needs careful consideration and testing before use and the researcher found that piloting the questionnaire enabled effective redesigning to take place. The collection of quantitative data was important in this study as it enabled the researcher to identify trends and discover relationships between different factors, and test the reliability of observed relationships.

On reflection although valid conclusions for one region have been revealed, the fact that the survey only covered one geographical area was a slight weakness in the research design. Testing other counties in different regions would have revealed whether the trends identified in Nottinghamshire were similar across the UK. The results of the survey also revealed that the use of dichotomous and Likert scales need

careful consideration. The responses to the questionnaire showed that incorrect usage of these scales can alienate respondents and produce disappointing results.

The study has shown that the use of Focus Groups is a particularly effective method of eliciting responses from school librarians. Participants in the discussions provided frank and honest opinions relating to their use of multimedia technology and how it was utilised by both pupils and teachers in their schools. The group dynamics worked particularly well and the librarians genuinely welcomed the opportunity to discuss their concerns and management practices.

In this study the group sizes ranged from between two to eight participants. The librarians responded well to this size group and it ensured that every Group member had the opportunity to express their opinion or relate their experiences. Holding the Focus Groups and Interviews in the summer holidays was successful as it enabled the majority of those librarians who had expressed an interest in attending a meeting to do so. It also resulted in the participants being relaxed as they did not have to contend with the pressures and demands that arise during term time. Using a participant's library as a venue for the discussions also proved to be successful and contributed to a relaxed atmosphere. An advantage of this approach was that for the majority of participants the Groups were held in a location that was geographically convenient.

It was important that Interviews were conducted as the data collected served to validate the information gathered from the Focus Groups. The Interviews revealed that the problems identified by the Focus Groups were common to most of the librarians in the study. The Interviews also enabled the perceptions of librarians from different types of establishments to be gathered, notably the CTC in this study. This provided some interesting results. The Interview was a useful research tool to employ as it enabled the researcher to discover the concerns and management strategies that were employed by an individual librarian.

The information gathered from the Focus Groups and Interviews was substantial and analysing the results was a long, but rewarding task. When considering whether to use these research tools, it is important to remember that transcribing the data can be very

time consuming. Although it was very labour intensive for the researcher to conduct all the Interviews and moderate the Focus Groups, this ensured that the application of the research tools used was consistent.

This combination of research tools and data collection methods enabled the researcher to collect both valid and reliable information from school librarians. It can be concluded that the methodology used to conduct this study is particularly suitable for gathering information about the activities and practises, as well as the concerns, perceptions and opinions of secondary school librarians.

12.2 Literature review

The literature review enabled the identification of important issues and trends within the area of study and provided a background and context for the research. CD-ROMs and the Internet are identified in Chapter 2 as being the popular and pervasive technologies in schools at the time of the study. The second part of the review revealed that using a student-centred teaching and learning approach is the most effective way of exploiting the benefits that multimedia technology has to offer to education. Key issues in library management in relation to the exploitation of multimedia resources are examined in Chapter 4 and focus on information skills, the quality of resources, staff training and the changes that are taking place within librarianship in response to the introduction and integration of multimedia and new technologies. These issues form the basis of the study and are pursued in the questionnaires and the Focus Groups. Overall the literature review revealed that the management of multimedia resources poses many challenges for the secondary school librarian.

12.3 Core questions

The results collected from the study of secondary school libraries has provided a picture of the situation that exists in schools across Nottinghamshire and its two neighbouring counties - Lincolnshire and Derbyshire. The study has shown that all of the school libraries in the study house electronic media in the form of CD-ROMs, and

that librarians implement a variety of strategies in response to the management problems associated with the utilisation of this technology within the library environment. However, if change is to take place at a whole-school level, key issues need to be addressed by senior management. It is important to remember that each school is different and that therefore any recommendation or strategy provided in this thesis can only act as a general guide. The librarian is able to implement certain changes however, to be effective some of the strategies require the support of, and co-operation from, teaching staff and senior managers.

Question one: What issues do librarians believe need to be addressed in order to manage, exploit and develop multimedia resources successfully within the secondary school library?

The first question was concerned with identifying the issues that librarians believe need to be addressed in order for the full potential of multimedia resources to be realised in schools. Answers to this question are contained in the Chapters that analyse the data obtained from the questionnaire (Chapters 6-9), Focus Groups (Chapter 10) and Interviews (Chapter 11). The study revealed that there are seven key issues. These are: investment into technology; the availability of quality educational software; the delivery of a whole-school information skills programme; the provision of training; access to an Education Library Service; the adoption of student-centred teaching and learning; and the recognition by senior managers that the librarian has the ability to raise the standards of pupils within the school. These issues are described in greater detail below.

The evidence from the Nottinghamshire study shows that there is a need for continuous investment into technology, to ensure that it is up to date and can support the requirements of the software available. This is a change that can only occur if investment in computers and IT is adequately provided for and included in the annual budgeting cycle. This type of investment can only be realised if the school produces a long-term financial plan. This would require managers to be able to set a budget that would include an IT allowance for future expenditure on IT-related software and

equipment. The library could then become part of a planned rolling programme that would enable equipment to be upgraded and replaced.

This study has also revealed the need for quality educational software to be available for purchase. The creation of such software requires extensive planning to ensure that it is pedagogically sound and relevant to the curriculum. The subsequent availability of this software would then encourage teachers to utilise and integrate IT within their teaching areas. This in turn would provide the librarian with a tool for expanding teachers' involvement in the library, and enable him/her to forge links with subject areas.

If pupils are to become information literate, and be able to locate, retrieve and exploit both traditional and electronic media, information skills is an area that needs to be addressed by schools. The evidence shows that pupils need to be taught how to use electronic media to evaluate and extract information. This requires the involvement of the librarian in partnership with teaching staff to provide input into the creation of learning and teaching tasks and to provide training for both staff and students in relation to information proficiency. The area of information skills is vitally important and needs to be recognised and supported at a whole-school level if change is to occur within the school. The librarian needs the support of senior management as this would provide him/her with the ability to introduce new practices and priorities relating to information skills throughout the school.

The Nottinghamshire study shows that the majority of schools are at the formative stages of integrating the use of the Internet. The study has shown that to use this research tool the user needs to be able to cope with the large number of documents that a search can retrieve. It is the librarian's specialist knowledge and skills in the area of information retrieval which need to be recognised and utilised by senior management, if the librarian is to be effectively deployed.

In order to become proficient users of technology both teaching staff and librarians need specialised training. Managers need to be aware of the requirements of each group and provide the opportunity for staff to undertake training. If teachers and

librarians are confident and competent users of technology, then this will benefit pupils. If staff are unable to use the technology available, then they are unlikely to recommend its use to pupils. The element of time is especially important and the librarian needs to offer training sessions that are flexible and can be adapted to suit the needs of the individual teacher. In this way the IT awareness and skills of the teaching staff can be raised. This also provides the librarian with the opportunity to promote the facilities and services that are offered by the library.

Outside organisations such as the Nottinghamshire Education Library Service (ELS) can be invaluable to individual librarians and can provide them with the opportunity to meet with a network of local school library practitioners. This is an aspect that is particularly valued by individual members. ELS is also in a position to supply librarians with additional services relating to new technology. The provision and organisation of training is a service that the librarians valued. ELS needs to assess its position in relation to technology and provide services that relate directly to the librarians' experiences of IT. This could include training, advice, and the opportunity for members to discuss the impact of electronic media on their services, as well as offering more proactive advice and support concerning specific technological issues. It is important that ELS remains at the cutting edge of new technology and is able to provide information and services that relate to the needs of the individual librarian at a practical level.

The effective implementation of multimedia technology into lessons requires the adoption of a teaching style that advocates active and independent pupil learning. This requires the teacher to assume the role of facilitator and to employ a less didactic approach. This style of teaching enables the librarian to work in partnership with staff, and become involved with the delivery of the curriculum. However, the majority of schools appear not yet to be in this position and the librarian therefore needs to work with those individuals who are enthusiastic about technology and who also encourage independent learning.

If organisational and cultural change is to be implemented and sustained within the school, it is vital that initiatives are supported by senior managers. The librarian can

only work within the boundaries of his/her school, and therefore only some of the strategies that have been suggested in this study will be relevant to any individual school. It is important that the librarian ensures that senior managers are aware of the role of the library and the services that it offers to pupils within the school. The study undertaken by Wishart (1999) emphasised that the greatest constraint on librarians was senior managers' perception of the librarian's ability to support pupil development. It is vital to convey to senior managers that the librarian has the potential to raise standards in relation to the utilisation of IT and the development of information skills within the school.

The librarian also needs to ensure that managers are aware of the impact that electronic media has on the organisation and management of the library. This includes outlining the need for continual development of ICT in the library and the need for changes in library practice. Finally, the librarian needs to be aware of the range of strategies which he/she can employ to solve the problems that are created through the introduction and use of electronic resources in the library.

This study has shown that librarians believe that if these conditions exist within a secondary school, then the librarian will be able to manage multimedia resources effectively and efficiently.

Question two: What strategies do librarians apply in order to manage multimedia technologies effectively?

The second question was concerned with identifying the strategies that librarians use in order to manage multimedia technology. Answers to this question are contained in the Focus Groups (Chapter 10) and the Interviews (Chapter 11). The evidence shows that librarians need strategies to address problems that arise from constraints created by the curriculum and by the culture of the school within which they work. The study has also revealed that librarians need to implement solutions to solve day-to-day resource management problems. The recommendations on page 295 provide school librarians with a set of tools that can be used to manage multimedia technology more effectively.

These management practices are fundamentally important as the issues arising from the integration of new technology, for example user-training, will remain constant.

12.4 Conclusion

This study is important as it provides a benchmark against which future studies into multimedia technology and school libraries can be measured. The picture created by this study is supported by the research undertaken by NCET (1996b) and more recently by Wishart (1999). The similarity of the results suggests that although the NCET project results were published in 1996, and the actual pilot experiments took place even earlier, little has changed within schools between 1996 and 1999. The problems faced by librarians are the same. This indicates that little or no change is occurring within education and school libraries to meet the challenges presented by multimedia technology. This is a cause for great concern. The majority of libraries are under-resourced and the potential that multimedia technology has as a teaching and learning tool is being under-utilised. This presents a situation which is disheartening and indicates that the advice and recommendations from the NCET study have not yet been heeded.

12.5 Recommendations

For the school librarian

1. Communications

Librarians need to communicate with other library professionals to enable experiences and recommendations to be shared.

2. Liaison

Librarians need to form partnerships with teaching staff and plan tasks and projects that ensure that pupils make effective use of the library.

Librarians need to liaise with teaching staff concerning the integration and teaching of information skills within the curriculum, to ensure that pupils can utilise electronic resources effectively.

3. IT support

The librarian needs to adopt a proactive approach and provide support and guidance to pupils and teachers who are reluctant to use technology. This includes communicating evaluations of new materials to teachers, and asking them to recommend items for purchase.

The librarian could use pupils to provide support for their peers during lesson and break times.

4. Promotion

The librarian needs to promote actively the IT resources to both staff and pupils, to raise their awareness of the materials that are available in the library.

5. Training

The librarian needs to have a flexible approach to the training of teaching staff. To accommodate teachers' busy schedules, support sessions need to be provided at times that suit individual members of staff.

Pupils need to be taught how to extract information from the multimedia resources that are available in the library.

6. Strategies

The librarians need to assess the practical problems caused by new technology and introduce a variety of appropriate strategies to manage issues effectively including managing demand, access, pupil use of electronic resources, and monitoring pupils' printing.

7. IT committee

The librarian needs to ensure that he/she is a member of a school IT management forum.

Whole-school issues for the Head of School

In order to maximise the use of IT, changes need to take place on a whole-school level.

1. Equipment

Equipment in the library needs to be included in the school's IT upgrading and replacement programme. Maintenance of equipment needs to be planned as part of the school's expenditure for each year.

The library needs to house enough equipment to meet the needs and demands of the school community and must therefore be provided with sufficient funding to enable it to fulfil this function.

2. Training

Both librarians and teaching staff need to be provided with specialist IT training. This will ensure that staff are able to utilise the equipment and can therefore provide effective support to the pupils.

3. Time

Teachers and librarians need to be provided with time that they can use to learn new technology and to create working partnerships with each other.

4. Information skills

Information skills-teaching needs to be integrated into the curriculum at a whole-school level.

5. IT policy

There needs to be a forum available for members of teaching and support staff to discuss the direction of IT development within the school.

6. Teaching

A resource-based teaching style could enable the effective use of multimedia software and the Internet by pupils, and could encourage independent learning.

7. Technical assistance

To support and train both the librarian and teaching staff in the use of multimedia technology, the school needs to provide technical assistance.

8. Senior management

Senior managers need to recognise the importance of the services that are provided by the school library and the role that the librarian plays in the education of the pupils.

Innovations in the use and development of IT in the school and the library, need to be supported by senior management.

In order to achieve a long term cultural change within the school, the adoption of teaching and learning practices that encourage resource-based independent learning, need to be supported and encouraged by senior management.

12.6 Questions for further research

The changing pace of multimedia technology and the range of new initiatives that are being introduced and implemented by schools give rise to some questions for further research. Using this study as a benchmark, it would be interesting to discover whether the initiatives that are adopted by schools actually change the ways in which multimedia resources are exploited within the schools, for example:

1. How has the situation changed in light of the NOF funding for teacher and librarian training?

2. Have the issues identified by librarians in this study, concerning the effective exploitation of multimedia resources, been addressed within schools?

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Management implications of multimedia applications in school libraries
Questionnaire for Librarians

How many CD-Roms do you have in the library ? _____

What is the total number of CD-Roms in school ? _____

- **Resource Management**

How do the following groups of people know which CD-Rom's are available ?		**Please circle as appropriate.** Teachers	Pupils
1	List on display in the library ?	1	2
2	List on display in the staff room ?	1	2
3	List on a notice board ?	1	2
4	Have to ask the Librarian ?	1	2
5	Other (Please specify)		

	All	Most	Some	None
6. Do you provide written instructions for use with individual CD-Rom's ? **Please circle one**	1	2	3	4
7. If you do provide instructions, are they readily available next to the machine ?	1	2	3	4

- **Promotion**

How much time, generally, do the following people take to familiarise themselves with new CD-Rom's ?

		Librarian	Teachers
8	<30 mins	1	2
9	up to an hour	1	2
10	1-2 hours	1	2
11	>3 hours	1	2

12. When do pupils, generally, experiment with new disks ?
(ie lunch time, before school)

Do pupils request to use specific disks ?		Always	Often	Seldom	Never
13	years 7-9	1	2	3	4
14	years 10-11	1	2	3	4
15	years 12-13	1	2	3	4

- **Acquisition**

How do you find out about new CD-Roms ?	**Please circle as appropriate**				
	Always				Never
16 Publishers	1	2	3	4	5
17 Exhibitions	1	2	3	4	5
18 Reviews	1	2	3	4	5
19 Other Librarians	1	2	3	4	5
20 Other members of staff	1	2	3	4	5
21 Do you try to see the disk in action before purchasing ?	1	2	3	4	5
If you have bought a disk which you feel is excellent, do you share your evaluation with;					
22 Teaching staff	1	2	3	4	5
23 Other Librarians	1	2	3	4	5

- **Copyright**

24 Do you provide a written notice concerning copyright ?	Yes 1	No 2

25 When pupils use CD-Roms to print out information, how often do you remind them about copyright information ?	Every time 1	2	3	4	Never 5

- **Curriculum**

26 Is the use of CD-Rom's during lessons specified by teachers ?	Always 1	2	3	4	Never 5

27 Is your CD-Rom collection geared towards any particular subject area ?	Yes 1	No 2

If yes, please specify which area: _____

28 Do you feel that you successfully integrate the use of CD-Rom's when answering inquiries ?	Always 1	2	3	4	Never 5
Do you think that pupils find CD-Rom's:	Always				Never
29 Easy to use	1	2	3	4	5
30 More attractive than books	1	2	3	4	5

31 Today's range of CD-Rom's are so intuitive that formal completion of search sheets for students is unecessary ?	Strongly agree				Strongly disagree
	1	2	3	4	5

32 Do pupils undertake any formal search prepartion for use on CD-Rom's? (ie completion of a search sheet)	Yes	No
	1	2

If yes, please specify the format _____

- **Environment**

Do you believe that the location of multimedia computers within the library;	Strongly agree				Strongly disagree
33 Is important	1	2	3	4	5
34 Effects frequency of use	1	2	3	4	5
35 Can encourage use	1	2	3	4	5

- **Access**

36 Do you have a booking system for CD-Rom's in lesson time ?	Yes	No
	1	2

If no, then please move onto question 43

Please specify the format of the booking system ? _____

37 Is the booking form for staff use only ?	Yes	No
	1	2

38 Do staff use this system ?	Always	Mostly	Seldom	Never	
	1	2	3	4	

39 When are students able to book machines? (please circle more than one if applicable)	Lesson times	Dinner	Break	After school	Before school
	1	2	3	4	5

Other, please specify _____

Where is the booking form kept ?

40 For teachers _____

41 For students _____

How do you try to create a fair booking system for pupils ? _____

	Strongly agree	Agree	Disagree	Strongly disagree
42 Do you think that a booking system provides the best means for equality of access?	1	2	3	4

- **Censorship**

	Strongly agree	Agree	Disagree	Strongly disagree
43 The process used to select CD-Rom's means that censoring information is unnecessary	1	2	3	4

- **Value and quality assessment**

Have you used any of the following methods to assess individual CD-Rom disks ?	Pupils	Teachers	Library staff
44 Tally of use	1	2	3
45 Survey	1	2	3
46 Informal questioning	1	2	3

Other, please specify method and group tested _____

_____

- **Finance**

Are CD-Rom disks purchased;	Always	Often	Seldom	Never
47 By the Librarian	1	2	3	4
48 By the subject department	1	2	3	4
49 Jointly	1	2	3	4

Other, please specifiy _____

50 How is money allocated for the purchasing of new CD-Rom's? **Please circle as appropriate**

Separate IT fund	Part of library budget	Ad-hoc (requested as required)	Have to make specific development bids
1	2	3	4

How many mulitmedia machines have been purchased in the last 5 years for the library ? _____

_____

- **Training**

Have you ever provided any INSET training on CD-Roms in the last 2 years for;	Never	Once	2-3 times	>4 times
51 Teachers	1	2	3	4
52 Library staff	1	2	3	4

Have you ever encountered any of the following problems with teaching staff concerning CD-Roms ?	Always				Never
53 Technophobia	1	2	3	4	5
54 Little interest	1	2	3	4	5
55 Low priority	1	2	3	4	5
56 Unable to comit a time	1	2	3	4	5
57 Do teachers show pupils how to use CD-Roms in the library ?	1	2	3	4	5

	Agree				Disagree
58 It is important that staff know how to use CD-Rom disks ?	1	2	3	4	5
59 Training teachers how to use CD-Roms is important.	1	2	3	4	5

Do you teach CD-Rom searching skills to pupils,

Please specify which year groups and the number of lessons

	Year groups	Number of lessons	N/A
60 As part of the library induction			
61 As part of a study skills program			

62 Other, please specify _____

- **Personnel**

63 Who has the responsibility to provide technical backup ?

Specific IT technician	Member of staff	Yourself
1	2	3

Other, please specify _____

64 Does the amount of technical back up available in school influence you attitiude towards new technology ?

Feel less inclined to purchase				Feel more inclined to purchase
1	2	3	4	5

65 Do you provide CD-Rom searching sheets for students to complete ?

Yes	No
1	2

	Yes	No	N/A
66 Are library staff encouraged to familiarise themselves with new technology ?	1	2	3

How do you encourage and motivate teachers to use new technology ?

_____

_____

_____

_____

- **Follow up interviews**

Please delete as appropriate:

I am able \ not able to participate in a follow up interview

Name:_____

School Address:_____

_____

_____

_____**Postcode**_____

Tel No._____

THANK YOU FOR YOUR ASSISTANCE AND TIME

Appendix B Questionnaire results from Nottinghamshire

Columns = question numbers; Rows = individual schools

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	39	39	39	39	39	39
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Internet questionnaire results from Nottinghamshire

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3						3	2	1	14
4						1		7	14
9	8	12	11	9	12	4	4	5	14
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Questionnaire results from Derbyshire

Columns = question numbers; Rows = individual schools

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Totals

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	1	2	3	4	5	6	7	8	9	10	11	Totals
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Questionnaire results from Lincolnshire

Columns = question numbers; Rows = individual schools

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Internet questionnaire results from Lincolnshire

Columns = question numbers; Rows = individual schools

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Appendix C

Management implications of multimedia applications in secondary school libraries

Interview/Focus Group Questions

1. Managing demand

How do you balance your professional role in relation to IT for example, helping pupils undertake searches with the technical aspects of managing equipment, such as loading the printer?

What is the optimum number of pupils to have using a computer in the library?

2. Searching /IT skills

Drawing on your own experiences, would you agree with the quote when it says that pupils lack the skills they need to undertake searches on CD-ROMs?

> *"The main problem remains that many children lack the search skills needed to extract the information locked beneath the shiny surface."*
> *Jack Kenny TES2 2/5/97*

What do you think is the most effective way of teaching searching skills to pupils and do you think that this whole area needs a greater profile within schools?

How well do you think that pupils use the multimedia features that are available on CD-ROMs?

Do you think that CD-ROM user-interfaces and icons are useful and easy to use? Do you think that pupils understand and use the hypertext links?

How do you stop pupils from having bad experiences when using CD-ROMs and how do you stop pupils feeling frustrated if they cannot retrieve the information they want?

3. Using CD-ROMs

Looking at the quote would you agree that the most helpful thing to do would be to ban the printer?

> *"Probably the most helpful service a librarian or teacher can provide for a pupil is to ban the printer" Jack Kenny TES2 2/5/97*

Do you use pupils as teachers and let them instruct or guide their peers?

4. Rival Technologies

Have you used or come into contact with CD-I or CD-TV in your school?

5. Outside Influences

Do you think that the growth in the home market for PCs has affected pupils' expectations at school in relation to the provision of IT equipment in the library?

Has anyone had any experience of IT sponsorship within their school?

What or who influences the IT provision in your library?

6. Education as a whole

Do you think that schools fully utilise the technology that they have? How do you think that this situation could be improved?

How is the acquisition of IT and information skills integrated into the curriculum?

What type of provision, in terms of skills, access and equipment, do you think that the school library should be offering to pupils?

7. Guiding IT policy in school

What is your role in relation to school IT policy?

8. Ofsted

Have you received any feedback in relation to IT provision in the library from your **Ofsted** inspection?

9. Political Climate

How do you think the Government's initiative on IT and the Internet will affect schools?

10. Authorship

How do you try to achieve a balance between pupils using print and non-print resources?

How do you stop pupils viewing the information that they retrieve from a CD-ROM as being the only authoritative version?

Do you find that teachers themselves normally only want pupils to find one piece of information and therefore only use one source and that pupils will only use more than one resource if the teacher has specifically requested that they should do so?

11. Role of organisations

What role do you think that ELS provides in terms of raising awareness and providing practical advice for school librarians in relation to developments that are occurring in the area of IT?

Has anyone used the services offered by NCET?

12. Future Developments

Do you think that more information will become available on-line and how do you think that IT provision within schools will develop? Will schools be able to match the fast pace of technological change?

Do you think that CD-ROMs will become obsolete and how soon do you think that this will happen?

13. Internet

Looking at the quote on Intranets - do you think that schools will move towards developing their own internal networks?

> *"Adventurous schools might even like to think about constructing an intranet with their own reference area." Jack Kenny TES2 2/5/97*

How do you think that you will approach the problems raised by pupils searching the Internet? How will you approach the teaching of Internet searching skills?

Do you think that pupils have high expectations of the Internet?

Do you think that schools will follow the example set by public libraries and offer the Internet as a pay-as-you-go service, especially if the research being undertaken is not curriculum based?

Has there been, or do you think that there will be, any parental pressure to have an Internet link in school?

Appendix D

An Interview Transcript

1. Managing demand

How do you balance your professional role in relation to IT for example, helping pupils undertake searches with the technical aspects of managing equipment, such as loading the printer?

We haven't so far used a great deal of the computer, we're using Encarta and we've found that particularly useful for a music project we're doing, nobody's actually downloaded any information yet because the printer that we have got, which is very old, isn't compatible with the computer that we've got at the moment (laughs). Duncan and I went on an Internet course and we were taught how to download on to disc and to use the disc to find out where you are on the Internet and quite a few other things so theoretically we know how to do it, practically we haven't done it other than on the course. My problem is that it's very difficult to find additional time to fit in on the computer, particularly at this time of year, now hopefully next year, when we get to this time of year demand for using it probably isn't as great. We've got Encarta 1997.

What is the optimum number of pupils to have using a computer in the library?

When we tried it last week, and this was the first time, we got a class up to use it. We had four and we found that four was probably as many as you would need or as many as you could cope with, however when we went on the Internet course they were using their Internet linked through a modem and projector on to a large screen and that was quite useful because that meant, I think there were about 15 of us and it meant that you could see what was going on, so a whole class would be able to use it. Now having said that there were snags so I mean you'd obviously have to work it out in advance of using one small screen and turning it into a class use where my feeling was that even with 4 of you, 2 of those 4 aren't getting a very good view.

2. Searching /IT skills

Drawing on your own experiences, would you agree with the quote when it says that pupils lack the skills they need to undertake searches on CD-ROMs?

> *"The main problem remains that many children lack the search skills needed to extract the information locked beneath the shiny surface." Jack Kenny TES2 2/5/97*

No I don't I think that they found it very easy to use, I mean obviously we were looking at musical instruments and guitars, now if you type guitars in the find box, then you don't get guitars, whereas if you type guitar in you do get guitar, so that was possibly a problem. The kids who were using it on Thursday were less able and they were quite able to find information, with quite little staff help. I mean obviously one of the problems with musical

instruments is in the spelling of them, you know if you can't spell guitar it's very hard to find something, but the teacher was there to give them some guidance as to that and what the keyword was, but it would have been exactly the same had they been looking in an encyclopedia, the problem would have still have been there. When I was introducing them in the way to look up things I likened it to a book and said obviously on the find page it's like an index you've got all the references, so you could go laboriously through all of those or you could find the word and pages, once you get to the pages it's quite easy for them to click on to a coloured word and find more information and they enjoyed the fact that there was sound on it and they could listen to the guitar playing a piece of music, I think there is about six pictures of guitars and you can hear the different guitars playing, you wouldn't get that from a book, you wouldn't know that a Les Phillips has one sound and a Classical guitar another. Particularly relating to what they were doing, which was musical instruments, it was excellent and probably they hadn't, other than sitting in a music room and listening to a record and looking at a picture of a guitar at the same time, which they hadn't been able to do, that was a very useful skill that they were able to use.

Do you think they needed to have the teacher there?

I don't think a more able class would, I think if anything perhaps a criticism of it would be it is pitched at quite a, you know 12-13 level, so a more able class would be able to use it quite easily.

What do you think is the most effective way of teaching searching skills to pupils?

One of the things we had with one PSE project was a check list which identifies the skills which they acquired in using the project, things like writing letters, using maps and dictionaries and those sort of things and one of these was information technology. Last year the kids weren't able to fill it in and obviously there were pupils who had computers at home who were able to use that skill but if they didn't have computers at home then we weren't able to incorporate that into the PSE project, next year we will be able to.

Do you think that this whole area needs a greater profile within schools and how do you achieve this?

Yes and I don't know. I don't think it's only searching skills on the Internet that need polishing up, our year 7 pupils by the time they've done their library project are very clever at getting information from books and in fact the music teacher has said that the ones that have been doing their music project have come to her and said "Do you want a bibliography Miss, shall I put a glossary in?" But that skill is completely lost after year 8 because they don't have any follow up lessons so even when it comes to looking through a book to find information they need they're not skilled at it any more because they've lost the skill that they had, certainly they can't transfer any skill that they might have had to, so far we haven't seen it a great deal, to the Internet in particular. I think this business of keywords is quite difficult to work out and I was looking for something for one of the maths teachers the other day, when we were on the course and it was tessellation and Roger Penrose, I think he's an Oxford

Professor. Now we turned up something like 10,000 documents that included tessellation and Penrose (laughs). So you've got to target what you are looking for very carefully and how you do that I don't know and certainly, the course I was on didn't give you any greater guidance and it's difficult to find the best search engines. I think Yahoo! is quite good and Yahoo UK! obviously relates to UK information.

Do you think that pupils use the multimedia features that are available on CD-ROMs?

Yes I do because it was one of the recommendations of our Ofsted report that where IT wasn't used in the subject it be introduced and I think that probably it is essential. I think it's really easy for people to worry, boys seem to go on computers with some sort of fervor that girls don't have, even the girls who have computers at home still seem to be happy to read books. I think you've got to get everybody so that they are happy to use IT even if they wouldn't chose to use it, they feel that they can actually extract the information and certainly the only way you do that is to use it a lot. I mean I didn't have a computer at home, I do have one now, and when I first got it I was hopeless, I'm still very hopeless, my daughter who never used a computer when she was at school really enjoys it. When she went to university, started using them a little, in her first year, got much better in the second year and now is very good because she did a computer course as part of her degree. So I think you've got to get over the initial, "I don't really understand that - I'm not going to use it" and possibly one of the ways to do that is to let the kids use them as they like, Encarta and other CD-ROMs which actually have music, graphics etc. so that it's quite exciting to use it, then you do tend to learn, I mean one of the things I could not do with my PC was use the mouse I could never click on what I wanted now I can use the mouse (laughs). I think we've got to encourage the kids to use it for all sorts of things in the hope that when they do want to use it they are able.

Do you think that CD-ROM user-interfaces and icons are useful and easy to use? Do you think that pupils understand and use the hypertext links?

The problem there is that we haven't got many CD-ROMs and one of the reasons why we haven't got that many, apart from the fact that the computer in the library is fairly new, is knowing which ones are most user friendly and whether they are worth buying, obviously it's a bit the same as books, you don't know what you're getting until you've opened it and then the books you get aren't as good as you think they're going to be when you actually read them through, but you're reluctant to spend what's perhaps twice as much on a CD-ROM and then discover it hasn't got what you want on, so we haven't got many at the moment. The kids that I've seen using Encarta haven't had many problems but it may be that the kids who are using it have computers at home and so they've already used something similar and when we were doing our PSE project we actually identified that in most of the year 7 classes out of 30+, 10 children in each class had their own computers at home.

3. Using CD-ROMs

Looking at the quote would you agree that the most helpful thing to do would be to ban the printer?

> *"Probably the most helpful service a librarian or teacher can provide for a pupil is to ban the printer" Jack Kenny TES2 2/5/97*

That would be the same as banning a photocopier to copy an encyclopedia wouldn't it? I mean I can see what he's getting at but it would be much better for the pupil to read the reference and take the information away in their brain and rewrite in their own words, but that's exactly the same as taking information form a book, you can photocopy it or take the book home and copy it word for word. We all know that that is not ideal but equally we all know that that is what kids do and it's nothing new that kids have done that.

How are you going to deal with it?

It isn't my role to act as a police man to the use that they put the information I give them and I would hope that if teachers become aware that pupils were copying large chunks out of a book or using photocopies and just sticking in the copies or using great chunks of information they had printed out from Encarta that they would show them the error of their ways, I don't actually see that as my role and obviously in PSE lessons I point out that there is no point, no benefit to the pupil of copying great chunks during these sessions, for instance, we've had sessions where a teacher has asked one of the pupils what a particular word in an article means and the pupil doesn't know then it is suggested to them, one look up the word and find out what it means and two, write it in words that they can understand. I think the constraints on time is a big thing, making sure each pupil is using the information in the best way. We're teaching them in the library to extract the information. How they use the information extract has got to be in cooperation with he teaching staff.

How do you stop pupils from having bad experiences when using CD-ROMs and how do you stop pupils feeling frustrated if they cannot retrieve the information they want?

One of the most satisfying things about this Internet course was that the tutor couldn't get online. He was supposed to have six laptops which were meant to be linked to the Internet and he couldn't get on, so this is a very real problem in classrooms in using a television and video that wouldn't work, tape recorders that want tape and things like that, I think basic preparation is necessary if you're showing pupils how to use it, make sure it does work. There are times you could hurl them across the room (laughs) and you think, "This stupid computer." when it probably is you. Many times have I felt incredibly superior when I've solved an IT solution by switching on the plug (laughs). I think it's very easy to have a bad experience with the Internet , first time I actually used it for searching was when one of our 6th form pupils wanted company information about McDonalds, we had Mc Donalds the painters in Idaho. We had McDonalds the garage, did we ever get McDonalds the burger chain , no we didn't. She said, "What am I going to do?" and I said I'm going to phone up McDonalds in Mansfield and find out where head office is and phoned them up and asked for information and what they did is send us a whole package of stuff which was really useful and the cost of finding that information was probably cheaper than using the Internet, for the amount of time you would have needed to find the information we've got. I think you've got to be aware of that. Another thing that came out from our course is that you can be told that there are documents on the subject you are searching for and when you get to them, they don't exist or haven't been updated - just as a book goes out of date when it's published - if info isn't regularly updated then it isn't useful.

Do you use pupils as teachers and let them instruct or guide their peers?

I think it can be quite useful and pupils can actually assimilate information from another pupil as to how to something the best way, that they might not necessarily do from a teacher and certainly in my experience when it comes to setting a video pupils are quite quick at assimilating these skills even if they don't know how to use them once - they know the way to do something - the glamour of the internet is at the moment sufficient to make them - they are desperate to get on it - they would happily come and pay to get on it . I think to go home and say "I've surfed the Net today"- would be worth a pound (laughs) "I've found the football scores for last Wednesday" - well you could have used the paper for those "well I know you could" (laughs)

4. Rival Technologies

Have you used or come into contact with CD-I or CD-TV in your school?

I've read about it but I haven't actually seen any of it. It hasn't happened and filtered down to me. There is a wariness of buying something too early and getting stuck with a system that isn't a popular one like the ARCs - they've given the kids computer skills but unfortunately are not transferable.

5. Outside Influences

Do you think that the growth in the home market for PCs has affected pupils' expectations at school in relation to the provision of IT equipment in the library?

Relating this back to the PSE project obviously some pupils are able to get access to a lot more information and some of them do simply access that information and stick it in there project and I think some embers of staff haven't been aware that this happens. I think people feel that they are going to be able to get a vast amount of information from the Internet that's going to be of use if you target it at what you are looking for. I think perhaps the reality of that falls far short of what you'd expect. As parents generally do not tend to have had the same experiences as their kid, they tend to buy Encarta but not look at it, and hear about the Internet and cough up the money to go on but not actually go on it themselves. Because of the gap of ability to use technology and I think perhaps parents might have greater expectations of that than IT can actually supply, than what the children actually get out of it.

Has anyone had any experience of IT sponsorship within their school?

Not as far as I know, obviously we take part in free schemes etc. There is a bid at the moment for replacing a whole computer suite, presumably that's outside funding.

Is sponsorship the answer for obtaining IT equipment?

Well certainly at the moment there isn't space in school budgets to allow for that so you've got to look for other sources else where. I don't know how I feel about sponsorship, if you haven't got the money on your normal budget and you can get the money from somewhere else then are you prepared to get it from just anywhere are there only certain organisations

you should accept sponsorship from? We're on BT, I don't know why we're on BT Campus Connect I assume that some special deal is done with schools. BT Campus Connect which actually when I saw what service provider we used when we went on our course, he told me what it was called, it was supposed to be very good and able to provide you with service most hours of the day, Campus Connect looked better than I imagined, it was and I rather imagined that we might have been, through cost ended up with a lesser service and it didn't appear that we had. It's quite quick to get to the search engines and quite easy to sort out what you are doing, but I don't know but I imagine some deal has been done there. It's not a bad thing but obviously places do not offer sponsorship or reduced price deals unless there's something in it for them. The theory of the tutor of the course we went on, was that when everybody has a link it will make the telephone less desirable so BT needs to get in to a new market.

Who made the decision to buy the first library computer?

The decision was made by senior management, I wasn't consulted in any way, I was just told it was coming.

Do you influence the IT provision in your library?

No.

6. Education as a whole

Do you think that schools fully utilise the technology that they have? How do you think that this situation could be improved?

Probably not. I mean certainly the computers we've got are not used all the time. Certainly again the tutor at the course I went on said in actual fact Britain has got the highest use of computers in Europe and USA, I mean you tend to think of America as being a lot more technically aware. I think perhaps the British take on new ideas, even if they don't use them terribly well (laughs). But "Oh well we must have a computer etc." They are all part of the package of things we must have, perhaps because we have such appalling weather we're happy to find things which go on inside rather than outside (laughs).

I don't know whether we need guidance from above or whether a clear school policy, it's quite accepted in this school that where pupils have some learning difficulties they use computers to help them with their writing. We certainly did appear a couple of years ago to have a strong IT policy and know where we are, whether or not we have an IT policy and whether this has changed, I mean when everything has to compete for a place in the budget then it's difficult to look at things for the long term. This is a difficulty schools have where their budget is always set on a year to year basis, getting cohesion into a budget when you don't know from one year to the next what the pluses or minuses are going to be, it's very difficult to bring in a strategy that goes over a period of years.

Are CD-ROMs and the Internet going to be funded from the library budget?

Yes, I mean I think it's something that the school needs to think about and decide where the Internet and this computer actually fit into the schools plan and whether the library is the funding source for CD-ROMs or the departments should be, now for instance, because we've

been working very closely with the music department at the moment their going to have a musical instrument CD-ROM form the Tesco's money. They haven't got a computer so obviously we will use it up here but I mean it will be the music departments CD-ROM. Whether or not you want to ask each department to select a CD-ROM which would be particularly suitable for their subject which they could then use in the library, I don't know how many IBM compatible computers we've got at the moment with CD-ROM facility. I don't think we've got that many I think there is one in the computer room or two, I think the 6th form have got one and careers have got one and possibly there's one down in design and technology. Obviously if we have only got one computer available to all pupils for general use then it could be very difficult to work out how they are going to use it, are they going to use it in lesson times in small groups, are they going to have a screen with a projector? I think these decisions need to be made as a whole school policy, obviously the library can make some suggestions. Certainly I would be happy to buy something like an atlas programme and general information CD-ROMs, but I think very specific CD-ROMs I think they should be purchased by the department, certainly initially. It would perhaps be something to put in a bid to the Friends of the School for perhaps £100 to be spent on CD-ROMs in the library on a range of topics.

7. Ofsted

Have you received any feedback in relation to IT provision in the library from your Ofsted inspection?

Not really, unfortunately one of the inspectors who came in who looked at the 6th form, came over when some of the 6th formers were on the internet, when we'd had it just over a week or so and I don't think they managed to find the things they were after although they enjoyed searching because it was all so new, nobody knew what they were doing and he stood and watched what they were doing. He wouldn't have been able to report that it was a bonus to them and I think he was the only one who also made any comment. But then it may well be that the inspectors are not familiar with Internet. One has to argue that if you are spending this sort of money to set up and the on cost during the year, to be fair we don't actually know what it has cost us this year, if you remind anybody (laughs) opening a can of worms you'd rather not open, but obviously there is an issue there if you have this facility and it's not used is there any point having the facility or if you have a facility and it's costing you a lot of money but it's not achieving the result it should be then equally is it worth having or have you got it so you can simply say "Ah, yes." there's a tick in our Internet box.

8. Authorship

How do you try to achieve a balance between pupils using print and non-print resources?

Yes, I can see that most pupils would actually think it's much more exciting to use a computer than to use the World Book and to be fair I'd have to agree with them. These are children who have been brought up with TV, TV has been on the whole time so there is no question that the...obviously children have been used to turning on the TV first thing in the morning , on CD-ROM there's interesting graphics, it's moving , it's going to be a lot more fun than World Book. In PSE we show them how to use encyclopedias and I would hope as part of

that we would show them how to use the Internet as well, but probably not perhaps at the same time you would have to get their skills on using encyclopedia honed in first and perhaps used Internet and CD-ROM and Encarta as a boost towards the end of the course so that they didn't leap their first of all.

Do pupils view the information that they retrieve from a CD-ROM as being the only authoritative version?

Yes, but I don't doubt that that's a problem experienced if you were looking through Children's Britannica and I think this relates very much to the type of pupil it is and how happy they are looking at information, projects are done during the year where some pupils have looked for 8-9 sources of information and others have been very happy with a paragraph.

Do you find that teachers themselves normally only want pupils to find one piece of information and therefore only use one source and that pupils will only use more than one resource if the teacher has specifically requested that they should do so?

Yes, I don't think necessarily that teachers always appreciate the use of sources for information, we try to get kids whatever project they do to use a bibliography because we feel that this is excellent training for when they go into Higher education. They must mention sources, we start off with year 7. I say the problem is that you don't re-enforce them anywhere else in the timetable. This means that perhaps pupils don't give a list of sources where they get their information from and when I say to them please acknowledge, if I do any photocopies I always write on top of the photocopy the source. I don't know whether the pupils do. Yes, I would find it quite difficult to acknowledge the source from information from the Internet because certainly when I looked at some papers form the department of the Environment, it's not been all that clear where the information has come from, not a specific paper that they are relating to.

9. Role of organisations

What role do you think that ELS provides in terms of raising awareness and providing practical advice for school librarians in relation to developments that are occurring in the area of IT?

I think that much the same way as with books, I mean I've certainly seen a booklet they've produced on CD-ROMs and grades them and because we haven't been in a position to buy many, I haven't sort of specially looked to see and I have to say since ELS moved to Glaisdale we've lost the opportunity of calling in there which we use to do at least twice a term. I think a combination of things I found ELS extremely helpful in speaking to them on the phone and the resources they've sent me, I see no reason to suppose that it would be any different with CD-ROM, but because of our geographical situation from Glaisdale we haven't actually been this year, now it is trying to fit in a visit at the end of September and then we could look at CD-ROMs and presumably have a look at them on computer and think, "Yes, this would be useful or no it wouldn't." This is something I would hope that they would be able to give us more guidance on because you can waste a lot of time. With the Internet I would hope that they would be able to give the best advice on how to use that but this is where I'm at a bit of a

loss because I don't have the link with professional librarians that other librarians have with ELS to get information on training days, book selection and that sort of thing.

Have you used the services offered by NCET?

No

10. Future Developments

Do you think that more information will become available on-line and how do you think that IT provision within schools will develop? Will schools be able to match the fast pace of technological change?

I can remember having a competition last year focused on Library 2000, some of the entries were computerised Library, no librarian (laughs) a bank of computers that the pupils sort of hooked up to found the information they wanted and I don't know how they printed it off. I don't really know why they had a teacher still in actual fact they could've stayed at home and done it all (laughs) and perhaps this is, certainly on the Internet, without needing to go to the store, I didn't really like the idea of all these humans locked in their little boxes (laughs) Obviously the constraints of the printed word being out of date before it's even published and the degeneration physically of books in relatively short time in a well used library, makes things like CD-ROMs attractive. You've got the information, you can use it more than one and presumably they don't degenerate with users as quickly as a book would. I still feel that there is a role for books and a role for IT in libraries to be developed and I would hope that in five years time we won't just have one link and one computer.

Do you think that CD-ROMs will become obsolete and how soon do you think that this will happen?

I don't know, I suppose if you can go on the Internet and go round the Louvre, for instance, looking at the pictures, you don't need books on artists, you've got paintings that are displayed in the Louvre, I'm not sure , I don't know whether if we had networked computers linked to the Internet whether that would be better for pupils to assimilate information from that, than it is one to one or to have books at all. I don't know it's difficult for me to judge because were still in a very early stage with ours, I haven't actually been anywhere to see it used in a much wider area. I think the problem with schools is that everything comes out of the budget and unless we find some way of increasing funding in schools then perhaps the increase in IT use is always going to be piecemeal and obviously if you're responding to a demand you tend not to get as good a result if you are thinking in advance.

11. Internet

Looking at the quote on Intranets - do you think that schools will move towards developing their own internal networks?

"Adventurous schools might even like to think about constructing an Intranet with their own reference area." Jack Kenny TES2 2/5/97

We don't have an Intranet site at present.

Do you think that schools will follow the example set by public libraries and offer the Internet as a pay-as-you-go service, especially if the research being undertaken is not curriculum based?

We've already identified demand as far as pupils are concerned, they would like to pay as you go and I don't think if the library was to have an Internet link that you pay for, providing that school and public libraries were comparable. I think it would only encourage use within school and schools use would encourage use in public libraries. I don't think pupils should be charged to use it when it's being used as part of the curriculum in other words I wouldn't want to see a situation where the 6th form were charged to go on the internet to find information for their course. However if pupils and staff want to go on it out of classroom hours to find information on leisure topics or even to look for additional information on educational things, I don't see a problem with asking them to pay for that use, because it would be additional to normal use. I think you've got to have free, in that, someone else is paying for it during the school day, I think, but I do think that there is a case for charging pupils to use the facility for their personal use, having said that, obviously you'll not going to let them look at certain things. This is why I feel it would have to be a club so that they would be aware from the beginning that they don't have unlimited access to everything.

How do you envisage it being used in your school?

I think it would be more low key than that, my own feeling is that if you use the Internet with the teacher keeping an eye on things, they ought to be able to ensure that they don't get on to any programs that are bad for them, although I don't believe in censorship obviously if somebody wanted to find out how to make a bomb, the information must be contained in the books. We do not have a book that says this is how you make a bomb and blow up your school, in the same way I'm constantly aware hat kids who see naked bodies on TV still find it extremely exciting to look at a picture in a book (laughs) So I'm not really sure what the solution would be, I understand that you can get some software that prevents you from getting into the hard core channels, which would definitely be our concern and because it would be very awkward if it was found out that pupils within a school situation were looking at things they shouldn't however, in this day and age we must be aware that some kids do watch things and videos that are not desirable and we've got to be seen to be operating in a healthy way where you would have done everything you could to make sure that they don't watch things they shouldn't.

A Focus Group Transcript

1. Managing demand

How do you balance your professional role in relation to IT for example, helping pupils undertake searches with the technical aspects of managing equipment, such as loading the printer?

Pupils show me how to print

Seems to work quite well, certainly I spend a fair bit of time doing the technical side of things, certainly now we have a new laser printer which doesn't mean feeding in the printer dot matrix. It means that they can print without me. Therefore that's very easy to do. But in terms of encouraging them - at the minute I've resorted to encourage them to use books first then use the CD-ROMs later because so many year 10 will come into muck about as much as possible. Also we guide them to the encyclopedia's before the CD-ROMs. Plus I don't think I'm their to supervise everybody in the library doing particular bits of work - so yeah.

Hmm, we are still at the novelty stage with the CD-ROMs - they come in at when they want to and say, "Oh this is really interesting, oh there's an amazing amount of information on football" and they all want to have the whole lot - print he whole lot out and can I have a copy for my friend. So we're having to you know, limit them to two pages or say take notes or what about the books - "ugh" (their reply). I think that once they settle down it will be a lot easier and lot easier to manage.

What is the optimum number of pupils to have using a computer in the library?

3

They argue anyway - two is ideal, enough to bounce ideas about.

Yeah - on their own doesn't work too well, does it?

Three is really the maximum. I mean teachers think that they can send groups of six but it doesn't work at all.

They start pushing and shoving and saying it's my turn.

There's a video of basketball or volleyball and they move off task.

2. Searching /IT skills

Drawing on your own experiences, would you agree with the quote when it says that pupils lack the skills they need to undertake searches on CD-ROMs?

> *"The main problem remains that many children lack the search skills needed to extract the information locked beneath the shiny surface." Jack Kenny TES2 2/5/97*

With some of them yes.

I don't think that they see it as something they have to develop - with books you go to crack the code, then the shelf, then you select or reject.

3. Using CD-ROMs

Looking at the quote would you agree that the most helpful thing to do would be to ban the printer?

> *"Probably the most helpful service a librarian or teacher can provide for a pupil is to ban the printer" Jack Kenny TES2 2/5/97*

Definitely

Absolutely

For pictures and graphics I think that to expect someone to sit there and either sketch an artist's painting from the screen is not reasonable or to sketch a graphic portrayal of participation again or something. I think it would be, it would help them to understand it if they have got it in their hand and can take it away and I certainly wouldn't, I am certainly stopping them doing the text.

It is part of their education learning how to select the relevant piece of information which is usually on a sentence in a whole article and so they get very irritated if I won't let them print the whole lot out but when you can, sit with them and say, "Well what was the question you wanted answering?" and we look and we see that it's just a little bit that they can copy out in hand.

If I'm not hanging around you'll come back and you'll find that they have actually written out word for word the whole of the entry even though they don't - so in that case they might as well have printed it because they haven't really got what they want from it anyway.

But I think that goes back to the teaching doesn't it? We really need to get this into the curriculum. When, I don't know, but it needs to be, it's a basic skill of selecting information, the relevant piece of information and not writing everything out.

I mean I allow text coming off the Internet, simply because of the time factor although in my situation it doesn't really matter cost wise, but for ease, the fact that you might not be able to go back to that page, which again means we just might as well capture it and have it. But what I haven't followed through is what they are actually doing with any print out of either pictures or text in school work at all. So that might be worth something to investigate in terms of how it follows through.

If a pupil's sent down for a piece of information, more recently we were looking at graffiti and we went through the newspaper articles with a couple of pupils. I went up to the classroom

and had a word with the member of staff and found out the whole class were doing it, came back and I said to them, "Right we will print whole articles out" they will go back to the teacher, you as a class can decide the relevant things and the teacher can then photocopy for you from the print out, but I'm not doing any more than one printout of anything and then I sat and worked with them, but it is having the time if you've got other pupils in the library, you sometimes have to leave them to get on with it and then you are not sure what they are printing out.

We're quite lucky at the moment because we've only got the one PC so I can keep tabs on what they are doing and also, I keep the photocopy paper under lock and key I can whip it out of the machine and say, "No you cannot make three copies of all that because you don't need it - read it off the screen." "Oh Miss" But what we're going to do when we get the others set up, I'm not quite sure.

I do that I don't leave paper in the printer at all. You have to ask for paper and that's the only way I can control what gets printed.

But they are very loath to read off a screen even if it's only two or three lines underneath a picture or something. It's, "I want a printout" "No read it" Mutter, mutter, mutter. I don't know what it is about that.

We have got some software which restricts, "Winlock" I think it's called, very useful, but you can prevent, you need to put a password in to get the print going which has been useful before now, but it causes too many other problems with other things, so I usually disable it. But it has been useful.

Do you use pupils as teachers and let them instruct or guide their peers?

Yes, cascade - yes if you show the first couple to come down to search for something and then leave one of them there for the next group that comes down to look and so on you can quite happily leave the whole class coming down in two's and three's to find their way around the system once you've taught the first three.

Have you organized that so it happens like that?

Yes

I haven't done that, but that's quite a good idea.

I do it with certain teachers, not all.

I get fed up with repeating the same instructions over and over again in one lesson so I'll do that.

4. Rival Technologies

Have you used or come into contact with CD-I or CD-TV in your school?

No I haven't

Volvo sent me a CD-I disc, it was free with one of these, because I'm collecting glossy car brochures, and the Volvo one had a CD-I disc in it and I'm wondering what the hell to do with it because I can't run it on anything (laughs).

Does it run on a CD-Rom?

No

It needs a special decoder box

5. Outside Influences

Do you think that the growth in the home market for PCs has affected pupils' expectations at school in relation to the provision of IT equipment in the library?

Yes I think so - they are probably more demanding and expecting your PC to do this and that and everything else that theirs does at home - "why can't we play any games on it?" and "where's the joystick?" and all that that sort of thing. But I think in the end it is more beneficial because they are more aware of what the thing can do and how to get hold of info, but certainly what its capabilities are as a bit of technology, so yes.

Do many people at your school have PC's at home ?

They have varying a lot of them are still on Atari and all that sort of stuff.

Playstations.

Yes, yes - they're all on that. There's a few who are very good. There's one who's father works in computers and if there's any glitches on them I say "Richard, can you come and sort this out please?" so that's quite useful, but yes, they can still be a bit demanding and say "Why can't we have this game?" and "Why can't it do this?" and "My graphics are better, the one I've got at home is much better and it's got sound this, that and the other" and again "Why can't we have a joystick?" Because!

I think the problem is that they have too much now they can alter your computer with ease.

Oh no they can't. We've got locks on it. (laughs) Which means I can't get into it half of the time.

Yeah there's trouble, they end up mucking around with too much stuff.

Yes the first week we had the PC the hard drive got wiped twice - or somebody put something on it or did something to it - one of the IT coordinators put a lock on it

Has anyone had any experience of IT sponsorship within their school?

I've asked for it, I've written off to a couple of firms but not got any response. The only bit of sponsorship we've had would be through this local learning partnership thing with Clarendon

College doing free courses for the community where they have money available and we were able to swing it to spend £800 on a new PC for the library and we could make it available for the feeder schools and the people on the courses, so there's a bit of indirect sponsorship I suppose.

You can do that more easily being a joint use library can't you?

What or who influences the IT provision in your library?

The librarian (laughs)

Yes

Yes - the IT co-ordinator's quite keen but if I wasn't 'pally' with him he probably wouldn't be interested so he chips in from time to time.

Well our IT co-ordinator is the Deputy Head, who's never had a lot of time, though he's been very supportive of the library and in fact he's more likely to bring me discs because he's not had time to do them so I have won discs in that way. We have got a new IT co-ordinator starting in Sept. so it could be all changes - whether they will be good for the library or not I don't know but I've got to work hard at that one.

My IT provision is what I, I have to do my own buying. We've actually got a job share IT co-ordinator now, but one of them is a science teacher he's very keen, it was me and him who organized the mini bus up to Crewe to fetch all these interesting machines - most of which seem to work. So I think that's something that I can work on.

I actually bought 2 CD-ROM discs in partnership with departments. I put it to them that this would be a useful disc for them to have - I've got one of the Shakespeare discs that way, Aspects of Religion is a joint purchase - with the RE department an the Library. Both are kept in the library.

That seems to work quite well - because we do that and then they've got a vested interest and they've actually spent some money and then actually got the disc as well.

Yes, I did much the same with the Sainsbury voucher thing which we went in for in a big way.

Tesco vouchers have bought us quite a few discs.

I went and waved a catalogue at them and said "Well, there's this, this and this - do you think that any of them would be useful?" "Oh yeah, 3, great." So we got the National Gallery disc, Dangerous creatures and various other bits - So that's quite useful so again they feel they've got some sort of input into things.

6. Education as a whole

Do you think that schools fully utilise the technology that they have? How do you think that this situation could be improved?

No

Will from the top

And time in the curriculum

Time is a very big thing - and the confidence of the teacher in the technology - because a lot of them haven't got the confidence to use it themselves so how can they expect them to bring in a class to promote it.

And the unwillingness of teachers to alter their teaching styles to fit it in and the fact that they've already got their lessons for the next 10years already worked out and it doesn't need the IT in it and so therefore it works quite happily without it.

And also the problem is that if they do bring a class in to the IT room the chances are that someone will have taken all the mouse balls out.

Yeah it's unpredictability that comes in as well sometimes.

How is the acquisition of IT and information skills integrated into the curriculum?

Well this is what the IT co-ordinator is supposed to have an overview of but - I wouldn't like to say whether it has been done here up to now. The difficulty is when you've got the department head as IT co-ordinator - there isn't and awful lot of opportunity to talk to them.

If it hadn't got mentioned in Ofsted I think it would be tackled, but I think in the next couple of years it will be more sorted out in our school in terms of across the board.

I think there will be a lot of changes too, because we're in the process of having a second PC network put in - and like you we offer courses to people from the outside community and so its making a lot more computers available to pupils here and there's going to be a lot more scope now to teach them the skills and see that they are transferable hopefully.

I think we are going to see a lot of change here.

I hope we're going to have some changes as well, we've had a - the IT co-ordinators for a year but everything's been kind of ticking over cos the Head left at the end of this summer term and we've got a gap now until January, but our new guy is coming from Derby and he's from a community school so we're hoping that that will mean that he's got some new ideas. At the moment we're just ticking over really.

What type of provision, in terms of skills, access and equipment, do you think that the school library should be offering to pupils?

What skills? Certainly from the Primary school, certainly transition students year 5 and 6, I think ought to be introduced to their secondary school library and its facilities and IT element before they get there - in terms of what they leave with I suppose confidence more than anything, and the skills themselves in terms of using IT ought to be provided by the school. In

other areas, personally, I don't think the library role is in that but certainly being able to get hold of info and being confident in using what ever library they then move onto in their further education than I think that's quite important as a school and ought to be given.

I think that that's the most important skill they should take away from school, the ability to find information when they need it, how to access that information, whether its from IT, books or whatever - if you've worked hard at it right through the school like it should be - they should be able to use any library, anywhere with confidence. But there's always a fear of what you don't know - but as long as they can over come this they should be able to find any information they want.

But if Technology is getting - is going to be more pervasive anyway - so the more you can get them used to everything that's possible, the more you get them used to stuff which they are going to see at university libraries the better.

7. Guiding IT policy in school

What is your role in relation to school IT policy?

I'm on the IT committee which I've been to once in 2 years, but that again should be sorted - in terms of the whole policy I've very little contribution I'm trying to draw up an Internet policy at the minute as we are the only access point in the school, but I should think that the emphasis is on where Ofsted want us to go and build IT in the curriculum rather than as a tool to retrieve information.

I'm not on a group at all - in fact I think the policy has been written by the Deputy and he's just aware of what's happening in the school and builds that in, but I haven't any direct influence other than telling him what I'm doing in the library so that he's aware of it - but like you say things will change.

The library always run an IT element in year 8 and also in year 10 - but how this is going to link up with the new regime? I have absolutely no idea. This is something which we have to sort out in September.

8. Ofsted

Have you received any feedback in relation to IT provision in the library from your Ofsted inspection?

No I didn't - almost the opposite in that it sort of said something like - about the Art department - they didn't use technology for research at all yet I'd spent five minutes with the Art inspector telling how useful the internet and CD-Roms were! It was quite the reverse. (laughter)

9. Political Climate

How do you think the Government's initiative on IT and the Internet will affect schools?

It's given the governors and stuff a bit of a cop out because I'd put in for a modem from the amenities committee and I got a letter back saying "As the Government's going to provide one free we don't see why you should have one now." So they better be quick about it otherwise we're going to have to buy one from the library budget - but yes - if it all comes together it will be lovely.

I think I've mentioned before, the community aspect of school - I mean we are encouraged to be community schools a lot more and provide courses for parents and we've certainly increased our networks because we are offering courses for parents and that has to be good for a school and there's also the homework after school study clubs - which the Government's pushing for - I don't know why because I've been doing it for the last three years anyway, but certainly that is a big thing that they are able to come in and use use computers after school for homework purposes. I think that anything they put forward like this can only be good for IT in schools.

Because we got a grant from the Princes' Trust for a homework club and I've managed to nick that to spend on a computer for the library because that was where the homework club would be.

Yes I've got £1,000 from that as well.

European union initiatives?

Well if they were nice ones I'd be quite happy to hear them but they'd probably be to beaurocratic. I wouldn't be surprised if they came up with something in terms of Internet.

The school you should get info from is Wilford Meadows as they have very strong European links.

10. Authorship

How do you try to achieve a balance between pupils using print and non-print resources?

By saying that 2/3 can go on the CD-ROM at any one time - the others have to go somewhere else for the information. They're given a time limit on the CD-ROM and then they swap round.

By physically preventing them by standing in the way (laughter). But we also have trouble, we've got 2 OPAC terminals in our library as well and they'll come down for one piece of information and they'll just go and sit on the OPACs to find out where it is in the library and I keep saying Crack the Code will take you there in 2 seconds whereas this will take you 20 minutes to find exactly what you want, so yeah physical direction I think.

How do you stop pupils viewing the information that they retrieve from a CD-ROM as being the only authoritative version?

I suppose it is seen like that, but I suppose I don't listen or don't follow things through so if they've found a piece of info - I haven't had time to check what they've found and persuade them that there's an alternative point of view elsewhere.

I think the important thing is to do with the CD-ROM as you would do with books and point to the date of issue and ask them to take that into consideration before they use the information. I mean luckily thing like Encarta are labeled '96-'97 so you know how up-to-date the information is. I do that all the time with books particularly with geography. Look at the back of the title page - see what date it's published and then decide if you can use that as your information or do you search elsewhere.

It also comes down to selecting the CD-ROM in the first place, as whether you think it is a quality production in terms of what it's based it's information on in the first place.

Do you find that teachers themselves normally only want pupils to find one piece of information and therefore only use one source and that pupils will only use more than one resource if the teacher has specifically requested that they should do so?

They don't often tell you - anything (laughs). Well some of them have worksheets where they have got things to work through like medieval realms and different bits of stuff about castles which you can assist with straightforwardly because you can see the questions in front of you but most come down without anything written down on paper so you don't know exactly what they have to find out. You might fly up to the classroom to find out exactly what they are supposed to be doing.

I would agree with that. I go or often send them back to get it clarified otherwise you waste a lot of time (agreement).

Yes definitely.

11. Role of organisations

What role do you think that ELS provides in terms of raising awareness and providing practical advice for school librarians in relation to developments that are occurring in the area of IT?

Quite a strong role especially in terms of access to new CD-ROMs before you buy and their evaluation of bits and pieces of software beforehand.

It's also the links - I mean through them we know who's got what and can ring other people up to say "Is this any good, how do you use it?", and that's very vital info.

Whether they could do any more I'm not sure, I mean there are publications which cover stuff you'd want to get from them anyway like reviews and things like that certainly. Was it School 2000, what was that called?

Library 2000.

Library 2000 which is now inside School Libraries isn't it or something - I mean that was very useful.

Yes it was useful.

And I suppose it would be nice if ELS did that, but it would be asking a bit much really - certainly keeping you aware of new stuff, new developments like DVD, whenever it comes out or is useful - I don't even know what the initials stand for but I know it will have some impact on CD-ROMs and keeping aware of that sort of information.

I mean it's also useful to get through to the bulletin information on discs that have been bought by other people and they've found it very difficult to use them and you know the technical problems because it stops you wasting money then.

Has anyone used the services offered by NCET?

Leaflets I've picked up at BETT - they all stock sheets of stuff - go to any exhibition and we get them through the post aswell - they often find their way through to the library. We've also had information from - I've filled in a form for the IT in Schools programs that we are on - I can't remember what the title was but I did register the school and I get all the stuff that way.

We've just started using the web page cos that's got a lot of information on which we've just discovered over the last month. But otherwise it's Mail shots or other stuff or the IT co-ordinator might have stuff or maybe things in School Librarian, I would imagine, in the briefing sheets.

Again just bumpf that comes through the post.

12. Future Developments

Do you think that more information will become available on-line and how do you think that IT provision within schools will develop? Will schools be able to match the fast pace of technological change?

The pace in schools is bound to lag behind simply because we can't afford to update things every 6 months or every year or whenever something amazingly glossy comes out - a must have.

You're limited by the computer you've got because software keeps coming out requiring more and more power and memory and everything else, and you are limited by what you've got.

I think a constant fund for up-grading is probably going to be needed for memory, drives and various things like that but I've found a lot of stuff on the Internet is a lot better than the stuff I've got on CD-ROM. So say like art work - Toulouse Lautrec we were looking at the other day and we didn't even look on the CD-ROM but I imagine that would have had 2 shots of his work, whereas on the Internet there's the whole Museum of Toulouse Lautrec that you can get across to - so for certain things, I mean I'm not going to buy an artist CD-ROM ever again

at the moment (laugh). So I won't be buying an artist on CD-ROM because I know there is enough on the internet and there will always be something on there I mean stuff like essays are invaluable on CD-ROMs.

You wouldn't have the time but I would imagine all schools getting on-line and all schools having 20 Internet lines perhaps so that there is no access problem like there is at the minute.

But there is the cost involved isn't there with the Internet, which you don't have with CD-ROMs.

No it's a one off and that's it.

And CD-ROMs are portable.

Do you think that CD-ROMs will become obsolete and how soon do you think that this will happen?

I don't think so immediately because people are just beginning to have PC's at home which require CD-ROMs whether it moves on to more games and less information I don't know, but I can see CD-ROMs being round for a bit.

DVD's will probably take them over.

What is a DVD?

It's a Digital Video Disc. So some of the bits in the computer press suggest that they are going to take over CD-ROMs anyway, but I suppose we are just going to have to sit back and wait and see.

13. Internet

Looking at the quote on Intranets - do you think that schools will move towards developing their own internal networks?

> *"Adventurous schools might even like to think about constructing an intranet with their own reference area." Jack Kenny TES2 2/5/97*

That's what our department was thinking could be a possibility because of the time involved in finding information. I mean a whole class can't use the internet at once can they - but if either a pupil or member of staff had downloaded stuff and then are making that available to support a piece of work, I mean I don't know, I haven't got it in the library yet, it's coming. I'm going to have it in that room. I'm going to be asking a whole lot of questions from people who've got it (laughs) but that's my understanding of what he was thinking about for something.

One day we'll get a CD-ROM dedicated server so all our CD-ROMs are accessible from every computer at school, but it's going to cost a fortune and it'll be a long time before that happens but I would think that is what would happen, but there's something on the Internet at the minute called the **"High down hub"** which is a school in Reading, I think, which is linked in

with all it's primary schools and stuff like that and they've got their own Intranet and the local community library archives and is all linked to everything else on there and certainly looking at it you think, "well that is the way to go". In terms of everybody either from here or from schools or public access points can get into a community database which will have bits and pieces from the Internet as well on it. But that looks quite exciting from what I've seen of it.

How do you think that you will approach the problems raised by pupils searching the Internet? How will you approach the teaching of Internet searching skills?

Well what we've done so far is either do one to one tuition of this is a search engine, this is a directory, you need keyword and click on this, that and everything else. One way, I think I'll do in the future is create our own web page on our own disc which will have links to useful bits, because at the minute there's too many places to go to look, and when they turn the Internet on at the minute they get Yahoo!, it comes up as the search engine the directory to use straight away, and that's relatively straight forward but there's the complexities of Boolean logic and all that sort of stuff - they're not going to get that at our school - they're not going to be able to pick that up I think. So just a very basic usage to start with and then see how things go.

Do you think that pupils have high expectations of the Internet?

I think so they are certainly very keen "Miss, Miss when are we going to get the Internet?". I haven't gone into it - I haven't sort of sat them down and said, "Okay, what are you expecting from this amazing beast?" But yeah, they are certainly keen and they certainly possibly expect it to be the answer to all their homework problems.

I expect it to be much better than it is in terms of speed and in terms of actually coming up with what you want because there's so much stuff on there you don't want, it's very hard to pick out especially what you're after, which is where I suppose the BT walled garden or whatever it is, Campus World stuff comes into being useful as it restricts what you're looking into - but then your'e probably going to miss a whole load of other stuff that's quite useful to you. But I think expectations are high and they're annoyed at how long it takes to load up a picture on the screen as it goes down line by line.

Do you think that schools will follow the example set by public libraries and offer the Internet as a pay-as-you-go service, especially if the research being undertaken is not curriculum based?

Well certainly students are surprised that they don't have to pay for it in school, when I let them use it in free time and they are looking up pop groups and stuff. They a lot of asking, "How much is this going to cost me?", and they are quite surprised that it is all free. Certainly Nottinghamshire public libraries 2 Internet points will be launched in November and they will be free to just students and some other category which I can't remember, but primarily it will be £2.00 per half hour, or something like that is the launch price and you are thinking how will that affect the school demand? It's hard to say because I don't think they won't come across internet usage in libraries until they are students, until they are older than at our age. It just depends how prolific it becomes within the right area of the library that they are actually going to wander into and what size library, because at the minute it will just be Mansfield and Nottinghamshire library in Nottinghamshire. So I can see them wanting easier access in

schools and either using the school stuff, if it's going to be free, a lot more than they would in the public library.

Has there been, or do you think that there will be, any parental pressure to have an Internet link in school?

No, none at all.

I don't think we have had any pressure. I think the head has used it as a bit of PR. I think on parents evening they'd be a bit disappointed if it wasn't there. I don't think that they wouldn't send their child to this school if it didn't have an Internet connection. I don't think I'd go as far as that.