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**ISSUES AFFECTING THE INTRODUCTION
AND IMPLEMENTATION
OF
EDUCATIONAL MULTIMEDIA**

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A thesis submitted in partial fulfilment of the requirements of
Sheffield Hallam University
for the degree of Master of Philosophy

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Collaborating Organisation:
Department for Education and Employment

ABSTRACT

The aim of this study has been to identify the issues which affect the introduction and effective implementation of interactive video and to relate the results to the introduction and implementation of educational multimedia.

The research methodology adopted has involved a mixture of quantitative and qualitative methods. Data has been collected by questionnaire, case studies, and semi-structured interviews. The case studies report on five secondary schools involved in the Employment Department Managing Flexible Learning Programme (MFL), providing a record of the activities relating to the introduction of interactive video in the schools over a six month period. The questionnaire was designed to obtain feedback from a sample of schools involved in a range of interactive video projects. In-depth semi-structured interviews with educational consultants involved in working with schools to introduce interactive video were also used.

The literature review investigates research on teaching and learning, managing educational innovation, parent (earlier) technologies and interactive video.

The issues identified from this study are classified against appropriate headings and associated with areas of responsibility.

The issues are categorized under the following three headings:

- educational issues which are not exclusive to the use of technology
- general issues which relate to educational technology
- issues which relate specifically to multimedia programmes

and the following four areas of responsibility:

- management in developing an institutional strategy
- management of the introduction and implementation process
- teachers in terms of their role in the learning process
- educationalists and designers in the development of appropriate material.

This study has identified that the management of the implementation process is the most significant area for consideration and that institutional strategy will not be realised if the process is not managed effectively.

Educational multimedia presents issues at a strategic level in terms of immediate and long term resourcing. However, provided that the technical infrastructure is adequate it was found that the major issues were associated with managing educational innovation in general.

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CHAPTER 1

INTRODUCTION

This chapter provides an introduction to the study, with background information and a chronological perspective from 1988 of government funded educational initiatives and evaluations to investigate the potential of interactive video within the school sector. It highlights the similarity between interactive video applications and digital multimedia applications and emphasises how research into interactive video is relevant to the introduction and effective implementation of digital multimedia.

This study focuses on practical and strategic issues which affect the introduction and implementation of interactive video by examining the conditions which need to be in place to allow the technology to be used effectively. It takes into account past research and identifies, consolidates and presents issues in other important areas of research, for example: educational innovation, issues associated with parent (earlier) technologies and the management of learning environments.

The study draws on data collected by questionnaire, case study and interview and reflects the development of interactive video in education. Evidence drawn from the data is used to form recommendations to support the introduction, implementation and development of multimedia within learning environments.

The similarity between analogue videodisc technology using computer-controlled audio-visual elements (interactive video) and digital multimedia applications presented through compact disc delivery systems provides the technological foundation for the findings of this study to be relevant to the future development of educational multimedia. Both interactive video and digital multimedia have the potential to combine text, graphics, still and moving images and sound within an interactive computer-controlled programme. Ely and Plomp (1986, p. 237) suggest that *educational technology is nothing more or less than a methodology for solving educational problems*. The implication being that the delivery system plays a minor role in the learning process and that the design of the software and the application of appropriate media is of greater significance.

1.1 BACKGROUND

In recent years the use of video in the classroom has increased dramatically, from situations where teachers (a term we use to signify both school teachers and university lecturers) made occasional use of a 16 mm movie during a class, to one where VHS videos are now a common teaching resource. The materials available have also undergone a dramatic change. Although pre-recorded television

programmes, of 30 minutes duration or longer, are still used in appropriate situations, short video clips are now becoming the norm.

Advances in technology and a change in teaching and learning styles have been the driving force behind these developments. The 16 mm movie projector was temperamental, often requiring the assistance of a technician to set up and use, and costing so much that few items of such equipment were available in any one institution. Nowadays, the VHS video cassette recorder/player (VCR) is a familiar item in most homes and High Street prices have fallen to the extent that most teaching institutions have VCRs available in large numbers.

The ready availability of video equipment, and the easy familiarity which most students have with its use, has enabled tutors to experiment with new ways of utilising the resource.

In addition to these readily available home based technologies, the videodisc has gained acceptance as a commercial storage medium for high quality video and stills. The capacity of a videodisc as a storage medium for multimedia and data is exceptional. Interactive video incorporates media elements which are flexible, allowing the development and integration of a range of applications. However, the complex method of controlling the videodisc by computer has proved to be expensive and has contributed to its limited acceptance in the educational sector.

With the recent growth in multimedia computer systems, the development of interactive video through cable communications and the attendant price reductions, video is set to become a fully integrated force in education and training.

Video has now become an interactive technology where students no longer sit passively in front of the screen, watching a programme, but interact with the resource combining it with other learning activities. The interaction with multimedia is now widely recognised as offering new and effective approaches to teaching and learning.

In 1988 the outcomes from the study by the Employment Department, TVEI Teachers Support Group, suggested that interactive video, incorporating a strong visual stimulus plus active involvement, encourages a number of skills associated with experiential learning and can present learning experiences which would be difficult to simulate in any other way.

Laurillard (1987) uses the term 'interactive media' as a 'catch-all phrase' that embraces all forms of computer-controlled media. She then refers to the technology most discussed as computer-controlled videodisc, emphasising the importance of videodisc as a technology capable of integrating multimedia elements. Laurillard (1987, p. 10) refers to interactive video as having *many of the experiences which are relevant to all forms of interactive media*.

The potential of interactive video was also recognised by Butcher (1987, p. 58) who acknowledged that IV offered the widest range of features of all educational technologies.

1.2 Interactive video in UK schools

Over the period from 1987 to 1994 there have been several educational initiatives investigating the potential of videodisc technology. The initial part of this research uses case studies and data collected from a selection of schools covering the range of educational initiatives. The data collected reflect a wide range of experience, some schools were established users with other schools being in the early stages of implementation.

An early study produced to support the Technical and Vocational Initiative for the Employment Department (Developments in Interactive Video in TVEI, 1989) focused on the use of tape-based video, and emphasised the difficulties of using such a medium in a non-linear manner. The educational advantages gained from low-cost production were diminished by the limited flexibility of the resource. The delays caused by the tape winding on/back to the required section made the resource virtually unusable as an interactive medium.

One of the first initiatives to investigate the potential of videodisc technology in UK schools was a two year project entitled Interactive Video in Schools (IVIS), which was funded by the Department of Trade and Industry (DTI) in 1987. The aim of the project was to investigate the educational potential of interactive video (IV) in schools and to identify educational principles and criteria to guide future software design.

This initiative focused on the use of computer-controlled videodisc technology in education, and allowed developers and researchers to experiment with a system which used non-linear access to multimedia. The information on the disc was available instantaneously, presenting a range of interactive options to the user.

An extension to the IVIS project was the Interactive Video in Education (IVIE) project in 1988, funded by the Department for Trade and Industry. My appointment to the project as a field officer, to support the introduction and implementation of IV to selected schools in Yorkshire and Humberside, provided me with first hand experience of working with interactive video.

At the time of IVIS, interactive video was identified as being a catalyst for educational change, a powerful learning resource providing a new dimension to the use of the computer for teaching and learning.

The IVIS project evaluation (Norris, Davies and Beattie, 1990) highlighted the educational potential of IV and identified the *critical importance* of training and support for teachers.

As a result of involvement in the IVIE project I established the Centre for Interactive Video (now The Centre for Multimedia in Education) at Sheffield Hallam University. The Centre has been supporting the introduction, implementation and development of interactive video and multimedia in education at a national level.

In 1989 the Interactive Video in Further Education (IVFE) project, also funded by the Department of Industry, followed a similar programme to IVIS/IVIE.

In the UK, the Training Agency/Employment Department has been committed to the promotion and investigation of the potential of technology, in both education and training. A number of reports refer to IV in the context of supporting flexible learning (Training Agency 1988, 1989; Employment Department 1989, 1990, 1991).

A major aim in the Employment Department's programme over the last decade has been to encourage a more flexible approach to teaching and learning, concentrating particularly on environments where students take a greater responsibility for their own learning and where limited tutor resources can be targeted more effectively. The term commonly used for this type of environment was flexible learning environment.

Two funded commissions in 1991/92 and 1992/93 enabled my involvement with a number of schools, supporting the introduction and the implementation of interactive video. The projects were embedded within a much larger national project with the emphasis on the management of flexible learning environments.

In 1993 the National Council for Educational Technology (NCET), with funding from the Department for Education, placed interactive video systems in selected schools throughout the country and carried out an evaluation study.

The NCET project produced some of the most recent research on the potential of interactive video in education. The evaluation assessed the impact of interactive video on teaching and learning in schools. It compared the advantages and disadvantages of using the technology, reviewed material, examined classroom issues and identified factors which encouraged progress. The evaluation emphasised the importance of the environment in relation to further development and recognised that introducing interactive media into schools is an enterprise which *has to be taken slowly, and planned and nurtured carefully* (NCET, 1994).

1.3 Continuing development

Recent developments in technology now allow the capture of digitised video to a variety of storage media, such as floppy disk, hard disk and compact disc. Publishers and educationalists are able to design interactive multimedia teaching and learning applications which include video interaction for the desktop computer.

Interactive video is now in a period of transition. The old technology – interactive video systems, specifically designed for 30 cm analogue videodiscs – is being superseded by integrated desktop multimedia systems, which use a digital format, with compact disc as the storage medium.

Although the new hardware systems and the discs are using a different technology the applications will be based on the same mixture of media and interaction which has been used throughout the years with videodisc. The projects and research investigating the potential of interactive video over this period of time are relevant and should therefore be taken into account. These early findings have identified lessons which should be reflected in current initiatives.

Questions still need to be asked about the selection of media, the design of the most effective user interface and the learning process. Lessons from past research and the examination of learning outcomes in relation to media selection and presentation should help to address some of these questions.

These complex issues are acknowledged by Butcher (1987, p. 44) who noted that to exploit these features it is essential that the experienced exponents of the television arts become familiar with the capabilities of computer-based media and similarly that computer-assisted learning (CAL) authors realise the dramatic potential that video can bring.

1.4 Recent initiatives with multimedia

The introduction of easy-to-use authoring software has provided an environment which allows the creation of in-house custom-made multimedia programmes. An example of this development has been reflected by the National Education Multimedia Awards (NEMA), organised by the National Council for Educational Technology. The awards were designed to encourage the creative production of multimedia in schools. Submissions in the under 12 category included entries from infant schools.

In the higher education sector, university consortia are being encouraged through the Teaching and Learning Technology Programme (TLTP), funded by the Higher Education Funding Councils (HEFCs), to produce in-house technology-based programmes to support teaching and learning. The emphasis on a collaborative approach is to encourage the production of material with a generic value across the University sector. A contributing factor affecting the positive response to this initiative has been the development and availability of multimedia authoring software. Authoring software has made it possible for educational institutions to produce computer-based multimedia material independently from the commercial software publishing companies.

1.5 Summary

Studies related to the introduction and implementation of technology are crucial to support educational development. Although it is important to be able to identify and

incorporate appropriate media with the most effective user interaction, even the most appropriately designed material will still not achieve effective learning outcomes if the implementation process is not embedded within a suitable learning environment.

In order to create an environment which will support the effective use of multimedia the issues facing the teacher in relation to the implementation process must be considered. It is necessary to take into account the practical and strategic issues in addition to the pedagogical issues.

Some historians believe that events are cyclical over time; some psychologists believe that the best indicator of future behaviour is past behaviour; some philosophers say that we learn from our mistakes. All of these viewpoints seem to describe the activities of educational technology over the past fifty years.

(Ely and Plomp 1986, p. 246)

CHAPTER 2

LITERATURE REVIEW

2.1 BACKGROUND

This chapter sets out to draw together analysis and research findings which examine issues affecting the introduction and implementation of interactive video. The literature review will also provide some evidence to suggest that issues which affect the implementation of interactive video are similar to issues which affect the introduction and effective implementation of digital multimedia applications. The comparative issues relating to interactive video and multimedia will be discussed in Chapter 5.

The literature search initially focused on identifying research relating to the introduction of interactive video and issues which affect implementation. A large body of research examining the effectiveness of specific applications and learning processes was found. However, research relating to institutional implementation and management, on either a small or large scale, was found to be limited.

A recently commissioned report to inform the Dearing Review on Higher Education provides further evidence to suggest that research into managing the implementation of technology is limited:

There is an extensive literature on the management of innovation and change in education, but little that deals specifically with the convergence between distance, open and flexible learning and information and communications technologies.

(Dillon, 1997)

During the examination of the literature it became evident that the implementation of interactive video was inter-linked to other important areas of research; for example, educational innovation, issues associated with effective learning, the use of IT, and the management of learning environments. The literature review was therefore widened to examine other factors which were considered to be significant.

The need to widen the search was also reinforced by the writer's personal experience of working with schools to support the introduction of interactive video. During the time spent working with schools it became evident that in order to develop an effective environment, the conditions necessary to support the implementation process encompassed a wider range of educational issues. In general, research focusing on teaching and learning, parent (earlier) technologies and interactive video all have common strands that need to be considered.

2.2 TEACHING AND LEARNING

In relation to teaching and learning the following areas have been identified for consideration:

- the learning process – how people learn
- the influence of government – how political issues affect education
- innovation and change – managing educational innovation
- learning resources – human and material
- the learning environment – external physical conditions.

2.2.1 The learning process

The learning process is complex and has many facets. There have been many studies designed to identify what happens during the learning process and what affects the learning process.

The activity of teaching presupposes a model of learning. It is accepted that there are different approaches to teaching and there are different theories of learning, for example behaviourist, constructivist and socio-cultural.

Jones and Mercer suggest that:

In any form of teaching, assumptions are made about the kind of learning that the teacher hopes will take place, and about the process of learning; the teacher has a model of learning, although it may not be explicit.
(Jones and Mercer, 1993, p.11)

If this is the case different theories of learning may have a direct bearing on the implementation of technology. For example, if the design of a piece of software is based on socio-cultural theory it will affect the implementation process in terms of the role of the teacher and the learning environment. It also implies that the software designer's model should match the model of learning assumed by the teacher, or alternatively the teacher should change the model of learning in accord with the design of the software.

Jones and Mercer conclude that:

particular theoretical approaches to learning have different and distinct implications for the ways educational software is designed, for the way classroom activities are organised, and for the ways computer-based learning in the classroom is evaluated.
(Jones and Mercer, 1993, p. 25)

For instance computer software can be designed to replace the teacher by offering the user a personal dialogue with the computer programme. This particular approach usually requires the software to have a high level of interaction, it will need a minimum amount of support from the teacher and is

often used in social isolation on a 'single user' basis. In contrast, a socio-cultural approach to learning requires a computer programme which has been designed to support teachers and pupils working together.

Laurillard acknowledges that past studies have investigated sufficient aspects of learning to admit a general account that can advise teaching. Laurillard summarises her work under the following learning activities:

- *apprehending the structure of academic discourse*
- *integrating parts of the process*
- *acting on descriptions of the world*
- *using feedback*
- *reflecting on the goal-action-feedback cycle.*

(Laurillard, 1993, p. 68)

Laurillard proposes that what teachers know about student learning should influence the teaching process, that is, that there is a logical link between the two.

On the basis of opinion, this section on the learning process so far suggests that there should be a sequential order related to the process of learning; that is, that an understanding of learning theory, followed by an understanding of related learning activity should lead to the development of a teaching strategy. Up to this point the process is theoretical.

2.2.2 The influence of government

Teaching strategy can be influenced by societal and cultural change. Education is directly linked to the perceived needs of the country and is therefore influenced by government policy. Government policy relates directly to resourcing and can also dictate crucial change in educational systems. In recent years there has been a number of government funded initiatives designed, primarily, to influence educational strategy and ultimately teaching and learning. Examples of these initiatives can be traced through the history of educational projects funded by the Employment Department, formerly the Training Agency, now part of the Department for Education and Employment. An example of such an initiative is the Technical and Vocational Education Initiative (TVEI, 1989), which was set up:

to equip young people of 14–18 for the demands of working life in a rapidly changing society

and:

to relate the whole curriculum to the world of work.

(TVEI, 1989, p. 18)

In the Higher Education sector, the Teaching and Learning Technology Programme (TLTP) introduced large amounts of funding with a view to influencing teaching strategy.

Government initiatives on this scale, carrying large amounts of funding, are introduced to generate change and influence teaching and learning strategy.

Education 2000 (TVEI, 1989), although a charitable trust formed to bring together people in education and the business community, was commissioned by government bodies to identify the key strategic issues in moving from teaching to learning in the case of young people between the ages of 11–18.

Government policy reflects change at a national and international level. It reflects change taking place in our society and it introduces change to ensure future development. The influence of government policy on our education system therefore implies change. Although government-led initiatives have prompted change, when expectations were not met disappointment has overshadowed most of the good that was achieved. The implementation of change has often been badly managed and disappointing.

Fullan refers to:

the way that educational change is treated by political decision-makers results in a system that is more likely to retain the status quo than to change it. When change is attempted under such circumstances it results in defensiveness, superficiality or at best short-lived pockets of success.

(Fullan, 1993, p. 3)

Fullan's book (1993) attempts to enable educationalists to become the agents of change rather than the victims of change.

2.2.3 Innovation and change

Early investigations acknowledge the introduction of educational technology as innovative within the learning environment. Donald Ely (1987), suggests that to use educational technology to its fullest potential:

we must study the role of the teacher, the role of the learner, the role of the media, and the environment in which they all react. Innovations must be considered within the historical and cultural context in which they appear.

(Ely, 1987)

He places particular emphasis on innovative and creative conditions of learning and the move away from 'traditional' forms of teaching as being related to the use of educational technology.

One of the most recent studies of interactive video (NCET, 1992–4) piloted the use of interactive video and 'associated technologies' in the curriculum. The report acknowledges that the introduction of interactive video required a strategy designed to support educational innovation.

In a report which examined the implications for developing a strategy to support the introduction of flexible learning to schools (Training Agency, 1989), particular emphasis was placed on creating the conditions necessary for effective innovation.

The report emphasises the fact that change is a dynamic process, and that although it affects individuals, in order to achieve change on an institutional scale it needs to be placed within a social context. The differences between the existing culture within the institution or the department and the move towards what may be a new culture, need to be taken into account. This usually involves a large number of people as facilitators and has to take place over a period of time. Educational innovation is less likely to be successful if the implementation process has not taken the social context into account. Within an institution the social context is likely to have a number of levels including organisational levels.

Taking into account these statements, Bolam (1989) suggests that a number of conditions should be in place if implementation is likely to be successful.

He argues that the implementation of an innovation is more likely to succeed if teaching staff see the innovation as centrally relevant, are aware of the benefits and can quickly understand what is expected. The innovation should be flexible, to allow adaptation and it should support underlying values similar to those of the user group. In terms of management issues the innovation must be realistic in relation to cost, staff time and staff status.

He further suggests that:

- a successful implementation programme requires a carefully designed strategy which can be adapted to support an on-going planning process
- it should be possible to modify the aims and objectives in response to feedback and involve the interest groups at all stages
- it is important that target users feel able to develop and modify the innovation in order to gain a sense of ownership
- a 'critical mass' of people is developed so that target users do not feel alone or isolated.

Bolam stresses that management should be openly supportive and ensure that staff training is provided by peers and practitioners in a relevant and continuing form and that continuing external support be provided at an individual and strategic level.

To summarise Bolam, the system for implementation should try to accommodate the following conditions. The innovation should:

- be seen to be an advantage by the target user group
- have appropriate status in the context of other developments
- have appropriate leadership in relation to style and status
- be backed by a successful ‘track record’ particularly in relation to implementation.

The target users should:

- be receptive to change
- have high staff morale
- have the active support of the head of the institution or department
- have adequate funding
- expect to expend extra effort.

The organisation/institution should be adaptive and be able to change:

- structures and timetables
- role behaviour within the departments and sub-structures.

Interestingly, these conditions outlined by Bolam as practical generalisations about the change process do not refer specifically to the implementation of technology. However they are reflected in a report on teaching with interactive media (NCET, 1992–94), which devotes a chapter to the management of innovation and suggests that the politics of innovation are not an established competence among school managers.

Bolam’s list of criteria for successful innovation and NCET’s challenge to school management suggest that the problems of managing innovation can be addressed. Fullan (1991, p. 99) takes a cautious approach to innovation. His view is that it is dangerous for policy makers to assume that the solutions that they offer are unquestionably the right ones. He also acknowledges the difficulties incurred when ‘experts’ try to get others to action their knowledge. Fullan relates the disappointing outcomes of many large scale educational initiatives to the innovation having been led by ‘decision makers’, seen to be on the outside, and not the educators working from the inside. He suggests that apparently ‘rational’ solutions have backfired when they have ignored the culture of the institution.

As we have seen, decision-makers can make organisational and curriculum change, but still not make any progress.

(Fullan, 1991, p. 353)

Fullan’s approach to effective planning is to emphasise the need to understand the process of change. He claims that:

change is not a fully predictable process

knowledge, once obtained, is far more powerful as a resource than a memorised list of specific steps that we should follow.

(Fullan, 1991, p. 107)

The National Council for Education Technology (1995) adapted the findings of research which had focused on managing change in industry to the education sector and produced an educational institutional matrix. The matrix, developed as a planning tool for senior managers in secondary schools, identified five main stages an educational institution will go through in implementing educational technology. The five stages: *localised, coordinated, transformative, embedded* and *innovative* can be more broadly categorised under three main headings: *evolutionary, transformational* and *revolutionary*. The other categories represented in the matrix: management, staff development and curriculum development, resources, external links and evaluation, relate to key areas that institutions should consider as the institution progresses through the various stages of the implementation process.

2.2.4 Learning resources

An important consideration in developing strategy is the release of resourcing.

Within the matrix developed by NCET (1995), *resources* are divided into three categories, *technical support, funding* and *physical resources*. It is interesting to note that NCET identify staff development as a key area but do not indicate that it has resourcing implications.

Fullan's considerations in *Planning for Adoption* (1991, p. 63) focus on *the three Rs of relevance, readiness and resources*. *Resources* concerns the agent of change providing support as part of the process of change.

On the subject of staff development and internal and external support, Fullan (1991, p. 85) suggests that support during the implementation process is more important than prior training. McLaughlin and March (1978) stress that:

skill specific training by itself has only a transient effect because the use of new materials and methods is often mechanical without the underlying ideas becoming assimilated.

(McLaughlin and March, 1978)

Staff development is based on the concept of *learning something new*. Accepted theories of learning promote the idea of learning through interaction. Learning by doing underpins the approach taken by Fullan in suggesting that full involvement in the change process and support and guidance appropriate to the experience is more likely to result in effective staff development.

Initiatives such as TVEI and the Flexible Learning Programme introduced educational change at all levels within previously accepted teaching frameworks. Teachers were expected to examine past practice and look for new ways of teaching a new generation for a rapidly changing society. Teaching strategy, the curriculum, learning processes, the learning environment, the role of the teacher and the use of resources were all challenged.

Flexible learning reflected a particular approach to learning which was developed to:

meet the learning needs of students as individuals and in groups through flexible management and use a range of learning activities, environments and resources.

(Employment Department, 1989)

Resources, in this context, relates to resource areas, human support, management of resource areas and the production and selection of learning materials. Funding was identified as a key factor in Flexible Learning practice which was acknowledged as being resource intensive; that is, the implementation process was expensive in terms of material resources. Although there was a need for appropriate resources it was also clear that the management of the resources and of the learning process was paramount to success. It was crucial that initiatives on this scale were supported by sufficient funding.

Identifying appropriate resources is difficult. A number of pedagogical and practical factors influence the selection process. Laurillard proposes a framework as a guide for designing a teaching strategy. She suggests three stages:

- *define aims and objectives*
- *identify students' learning needs*
- *design learning activities.*

(Laurillard, 1993, p. 208)

After consideration of the framework a teacher can begin to make decisions about the resources needed to support the learning activities. However, the most appropriate material will not be used effectively if the context of the delivery is not appropriate. Laurillard feels strongly about the context of delivery and the factors that enhance learning. She goes as far as to say that *good delivery can retrieve poor material* (1993, p. 220). She emphasises the need to consider all support costs that enable materials to be used properly.

2.2.5 The learning environment

The learning environment may relate to the physical environment which could be a classroom, a library or the home. It may also describe relationships between the teachers and the learners and the way that resources are used. For example, the environment to support a distance learning course, which may be delivered through an electronic communications network, should take into account the learning environment, communications and relationships between the teachers and the learners and the application of resources.

For the benefit of this particular study, this section focuses on generic issues which influence the management of resources.

In an extensive review of multimedia applications and theories of learning, Atkins (1993) identifies a number of issues which are relevant to successful implementation:

- *the suitability of multimedia applications for different subjects and particular contexts.*
- *the role of the tutor in relation to the learner and the environment.*
- *the relationship between the learner, the application and the context of delivery.*

(Atkins, 1993)

Crow and Rariden (1993) identify the rate of change and factors influencing change as:

- *the centralisation of computing sources across disciplines*
- *the automation of libraries*
- *the development of computerised networked infrastructures*
- *the integration of computers into the curriculum*
- *the development of more powerful software applications and computer systems.*

(Crow and Rariden, 1993)

Crow and Rariden draw attention to the influence interactive multimedia and the changing learning environments are having on the educational system.

A number of reports which have focused specifically on evaluating the use of interactive video to support learning suggest that interactive video supports a student-centred, active approach to learning and encourages:

observation, communication, problem-solving, decision-making etc.
(Employment Department, 1989, p. 6)

Norris and Davies in their article, *Evaluation new technology: the case of the Interactive Video in Schools programme*, report that:

*the most frequent use of interactive video was for small group work.
...and video disc designers will have to take into account group
learning processes.*

(Norris and Davies, 1990, p. 90)

Scrimshaw (1993, p.10) identifies software *as a potentially major variable* which is likely to influence the teaching and learning process and the environment in which it is applied. Scrimshaw points out that *when pupils use a computer program they are interacting with a hidden teacher, namely the program designer* and that the integration of computer based activities should take into account the programme design. He implies that the nature of the software will have a direct effect on the way that it is applied to the learning process.

The Employment Department (1991, p. 14) outlined a flexible learning framework which had at the core of its strategy three main areas of activity; managing student/teacher partnerships, managing student learning pathways and managing student use of resources. Under the heading of managing student use of resources, the aims of the teacher were focused on organising resources, ensuring that students had access to a range of resources, planning the appropriate use of resources, and developing competencies in using sources of learning. It was suggested that although learning resources themselves may not always be highly structured, to be used effectively they must be organised so that they are accessible.

Ely (1988, p. 25) provided an analysis on the field of educational technology, highlighting the following issues which were raised at the time about the management of resources and the learning environment:

- What is the most suitable location for hardware and software in the school ?
- What administrative arrangements should be made for educational technology in the school ?
- To what extent can educators depend upon the home use of computers and technology ?
- How can equal access to technology in the schools be assured ?
- What are the optimal physical arrangements for individual use of computers and video ?

These issues, identified over ten years ago, remain relevant to the introduction of all types of current learning technology.

The importance of the *right environment* is emphasised by NCET (1994, p. 8). This report suggests that *the main responsibility for creating the right environment lies with the headteacher (and deputy)*. The report goes on to emphasise the need to provide: a supportive environment, locations for hardware and materials that allow systems to be integrated with other classroom teaching and long-term resource management and financial planning for maintaining and updating resources.

Educational change presupposes the development of a strategy to manage the process. Both the management process and the strategy should take into account the learning environment and resources. Fullan suggests that:

there is a strong conceptual rationale for the importance of restructuring schools, but there is not much empirical evidence of its positive effects.

We are still in the early stages of restructuring experiments...

I include restructuring as a theme for implementation because of its obvious importance and potential and because much of the action in the 1990s will centre on attempts to reconstruct schools...

(Fullan, 1991, p. 88)

The Improving Quality of Education for All project (IQEA, 1995), a school improvement and development project, found that school improvement works best when a clear and practical focus for development is linked simultaneously to work on the internal conditions of the school. The report suggested that a strong feeling of trust and openness was essential to develop supportive relationships, that teacher expectation in relation to performance and behaviour needed to be established and the ability of the teacher to develop a range of teaching styles, reflect on practice and analyse and improve practice were particularly important.

The report emphasised the importance of change at the classroom level, establishing conditions that support teacher development rather than school development. This point of view is reinforced by Fullan (1991, p. 84) in his approach to staff development. He firmly supports the view that the most effective implementation has staff development embedded in the process and the most effective staff development is embedded within an implementation programme – staff development, innovation and implementation creating a synergy and developing together.

Laurillard refers to the importance of academic decisions concerning:

scheduling contact hours, the means of access students have to relevant material, or equipment, or activities, for their study, the form of assessment, the administration and technical support given to students, etc.

(Laurillard, 1993, p. 219)

Most of these aspects of the student experience are practical arrangements that relate to the environment and managing the environment and resources.

She emphasises the significant effect these issues can have on how students learn and recommends that teaching staff should be involved in helping to create the conditions that allow students to study effectively and not leave all the decisions to be made at an institutional level.

On the issue of delivery Laurillard stresses the importance of ensuring that adequate funding is made available to cover resourcing.

2.3 PARENT TECHNOLOGIES

During the course of this study it became apparent that many of the issues that have been associated with parent technologies are relevant to the newer, more sophisticated, technologies such as interactive video and CD ROM multimedia. The term parent technologies is used here to represent earlier educational technology. This part of the review will attempt to indicate the similarities between educational technologies.

Some of the most extensive reviews of educational technology were carried out in the 1980s by Donald Ely. As the director of the ERIC clearing house Ely undertook an extensive review of relevant research activity spanning a period of forty years.

Early studies of educational technology in America examined the relationship between the media and the delivery system. Ely (1983) describes educational technology as the delivery system and identifies media as being part of the delivery system; the delivery system playing a minor role in the learning process and the design of the software and the application of appropriate media being of greater significance. This goes some way to supporting the theory that forms the basis of this study – that research related to interactive video is relevant to the application of multimedia CD ROM.

Ely (1987) drew attention to the important relationship between the learner, the teacher, the media/technology and the environment in which they interact. In his review of research at that time, he suggests that media and technology were seen both as an enhancement of the teaching process and as a replacement for certain teaching procedures.

Ely suggests that there had, up to the time of his report, been five distinct periods of educational media and technology research. He relates particular periods of research to the development of different sets of issues.

Questions which were being asked at the time focused on the following issues:

- Can students learn from a particular medium ? Is one medium more effective than the other ? This included video and audio.
- Can learning be increased by changing the variables ? Hoban and Van Ormer (1950) examined the angle of viewing a monitor in relation to effective learning. This could be classified as an environmental issue.
- What sort of conditions support learning with media ? Conditions in this case related to how the media was applied, for example, does the repeated showing of video increase learning retention ?
- What is the relationship between the learner and the system ? Does the different learning style preferred by the individual learner affect the learning outcome ?

The final period of research examined the way in which multiple media variables affected different learners.

Research focusing on the effect media variables had on learning moved to a more sophisticated level in an attempt to identify multiple factors that affected learning. This resulted in a change in the terms of research methodology, from a quantitative approach to a qualitative approach with the focus on in-depth case study.

It is clear that, throughout this period, the delivery system was not identified as an important variable. The emphasis was placed on the medium, the design of the material, the environment, the application and the learning process. The research suggested that how a medium is used is more important than what the medium is.

Ely and Plomp (1986) again stress the application as being the most important factor to consider: *The process of educational technology begins with an analysis of the problem rather than the medium as a problem.* They suggest that some of the less successful uses of educational technology occurred when it was offered as a solution to a problem which had not been clearly defined.

The mystique which surrounds the new technologies causes enthusiasts to try to apply them in almost any setting without, however, raising the right questions.

(Ely and Plomp, 1986, p. 237)

Problems were identified when a greater importance was attached to the equipment being used than to the design of the programme. This often related to funded initiatives when a new medium was being tried out in an almost desperate attempt to 'prove' the effectiveness of the technology. Parallels could be drawn with government funded initiatives identified in this study such as the Interactive Video in Education Project and HEFC's Teaching and Learning Technology Programme.

Ely and Plomp (1986, p. 241) drew together the following list of reasons why some projects did not fulfil their expectations:

- goals were confused
- the emphasis was placed on the medium instead of the application
- lack of management and support infrastructure
- resistance to change
- lack of support systems
- lack of training
- requirement for funding that could not be met
- lack of appropriate software
- the full potential of the system was not grasped.

The trends which were identified as running through a successful programme were:

- meeting critical educational needs
- programmes designed for the learner rather than the teacher
- cost-effectiveness
- simple delivery systems
- appropriately designed software
- programmes based on measurable skill competence.

Based on the analysis of the research carried out prior to 1986 Ely and Plomp (1986), designed a set of guidelines to support a successful implementation programme.

Their guidelines were designed to be altered and adapted and suggested the following stages:

- Identify the problem and use the technology to solve the problem.

This suggests that the effective use of educational technology should be to enhance the learning process or to provide additional resources which are unique to the media.

- Take into consideration the context in which the teaching and learning will take place.

Here the emphasis is placed on the learning environment and all aspects that affect the environment in terms of access to delivery systems, support, training and management.

- Design the material to reflect the learning process.

The learning process in this case should take into account the complete learning experience, including the environment, the role of the teacher and how the students learn.

- Select and use media to gain added value.

This suggests that media should be fully integrated and that the type of media used should be selected to enhance and deliver the content.

- Determine the role of the teacher.

The design of the material, in terms of content and delivery will affect the role of the teacher. Ely and Plomp warn against the teacher being denigrated and imply that the level of participation a teacher has in the planning and delivery process has a direct effect on the success of the implementation programme.

- Set up a support system for teachers and students.

The findings emphasise the importance of a support system that takes into account both practical help with delivery systems and theoretical help with teaching and learning processes.

When viewing the future of educational technology Ely and Plomp (1986, p. 246) propose that through educational technology research we have learnt about teaching and learning, about the use of media, about the importance of design, how to look at the whole rather than the parts, that education as an institution is not easy to change, that the goals of education are different to those of other sectors of society and that despite what we have learnt *the potential for failure is still there*.

2.4 INTERACTIVE VIDEO

A large amount of research and evaluation has been carried out into the effectiveness of interactive video. Although there are numerous reports examining individual applications they tend to present a narrow view of the technology, focusing mainly on subject specific aspects. This study draws on papers, studies and reports that have presented an overview of the technology in its broader sense, identifying, for example, the strengths and weaknesses of interactive video and the conditions necessary for implementation.

2.4.1 Interactive video in US industry

Interactive video was greeted in the eighties with excitement and optimism. The enthusiasm for the technology was related to its flexibility and multiplicity of capabilities in terms of media storage and learner motivation. It was described by Evans (1986) as *the biggest breakthrough in instructional technology since the Gutenberg Press*. Evans, in the summary of his report on past studies of interactive video research, reflects the findings of interactive video studies that were carried out in the US prior to 1986:

Collectively, the studies indicate interactive video instruction is well received by students and instructors; is time efficient; is frequently cost effective; and in some cases promotes significantly more learning than traditional instruction.

(Evans, 1986, p. 241)

Evans recommended that future research should focus on the *attributes that can maximise the effectiveness of the medium*.

A report examining thirty studies by corporate, government, military and educational users carried out in the US by DeBlois (1988) compared videodisc against other training methods. Videodisc was reported to be versatile,

enthusiastically accepted by both individual users and learners working in groups, effective for instructional purposes and effective in terms of learning and retention.

In America in the late eighties interactive video was perceived as the instructional technology to meet the challenges that trainers were facing at the time. Early evaluations had shown that videodisc could provide students with an interactive training environment with high quality simulation. In the conclusions in a report to Congress (Fletcher, 1989, p. 20) the author discusses learning effectiveness, cost effectiveness, time saving and retention. There is little evidence in the early American reports of the conditions and the environment in which interactive video was introduced.

2.4.2 Interactive video in the UK

Towards the end of the 1980s a number of interactive video reports were produced in the UK, for example: *IV in Industry and Further Education*, *Interactive Video in Industry and Education*, *Use of Interactive Video in Further Education*, *Developments in Interactive Video in TVEI*, *Evaluating new technology: the case of Interactive Video in Schools (IVIS) programme*, *Interactive Video in Higher Education*.

Although the main focus of the reports was the potential of interactive video in terms of learning, some reports did identify issues which related to the introduction of interactive video and the environment necessary to support implementation.

2.4.3 Interactive video in UK industry

Kirkwood (1988) produced a report for British Telecom which was based on the evaluation of a set of interactive video materials on appraisal and counselling. In the section that presented the main findings the following areas were singled out for further discussion:

- *familiarisation*
- *IV design*
- *the workstation environment*
- *validity of the training simulations*
- *open learning – catering for different needs*
- *central and local support for district training departments.*

(Kirkwood, 1988, p. 37)

The report highlighted the importance of prior familiarisation with the delivery system and the materials. It recommended that the software should be easy to use, the working environment and access to the equipment should be trouble-free, the content of the material be appropriate, the trainers and managers should

have appropriate skills, the amount of time needed to work through the material should be clear, and that the necessary localised adaptation of the course and material be supported.

Copeland's (1988) work carried out for the Ford Motor Company examined the evidence at the time to support the view that *interactive video can be effective in getting across difficult concepts*.

Based on a wide range of experiments with interactive video used for training in the US and the UK Copeland suggests that:

interactive video is well-liked by users and achieves high levels of learner success. It achieves significant cost benefits for applications involving a larger requirement for distributed training and it compresses the time usually required for training.

(Copeland, 1988, p. 62)

However he does point out the importance of design:

the skills and experience of the programme designers, producers and programmers are critical to the creation of good and successful interactive video programmes.

In the case of Copeland's report and most research based in industry, the environment, availability of equipment, support and the social context fails to be mentioned. The picture is limited in terms of how the technology is introduced and implemented.

2.4.4 Interactive video in education

Between 1985 and 1988 the Department of Trade and Industry funded a development project to research the potential of Interactive Video in UK Schools. Industrial companies which had used interactive video as a training medium agreed to support a short study to investigate how interactive video might be integrated into the school system. As well as identifying areas of common need between UK industry and UK schools, one of the terms of reference for the project was to *identify a sound strategy for fostering the introduction of IV into UK schools* (Boyers 1988). At the time the report was commissioned it was noted that industry's use of interactive video focused on the use of programmed learning packages aimed at large numbers of workers through a limited number of outlets and 'point of sale' information discs for employees and customers. The report by Boyers stated that there were no obvious parallels with the use of interactive video in industry and its anticipated use in schools.

It is worth noting that prior to this initiative awareness of interactive video using videodisc technology within the education sector was very low. Any notable

work that had been carried out previously had made use of tape based systems. Although the report indicated that there would be an effect on the organisation of schools and classrooms there was little evidence to suggest what was to be expected.

The report emphasised the need to use the full advantages of the media effectively in order to justify the cost and recommended that the following be taken into account:

- IV material should be designed to complement other resources
- the material should relate closely to the relevant syllabus
- appropriate training for teachers and technical support staff and sufficient hardware should be provided
- the software should allow classroom teachers the option to adapt the material
- IV should be used to deliver in-service training for teachers
- LEAs should be encouraged to provide a collaborative support structure
- financial support to provide action research into the effectiveness of the project is important.

At the time of this report other government agencies were carrying out investigations into the potential of interactive video. Both the Training Agency and the Department of Education and Science through NCET were carrying out similar studies. There is very little evidence of coordination between the studies.

2.4.5 Interactive video in higher education

One of the factors which influenced the introduction of interactive video into the UK education sector was the high cost of the equipment. The main areas of activity were confined to institutions employing individual enthusiasts or institutions involved in government funded initiatives. Between 1986 and 1989 the DTI and DfEE funded interactive video initiatives in both the Further Education and School sector. A small amount of funding was directed towards the Higher Education sector through a project targeting initial teacher education. Studies on the use of interactive video in Higher Education are therefore limited and had a tendency to focus on the use of a specific application in a limited and controlled environment. The emphasis was towards the design of material and studies were often carried out by individual teachers using a single delivery system in a classroom environment. In Higher Education in the early nineties there was little evidence that a broad view of the learning environment was considered in relation to the effective use of interactive video.

Although the use of interactive video in Higher Education was not widespread a number of useful studies were carried out.

Laurillard's (1984) early studies into the effective use of video examine the kind of learning experience interactive video offers students. She explores modes of learning and summarises the results of field trials which were designed to *examine students' behaviour with the medium*, the focus being the learning environment that existed between the learner and the medium. The learning environment that extends beyond the learner and the medium is not considered.

Laurillard (1987) presents a wider view of the issues that surround interactive video in a book contributed to by a number of authors with a wide range of experience in the design, development and use of interactive video in education and training.

Laurillard acknowledges that:

these new instructional forms make the learners active, rather than allow them to be passive recipients of knowledge. Assembling educational material for an interactive video lesson is radically different from assembling materials for a lecture...

These issues force educators to consider carefully how far interactive media bring welcome assistance to the teacher, and how far they bring unwelcome problems.

(Laurillard, 1987)

Laurillard (1987) emphasises the importance of design and the need to understand how to use media effectively. The fifteen contributors to the book focus on technological issues, design issues, applications and the learning process. The physical environment and the process of implementation and integration are not identified as important issues. Implementation is mentioned by Pask and Boyd:

...it becomes clear that implementation of this kind of system requires several independent processors.

(Pask and Boyd, 1987, p. 110)

The scope of their terms of reference is limited to the number of systems used and the design of the material.

The second part of the book sets out to illustrate the potential of the media and the constraints such as *economic feasibility, the need for organisation and planning, the limitations of existing hardware and software*. Economics, planning and hardware are presented in relation to producing material and not the learning environment. Laurillard (1987), in her postscript, urges *teachers to record, analyse and articulate their experiences*. Towards the end of her postscript she raises issues which relate to the environment when she

emphasises the *flexibility of existing education systems to adapt to the kind of resourcing demands technology makes.*

Although Laurillard (1987) does not address the importance of management and institutional infrastructure, she begins to acknowledge the wider context of implementation in her book *Rethinking University Teaching* (1993).

In addressing the issues that Higher Education will face in the nineties she identifies the role of learning technology and institutional change:

I see the solution as being found in a new organisational infrastructure, not in guidelines on how to teach ...

(Laurillard, 1993, p. 4)

She suggests that the use of a methodology based on mechanisms, tasks and responsibilities is more productive in terms of developing an organisational infrastructure. Although Laurillard (1993) does not relate specifically to interactive video she describes the use of media, interactive media and learning technology in terms of their technical potential and application to learning processes and begins to explore issues which affect implementation within the context of teaching and learning and an organisational infrastructure:

...new teaching methods, such as educational media, depend for their success upon being properly embedded into the existing learning context. Innovation will necessarily require changes in what exists already, and if this is not acknowledged and accommodated, then the innovation will not succeed.

(Laurillard, 1993, p. 221)

Sprunt (1989, p. 5) offers three possible approaches to supporting institutional needs in interactive video:

- the institution responds in an ad hoc way to individual needs
- the institution takes a direct market orientated approach in which certain courses are targeted
- the institution takes a positive, proactive approach which introduces interactive video into the curriculum on a wide front.

Sprunt acknowledges that the management of these methods is important. He suggests that a central unit can provide a coordinating function, and that there will be an associated need for technical support, training and general advice on establishing interactive video approaches within the curriculum.

Bork (1987, p. 29), attempts to identify the potential of interactive video by examining research related to *the full facilities of the modern computer and the best current video practices.* He considers the importance of an interactive

learning conversation and the effect it has on the learner. He suggests that *good interaction* will adapt to suit the individual learner and is therefore more likely to motivate the learner. The style of interaction, the degree of interaction and the quality of interaction relate to the design of the material and the learning process.

In a study carried out at Thames Valley University into the effective use of interactive video with large groups, Jones (1993) identifies key issues for successful learning. He suggests that the tutor must:

- be familiar with the content and mode of learning
- decide on appropriate learner interaction
- decide what is appropriate in terms of support for the learner
- adopt an effective evaluation process.

Jones highlights the need for teachers to influence the design of materials and stresses the difficulties involved in managing the use of technology-based courseware.

It is crucially important that tutors learn to integrate current interactive media into their programmes... Understanding current training technology will at least give us a fighting chance of making effective use of the emerging training technologies.

(Jones, 1993, p. 188).

2.4.6 Interactive video in further education

In 1989 the Department of Trade and Industry funded a three year programme, 'Interactive Video in Industry and Further Education'. The project was managed by the National Interactive Video Centre and was designed to support the move towards greater flexibility in education and training and to complement the development of modular programmes and incremental accreditation. Two of the six aims within the programme were:

- to devise guidelines for interactive video courseware design and its implementation into the curriculum
- to clarify staff development issues associated with the use of interactive video courseware.

The project supported the production of generic interactive video discs for industry and Further Education. Unfortunately the project funding was not continued and a final report was not made available for general distribution.

Hall's (1993) study for the National Council for Educational Technology and the Further Education Unit (FEU) provided a report on the use of Interactive

Video in Further Education. Hall acknowledges that despite earlier expenditure by the DTI, the use of interactive video in the FE sector was marginal. He draws attention to the fact that:

almost all IV programmes available to and used by colleges have been produced and published by commercial organisations as training programmes for use by industry and business. As such they are often perceived as 'stand alone' teaching programmes.

(Hall, 1993, p. 2)

The National Council for Educational Technology had identified an number of purposes for the study. One of the aims was to identify ways in which learning with interactive video was organised and managed. Common to both NCET and FEU was an interest in the problems and issues not just relating to interactive video, but of the role of multimedia and IT in general.

Hall emphasises the similarities between interactive video and other multimedia technologies:

It is clear that many of the issues which are looked at in this note are not peculiar to IV but are common to other learning technologies.

(Hall, 1993, p. 8)

Hall identifies a disparity of use and relates it to:

- a. *lack of commitment within a college by management and/or staff to using information technology as a teaching resource*
- b. *the existence within a college of a commitment by management and one or more committed individuals who are prepared to make a substantial and continuing effort to foster the use of the medium*
- c. *lack of understanding of ways to use and integrate IV into courses together with insufficient knowledge of available IV programmes.*

(Hall, 1993, pp. 2–3)

As well as identifying management and staff attitudes as major factors inhibiting the use of the medium, Hall also recognises that the cost of workstations and programmes and the limited amount of curriculum-related courseware significantly affects the acceptance of a new resource.

Hall associates the relative failure to realise the potential of interactive video in Further Education with organisational issues, funding and implementation of learning technologies rather than with the effectiveness of interactive video. The report is divided into sections covering management issues, programmes, the benefits of IV to the teaching process, the relationship of IV to emerging technologies and impediments to the use of interactive video. Identified under

the heading of impediments is the cost of equipment and programmes, the lack of appropriate material, the attitude of teaching staff and access to equipment. Hall emphasises the need to address the issues urgently:

... if the potential for the emerging technologies – which are simply a different means of transporting the same messages – are to be realised.
(Hall, 1993, p. 39)

2.4.7 Interactive video in schools

The Interactive Video in Schools (IVIS) programme, one of the most extensive educational interactive video projects (1985–87), was funded by the Department of Trade and Industry to produce, field test and disseminate a number of interactive video packages. Throughout the eighties the DTI provided a major impetus to the application of technology to education, playing an important role in promoting the use of computers in education and encouraging relationships between the education sector and the information technology industry.

The programme had six main objectives, summarised as the following:

- to produce a number of interactive video packages
- to investigate the potential of interactive video across the curriculum
- to create a core of teachers with expertise to support further exploration of the medium
- to create a core of teachers with expertise to raise awareness and extend dissemination
- to develop links between the programme developers and hardware manufacturers
- to create increased awareness amongst all sectors of the education service, including publishers.

At the time the expectations of interactive video were high. It was heralded as:

a major new dimension to the use of the computer for teaching and learning; a significant leap forward; an agent for educational change; a genuine chance to develop a new learning industry; the most powerful teaching tool yet available to teachers; a technology believed to have immense educational potential, enabling a quantum leap forward in the effectiveness of good teachers.

(Norris et al., 1990, p. 88)

The programme was evaluated by a team from the Centre for Applied Research in Education at the University of East Anglia (1987–89). Their views covered a wide range of issues associated with the IVIS programme. Two areas significant to this study focus on implementation and software interaction. The latter of the two areas presents the concept of interaction and describes four different ways in which the user interacts with the material.

The methods of user interaction can be summarised as follows:

- a system of classification
- a system of fixed branches or routes
- presentation tools
- a system of rules.

The four listed methods of interaction are significant to this study in that they provide a set of structures used in interactive video which can also be identified in the latest multimedia applications. This will be discussed further in Chapter 5.

According to a Parliamentary Office of Science and Technology report (1991) the views of the IVIS evaluators sum up the key benefits and problems involved not only in introducing interactive video but also in respect of any computer based learning materials.

At an early stage in the programme, both the teachers' and the pupils' confidence and competence were identified as key factors to success and it was emphasised that the time which should be allocated to this area of work should not be underestimated. IVIS also demonstrated the critical importance of extensive support and time allowance for teachers who are testing out new technology in the classroom.

In relation to implementation Norris et al. (1990) conclude that:

Technological innovations are relatively easy to install as long as there is an effective system of delivery and training. However this does not guarantee easy integration with curriculum and classroom practice...Would be innovators frequently over-estimate the inherent power of technology to change teacher behaviour and under-estimate the prior requirement for staff development. As Michael Fullan puts the general point: educational change involves learning how to do something new. It is for this reason that if any single factor is crucial to change, it is professional development, Fullan (1982, p. 257).

(Norris et al., 1990, p. 92)

Although Norris and his colleagues found it difficult to estimate the effectiveness of interactive video, it was generally accepted that interactive video was a powerful learning resource:

...it seems to enhance the understanding of difficult concepts. This claim is also made about computer assisted learning, but with interactive video it is the richness of visual images that teachers said was significant.

(1990, p. 89)

The evaluation report emphasised three significant attractions of interactive video which echo long-standing claims for computer assisted learning generally:

- interactive video enables pupils to learn at their own pace
- interactive video can release the teacher to work more closely with pupils
- pupils enjoy using interactive video.

Following the IVIS programme the Department for Trade and Industry provided funding of two million pounds to cover the installation and support of interactive video in every Local Education Authority and Initial Teacher Training Establishment in the United Kingdom. The Interactive Video in Education (Duckworth, 1989) project was seen as the final stage of initiatives funded by the DTI which were aimed at bringing the importance and potential of interactive video to the notice of decision-makers in the school sector.

Angus Doulton, in his foreword to Duckworth (1989), acknowledged the DTI as having played a major role in helping to chart the way forward for the development of interactive learning technologies in support of autonomous learners and teachers.

The report attempted to highlight the successes and failures of three years of government-funded development activity with a view to the report being used to guide government-funded initiatives in the 1990s. The end of this project marked a watershed between expensive interactive video equipment and the emergence of a new generation of multimedia technology that would eventually have the capacity to deliver the same mixture of interactive media through a cheaper, faster system taking advantage of on-line communications systems.

The National Council for Educational Technology's report on Teaching and Learning with Interactive Media (1992–94), bridges the gap between interactive video and other associated technologies. Areas in the report particularly relevant to this study are recommendations made under the headings of implementation, resource provision and the management of innovation.

Under the heading of implementation the report suggests that:

the successful teaching strategies were those that prepared the pupils for the on-line task, offered a structure for the work they did at the workstation, ensured at least occasional supervision of progress, and provided some form of debriefing or follow up activity to make sure that the key lessons had been learned.

(NCET, 1994)

Other issues identified for consideration were time for careful planning, time for familiarisation, the preparation of customised worksheets and the need for appropriate supervision. The report emphasised the importance of careful timetabling to ensure effective resource provision within a classroom environment. Reference is made to the management of innovation in section 2.2.3 of this chapter.

The report concluded:

...in order to achieve the necessary standards of excellence and economies of scale, new educational technology needs to be developed and implemented along industrial lines. These will only be achieved as the educational system moves towards large-scale long-term integrated usage of new technology. The infrastructure that needs to be in place to support the optimal development and implementation of new technology in schools touches every level and aspect of the school system...It is a matter of the different agencies in the system recognising what must be done and working together to achieve a coherent long-term strategy.

(NCET, 1994, p. 87)

2.5 SUMMARY AND IMPLICATIONS FOR THIS ENQUIRY

The literature review has taken into account a broad range of research and analysis, examining not only different associated areas, but also covering an extensive time period. Although many of the reports and studies focus on specific areas this summary identifies some of the broad issues which affect the introduction and implementation of educational technology and the use of media.

Some of the earlier studies (Ely, 1983) examined the relationship between media and learning, identifying issues which relate closely to the implementation and effective use of interactive video and digital multimedia. Jones and Mercer (1993, p. 25) highlight the importance of the learning process and how it relates to software design and to the teaching environment. Laurillard (1984) also explores learning styles focusing on the interaction and relationship between the learner and the medium. Some large scale government funded initiatives (IVIS, 1985) examined the potential of the technology, placing the emphasis on extending levels of user interaction and incorporating the full use of all media elements, while other large scale projects (Employment Department, 1990) focused on managing the role of information technology.

The literature review reveals areas and issues which are inter-linked and are crucial to the effective introduction and implementation of educational multimedia. For the benefit of the discussion in Chapter 5 the issues are categorised in the following way:

- educational issues which are not exclusive to the use of technology
- general issues which relate to educational technology
- issues which relate specifically to multimedia programmes.

The conclusions drawn from the literature review suggest that issues associated with the effective use of media and technology, educational management, the learning process and the role of the teacher are relevant to the effective introduction and implementation of educational multimedia and that each area has a wide range of associated implications to consider.

CHAPTER 3

METHODS OF ENQUIRY

The overall approach to data collection which has been adopted in this study consists of a mixture of quantitative and qualitative methods.

3.1 OVERVIEW

The data collection process began with:

- small scale case studies on five schools
- follow up surveys by questionnaire
- in-depth semi-structured interviews with educational consultants.

The results of the case studies influenced the design of the questionnaire. The interviews, with two educational consultants, were used to explore the findings from the case studies and the results of the questionnaire in greater depth.

3.1.1 The case studies

The case studies report on five schools involved in the Employment Department's Managing Flexible Learning Programme (MFL). They provide a record of the activities relating to the introduction of interactive video in the five schools over a six month period and issues which affected the implementation process. The issues identified as an outcome of the case study report were incorporated into the questionnaire design for further investigation.

3.1.2 The questionnaire

The questionnaire was designed to identify issues from the case studies which were seen to be influential in the introduction and implementation of interactive video. The issues were incorporated into the questionnaire which was sent to a number of schools which had been involved, over varying lengths of time, in a wide range of educational interactive video projects.

The questionnaire was designed to obtain feedback on the process each school had undertaken to introduce and implement the use of interactive video and to identify significant issues relating to that process. It was sent by post to the member of staff identified as the project coordinator in each school.

The purpose of the questionnaire was to investigate the issues further and identify key activities which had a significant influence on effective implementation.

3.1.3 Interviews

The semi-structured interviews were designed to encourage free expression and were used to gain more in-depth data based on that drawn from the case studies and the questionnaires.

Two educational consultants were interviewed who, over an eight year period, had a considerable amount of experience of working with schools to support the introduction and implementation of interactive video.

3.2 CASE STUDIES

3.2.1 Background

The case studies focus on practical issues relating to the use of interactive video in flexible learning environments and cover the experiences of five schools over a six month period. The aim of the project was to identify issues which affected the introduction and implementation process, and to produce a document to provide guidance to school managers (Hudson A, 1993).

Based on early discussions in each school with head teachers and key members of staff the following areas were identified for consideration:

- the support of senior management
- allocation of time for training
- the production of tailored material by staff and students
- the location of, and access to, systems
- teacher and student support structures
- dissemination
- computer platforms and relevant software.

The project included an initial analysis of the needs of each school, which was based on feedback from meetings and presentations with members of staff, including technical and resource centre staff. This identified the level of experience and interest among the staff, the type of equipment that was being used in the school, software and

discs that the schools already had available and the particular hardware platform which the schools were using.

3.2.2 Methodology

I spent four days working as an external consultant with each of the schools over a six month period.

Based on my discussions with the appropriate staff in the schools and experience which I had gained previously from working as a field officer on the IVIS project a number of generic objectives were formulated.

Within each school the aim was to address the following:

- raise awareness throughout the school
- identify key curriculum areas for implementation
- analyse needs in relation to the purchase of equipment and staff training
- acquire necessary equipment and discs
- ensure appropriate access to equipment
- develop a staff/student support structure
- formulate a structured development programme focusing on classroom projects, specifically tailored to curriculum needs
- address on-going staff training within the curriculum
- disseminate information and skills across the school
- identify future developments.

The approach to meeting the objectives in each school was negotiated to ensure that staff developed strategies suited the teaching environment.

The case study of each school took the form of a diary of events which covered the following:

- the background experience of each school
- initial meetings and presentations
- a needs analysis.

A programme of development was structured to include:

- staff training
- curriculum planning
- the development of classroom material
- curriculum implementation
- feedback from staff and students.

The closing snapshot of each school illustrated what had been achieved in relation to the following:

- which hardware systems the school was using
- where the systems were located
- which subject areas were actively using interactive video
- which areas had been identified for future development
- how ongoing support would be provided.

The synthesis of each case study was presented in a summary which identifies a number of issues as being crucial to the success of an educational initiative using interactive video. The issues are presented in Chapter 4.1 of this study.

The issues were used to form the basis of the questionnaire which was designed to provide more focused data for further analysis.

3.3 SURVEY BY QUESTIONNAIRE

3.3.1 Background

The data collected reflects the experiences of a number of schools that were involved in different government funded interactive video initiatives over a period of eight years.

Although the sample group was small at 30, it was chosen to represent a cross section of secondary schools involved in all government funded interactive video initiatives since 1988. Seventeen schools responded to the request for information.

The response to the questionnaire covered schools from the following identified initiatives:

- Interactive Video in Schools (IVIS) DTI, 1987/9
- Interactive Video in Education (IVIE) DTI, 1987/9
- Managing Flexible Learning Project, Employment Department, 1990/2
- National Council for Educational Technology, DfEE, 1992/4
- Grampian Staff Development/PE Project (Scotland) 1993.

The results reflected a range of experience. About half of the schools that responded were relatively new users of interactive video while the remaining schools had up to eight years of experience which varied from widespread consistent use, to intermittent experimentation.

The range of schools represented can be subdivided into the following groups:

- 18% IVIS initiative (1987–89)
- 18% were involved in the Employment Department's programme Managing Flexible Learning (1990–92)
- 47% were involved in the NCET evaluation of interactive video in schools (1992–94)
- 24% which were involved in the Grampian regional programme of support for interactive video (1987–94)
- 5% which had purchased interactive video without the support of government funding (1994).

3.3.2 Questionnaire design

The following areas, drawn from the case studies, were seen to influence the implementation process and were used to form the basis for the questionnaire (Appendix 2):

- equipment
- management and coordination
- awareness raising
- access
- internal/external support

- staff development time
- key curriculum areas
- dissemination of information and skills
- continuing developments.

The questionnaire was designed to provide data for further examination with the aim of identifying key activities which have a greater influence on effective implementation.

The questionnaire incorporated a combination of short questions requiring a 'tick box' response and questions which provided the respondents with the opportunity for open comment. The responses to the open questions were grouped and collated in order to identify emerging themes.

The questionnaire was designed to obtain information relating to the following questions:

- how was interactive video introduced into the school?
- who introduced interactive video to the school?
- was external support provided?
- which staff were involved in the implementation process?
- was time allocated to the staff involved?
- was the senior management involved?
- how was interactive video applied ?
- how often were the systems used?
- where were the systems located?
- who provided support for staff and students?
- which factors influenced the staff to use interactive video?
- which software and hardware was used?
- which factors influenced the choice of video disc?
- how did the use of interactive video support the curriculum?

- how will the use of interactive video be developed?
- which factors are likely to restrict development?

The data relating to each question have been analysed quantitatively in order to identify emerging themes, and the open responses were grouped for discussion and have been incorporated into an overview commentary.

The analysis of the data collected is discussed further and presented with evidence in Chapter 4.2. Appendix 3 contains the complete data analysis from the questionnaire.

3.4 INTERVIEWS

3.4.1 Background

The first consultant, RM, was a field officer for the Grampian Education Authority on the IVIS Project. When the funding for national support came to an end RM continued to support interactive video developments as an advisor within the Grampian authority.

A strong commitment from the Scottish Office, to continue the development and the support of interactive video, along with an experienced educational production unit, based at the Scottish Centre for Interactive Video at Moray House, provided the foundation for the continued production of specific material and regional support. Following the IVIS project RM worked at a regional, national and international level supporting the production, introduction and implementation of interactive video.

The second consultant, JD, was the Education Manager at the National Interactive Video Centre and was responsible for coordinating the Interactive Video in Education Project. Since IVIE, JD has worked with the Employment Department on the Managing Flexible Learning Project. She has worked as a consultant for commercial companies, evaluating educational material and has also been responsible for an interactive video project funded by Carnaud Metal Box. The Carnaud Metal Box Project involved introducing and evaluating the use of interactive video in twelve schools.

3.4.2 Methodology

The semi-structured interviews were designed to gather information, collect opinions and explore experiences. The interviews were structured to cover certain areas and explore issues which had been identified through the case studies and the questionnaire. They were also designed to allow RM and JD an opportunity to present an open account specific to their own particular experiences.

The analysis of each interview focused on the exploration of issues identified in section 4.1.2 *Issues identified from the case study* and section 4.2.7 *Key issues essential to successful implementation*.

Appendix 4 contains the full transcript of each interview.

3.4.3 Interview process

At the time of the interview with RM the Grampian authority was involved in the production and introduction of two new interactive video packages; a programme aimed at school managers and a programme designed to support the higher level PE syllabus.

The interview was designed to encourage an open explanation of events which had influenced the historical development of interactive video in Grampian. It was also designed to explore some of the key issues which had affected the introduction and implementation process and to identify how the issues had been addressed.

The interview with JD took place while she was working on the Carnaud Metal Box project. The project formed the basis of the interview. The twelve schools involved in the project were 'new users' and had been provided with interactive video systems and generic training programmes. The material, originally designed for business and industry, had been selected by JD based on her knowledge of the material and her analysis of the needs of the schools.

The interview focused on raising practical and theoretical issues which had affected the implementation process. The interview also explored JD's personal feelings about the future of multimedia in education.

CHAPTER 4

RESULTS OF THE ENQUIRY

The analysis of data is presented in three sections under the headings of the three methods of enquiry. Each section is summarised. The summary at the end of this chapter collates the salient points drawn from each section.

4.1 ANALYSIS OF DATA COLLECTED BY CASE STUDY

The case studies reflect my experience of working with five schools, over a six month period, involved in the Employment Department's *Managing Flexible Learning Programme (MFL)*. My role, as an external consultant, was to support the five schools as they attempted to introduce interactive video into the curriculum. The case studies provide an account of the experiences of each school over the six month period (Appendix 1). The analysis of the case studies attempts to identify the issues which affected the implementation process. The issues identified as an outcome of the case study report were incorporated into the questionnaire design for further investigation (4.1.2).

4.1.1 Influences affecting the case studies

The case studies raised issues relating to the introduction and implementation of interactive video as a resource to support flexible learning. They highlighted several common factors which needed to be considered in order to facilitate the introduction and successful implementation of interactive video within a flexible learning environment.

Although the reasons for introducing interactive video into the curriculum were similar in each of the five schools, the experience of the teaching staff and technical support staff varied considerably. Each school was committed to developing and managing interactive video across the curriculum. Although the foci for the developments were different, the staff of each school had identified the important and growing contribution that technology could make to learning and were interested in exploring the potential of interactive video as a new resource.

An essential prerequisite to planning the case study project was an analysis of each school in relation to the following:

- existing skills and expertise
- IV equipment already available

- the school's IT policy
- strategies
- targeted curriculum developments
- staff development programmes.

The experiences of each school were also affected by different management structures, the availability of non-teaching support and adopted learning styles.

Since the experiences of each school were different, each case study reflected a range of strategies applied to the following key issues:

- project management
- computer platform adopted
- curriculum areas involved
- staff/student involvement in curriculum project
- time allocation for training
- access to the equipment
- funds available.

The support given to each school followed a similar pattern. Initially there was a period of awareness raising which took the form of presentations and discussions with key members of staff. This introductory process was used to gather information about the existing experience of the school and to develop an understanding which informed the design of a project specific to the needs and experience of each school.

The projects within each school targeted identified staff and subject areas and, in four out of the five schools, focused on the use of authoring software to tailor existing videodiscs specifically to support the syllabus.

An important part of the project focused on staff training and identifying which teaching and non-teaching staff would provide on-going support and further dissemination across the school.

For examples of case studies see Appendix 1.

4.1.2 Issues identified from the case studies

The case studies highlighted several common factors which needed to be considered in order to facilitate the introduction and successful implementation of interactive video within a flexible learning environment. These were:

- **Computer Platforms**

What type of systems should be purchased ?

The choice of computer platform reflected the needs of the pupils and teaching staff, and the material that was already available.

- **Management and coordination**

Which senior members of staff should be responsible for managing the process ?

Implementation required effective coordination, management, communication and dissemination across the school. Implementation was most successful when senior management showed commitment to providing time for staff development and funding for appropriate material.

- **Awareness raising**

How can interest be stimulated ?

Each school used the external consultant in a process aimed at raising awareness across all departments. This resulted in an increased interest in interactive video and support for the projects.

- **Access to equipment**

How can the equipment be managed ?

Access to the equipment was affected by the following factors:

- the number of systems
- the amount of technical support
- the software interface
- the demand on the systems
- physical constraints of the school buildings.

- **Internal support for staff and students**

Which conditions are necessary to encourage and support future development ?

It was essential that staff and students developed expertise and a support structure within the school and were not dependent on external support. A training programme was an important element to ensure consistent and continued development.

- **Staff/student development time**

What are the implications on staff time ?

One of the major implications relating to the implementation of the new technology was the increased demand on the time of the support staff as well as the need for staff/student training and development time.

The case studies highlighted the following approaches to allow teaching staff project development time:

- funding from the staff development budget for a group of teachers to work as a team
- timetabled non-teaching time
- working alongside pupils on joint development projects within class time.

- **Identifying key curriculum areas for implementation**

Who should be involved in the project and why ?

In order to identify key curriculum areas for development the following issues were taken into consideration:

- school policy targeting subject areas for development
- staff development
- staff interest
- applications available to support specific areas of the curriculum.

- **Dissemination of information and skills**

How can the whole school feel involved ?

The dissemination of information across departments was channelled through:

- structures supporting management/departmental meetings
- internal newsletters
- INSET.

An effective level of communication within the school was essential for the dissemination and the ongoing development of skills.

- **Continuing and future developments**

How can feedback from staff be embraced and how can the school support future development ?

At the end of the project the staff in the schools felt that there was a need for an external source of up to date information and advice relating to:

- new applications
- changes in the technology
- developments in schools at a national level
- projects and evaluations supported by government agencies
- updating skills.

4.1.3 Summary of issues drawn from the case studies

Although the introduction of interactive video had implications for staff development and training it was seen as a catalyst for change, effectively demonstrating the important contribution it can make to flexible learning. Both teachers and students were enthusiastic about the added value interactive video provided as an additional resource.

Interactive video used to its full potential was seen to be a flexible, exciting, 'media-rich' resource, which could support and encourage student-centred learning and student-centred teaching methods.

In my role as the external consultant working with the schools I was aware that a critical success factor was the commitment, skill and influence of the member of staff, within the school, who was responsible for managing the project. If the management was not firmly embedded within the school effective implementation did not take place.

Managing the integration and developing the potential of interactive video required commitment, expertise and the ability to influence.

4.2 ANALYSIS OF DATA COLLECTED BY QUESTIONNAIRE

A quantitative approach was taken to the data collected by questionnaire in order to gain evidence which could be used to identify the most significant activities which are likely to achieve effective implementation.

The questions in the survey (Appendix 2) were based on the results of the case studies and reflected past research and personal experience. The data relating to each question have been analysed quantitatively in order to identify any correlations, and the open responses have been incorporated into an overview commentary.

4.2.1 Effective implementation

Although effective implementation is difficult to define and there is little research available which focuses specifically on the implementation of interactive video, based on experience and taking into account the report by the National Council for Educational Technology (1994), levels of activity in the following areas were used as a measure to define effective implementation:

- use across subject areas
- the amount of use
- the mode of use
- further development.

Particular importance is attached to schools identifying further development. In order to emphasise the importance of further development a heavier weighting has been allocated to the 'Development' score. Levels of differentiation in the 'Development' category have not been identified.

The scoring system attempts to take into account a number of factors which reflect the amount of use and the range of use of interactive video. The score is based on a cumulative process. The more often IV is used and the wider the range of use, the greater the score. The identification of further development was given a higher weighting to reflect the importance of future strategy.

Table 4.2.1.1. The main parameters used to measure effective implementation

<i>Category</i>	<i>Score</i>	<i>Definition of score</i>
Curriculum subject	1	One point for each subject area
Amount of use	4	Used every day
	3	Used two or more times a week
	2	Used once a week
	1	Used less than once a week
Mode of use	1	Single user
	1	Small group
	1	Large group
	1	Presentation
	1	Staff development
Development	5	Identified further development

Table 4.2.1.2. The activity in each school in relation to the identified parameters

School	Subject	Amount of use				Mode of use					Development
		5/5	>2/5	1/5	<1/5	Single	Sm.G	L.G	Pres	Staff	
1	1+	Y				Y	Y	Y	Y		Y
2	1+			Y			Y	Y			
3	1+		Y			Y	Y	Y			Y
4	1+			Y			Y		Y		
5	1			Y			Y				
6	1			Y		Y	Y				Y
7	1			Y			Y	Y	Y		
8	1+	Y				Y	Y	Y	Y		Y
9	1			Y		Y	Y				
10	1			Y		Y	Y	Y			Y
11	1		Y			Y	Y	Y			Y
12	1	Y		Y		Y	Y	Y			Y
13	1		Y			Y	Y	Y	Y		Y
14	1			Y		Y	Y		Y		Y
15	1+			Y		Y	Y				Y
16	1+			Y		Y	Y				
17	1+			Y		Y	Y				Y

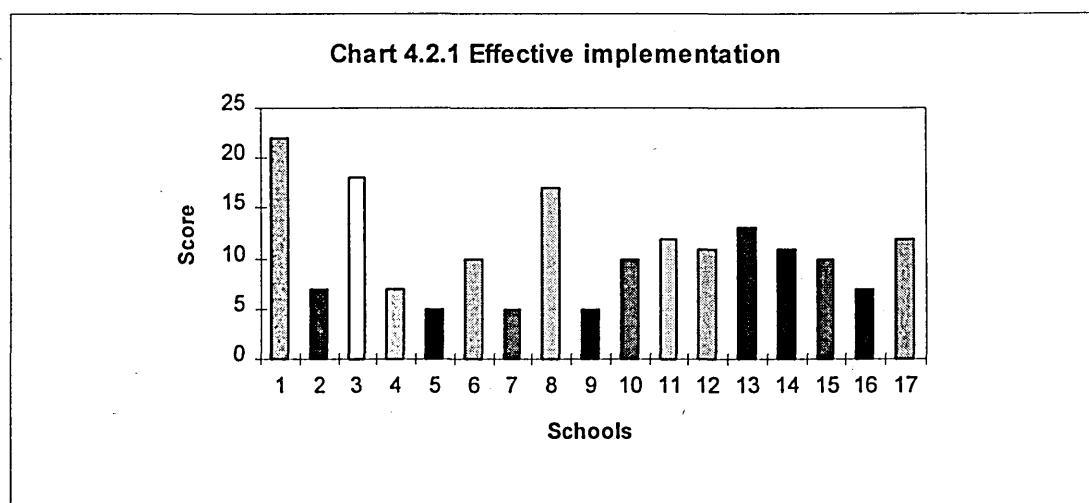
KEY Single = single user; SmG. = small group; L.G = large group; Pres = presentation mode; Staff = staff development

The sensitivity of the scoring system has been tested using different weights for the various aspects considered. In all cases, the same high scoring schools emerged – providing an indication that the scoring system was consistent.

Table 4.2.1.3 The scores for each school

<i>School</i>	<i>Subject</i>	<i>Amount of use</i>	<i>Mode of use</i>	<i>Development</i>	<i>Total score</i>
1	9	4	4	5	22
2	4	1	2	0	7
3	7	3	3	5	18
4	4	1	2	0	7
5	3	1	1	0	5
6	1	2	2	5	10
7	1	1	3	0	5
8	4	4	4	5	17
9	2	1	2	0	5
10	1	1	3	5	10
11	1	3	3	5	12
12	1	2	3	5	11
13	1	3	4	5	13
14	2	1	3	5	11
15	2	1	2	5	10
16	3	2	2	0	7
17	4	1	2	5	12

Chart 4.2.1. The differing levels of implementation based on the scoring system outlined in Table 4.2.1.1.



The total scores do not represent reliable data and are, therefore, not presented as a means of 'proof'.

Summary

Although the summation is not a reliable indicator of differences the scores indicate that schools 1, 3 and 8 achieved a higher score than the other schools. The data does go some way towards suggesting that three of the schools may have developed a more effective foundation for future development.

4.2.2 External support

Table 4.2.2.1 The schools' scores in relation to the receipt of external support

<i>School</i>	<i>Total score</i>	<i>External support</i>
1	22	Yes
2	7	Yes
3	18	Yes
4	7	Yes
5	5	Yes
6	10	No
7	5	Yes
8	17	Yes
9	5	Yes
10	10	Yes
11	12	No
12	11	Yes
13	13	No
14	11	Yes
15	10	Yes
16	7	Yes
17	12	Yes

The three high scoring schools, 1, 3 and 8 had received varying degrees of external support during the introductory period.

Schools 6, 11 and 13 had not received external support during the introductory stage. However school 11 had received some external support during the implementation process.

Although schools 2, 4, 5, 7, 9 and 16 had received external support their scores were very low. The systems and the software were only being used occasionally, in a limited

way. All six schools had indicated that there would be no further development. Eight of the seventeen schools were involved in the National Council for Educational Technology (NCET) Interactive Video Evaluation. Five of the NCET schools had received external support while the other three had been given only limited support from external sources. The (NCET) schools were all using the same discs on the same hardware platform.

Analysis of the data from the eight NCET schools revealed that having external support throughout the introductory period did not guarantee successful implementation. Four of the eight schools were using IV more than once a week, involving a range of learning styles and had identified further areas of development. Two of the four schools had not received external support.

Summary

Fourteen schools received external support but it was found that the support was not consistent. Some schools received extensive support and training while other schools received their external support from a distance.

Although the data relating to the identified criteria indicate that there was no clear correlation between external support and successful implementation this should be tested further with different levels of external support taken into account.

4.2.3 Key roles in the implementation process

The senior management of educational institutions can support educational innovation in various ways. Although the data collected has not measured the contribution of the senior management, it does identify their involvement along with other members of staff who were involved in the implementation process. The data relating to the key staff involved were examined by comparing the more successful schools against the less successful schools.

Table 4.2.3.1 Key members of staff who were involved in the introduction and implementation of interactive video

Key to table

Schools

ES	External support
SM	Senior management
SS	Subject specialist
IT	Information technology specialist
SD/CD	Staff/Curriculum Development co-ordinator
Subject	1 = IV used in one subject area
	1+ = IV used in more than one subject area

Table 4.2.3.1

<i>School</i>	<i>ES</i>	<i>SM</i>	<i>SS</i>	<i>IT</i>	<i>SD/CD</i>	<i>No. of subjects</i>
1	Y	Y	Y	Y	Y	1+
2	Y	Y	Y	Y	Y	1+
3	Y	Y	Y		Y	1+
4	Y	Y	Y	Y		1+
5	Y		Y	Y		1
6			Y	Y		1
7	Y		Y			1
8	Y		Y	Y	Y	1
9	Y		Y	Y		1
10	Y	Y	Y			1
11	Y		Y	Y		1
12	Y	Y	Y	Y		1
13			Y	Y		1
14	Y		Y			1
15	Y	Y	Y			1+
16	Y	Y	Y	Y		1+
17	Y		Y	Y		1+

The two schools which had achieved the highest scores against successful implementation had support at senior management level. The same two schools (1 and 3), had used interactive video across a number of subject areas.

School 8 had achieved a high score but had not received support from senior management. Further analysis of the questionnaire returned by school 8 indicated that a very committed member of staff had been responsible for the implementation process. It also indicated that the teaching and learning environment within that member of staff's subject area had been developed to support individual resource based learning. Analysis of the questionnaire indicated that the departmental support structure worked effectively with a minimum amount of input from senior management.

This is in contrast to school 2 where support was available in all 5 areas, but the school had a low score against successful implementation. On further investigation of this school it became evident that the head teacher, who was a dynamic character and had been the main force in introducing new technology to the school, had left the school very suddenly. This suggested that although the school had involved a wide range of staff in the introductory process, an effective strategy had not been formed. Three schools (5, 7 and 9), all with low scores had not received support from senior

management and had only used interactive video in one subject area. Only four schools (1, 2, 3 and 8), had received support through staff development or curriculum development. Schools 1, 3 and 8 had achieved high scores against successful implementation and had all received support through staff development or curriculum development.

All of the schools (3), which had received the support of senior management and had been provided with staff development or curriculum development had used interactive video in a number of subject areas.

In the case of seven schools which had not received the support of senior management and had not been provided with staff development or curriculum development the use of interactive video was limited to one subject area.

Summary

The data suggest that introducing interactive video through a staff development or a curriculum development programme is more likely to achieve effective implementation across subject areas. Schools implementing a staff development or curriculum development programme are more likely to be using a managed approach to supporting change, which implies senior management involvement. It also suggests that the process will be managed across more than one subject area.

4.2.4 Continued support

Past experience has shown that in order to secure the continued use and future development of technology in the curriculum, a support structure needs to be established.

I see the solution as being found in a new organisational infrastructure, not in guidelines on how to teach ...

(Laurillard, 1993, p. 4)

Table 4.2.4.1 The levels of continued support for staff using interactive video

The questionnaire was designed to provide data to identify which schools were supporting the continued use of interactive video and which members of staff were involved.

Key to table 4.2.4.1

Schools

ES	External support
SM	Senior management
SS	Subject specialist
IT	Information technology specialist
RC	Resource Centre Staff
N	No support

Table 4.2.4.1

<i>School</i>	<i>ES</i>	<i>SM</i>	<i>SS</i>	<i>IT</i>	<i>RC</i>	<i>N</i>
1		Y	Y	Y		
2			Y		Y	
3	Y	Y	Y			
4					Y	
5					Y	
6						N
7						N
8						N
9						N
10	Y		Y			
11			Y			N
12			Y			N
13			Y	Y		
14						N
15	Y	Y		Y		
16						N
17					Y	

Schools 1 and 3 involved senior management, subject teachers and either internal or external technical support to provide a structure for the continued use and development of interactive video. The six lowest scoring schools, (2, 4, 5, 7, 9 and 16) had used resource centre staff or had not developed a support structure.

Although schools 8 and 11 had scored highly the schools had not developed a support structure. This implies that the successful use of interactive video, in these schools, was based on the experience of one member of staff in one department. School 13 had identified the desire to develop the use of interactive video in cooperation with their IT department.

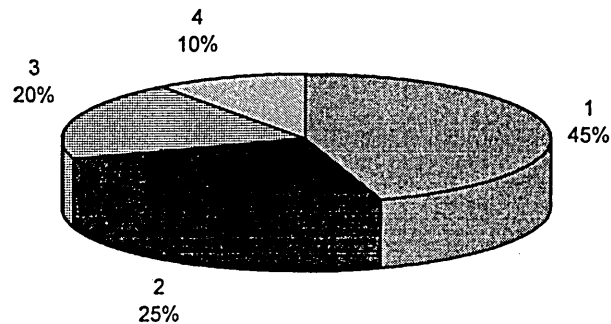
Summary

The most effective support structure for continued development should include senior management and subject teachers. Technical support was seen to play an important role.

4.2.5 Key factors affecting acceptance

Chart 4.2.5 illustrates the response to an open question asking the schools to identify how interactive video can support the delivery of the curriculum.

Chart 4.2.5 Interactive video - added value



Key to Chart 4.2.5

1	Supports resource based learning	45%
2	Motivates students	25%
3	Extends existing resources	20%
4	Encourages the use of IT	10%

Within the context of adding value to the curriculum teachers were mainly concerned that the material was relevant to the curriculum and that the content of the material matched the syllabus and was presented in an appropriate style.

Summary

Assuming that the material was relevant to the curriculum, the most important factor identified by the schools was that the use of interactive video encouraged and supported resource-based learning. The other effects identified were student motivation and the increased use of IT in general.

4.2.6 Key factors restricting development

When asked, in an open question, to identify the key factors restricting the development of interactive video the following issues were identified by the schools:

- 82% (14) of the schools identified the need for training and development time
- 65% (11) identified a need for funding to allow the purchase of more systems and applications
- 12% (2) identified problems relating to lack of space and equipment failure.

Summary

Most schools identified a need for:

- time; to allow staff an opportunity to become familiar with the technology and the material and also for lesson planning
- funding; for purchasing applications and equipment.

4.2.7 Key issues essential to successful implementation

The following areas were identified by the staff who completed the questionnaire as key issues which influence the successful introduction and implementation of interactive video:

- INSET/Staff Training/Time
- well designed/reliable software
- easy access to systems
- appropriate applications
- support material
- key staff for continued support
- culture reflecting a flexible approach to learning
- support of senior management
- staff and student motivation
- reliable hardware
- funding for training and resources
- accountability to external agencies.

4.2.8 Conclusions drawn from the questionnaire

Although there was no significant correlation between external support and successful implementation a balanced contribution of external and internal training throughout the early stages of the introductory and implementation period was the most common approach in the most 'successful' schools.

An important message drawn from the data was that the introduction of interactive video through a staff development or a curriculum development programme is more likely to achieve effective implementation and have the support of senior management.

The findings suggest that in order to support and encourage continued development a clearly defined strategy should be developed to create a structure which should include senior management and subject teachers. Technical staff and resource centre staff should be used to provide additional support alongside the teachers.

It is clear that it is important to identify material relevant to the curriculum. Most schools felt that interactive video encouraged and supported resource based learning and that the teaching and learning environment needed to be able to support resource-based learning. The findings suggest that if the right environment is created there is an increase in student motivation and a general increase in the use of IT.

All schools identified a need for more staff development time and further funding for equipment and applications. The importance placed on these two issues may also reflect the complexity of the equipment and applications and the relatively high cost of their purchase.

Schools also identified the following as being important to the effective use of interactive video; well designed software, good support material and reliable hardware.

Appendix 3 contains the complete data analysis from the questionnaire.

4.3 ANALYSIS OF INTERVIEWS

The semi-structured interviews were designed to encourage free expression and were used to gain more evidence to substantiate the data drawn from the case studies and the questionnaires.

The two educational consultants, RM and JD, have a considerable amount of experience of working with schools to support the introduction and implementation of interactive video. The experiences of the two consultants provide further evidence to support this study.

4.3.1 Background

JD was responsible for managing the Interactive Video in Education Project which was a national project funded by the Department of Trade and Industry in 1988. JD has worked as an educational consultant for Phillips Media and has also been responsible for managing educational projects for the Carnaud Metal Box company. The interview explored her most recent project with Carnaud Metal Box which focused on the implementation of interactive video

training programmes. The programmes were initially developed for business and industry to address skill areas such as making presentations, interviewing and negotiation. The project covered a three year period and involved twelve secondary schools which were located in strategic positions in close proximity to Metal Box factories.

RM is a development officer for the Education Authority in the region of Grampian in Scotland. She has been responsible for supporting the introduction, implementation and development of interactive video in the primary and secondary school sector over a period of eight years. Her advisory role includes working on national development programmes and has developed to incorporate work at an international level. Initially RM provided two particular schools with close support. She was interested *'to see what I could achieve'* by offering *'a lot of support'*.

More recent projects have focused on introducing interactive video material developed specifically for in-service training to all schools in the authority.

4.3.2 Analysis – Interview 1

The focus of this interview was a project funded by the Carnaud Metal Box company. The funding provided each school with a certain amount of time from an external consultant to manage the project (JD), two interactive video systems, interactive video programmes and supply cover to allow the teachers taking part in the project to be released from some of their classroom commitments. The funding had been planned by JD to take into account detail including trolleys and adapters for the workstations. The high level of funding lifted the financial burden from the school.

Two members of staff from each of the schools were provided with a full day of training and were allowed to select four interactive video programmes which they were responsible for introducing and implementing. The training programme took place in a hotel and drew staff together from the other schools involved in the project.

One of the main concerns JD had was that staff should have enough time on their timetable for familiarisation and staff development. Funding was allocated to each school to enable the schools to buy in extra teaching cover. JD's approach to staff development was to place the responsibility firmly with the schools, allowing the staff to assess and manage their own in-school training programmes.

It was clear that JD considered technical support to be very important. One of her responsibilities was to identify and train a member of staff who would be responsible for technical support and the 'pupil-logging' software. Each system was provided with a software package to record and log pupil progress.

When identifying staff who would play a key role in the project JD felt that a member of the senior management team and a member of staff responsible for curriculum development were usually the most effective. Occasionally a member of staff responsible for IT would be involved although JD thought that it was more important to understand curriculum issues than the technology.

The level of involvement and commitment from senior management was often related to the size of the school. It was difficult for senior managers to commit themselves to consistent involvement in a large school. JD felt that projects in the smaller schools had been more successful and that one of the variables that related to the success was the support from senior management.

JD felt that existing teaching styles affected the integration of interactive video. Teachers and schools that had not developed environments to support flexible learning were less likely to adopt interactive video.

Although many of the interactive video systems were located in libraries and resource centres JD found that teaching styles were often not flexible enough to accommodate pupils working in small groups in locations remote from the classroom and that the library environment had not adapted to support groupwork or whole class sessions. Librarians had accepted ownership and responsibility for the material if it was a teaching resource such as an information base. If the material was identified as a teaching package librarians were not as willing to become involved.

The interactive video programmes that the schools were using on this project were training packages. Each package was divided into self-contained modules. JD raised the following issues in relation to the material:

- preparing notes or guidelines to complement the material helped the teaching staff to maintain a feeling of control
- limited resources made it difficult to manage and maintain equal access for all pupils
- although the content of the interactive video package may have been appropriate, the length of time each group had to spend at the system to complete a topic was often too long
- the overall amount of time taken for the whole class to complete a topic on the workstation often exceeded the amount of time available the teacher had to spend on the topic
- teaching staff needed preparation time to develop a process to support the integration and management of the material.

JD acknowledged that the schools involved in the project were *'handed the top quality on a plate'*. Her reference to top quality related to external consultancy, hardware, programmes and other related costs.

In terms of support JD identified an important role for the technician. She felt that *'a technician is crucial to support and give people the confidence to start'*. The other crucial elements in the process were the support of senior management and the active support of a project leader with energy, time and commitment.

4.3.3 Analysis – Interview 2

One of RM's first projects was to work very closely with two particular schools, providing each school with *'a lot of support'* and *'spending a lot of time on site'*. Despite attempting to set her own agenda, she was constantly responding to the demands of the schools. Eventually, a model evolved based on the development of her working relationship with the school. Her role within the schools as a facilitator, working closely with the teachers and pupils, has now been taken over by a member of the school staff.

This particular model places a high demand on expertise and directs the high level of resourcing to a limited area. The success of this model depends on the expertise being transferred to the school and developed further. In this case the outcome at one of the schools proved to be successful. The outcome at the second school was less successful.

A second model that RM worked with involved drawing staff from a number of schools to take part in Local Education Authority-based training programmes. Having completed the training programme the member of staff was then responsible for further dissemination within their own school. This model allowed the external development officer to spread her expertise across a larger number of schools. Common issues associated with the two different approaches emerged during the interview.

Both models supported an in-service training programme, providing members of staff identified as key people responsible for the project within the school with training at an introductory and advanced level. The awareness-raising element of the training process was repeated with other members of the teaching staff as they were introduced to the material. Training was also provided in the area of technical support.

The first model placed the responsibility for all levels of training on the external expert. The second model transferred that responsibility to an identified member of the school staff at an early stage in the process. RM emphasised the importance of an active member of the school staff continuing with the training process and the commitment and support of a senior member of staff to ensure

further resourcing and development. RM felt that the commitment and understanding of the senior manager to the funding and resourcing implications was vital.

Within the first model where RM had worked very closely with the schools she had provided a wide range of support including:

- writing software files to adapt material for specific curriculum needs
- adapting old material for use on new hardware platforms
- advising on the transition of the technology onto new hardware platforms
- supporting extra curricular clubs for example, an interactive video club
- extra training sessions to introduce new developments and new skills.

In addition RM identified the following common issues which affected the success rate of both models:

- reliability of the technology
- costs in relation to hardware and material
- the continuous development of appropriate material
- support documentation
- access to the equipment
- a flexible approach to teaching and learning and to group work.

RM indicated that *'most of the technology ends up in the library'* and that most schools seemed to be comfortable with people moving around the school.

In the earlier projects RM felt that the flexibility of interactive video had been the key 'selling point'. On reflection she felt that the most important factor was how far the material related directly to the curriculum.

The project that RM is currently working on is funded by the Scottish Office. The material has been designed to meet a specific need (staff development), and the implementation programme, based on the second model, schools taking ownership at an early stage, will be carried out on a large scale across all schools in the Authority. The majority of the funding for this project is being channelled towards the development of the material and to support the training programme. An interesting change in the delivery of training is to introduce interactive video as an element within a much bigger training programme, in contrast to the way it

has been introduced in the past through a discrete 'one off' session.

RM emphasised that the outcome of the most carefully designed training programmes ultimately depends on the enthusiasm of the people who have been trained.

The large scale approach to training is reflected in the technician training programme which has been designed by the Authority and is now delivered to groups of technicians on specifically designed technician training days. The aim is to guarantee that each school in the Authority has a trained technician.

Despite the high degree of organised training RM felt it was important that the teaching staff and technical staff could contact the Authority for help at any time.

As well as the Authority training days each school is encouraged to use in-service days and personal development time for training and preparation. Within the school the staff development coordinator was identified as the key member of staff to implement in-service training.

RM's view is that interactive video is being used effectively in Grampian, and that schools value it as a resource.

4.3.4 Summary of analysis

Although RM and JD had the same aim, to introduce teachers to the potential of interactive video programmes and to support the integration of the material into the curriculum, it is clear from their interviews that quite different approaches were taken by the two external consultants.

In her role as a development officer RM adopted two different models. The first model, which can be described as the 'external expert' model, placed the responsibility for all levels of training on the external expert. The second model, which can be described as the 'mentoring model', transferred that responsibility to an identified member of the school staff at an early stage in the process. The second model also reflects the approach JD adopted.

Training, management and infrastructure

Both JD and RM thought that it was important to provide training at an introductory stage to the members of staff identified as key people responsible for the project in the school and that it was important to hold the training sessions in congenial surroundings outside the school environment.

The 'awareness-raising' process and follow up training sessions were repeated with other members of the teaching staff, on the school premises, as part of an

in-service programme. The in-service sessions could be led by the external expert or the trained member of the school staff. They also thought that it was very important to provide a training programme in the area of technical support. The initial difference between the approach of the two consultants was the follow up to the first senior management training session. When the staff returned to their schools RM's approach was to remain involved in the training process, working with both staff and pupils, while JD placed the responsibility for further training with the school. However, RM's current implementation programme involves all Authority-based schools and therefore raises serious questions about the amount of expert time available. The Authority has, therefore, adopted the model of intensive training with limited school contact. The Authority still provides the schools with support but the support is focused and used effectively.

RM and JD felt that a high level of commitment and support was required to adopt, exploit and develop interactive video. Although initially the support was provided to the schools as an additional resource, the schools were expected to take full ownership and responsibility for future developments and for resourcing implications. An important variable that affected the successful transition was the enthusiasm and commitment of the member of staff identified to take over the responsibility in the school.

Both JD and RM thought that although the training programme and the identification of a member of the school staff to take responsibility within the school is essential, other factors affected the implementation process.

The two issues RM and JD identified as crucial to the acceptance and adoption of interactive video were:

- appropriate material
- teaching and learning styles.

Appropriate material

RM made the following statement,

'the way we would go into the schools is not looking at the flexibility of IV – it's looking at how it would directly relate to something in the curriculum. I think that has to be the way forward'.

This is a significant statement as it reflects a change of emphasis from a technology led approach to a curriculum led approach and is based on a number of projects and of years of experience.

JD's concern was the amount of time each topic took to complete. In most cases the content of the material was appropriate. The problem in terms of implementation was that the material was divided into discrete topics. Each

topic was designed to be completed. JD's concern from the point of view of the teacher was,

'how do you get through all the topics in the time before you need to go on to your next topic?'

The two statements imply that 'appropriate material' relates to relevant content and time constraints. The content needs to be appropriate to the curriculum and the programming of the material needs to allow flexibility of usage in relation to time. Teachers are usually restricted by time limits built into the syllabus. Teachers usually have a limited amount of time to complete a syllabus. JD is suggesting that a resource which requires a fixed amount of time to complete may not fit into a teacher's time allocation.

Additional factors which affect the content and time constraints are:

- the interface; is it well designed and appropriate ?
- access to the material; are there enough systems available at open access points for pupils to use at different times of the day ?

JD and RM had not identified any difficulties with screen design but they both thought that the limited availability of the workstations had a direct effect on managing the use of the resource and particularly affected teaching and learning styles.

Teaching and learning styles

They both identified that interactive video is a resource best suited to a flexible learning or resource-based learning environment as opposed to a teacher-led whole class approach. They agreed that limited resourcing requires thoughtful management. Most of the schools involved in the projects had access to a limited number of interactive video systems, one or two at the most. It was important that the teaching style should accommodate the management of the resource in an effective way.

RM indicated that the teachers involved in her projects were familiar with flexible teaching styles and had found it relatively easy to incorporate interactive video into the learning environment :

'It would normally be used by a teacher with a small group'

'We encourage people to move around the school with the library as the base site'

'It's just acceptable, it's the way it is done here'.

However, JD found the learning environments in a number of her project schools did not support a flexible or resource based approach to learning.

'they will go with it if they are comfortable with group work and flexible learning styles; if they're not they won't.'

Summary

The analysis of the interviews identified and confirmed accordance on many of the variables which affect the introduction and implementation of interactive video. The important outcome of the analysis was the identification of what both JD and RM considered to be the key issues to address. These can be identified under the following three headings:

- management and training
- teaching and learning styles
- appropriate material.

Each of these headings supports a set of variables which reflect evidence drawn from the questionnaires and case studies. The relationship of the evidence drawn from the questionnaires, case studies and interviews is explored in section 4.4.

4.4 INTERVIEWS, CASE STUDIES AND QUESTIONNAIRES CONSIDERED

A careful consideration of the case studies, questionnaires and interviews has enabled me to draw the following conclusions. Three main areas of concern have emerged; management and training, teaching and learning styles and appropriate material. This concluding section will focus on the three areas of concern and consider the analysis of the interviews, case studies and questionnaires under the three headings.

4.4.1 Training, management and infrastructure

All three methods of enquiry identified the need for an effectively managed staff development programme which included training, and time for preparation and that an important part of the training process was the transfer of skills and responsibility.

However, it is often difficult to identify the skills and enthusiasm that individuals take forward from a training programme. If the software has been well designed and if the technology is stable and easy to use, the acquisition of skills should be relatively straight forward. The generation of enthusiasm and

commitment is not as easy. Both JD and RM admitted that the member of staff who takes over the role of the 'expert' often carries full responsibility for the development of the project.

Evidence drawn from the case studies and interviews suggests that introducing an educational innovation requires a manager who is enthusiastic and can convince other members of staff of the potential benefits of the project. They must also have the time, energy and vision to move things forward. Based on the evidence drawn from the case studies, questionnaires and interviews the successful implementation of an effective training programme ultimately depends upon a key member of the school staff. Evidence from all three methods of enquiry suggest that the key member of staff should have an understanding of, or responsibility for, curriculum development. Support from a member of the senior management team adds a level of credibility and significance to the project. It is also important that the project has support from senior management in terms of future resourcing; it should be incorporated into the school development planning process.

As well as addressing the initial implementation process, the training programme should address the following demands which will be made on structures required to support future developments:

- strategies for identifying future funding requirements
- mechanisms to provide sources of up to date information
- training programmes to develop new skills
- methods of dissemination
- national developments.

When an external consultant is involved, the schools should take full responsibility at the earliest opportunity. However there are other issues which need to be addressed before an effective structure to support interactive video can be guaranteed. The external expert plays an important role in ensuring that all key issues have been addressed or that the school is aware of the issues and the implications and has the resources and expertise to address them.

4.4.2 Teaching and learning styles

The three sets of data provide evidence to suggest that the learning environment, in its most practical sense, and teaching and learning styles affect and influence the effective application of interactive video.

It is clear that the constraints imposed by particular teaching and learning styles were made more difficult by the practical issues relating to the location and limited number of systems.

Teachers who had adopted flexible approaches to learning, and schools with a developed infrastructure to support the management of resources, were more likely to achieve the integration of interactive video. It was felt that the introduction of interactive video could be a catalyst for change. However, schools were less likely to use interactive video effectively if they had not moved towards the acceptance of flexible learning. An extensive, closely integrated staff development programme is more likely to be required by schools which had not adopted teaching styles to support flexible learning. There is a clear indication in the case studies, questionnaires and interviews that one of the key members of the school staff in this process is the teacher responsible for curriculum development. This reflects the importance of the relationship between the curriculum, teaching and learning styles and the resources available.

The primary issues associated with the resources are quantity and quality. Quality will be discussed under the heading of 'appropriate material'. Quantity directly affects teaching and learning styles. A limited number of workstations implies a high level of management and flexibility in terms of learning groups, location and resources. The impact of this scenario has a direct effect on classroom management and teaching and learning styles such as group activities, student centred learning and whole class teaching. It also relates to the approach the school is taking to the management of resources in libraries and resource centres.

Evidence drawn from the data suggests that there is a clear relationship between the use of interactive video and flexible learning or student centred learning.

4.4.3 Appropriate material

The three sources of data emphasise the importance of the material to the application. The case studies, questionnaires and interviews highlighted the difficulties encountered if the project was determined by the limited amount of material available rather than the needs of the curriculum.

During her interview RM reflected on the fact that when she had first started to work with interactive video she had felt that flexibility had been the key 'selling point.' She is now adamant that the most important factor is how far the material directly relates to the curriculum.

Teachers responded positively to material that matched the curriculum and were, on the whole, less enthusiastic if the material did not fit a direct need in the curriculum. Material designed for a particular subject area was more likely to be used if the following conditions were met:

- a clearly designed interface that was easy to use
- appropriate use of language which matched the level of user
- required a small amount of time for teacher familiarisation
- supported by useful documentation

- matched particular elements of the curriculum
- enhanced the curriculum and learning process.

The data suggests that interactive video is less likely to be adopted if the criteria outlined above are not met.

4.4.4 Summary

From the evidence collected it seems that the introduction and effective implementation of interactive video depends upon a number of associated factors. Each factor may have a different level in order of importance, but all of the identified factors are associated and therefore any one that is missing can cause the process to break down. The conclusions drawn from the data analysis will be considered in relation to the literature review in Chapter 5.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

The literature review relating to this study investigates a broad approach to the use of educational technology as well as focusing specifically on the use of interactive video. The case studies, questionnaire and interviews focus solely on issues directly related to the use of interactive video.

The issues identified from this study are grouped and categorised to provide a context for the discussion. In order to identify a set of practical recommendations that can form the basis of a decision making process the issues are classified against appropriate headings and identified with areas of responsibility. The classification is an attempt to provide a clearer understanding of the characteristics of each issue. The characteristics provide an indication of which members of a school's staff are most likely to be responsible for addressing the issues and what should be considered.

The study draws on the similarities between interactive video and digital multimedia to provide evidence that the issues associated with the introduction and effective implementation of digital multimedia and interactive video are highly similar.

5.1 THE COMPARATIVE CASE OF INTERACTIVE VIDEO AND DIGITAL MULTIMEDIA

A comparison of the findings drawn from the case studies, questionnaire and interviews, which specifically focus on interactive video, with general educational technology issues identified in the literature review reveals that many of the issues are similar. Hall, in a study for the National Council for Educational Technology and the Further Education Unit to identify ways in which learning with interactive video was organised and managed, emphasises the similarities between interactive video and other multimedia technologies:

It is clear that many of the issues which are looked at in this note are not peculiar to IV but are common to other learning technologies.

(Hall, 1993, p. 8)

Studies examining the use of media in teaching and learning also indicate that the implementation issues are similar in terms of using media in a learning environment.

Ely (1983) describes educational technology as the delivery system and

identifies media as being part of the delivery system; the delivery system playing a minor role in the learning process and the design of the software and the application of appropriate media being of greater significance. The application of media may be the use of video or audio tape, slides, still images, graphics, text or animation. The additional element is the introduction of the computer. Both interactive video and digital multimedia have the same potential in terms of combining computer programming with all media elements, the computer providing an element of control over the media. The potential of the combination is most commonly identified in terms of interactivity.

As part of a study of the IVIS programme Norris et al. (1987–89, p. 90) describe four different ways in which the user interacts with the material. In summary the four methods are:

- an index or category map that helps the user to select information or images
- a menu of structured choices
- authoring or presentation facilities
- a simulation environment.

The four listed methods of interaction, which allow the user to access the content in different ways, are significant to this study as they identify structures used in interactive video which can also be recognised in the latest multimedia applications.

In addition to acknowledging the similarities between interactive video and digital multimedia the focus of the issues identified in this study suggest that at the introductory stage less importance is attached to the use of media elements. The design of the material and appropriate content was identified by teachers as being very important. Teachers responded positively to material that matched the curriculum and were, on the whole, less enthusiastic if the material did not fit a direct need in the curriculum. Drawing on the literature review and the findings drawn from the data collection the similarities between interactive video applications and digital multimedia applications are presented in this chapter. Assuming an appropriate technical infrastructure is in place, applications incorporating media elements do not seem to have a significant effect at the introductory stage. However, the effective use of media and the effect computer-controlled media has on learning is significant and is an area offering potential for further research.

5.2 CLARIFICATION OF THE ISSUES

This study has identified a complex and wide ranging set of issues which are associated with the introduction and implementation of educational multimedia. Identifying the source of the issues begins to clarify the complex relationships between them. For example, funding is an issue often associated with the

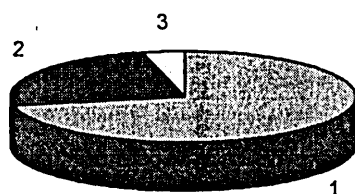
introduction of technology-based resources. In order to make decisions about funding, costings are required. This is the case with the purchase of any resource. The source of the issue is with the management or the budget holders who have the responsibility to decide what to spend the budget on and how much of the budget to spend. It is, therefore, an issue related to institutional strategy and management and not purely to technology. For the benefit of the discussion the issues have been categorised under the following three headings in terms of the source of the issue:

- a educational issues which are not exclusive to the use of technology
- b general issues which relate to educational technology
- c issues which relate specifically to multimedia programmes.

The following list draws together issues which have been identified in this study:

- a managing the use of limited resources
- a acknowledging and managing time requirements
- a allocating funding
- a active involvement of teachers
- a acknowledging the social context
- a managing change
- a staff development
- a institutional commitment
- a attitude of staff
- a teacher confidence
- a competence of the teacher
- a competence of the manager
- a resourcing the environment
- a managing the learning environment
- a understanding the learning process
- a defining a teaching strategy
- a identifying the level of implementation
- a providing support in terms of implementation
- b providing an adequate technical infrastructure with support
- b developing the required skills
- b understanding how to integrate the technology
- b appropriate content
- b the nature of interaction with the material
- b educational design of the material
- c effective use of media variables.

Chart 5.2.1 Source of issues relating to the introduction and implementation of educational multimedia



Key to Chart 5.2.1

1. Educational issues which are not exclusive to the use of technology
2. General issues which relate to educational technology
3. Issues which relate specifically to multimedia programmes

The categorisation indicates that the majority of the issues are educational issues which are not exclusive to the use of technology. Approximately 25% of the issues are related to the general use of technology with only one of the issues relating specifically to the use of multimedia.

5.3 KEY ISSUES WITH RECOMMENDATIONS

In an attempt to categorise the issues even further they have been placed in a structure relating them to the four areas of concern which were identified in the data analysis. The four key areas that emerged from the data analysis were: management issues, staff development and training, teaching and learning styles and appropriate material.

5.3.1 Management issues

- a managing change
- a institutional commitment
- a identifying the level of implementation
- a allocating funding
- a resourcing the environment
- a managing the use of limited resources
- a acknowledging and managing time requirements
- a providing support in terms of implementation
- b providing an adequate technical infrastructure with support
- a acknowledging the social context
- a active involvement of teachers
- a changing the attitude of staff
- a teacher confidence
- a competence of the teacher
- a competence of the manager.

Managing change

Although the responsibility for managing change permeates institutional structures, effective institutional implementation should start with the senior management and be transferred through appropriate structures to managers with identified areas of responsibility. The findings of the case studies, as discussed in Chapter 4.1.3, suggest that a critical success factor is the commitment and influence of the senior members of staff responsible for managing the implementation process. The conclusion drawn from the case studies and the literature review suggest that an implementation programme should be led with clear direction. Different management styles may be adopted. For example, some managers may lead implementation through a structured process. Others may take a more collaborative developmental approach. Whichever approach is adopted management should still, essentially, be pro-active.

Institutional commitment

In order to assess the level of institutional commitment senior managers should be fully aware of the implications of an implementation programme. The main areas of concern for senior managers are related to funding issues and cultural change. Adequate funding and institutional support is crucial to the success of a technology-based educational innovation. Managers should therefore be confident of the benefit of allocating funding and be aware of the impact that the programme will have on teaching and learning.

Managing the use of limited resources

Introducing and implementing technology-based resources at an institutional level requires a high level of funding. The experience of most institutions that have been involved in government funded initiatives is that the staff are expected to manage an implementation programme with limited resources. The management of limited resources requires careful consideration, a clearly defined process and continual monitoring. To gain optimum impact resources should be widely accessible. Limiting the use of resources to small groups may promote development in specific areas but on the whole inhibits wider institutional involvement. Resources should be managed to ensure optimum use and immediate access and be as widely available as possible.

Acknowledging and managing time requirements

Introducing new resources that affect the learning environment and the learning process requires careful consideration. In a report by NCET (1994) issues identified for consideration were time for careful planning, time for familiarisation, the preparation of customised worksheets and the need for appropriate supervision. Evidence drawn from the case studies, referred to in Chapter 4.1.2, indicates that a major concern of the staff involved in the implementation process was the increased demand on time. The results of the

questionnaire, in Chapter 4.2.6, reinforced the concern when 82% of the schools indicated that a lack of development and training time would restrict future development.

The amount of time a teacher needs in order to introduce a new resource is influenced by a number of variables which are often related to the complexity of the resource. Introducing and implementing multimedia resources may require the teacher to create time to become familiar with the technology and the content of the material, to develop new skills, to change the teaching process, to manage the learning environment in a different way and to produce extra support material. These demands place pressures on the teacher in excess of what may already be a full workload. Teachers require time and support to address these issues. In order to encourage and motivate staff, managers should identify ways of creating the time and support that is necessary.

Providing support in terms of implementation

If managing implementation is pro-active, the creation of essential support structures is more likely to be a re-active measure. A support structure is necessary to ensure that the implementation and future development and delivery is successful on a day to day basis and is able to respond to a range of issues from a crisis to a concern. Support should be easily accessible to staff and students, provide a stable environment and increase confidence.

Providing an adequate technical infrastructure with support

If technology is involved it is crucial that the technical infrastructure is stable, that there is immediate support to address problems and that this is adequate for the level of the resourcing and the amount of use.

Acknowledging the social context

If the introduction of a particular innovation requires change, senior managers should take into account the culture of the institution and the social context that has been established. It is important to recognise that although an institution may have adopted a particular educational style, individual departments within it may have established different work related frameworks. The approach adopted to managing a programme of implementation should assess the implications of cultural and social change, acknowledge that change takes place over a period of time and that managers may need to adopt different approaches for different departments.

Fullan relates the disappointing outcomes of many large scale educational initiatives to the innovation having been led by 'decision makers', seen to be on the outside, and not the educators working from the inside. He suggests that apparently 'rational' solutions have backfired when they have ignored the culture of the institution.

As we have seen, decision-makers can make organisational and curriculum change, but still not make any progress.

(1991, p. 353)

Active involvement of teachers

The process of implementation is most successful if teachers are actively involved in the changes that are taking place and in the decision-making process. The imposition of educational change is more likely to meet with resistance. Resistance may be created through a lack of understanding or a lack of confidence that may have developed. Teachers need to be given time to recognise the potential benefits of the resource, allowed to voice opinions, make decisions in relation to their individual needs and be acknowledged for their contribution.

Changing the attitude of staff

Teachers need to be convinced that students will benefit from the implementation of a new resource, that it will advance the learning process, bring added value to the curriculum and contribute in a positive way to their role as a teacher. Fullan's (1991) approach to effective planning is to emphasise the need to understand the process of change. It is, therefore, important to actively involve teachers in developments and the decision-making process and to introduce material that is relevant, demonstrates added value, is easy to use and reflects accepted models of learning. Bolam (1989) suggests that the implementation of an innovation is more likely to succeed if teaching staff see the innovation as centrally relevant, are aware of the benefits and can quickly understand what is expected.

5.3.2 Staff development and training

- a staff development
- b developing the required skills

Staff development is crucial to achieve change. Introducing a technology-based resource is likely to affect teaching and learning styles and classroom management. Members of staff may need an appropriate level of training and skill development in order to gain an adequate level of confidence. Training should be designed to enable staff to gain enough confidence to use the new resource and to change their style of teaching if it is necessary. The most effective staff development often takes place during the implementation process when the teacher is fully engaged with the students. Fullan (1991, p. 85) suggests that support during the implementation process is more important than prior training. He firmly supports the view that the most effective implementation has staff development embedded in the process and the most effective staff development is embedded within an implementation programme.

McLaughlin and March (1978) stress that:

skill specific training by itself has only a transient effect because the use of new materials and methods is often mechanical without the underlying ideas becoming assimilated.

(McLaughlin and March, 1978)

Both the initial stage of skill development and increasing confidence and the secondary stage of development through active implementation require management and support.

The data drawn from the questionnaires, as found in Chapter 4.2.3, supports the view that introducing interactive video through a staff development or a curriculum development programme is more likely to achieve effective implementation across subject areas.

If staff leading the implementation programme do not have the necessary level of skill or experience it may be appropriate to use an external consultant. In Chapter 4.3.4, both external consultants emphasise the importance of training at the introductory stage for the members of staff identified as key people responsible for leading the implementation process. In order to ensure the most effective use of 'expert' time and to support future development it is important that the skills and experience of the external consultant are transferred to the staff responsible for managing the implementation programme.

5.3.3 Teaching and learning styles

- a managing the learning environment
- a understanding the learning process
- b understanding how to integrate the technology
- a defining a teaching strategy

Managing the learning environment

The main factors to influence effective learning are teaching styles, individual learning styles, the learning environment and learning resources. In Chapter 4.3.4 of this study, the analysis of the interviews with the external consultants highlights the importance of resource management and the adoption of appropriate teaching styles. It is the role of the teachers to develop appropriate teaching styles and to manage resources and the learning environment. It is the responsibility of the institution to provide the necessary support and infrastructure to allow teachers to work effectively.

Understanding the learning process

An understanding of the learning process should underpin the development of an approach to teaching and learning that will support the introduction of new resources. At an institutional level, providing support for pedagogical

development is likely to be as necessary as providing support of a practical nature.

Understanding how to integrate the technology

In addition to pedagogical issues, the introduction of technology-based resources presents practical implications often with associated high costs. It is the role of the teacher to integrate the technology-based resources into the curriculum and to manage the resources within the learning environment. The integration is likely to be effective if the technology is reliable, an adequate number of systems are provided, the material is suitable and easy to use and the environment allows the teacher to manage the use of the technology in an appropriate way.

It is crucially important that tutors learn to integrate current interactive media into their programmes...

(Jones, 1993, p. 188)

It is difficult for institutions and teachers to find extra time for new developments. It is, therefore, important that the content and application is clearly defined and that the educational value of a new resource can easily be assessed. Software should be designed to support different learning styles and provide the teacher with an easy approach to familiarisation.

Identifying the contribution of technology and the importance of the material to the curriculum are key to informing decisions related to integration. The value of the content and the application should be assessed with the other elements that form the teaching process. Time variables, access to equipment, the role of the teacher, group collaboration and individual learning time also need to be taken into consideration.

Defining a teaching strategy

The findings of this study suggest that, in order to develop a strategy to support the introduction of multimedia, consideration of all of the issues raised by this study is required. A well informed member of staff with a comprehensive understanding of all of the issues is more likely to be able to plan ahead and define clear aims and objectives. It is the responsibility of management to make sure that staff are fully aware of the potential of the resource, understand the reasons for change, are provided with adequate support and are involved in developments.

...new teaching methods, such as educational media, depend for their success upon being properly embedded into the existing learning context. Innovation will necessarily require changes in what exists already, and if this is not acknowledged and accommodated, then the innovation will not succeed.

(Laurillard, 1993, p. 221)

5.3.4 Appropriate material

- b appropriate content
- b nature of interaction with the material
- b educational design of the material
- c effective use of media variables

Appropriate content

The selection of appropriate material should take into consideration a number of factors. Often the choice of material relates not only to the subject area in terms of content but also to the manner in which the content is applied. The introduction of a technology based resource can therefore enrich the subject area and it can also affect teaching and learning styles. Data drawn from the questionnaire, represented in Chapter 4.2.5, suggests that the use of appropriate applications encouraged and supported resource-based learning, student motivation and increased the use of IT in general.

Within the context of adding value to the curriculum it is important that material is relevant to the curriculum and that the content of the material matches the syllabus and is presented in an appropriate style.

Material could be considered to be appropriate if it can be easily integrated into the curriculum or added to a range of existing resources to broaden the resource base. It may also be identified as being appropriate if it is used as a catalyst for change. The use of technology has often been identified as a vehicle to change teaching and learning. In particular it has been used to encourage a more flexible approach to teaching and learning, concentrating particularly on environments where students take a greater responsibility for their own learning and where limited tutor resources can be targeted more effectively.

This medium accords well with present theories of learning. The technology itself encourages active, participative learning; it can also encourage several other forms of interactivity. It is part of a greater 'openness' of learning, and the exploration of supported self study.
(TVEI 1989 p. 24)

A highly structured implementation process is required and careful consideration of material is essential if the introduction of technology is to change the learning environment.

Nature of interaction with the material

The nature of the interaction may relate to the role of the teachers and how they interact with the students, how the students interact as a group or how the individual interacts with the software. All levels of interaction affect the learning process and the learning environment. The nature of interactivity can be

generated by a computer programme or by the teacher. Thought should be given to adapting teaching styles and incorporating different levels of interactivity into the environment.

Educational design of the material

The design of multimedia materials should take into account the learner as an individual and the learner as part of a group, different learning styles, the effective use of interaction, the effective use of media, content in terms of subject, ease of use from the point of view of the teacher and the student and cost.

Effective use of media variables

The use of individual media elements in teaching and learning is an established practice. Interactive multimedia programmes can incorporate the most effective media elements with the most effective levels of interaction. Technological infrastructures can provide access to the most sophisticated material. Designers need to apply established educational media techniques and new levels of interactivity to address the learning and teaching.

Provided that the technical infrastructure is adequate this study suggests that the additional use of media elements in a technology based application does not affect the introduction and implementation of multimedia.

5.4 AREAS OF RESPONSIBILITY WITH RECOMMENDATIONS

In order to provide a framework to support implementation it is important to be able to identify and allocate responsibility. The findings of this study suggest that a successful implementation programme requires careful management. Identifying the issues and understanding the implications is not enough. It is also important to have a clear vision of who the key people are in the process. In an attempt to clarify the different roles associated with implementation I have related each issue to the following areas of responsibility:

- management of the introduction and implementation process (mn)
- the management, in forming an institutional strategy (inst.)
- the role of the teacher (t)
- joint responsibility of educationalists and designers (e/d)

Management and training

- | | | |
|---|---|--------------------------------|
| a | managing change | (mn) organisational |
| a | institutional commitment | (inst.) institutional strategy |
| a | identifying the level of implementation | (inst.) institutional strategy |
| a | allocating funding | (inst.) institutional/funding |

a	resourcing the environment	(inst.) institutional/funding
a	managing the use of limited resources	(mn) organisational
a	acknowledging and managing time requirements	(mn) organisational
a	providing support in terms of implementation	(mn) organisational
b	providing an adequate technical infrastructure with support	(mn) organisational
a	acknowledging the social context	(mn) teacher/management
a	active involvement of teachers	(mn) teacher/management
a	changing the attitude of staff	(mn) teacher/management
a	teacher confidence	(mn) teacher/management
a	competence of the teacher	(mn) staff development
a	competence of the manager	(mn) staff development

Staff development and training

a	staff development	(mn) staff development
b	developing the required skills	(mn) staff development

Teaching and learning styles

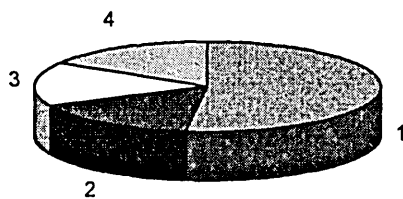
a	managing the learning environment	(t) role of the teacher
a	understanding the learning process	(t) role of the teacher
b	understanding how to integrate the technology	(t) role of the teacher
a	defining a teaching strategy	(t) role of the teacher

Appropriate material

b	appropriate content	(e/d) educationalist/designer
b	nature of interaction with the material	(e/d) educationalist/designer
b	educational design of the material	(e/d) educationalist/designer
c	effective use of media variables	(e/d) educationalist/designer

Chart 5.4.1

Categories of responsibility



Key to Chart 5.4.1

1. Management of the introduction and implementation process
2. The management, in forming an institutional strategy
3. The role of the teacher
4. Joint responsibility of educationalists and designers

This categorisation of areas of responsibility indicates that the main area of responsibility is associated with managing the implementation process and creating the conditions necessary to support educational innovation. The importance associated with this area is supported in Chapter 2.2.3 of this study by NCET (1992–94), the Training Agency (1989) and Bolam (1989).

Evidence drawn from the case studies and interviews as indicated in Chapter 4.4.1 of this study, suggests that staff responsible for the introduction of an educational innovation should be enthusiastic and have the ability to convince colleagues of the potential benefits of the development. The findings also suggest that the key members of staff should have an understanding of, or responsibility for, teaching and learning and curriculum development.

The other three areas of responsibility are almost equally shared between the senior management of an institution at a strategic level, the teacher's role to understand and develop an appropriate learning environment and the software designers working with educationalists to produce appropriate material.

One could debate the level of importance each area of responsibility has within the implementation process. It could be suggested that strategy and funding should be in place before any progress can be made. However strategy and funding is ineffective if suitable material is not available. The findings of this study suggest that strategy will not be realised and funding and material will be wasted if the implemented process is not managed effectively and if teachers are not engaged fully in the process.

The introduction and implementation of multimedia at an institutional level should be established through a clearly defined management process that addresses and supports institutional strategy and the requirements of teachers and their students. Although the findings of this study suggests that the management of the process is the most significant area of responsibility, successful implementation is not the sole responsibility of the staff managing the process. It is essential that the following areas of responsibility are also addressed:

- that senior managers responsible for making decisions at an institutional level are fully aware of the implications to the institution in terms of funding, resourcing and cultural change
- that teachers are fully supportive and accept the implications in terms of changes to teaching and learning, and the additional time required for their own development and training
- that multimedia publishers understand and address issues associated with the learning process.

5.5 SUMMARY

Many of the issues identified in this study are generic. They can be considered in relation to the introduction of educational technology and can also be considered in relation to the introduction of other educational resources, managing changes in teaching and learning and managing educational innovation. Some of the issues of managing change are predictable.

Fullan's approach to effective planning is to emphasise the need to understand the process of change. He suggests that:

change is not a fully predictable process

knowledge, once obtained, is far more powerful as a resource than a memorised list of specific steps that we should follow.

(1991, p. 107)

I propose that the use of resources within an educationally innovative process implies a set of variables which will directly affect implementation and which, to some extent are predictable. I therefore suggest that if a predictable set of variables affect a process *specific steps* can be followed in order to manage change.

Levels of implementation may vary. The findings of this study suggest that if a technology-based implementation programme is applied at an institutional level, it is important that staff managing the programme should have a clear view of current and future implications. The programme should be introduced sensitively with effective leadership and management. The staff responsible for managing the process should have clearly defined aims and lead developments decisively. If the management process is not effective it is likely that the initiative will lose credibility, staff will resist the change, money and time will be wasted and the end result will be a negative experience for teachers and students.

5.6 IMPLICATIONS FOR FUTURE RESEARCH

This study has focused on identifying practical issues which relate to the introduction and implementation of multimedia at an institutional level. A number of areas which relate more specifically to the impact of multimedia would benefit from further research, for example, the effect of multimedia as a catalyst to support and encourage educational change and the use of technology and the effective use of computer-controlled multimedia in learning.

The role of the internal or external 'expert' has been identified in this study and associated with the introduction of educational innovation, in particular with

reference to the use of technology and multimedia. For example, as discussed in Chapter 4.4.1, both external consultants, when interviewed for this study, noted that the member of staff who takes over the role of the 'expert' often carries full responsibility for the development of the project. Research investigating the most effective role of the 'expert' and the relationship of the 'expert' in different educational sectors would be of benefit to the implementation process.

At an institutional level this study has identified that the management of the implementation process is the most significant area for consideration. It covers a broad range of issues. Staff managing the implementation process are often responsible for fulfilling the institutional strategy, supporting educational innovation, advancing cultural change and increasing the confidence and competence of staff and students. The report *Teaching and Learning with Interactive Media* (NCET 1992–94) suggests that the politics of innovation are not an established competence among school managers.

Taking into account the significance of this area and the broad range of issues that it covers, the potential for research is extensive. For example the research could focus on identifying the most effective methods to manage the implementation process, identifying the implications for managing implementation on different scales and in different contexts, investigating different approaches that can be taken in the development of confidence and competence and identifying techniques that can influence and effect cultural change.

Based on the findings of this study I suggest that in terms of implementation the management of educational innovation is a key area for further research.

5.7 SPECIAL CONDITIONS RELATING TO THE IMPLEMENTATION OF MULTIMEDIA

At a practical and operational level, computer-controlled multimedia presents issues in terms of delivery. Decisions need to be made in relation to the quality of the media image and the capacity of the technical infrastructure. These decisions affect immediate and long term resourcing and should be addressed at a strategic level. The implications for the continued resourcing and future development of the technical infrastructure should be also be considered.

In terms of the application of multimedia to teaching and learning, careful consideration should be given to the most effective use of computer-controlled media and its effect on the learning process and social change within an educational institution.

APPENDIX 1

IMPLEMENTING INTERACTIVE VIDEO IN THE CLASSROOM

CASE STUDIES

IMPLEMENTING INTERACTIVE

VIDEO AND COMPACT DISC

INTERACTIVE

Case Studies and Guidelines

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PROJECT BACKGROUND

The Interactive Video (IV) and Compact Disc Interactive (CDI) Art projects were funded by the Learning Methods Branch of the Employment Department to support the TVEI Managing Flexible Learning Programme.

The projects focused on practical issues relating to the use of interactive video and compact disc interactive in a flexible learning environment and this report covers the experiences of the schools over a six month period. The aim of the report is to provide guidance for other schools that may be considering introducing these learning technologies into the classroom.

The experiences of the participating schools cover a range of issues, including:

- management decisions
- allocation of time for training
- production of material
- location of and access to systems
- teacher and student support structures
- dissemination
- computer platforms and relevant software.

The project incorporated an initial analysis of the needs of each school. This determined the level of experience and interest among teaching and technical support staff, the type of equipment, software and discs that the schools already had available and the particular hardware platform that the schools were using.

Recommendations regarding the purchase of equipment and discs took into account the following factors:

- Needs of teachers and students.
- Equipment already available.
- Cost.
- Curriculum initiatives.

In an extension to the first project, a new range of video discs from France focusing on Art plus a number of CDI applications from the Great Art Series was also used. Two of the schools involved in the IV project were able to investigate and compare the potential use of the Art video discs with a selection of CDI Art titles.

This second phase of the project was designed as a comparative exercise and to offer early feedback on a number of CDI applications specific to a subject area. It incorporated the use of the discs within the curriculum to investigate the following:

- Flexibility of CDI and laser resource discs (i.e. ease of access, manipulation and presentation).
- Relevance to the curriculum.
- Quality of image.
- Cost implications.

The second phase of the project also focused on and compared the interactivity offered to the learner by IV with that of CDI.

The IV and CDI project raised a number of issues relating to the introduction and implementation of modern technology as a resource to support Flexible Learning. It highlights several common factors which need to be considered in order for such an initiative to be successful.

Although the reasons for introducing CDI and IV into the curriculum were similar in each school, the familiarity and experience among the teaching and technical support staff varied considerably. Each school was committed to a programme of Flexible Learning development across the curriculum. Although the focus for the developments were different, each school had identified the important and growing contribution that technology can make to learning and were interested in exploring the potential of a new resource.

An analysis relating to existing skills and expertise, equipment already available, the school's IT policy, Flexible Learning strategies, curriculum developments and staff development programmes was an essential prerequisite to planning an effective development project.

INTERACTIVE VIDEO AND COMPACT DISC INTERACTIVE

Both IV and CDI are exciting multi-media delivery systems offering the user access to electronic resources through a range of interfaces. The systems offer a range of routes to different multimedia elements. Their application to teaching and learning will be determined by disc content, software interface and the needs and ability of the user group.

The video disc offers instant random access facilities, quality full-screen moving video and clear cataloguing of frame numbers. Although CDI has a number of limitations (some of which are related to routes of access through software design), applications using CD Audio and CD Photo are useful resources which will enhance a learning environment. The Art applications available at the present time lack flexibility, but indicate that the system has potential.

Hardware costs reflect the potential of the systems in relation to flexibility and further development. A CDI system is currently retailing at approximately a fifth of the price of an interactive video workstation. This proportion will vary in relation to the sophistication of the interactive video system (i.e. factors such as the power of the computer, hard disc memory etc.) Some interactive video workstations may also have a built in CD Read Only Memory (ROM) drive. However, video disc players linked directly to a TV monitor, totally independent of a computer, are only fractionally more expensive than a CDI player.

The cost of CDI and video discs varies enormously with the price range of video discs starting at as little as £20 (without software control), rising substantially up to hundreds or even thousands of pounds for sophisticated training programmes. Commercial CDI discs available for the home market cost around £15 to £50, with training discs again priced at a much higher level.

To realistically investigate the effectiveness of the two systems it is important to have a basic understanding of the hardware components and an awareness of the potential which the systems offer beyond the applications related to this project.

Feedback from the schools indicated an interest in using video discs with authoring software. Authoring software allows the images and video on the video disc to be edited, controlled and enhanced with text and computer graphics, enabling teachers and students to create classroom applications or multi-media presentations.

Applying authoring software to the production of teaching and learning materials presupposes an understanding of the basic elements of interactive video production. Advice and expertise relating to implementation and training can be crucial in ensuring that new technology continues to be used and explored after it has first been installed.

In the course of the project, staff and pupils at participating schools were introduced to a wide range of learning situations which could be enhanced and supported by interactive video. Each school was allocated four days of external support. Within each school the project covered the following:

- awareness raising throughout the school
- identification of key curriculum areas for implementation
- a needs analysis in relation to equipment and training
- acquisition of necessary equipment and discs
- access to equipment
- consistent staff/student support
- a structured development programme, focusing on classroom projects and specifically tailored to curriculum needs
- staff training, addressed as an on-going part of the curriculum projects
- dissemination of information and skills across the school
- identification of future developments.

Presentations aimed at raising awareness in each school covered the following:

- complete integrated video disc and software programs designed to be used in an Open Learning environment, as a group resource or as part of a structured teaching session
- video discs with authoring software
- video discs with bar code control
- video discs accessed through a simple hand-held remote control device.

A major aim of the project was to develop a sound foundation of expertise, support and management allowing scope for future developments.

The experiences of each school were affected by issues such as Flexible Learning strategies, management structure, non-teaching support and teaching and learning styles.

The experience of each school reflects a range of strategies applied to the following key areas:

- Project co-ordination within each school.
- Computer platform adopted.
- Curriculum areas involved.

- Staff and student involvement in curriculum project.
- Time allocation for training.
- Access to the equipment.
- Funding.

The approach to meeting the objectives within each school remained flexible throughout the project, allowing teachers to develop strategies which suited their teaching environment.

CHAPTER 1: WEST DENTON HIGH SCHOOL

BACKGROUND

West Denton High School is a 13-18 City High School on the western limits of Newcastle-upon-Tyne. Its students are drawn principally from three middle schools in relatively close proximity to the High School. One middle school serves a large council estate, another principally serves a council estate but includes some private housing, and the third serves a large private housing estate.

The main aim of the Flexible Learning project was to introduce flexible strategies and develop materials on a rolling programme throughout the school.

ANALYSIS OF LEARNING NEEDS

West Denton School had taken part in the Interactive Video in Schools Project (IVIS, 1987/89). This was a two year research project funded by the DTI to pilot eight subject-based interactive video discs in a number of secondary schools throughout the country. Teachers in the Modern Languages department had found *Siville*, the French language disc which created a realistic shopping scenario in a French town, particularly effective. The members of staff who had been involved in the IVIS project had experienced a number of problems with the software and the equipment. Although the school had two systems based on the BBC Master and had been provided with eight discs through the IVIS project, only one system and possibly two of the discs had been used effectively. Teachers in the Modern Languages department were continuing to use a system to run *Siville*, although other departments were not.

Frustration with interactive video was a common legacy left in many schools involved with the IVIS project. This was created by the introduction of an exciting resource that offered an opportunity to support new ways of teaching and learning but which could not fulfil its potential because of a lack of continued support. Although IVIS paved the way for many of the video disc developments that have been innovative in education over recent years, it also left a trail of scepticism among teachers who had encountered technical problems.

Despite these technical problems, teaching staff in the Modern Languages department had successfully integrated interactive video into their courses and were keen to develop their experience further.

The Modern Languages co-ordinator in the school had been using interactive video successfully to enhance the French curriculum since the IVIS project and had identified the potential of extending the material and editing discs.

Following a preliminary meeting and demonstration, a number of teachers formed a development group to investigate the potential of interactive video. The group met throughout the project to produce, with external support, classroom material specific to the needs of their particular subject area. The school had a number of resource discs but very few discs that would run as a tailored package with software programming.

After reviewing the hardware and software situation and the experience of the teaching staff wishing to be involved in the project, a presentation was arranged to demonstrate the potential of authoring video discs. As a follow-up to the presentation a meeting was arranged to plan the way forward.

CURRICULUM PLANNING

To develop a consistent approach in line with the school's IT policy the video disc players were linked up to Apple Macintosh LCs. The video disc players and monitors were taken from the systems which had been linked to BBC Masters and connected to Mac LCs by using a low-cost cable, which was the only necessary expense. This low-cost solution meant that each delivery system had two monitors, one showing the images and audio from the video disc, the second displaying the graphics and text produced through the computer.

Videostack, a software package that can control video disc, was available in the school and some members of the teaching staff were already familiar with certain elements of the package. To avoid unnecessary expense and to build on existing experience it was agreed that a sensible starting point for the project would be to investigate the potential of using Videostack with existing video discs. However, more than one authoring package for the Mac was investigated and Voyager was also purchased.

IT resources were available on open access in the school library and were supported by the school librarian. The systems were based in a small resource room that was attached to the library. Four video disc players were available. It was agreed that up to three of the systems could be placed in classrooms if appropriate.

A key decision was to include the librarian in the development group. The librarian acted as the main support for the development group. Her experience with technology resources in the library was extended to include the video disc players and the use of

utility software. She was fully involved in the production of the interactive video material and as a result of this experience proved to be invaluable in providing continued support and advice to members of staff after the project had finished.

Another important strategy was to ensure that the development group was given time to meet and work together as a team. Finding time to investigate a new technology-based teaching resource in isolation and without departmental support is difficult.

The strategy proved to be effective. Individual teachers, although pursuing their own subject area, collaborated with the other members of the group, sharing their ideas and planning strategies. Enthusiasm and motivation was high, enabling the external trainer to take on the role of the facilitator.

DEVELOPING CLASSROOM MATERIALS

Although the staff involved in the development group were from different departments and had specific needs, it was felt that a consistent approach would provide a foundation for dissemination to other departments. The idea of producing guidelines and a generic software shell that would allow teachers and pupils a quick and easy way of producing teaching material or presentations was discussed.

Four days of advice and support were available to the school in the course of the project. It was felt that although some development would take place before Easter the main part of the project would be easier to accommodate in the summer term when the group would be more able to meet as a team. Authoring with software requires a considerable amount of time. The authoring packages used in this project required up to three hours of training. The time required to produce teaching material is related to the content of the programme being produced. Editing images together can be achieved relatively quickly but additional text and interactivity requires more detailed planning and production time.

In an effort to make significant progress, funding from the school's Managing Flexible Learning budget was provided to release members of the development group for full- or half-day sessions. This proved to be very successful, allowing a group of enthusiastic, committed teachers not only time to produce material but time also to discuss their ideas and future plans.

Throughout the summer term, while material was being produced by the development group, progress was also being made with other members of the teaching staff. By using

external support time for demonstrations, a growing awareness and interest was beginning to spread to other departments which had not been directly involved in the project.

At this point in the project, a number of preliminary objectives had been met:

- The hardware had been suitably sited.
- Technical support was available within the school.
- The authoring software and video discs had been identified.
- A group of enthusiastic teachers representing a number of different departments had identified areas in the curriculum that could be supported by tailored material.
- Arrangements had been made to secure time for staff development.

The departments involved in the project were Science, Health Education, Social Sciences, Drama, Media Studies and Modern Languages.

CURRICULUM IMPLEMENTATION

Videostack proved to be a good starting point and some Science material was developed using the Geography disc. Videostack was easy to use and quite soon year 9 pupils were using the software to create their own stacks of weather images.

The material that was produced to support the Science curriculum was selected specifically to suit the year 9 course and parts of the modular science syllabus. Using the Geography, and Life and Energy video discs from the IVIS project and Volcanoes with the Voyager software, Hypercard stacks were produced on weather, food chains and webs.

The teachers from Health Education, Social Sciences, English and Drama produced a flexible package dealing with Conflict and Authority. The IVIS video disc Challenges was used with the Voyager software to present material designed to enhance the coursework of year 10 pupils.

The material was used as module for groups of students to complete as part of an integrated, structured programme of work.

FEEDBACK

The teachers who authored the material thought that “interactive video and the three discs used so far were very useful.” They also thought that using Hypercard as an authoring tool allowed them to provide different approaches to subject areas, creating more interest. They also found the resource to be flexible, encouraging pupils to access information from a wider range of resources.

Some comments from pupils who had used the material in the classroom were:

- “It supported the work I was doing and helped me to understand the weather.”
- “It was easy to understand and gave us the information we needed.”
- “It was easy to use and has helped us with a lot of our work.”

Closing snapshot of West Denton

IV Systems	Mac LCs running up to four video disc players
Location	Classrooms and library resource area
Project Areas	<i>Science and Physics</i> Staff, student production IVIS Geography disc, Videostack and Voyager control <i>English and Media Studies</i> Eastenders discs <i>Modern Languages</i> IVIS Siville disc
School Support	Development Team: Five members of staff including: FL co-ordinator Assistant librarian
Future Developments	Videostacks to be produced using: Volcanoes and Life and Energy discs For year 9 pupils in Science Health Education and PE to develop material User guides to be produced with examples of software for dissemination to other departments of the school.


SAMPLE SCREEN OUTPUTS

VIDEOSTACK AND CHALLENGES

USED AS WEST DENTON HIGH SCHOOL

The Weather


Before you can use this stack you must first tell the computer what kind of video disc player is linked to the computer by clicking on the set player button.



Set Player

The video disc player is a Philips VP410.

When you have set the player click on this hand for more information...




The Weather

Changes in the weather are caused by the sun warming the atmosphere and creating convection currents.


convection (30 secs)

Sometimes these currents directly cause weather changes such as:

convectRain (19 secs)



Stop



The Weather


When air cools, the moisture in it condenses to form... ..or sometimes...

rain (15 secs)


rain & snow (40 secs)

Occasionally the weather produced is more violent

storms (1 min 21 secs)



Stop



The Weather

The following stack contains information about weather systems. First of all read the text and then for further information use the mouse to click on the buttons. The buttons will activate the video disc to play a video sequence on the second monitor. Below are samples of buttons that you will come across as you go through the stack.



watercycle (45 secs)

Rain (15 secs)

cloud (11 secs)

Buttons also tell you the length of the sequence. The Stop button will of course stop a sequence at any point the hand buttons will take you back and forward

Let's begin!

The Weather


Air warmed by the sun expands and becomes less dense.

depressions (7 secs)


This does two things:

- 1 It makes the air rise
- 2 It reduces the air pressure to form...

lows (1 min 49 secs)



Stop




The Weather

When moving areas of warm and cold air meet, they often bring changes in the weather. When they meet, a Front is formed. This can be a...


warmfront (3 secs)

or a

coldfront (5 secs)



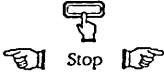
Stop



The Weather

[weather \(18 secs\)](#)

[measuring weather \(1 min\)](#)



The Weather


More often weather patterns occur on a global level, caused by worldwide movement of warm and cold air.

[intro \(2 min 46 secs\)](#)




The Weather

Warm air rises. If it is carrying a lot of moisture, this will condense when it cools. The condensation forms...

 [clouds \(11 secs\)](#)

For a more detailed description click...

 [clouds \(39 secs\)](#)

Clouds and condensation form part of the...

[watercycle \(45 secs\)](#)





CHALLENGES

Making Decisions: reacting to authority

This sequence of cards will help you to think about how you react to people in **AUTHORITY**.

You need some paper on which to record your thoughts/decisions/actions at certain points in the sequence of work.

Questions/tasks which have a * before them need a written response. Make sure that you record the card number and question/task letter each time.

To move forwards through the sequence click on the  at the right-hand side of the card. To move back at anytime, click on the  at the left-hand side of the card.



CHALLENGES

Making Decisions: reacting to authority

You must now insert the video disc into the video disc player and start it playing. Do this by:

- 1 pressing the **EJECT** button on the player
- 2 placing the disc on the drawer **CAREFULLY** with Side 2 upwards
- 3 pushing the drawer in **GENTLY** and when the picture appears, click **IMMEDIATELY** on the button below.

Click NOW



CHALLENGES

Making Decisions: reacting to authority

1. a) Discuss in your group what the word "authority" means to you
- b) Each person in your group should suggest **TWO** different types of people who you think have authority.
- c) Which situations can you think of where young people challenge authority?
Try to list at least **FIVE**.



Move on by clicking here when you are ready



CHALLENGES

Making Decisions: reacting to authority

2. a) Did you list which you put together for 1(c) include situations where young people questioned the authority of **PARENTS**?
- b) What are the most likely things that you can think of which would lead to this sort of challenge to parents' authority?



CHALLENGES

Making Decisions: reacting to authority

3. a) Did the list which you made for 1(c) include situations where young people questioned the authority of **EACH OTHER**?
- b) How does one young person have more authority than another?
- c) Does this vary according to the situation?



CHALLENGES

Making Decisions: reacting to authority

4. You are now going to see a picture of four friends planning a party. The parents of one of them are going to be away overnight. (This may have been one of the situations which you thought of in 2(b))
To see the picture click on the following button.

Click here

You must now choose to be one of the people you can see.



CHALLENGES

Making Decisions: reacting to authority

5. Once you have selected the character you wish to be, open the envelope marked with your characters name. You will have been given the envelopes by your teacher when you started this work.
Now that you have all selected your characters, using the information you have received, discuss **AS IF YOU WERE THESE PEOPLE** if and how the party will take place.



CHALLENGES

Making Decisions: reacting to authority

6. You have now come to certain conclusions having discussed your ideas within your group. Using this information answer the following questions.
 - a) Who decided that you should have the party?
How were all the members of the group persuaded that it was a good idea?
 - b) Who was in control of the discussion?
 - c) Who did you decide would take responsibility at the party if anything went wrong?



CHALLENGES

Making Decisions: reacting to authority

7. Now look at the sequence on the video. [Click here](#)

- a) Is this the same as your situation and outcome?
- b) Who is in control?
- c) Who will be responsible?
- d) Will the girl have the party?

If you need to stop the sequence while you think about a question or while you write something down, use the control panel below, "Step" - stop, commands to the left of "Step" play in reverse and those to the right will play the video forward at normal speed, or fast or slow.

 Fast Play Slow Step Slow Play Fast 

CHALLENGES

Making Decisions: reacting to authority

8. Now continue watching the video were your decisions correct? [Click here](#)

- a) Who is most in favour of having the party?
- b) Who is least in favour of having the party?
- c) What reasons are given to persuade the girl in the red scarf to have the party?
- d) Why does she 'give in'?
- e) How could the girl in the red scarf have avoided this?

 Fast Play Slow Step Slow Play Fast 

CHALLENGES

Making Decisions: reacting to authority



9. The party goes ahead its 3 a.m. the door bell rings. One of the characters goes to the door ... Choose to answer the door by clicking on the characters below.

[The male](#)

[Girl in grey](#)

[The girl with the red scarf](#)

[Girl in grey](#)

 Fast Play Slow Step Slow Play Fast 

CHALLENGES

Making Decisions: reacting to authority

CHAPTER 2: NORTHALLERTON GRAMMAR SCHOOL

BACKGROUND

Northallerton Grammar School is a 14-18 school with 800 students drawn from a large rural catchment area which includes many scattered villages across the Vale of Mowbray and the western edges of the North Yorkshire Moors. Local employment is dominated by many small industries with a leaning towards retail, tourism and agriculture.

Post-GCSE provision includes 250 students on 'A' Level courses (20 subjects offered), and a large number of students following the Diploma of Vocational Education and BTEC courses in conjunction with York College of Further Education. A large number of adult students attend day and evening courses, especially in Information Technology, Word-Processing, Modern Languages and Business Studies. The school is the local Open University Study Centre and caters for approximately 2,200 full and part-time students.

ANALYSIS OF LEARNING NEEDS

Two key areas of development at Northallerton Grammar School are the Learning Resource Centre and the development of strategies to increase the use of computer-assisted learning across the curriculum. Although interactive video had not been previously used in the school, the Flexible Learning co-ordinator had identified the potential of IV as a resource that could make an important and growing contribution to learning, enhancing many of the developments within the Flexible Learning programme.

In order to make decisions on issues relating to the purchasing of equipment, a number of INSET sessions were organised. The presentations were designed to introduce teachers to Interactive Video and the potential opportunities it provides for varied use across the curriculum, enabling teachers to consider possible departmental involvement in the project.

The Flexible Learning co-ordinator produced an evaluation sheet to allow the teachers a quick feedback channel, supplying useful information that could be used for forward planning.

By using the evaluation results from the presentation, the project could be designed to accommodate the needs of the students and take into account the training needs of the staff. Particular emphasis needed to be placed on training the IT technician who would provide ongoing internal support. Other project aims were to:

- increase awareness of IV across all departments
- stimulate interest in video disc technology

- integrate IV into the learning programmes of students by supporting interested departments
- support the departments with necessary time for development to enable specific end-products to be evaluated.

CURRICULUM PLANNING

Following the presentations, a project development group was formed which included the FL co-ordinator, the IT technician who had responsibility within the learning resource centre and five department representatives. The aims of the group were to:

- share developments across the five departments
- monitor and evaluate IV as a learning tool
- plan future developments of IV in the school
- disseminate findings to all colleagues (aided by a newsletter).

An interactive video system was purchased based on a PC platform, along with Opensoft. A number of IVIS (Interactive Video in Schools) video discs was borrowed from Allertonshire School, a feeder school which had been involved in the IVIS project.

A successful way of disseminating information throughout the school was through a newsletter, which was designed to keep the teaching staff informed of project developments and to report on the IV projects that involved the other four schools.

As a follow-up to the more general presentations, individual workshops were designed to focus on specific subject areas. Although a number of departments had shown interest in the possibility of using IV, setting up projects relating to specific subject areas was restricted by the video discs that were available to the school at the time. The main project therefore focused on the Geography department.

CURRICULUM IMPLEMENTATION

Within the development programme a time schedule was planned to incorporate workshops with the staff and students who were to be involved in the project.

The Geography project involved year 12 students using the IVIS Geography disc. The video, audio and still images contained on the disc related to desertification and irrigation technique, matching an element of the Human Geography 'A' Level syllabus on

Agriculture. Following a quick but comprehensive introduction to video disc technology, Opensoft and the Geography disc, a group of four students selected and edited the video images to form the basis of a multi-media presentation on irrigation.

The students prepared the text to support the chosen video during their Geography lesson and came to the next session prepared to add the text and complete the presentation. The material produced was used to disseminate the use of interactive video to other members of the teaching staff and irrigation techniques to other students. The process involved the students in research, collaboration and discussion and also required the use of analytical and presentation skills. Cross-curricular links were identified with Environmental Studies, Technology and Economics.

STUDENT FEEDBACK

The four students from the Geography department were very quick to understand the practical elements involved with authoring video discs and after the first introductory session needed very little help. They were enthusiastic and collaborated well as a group, dividing the tasks up evenly and planning their own strategies.

Comments made by the students in response to working with interactive video were:

- “We talked a lot about the major ideas which should be included and this tested our understanding.”
- “We discussed the best sequence many times, so it helped our development of the ideas into a logical order for someone else to follow. It was good getting to grips with technology.”
- “It was fun working as a group of four and deciding on our own ‘programme’ and what we wanted it to do. The finished product looked good.”
- “It was a new experience, beyond the bounds of classroom teaching, a look at the possible future more stimulating than a text book.”
- “Having to compose a detailed sequence of video and text with continuity helped me to remember as well as understand.”
- “It was for me a different and more rewarding way of learning because we were more in control of our learning.”

Closing snapshot of Northallerton Grammar School

IV System	PC-based
Location	Learning resource centre library
Project Areas	<i>Geography</i> Staff, year 12 student production IVIS Geography Disc, Opensoft <i>Access</i> Secrets of Study, pre-programmed disc for use as open access <i>Modern Languages</i> Staff, 'A' Level French Art discs
School Support	Development Team Five members of the staff including: FL co-ordinator IT technician
Further Developments	Disc Production, Media Studies Science development Evaluation, dissemination supported by IV Newsletter .

NORTHALLERTON GRAMMAR SCHOOL NEWSLETTER

Interactive

Newsletter of the Interactive Video Development Group, Northallerton Grammar School

No.2

May 1992

SPIN CD-I Project Application

Our application to trial the CD-I system and programme 'Welcome to Work' has been successful. We'll be lent a CD-I (Compact Disc Interactive) system by SPIN (Shell Phillips Interactive) who are developing this new technology. CD-I players are beginning to appear in shops in the south, and a growing number of educational programs are under development. Developers like SPIN are keen to evaluate the potential of CD-I in schools and training, hence their interest in this trial.

Our bid has committed us to trialling the material with a large range of students. We'll gauge student response by their completion of a similar questionnaire at the time of using the system. The CDI system will be available in the Resource Centre (hopefully near the Careers materials), and we're being loaned the system and CD go for the four weeks of June. Any interested colleagues might like to view the material and complete an evaluation on it.

Art added to NGS Projects

Because of the extra time available to support our project work by Alison Hudson, we've invited Art and Design to be one of the our main projects carrying out development work this term. The Art team will consider a range of possibilities and will have an INSET session with Alison at

the earliest opportunity. Many museums and art galleries now use IV for developing data banks of their complete collections.

Steering Group Meeting, 14 May at Ruffwood School, Knowsley

The meeting included a round-up of the IV projects in the five schools. In case it might be useful for departments to get in touch with other departments involved in IV developments, I thought you'd find it useful to have a summary of them. I've got the contact details. As you'll see, there are many different curriculum areas involved.

George Stephenson Community High School, Killingworth, Tyne & Wear.

IV System: BBC Master

Location: Mod Langs Dept. (temp)

Project areas: French (using Siville)

School support: FL Co-ordinator

Further developments: in History, English and Science.

Calder High School, Hebden Bridge.

IV System PC-based,

Location IT Resource Centre

Project Areas Art, (A-level work on The Louvre and Orsay discs with Opensoft control), Mathematics (using the DES Maths disc with Opensoft)

School support, FL Co-ordinator, IT Technician,

Further developments: DoVE course.

**West Denton High School,
Newcastle Upon Tyne.**

IV System: Apples (4 systems)

Location: Classrooms and LRCtre

Project areas: Science/Physics (using IVIS Geography disc, Videostack and Voyager control); English/Media Studies, Modern Languages (using IVIS Siville and commercial disks)

School support: IV Development team with FL Co-ordinator and Assistant Librarian,

Further developments: in Y9 Science using Volcanoes and Life & Energy; Health Education and PE; user guide being developed with examples of software to aid dissemination in school.

Ruffwood Community School, Kirkby.

IV System: Archimedes

Location: IT Resource Centre

Project areas: Design Technology (using the IVIS Design disc with Genesis control), PE (for GCSE using the Play Better Tennis coaching disc with Genesis),

School support: FL Co-ordinator, IT Co-ordinator and IT Technician.

Further developments: in Maths (using the Domesday disc) History (using the Somme disc) and Geography.

and, for comparison,

Northallerton Grammar School

IV System: PC based

Location: Learning Resource Centre

Project areas: Geography (Y12 student production using IVIS Geography disc with Opensoft control), Access course (using Secrets of Study), Mathematics (probable use of the Geometry disc using Opensoft), Art (discs and context yet to be decided),

School support: IV Development Group of six departments, FL Co-ordinator, IT Assistant.

Further developments: in Science, English/Media Studies; evaluation and dissemination supported by IV Newsletter.

Information about IV discs

New catalogues and information sheets about IV and CDI have been passed on to Rachel. Please ask her for details if you'd like to see what's available.

Somme IV Disc

The Somme package includes an IV disc and software. The total pack costs about £120. The software pack consists of a large database. The videodisk includes original black and white film sequences from the Imperial War Museum. Department(s) interested in using this material and evaluating it within the FL project should see Norman.

IV Project in Geography

On Wednesday 20 May Alison will work with four Y12 students (Richard Green, Sarah Pringle, Judith Burn and Nicholas Broadwith) to develop their own program from the IVIS Geography disc. They aim to work with both Gloria and Ann in support. The stills and video sequences on the IVIS disk will be used to create a learning unit on 'Desertification'. The Opensoft software enables selections of stills and video sequences from disc. It also enables captions and graphics to be added.

It is hoped that the students might be able to show their work at the Flexible Learning Steering Group on Wednesday 8 July at 7.00pm.

NC

May 1992

NORTHALLERTON SCHOOL INSET EVALUATION SHEET

NORTHALLERTON GRAMMAR SCHOOL

MANAGING FLEXIBLE LEARNING PROJECT

INTERACTIVE VIDEO PROJECT

There were three main aims of the INSET session:

- 1) to acquaint colleagues with the nature of Interactive Video and the potential opportunities it provides for varied use across the curriculum,
- 2) to inform colleagues about the school's intentions regarding the IV Project,
- 3) for colleagues to consider possible personal and/or departmental involvement with IV developments, either as part of the project or not.

INSET SESSION EVALUATION

PROJECT FORWARD PLANNING

1. During the INSET session, how clear a picture do you feel you acquired about the possibilities/opportunities for IV across the curriculum? (Please tick)

I've a clear picture of several ways in which IV might be used across the whole curriculum	
I'm clear about a possible but restricted way in which IV might be used in some (though not most) subjects or courses	
I'm unclear about the potential value of IV in most or any areas of the curriculum	

2. During the session how clear a picture do you feel you acquired about the opportunities for IV in your curriculum/course area? (Please tick)

I've a clear picture of several ways in which IV could be used in my own teaching subject or courses	
I'm clear about a possible way in which I could use IV in one of my courses with one year group or topic	
I can't see a practical way in which I might use IV in any of my teaching	

3. How clear do you feel about the school's planned involvement in the IV Project? (Please tick)

I've a clear picture of the school's IV plans	
I'm unclear about the school's IV plans	

4. How and when will you disseminate the insights you have acquired in the INSET session to your colleagues?

5. At this stage, how interested are you for your department/course to be involved in the IV Project as one of the two or three main initiatives?

Very interested and hope we can be one of those involved	
Interested but have some reservations about being involved	
We might choose to be involved but I am not interested at present	
Unlikely to be interested as a department at this stage	
We definitely won't be involved in the project initiatives	

6. At this stage, how interested are you in IV that you'd like to be **personally involved in an IV Development Group** which will share developments internally, monitor and evaluate the project initiatives and consider the future expansion of IV across the curriculum?

Very interested, would like to represent the department	
Interested, and would represent the department if others weren't	
Yes, but it depends on the involvement of the department in IV	
I'm unlikely to be able to be involved personally	
I'll definitely not be involved in the IV Development Group	

7. Were there any particular programmes/laser disks which impressed you? Please give details:

8. Were there any which you looked at which you thought were particularly poor in any way(s)? Please give details:

9. How many laser disks did you get chance to see in the session?

10. Did you feel the session was about the right length and paced well?

signed (if appropriate) _____ session: morning/afternoon

please return your completed questionnaire to Norman as soon as possible.

CHAPTER 3: CALDER HIGH SCHOOL

Calder High is Yorkshire's oldest comprehensive school, established in 1950. There are 1,100 pupils, including 190 in the sixth form. The catchment area is the semi-rural Calder Valley, with pupils whose backgrounds range from remote moorland farms to urban areas of Halifax. The Flexible Learning developments in the school have focused on:

- faculty secondments to develop resources and approaches to Flexible Learning
- appointing and training four technicians to support IT and AV
- developing a learning resources centre
- INSET for staff on Flexible Learning issues.

ANALYSIS OF LEARNING NEEDS

The first meeting at the school was with the Flexible Learning and IT co-ordinators who wanted to explore the potential of interactive video in the context of a multi-media resource centre. Staff in the school were not familiar with interactive video, so the first objective of the project was to demonstrate the potential of IV as a flexible resource to members of the teaching staff.

The main hardware platform in the school was Archimedes but there was a certain amount of development with Macintosh and PC systems. The school already had a Philips video disc player. As a result of early discussions, two local hardware distributors were contacted to offer specifications and costings to run the video disc player through a PC platform.

The decision to use a PC platform related to the range of material available. It was felt that a PC-based system would meet the future needs of the school by running:

- easy-to-use authoring packages with any video discs (PAL or NTSC depending on the video disc player)
- generic training packages designed for use in an Open Learning environment and suitable for post 16 students
- three new secondary Maths discs focusing on numbers, funded by NCC.

There is a range of generic Open Learning material available for the PC platform suitable for post 16 students, as well as robust, easy-to-use authoring software. Although generic packages are expensive, Calder High School has a large sixth form and so it was important to have the option of running appropriate training packages in the future.

A 386SX PC with a video board was purchased and placed in the temporary resource centre, along with a complete set of eight Interactive Video in Education (IVIE) video discs which had been acquired from the LEA.

A good authoring package will allow video discs to be 're-purposed' so that teachers and students can create classroom applications or multi-media presentations. An easy to use authoring package, PC Opensoft, was purchased to allow access and manipulation of any PAL video discs. The authoring route is accessible on all of the main hardware platforms but the PC platform will also run a large range of material specifically designed for Flexible Learning.

The IV system was situated in the resource centre where support was available from an IT technician. The technician first spent some time becoming familiar with the technology and was then given some training with Opensoft. The new system will ultimately be situated in a new purpose-built resource centre.

A presentation to staff was planned as part of a whole-school INSET day. The aim of the presentation was to demonstrate to the staff that video discs:

- are flexible and easy to use
- can enhance and support the transfer of information
- embrace positive elements associated with student-centred learning.

As a follow-up to the presentation a meeting was arranged with the project planning group (the Flexible Learning co-ordinator and IT co-ordinator and technician). to identify specific curriculum applications and plan a timetable of development.

CURRICULUM PLANNING (1)

A project was to be based around the work of five sixth form students on the Diploma of Vocational Education (DOVE) course. Students on this course are required to produce a presentation reflecting a particular subject area. Authoring packages mixing text and graphics with video disc images offer students the elements to support multi-media presentations. The post 16 students had a certain amount of flexibility within their school timetables, which was seen to be an advantage. Unfortunately the student time allocated to external commitments such as work experience was not flexible and created problems within the time constraints of the project.

CURRICULUM IMPLEMENTATION (1)

The students were asked to select appropriate material from a number of discs which had formed part of the Interactive Video in Education Project. The project had provided LEAs with interactive video workstations based on the BBC Master and a set of eight curriculum-based discs.

The students were introduced to interactive video and given support in using an authoring package to produce their own multi-media presentations which would become part of their coursework.

There were some difficulties relating to subject matter and timing. Although the discs were designed for secondary school use and contain excellent images which have been used successfully across the curriculum, the content of the discs was not specific to the students' areas of interest. This highlighted the need for discs to be selected initially on the basis of curriculum content. The students' external commitments also created problems with the continuity of the project, highlighting the need for close collaboration and detailed planning with the class teacher.

CURRICULUM PLANNING (2)

The need for discs to be selected carefully for curriculum content was reinforced following a demonstration of some new Art discs when, as a result of the highly specific content, a member of the Art department immediately identified the potential in relation to the 'A' level Art course. The Louvre and Orsay discs provide guided tours of the museums combining a narrative with full screen motion video and a collection of thousands of still frames illustrating in detail some of the greatest works housed in each museum. The content of these discs matched specific needs within the 'A' level Art syllabus.

CURRICULUM IMPLEMENTATION (2)

The 'A' level Art group was timetabled to use the Art discs for a double period each week. They were introduced to laser vision and shown how to access images and use authoring software. The students were impressed immediately by the quality and the number of images which were available and spent most of the first session investigating the content of the discs. The students arrived with their own agenda for the second session which was to find images which related to their own personal projects. Viewing the images in a group created a great deal of spontaneous debate and discussion on the aesthetic merit of different work of art and the relevance to their own projects. At this point the students began to create their own image bank, selecting images and detail to match specific areas of interest. The Art discs, although catalogued are an idea resource for creating tailored files. The authoring package Opensoft offers quick image grabbing facilities allowing linear or branched files to be created.

Each video disc contains up to 55,000 frames which run on normal speed at 25 frames a second. Authoring software accurately selects the section of video or still frame required, allowing the stills or video to be edited and sequenced in any order with the addition of text and graphical overlays.

Art students in schools and colleges are often taken to Paris on field trips, Calder is no exception. The French Art discs offer the students an ideal opportunity to preview the galleries and museums prior to their visit and a chance to organise their viewing effectively.

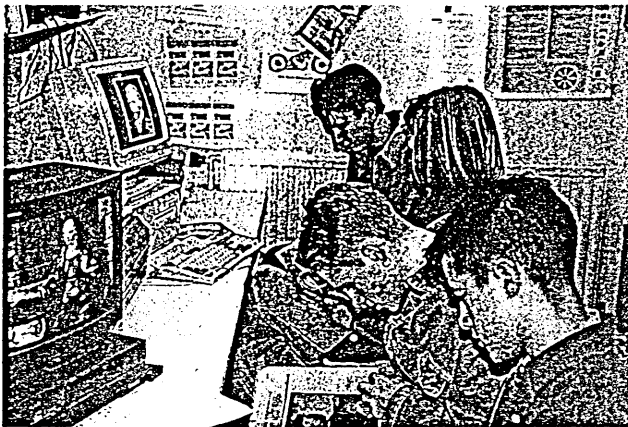
The Art department at Calder High is involved with the CDi extension project which will be developing material around the Art video discs and comparing their use as a learning resource with CDi art titles.

STUDENT FEEDBACK

Calder High School's experience demonstrates the need for discs to be selected carefully for curriculum content and the important role the subject teacher plays in the planning process.

Some comments from pupils who used the art video discs to support their 'A' level studies were:

- "I used the art disc for quick references to different work for ideas."
- "I had access to a wide variety of sculptures and art work at the touch of a button."
- "It was simple and useful and was a refreshing change from looking through books."
- "The images were very clear which surprised me, having all of that information on one disc was very easy to use and very helpful."



A-level Art students at Calder High School using CD-I and Interactive Video.

Closing Snapshot of Calder High School

IV Systems	PC-based
Location	Learning Resource Centre
Project Areas	<i>Art</i> Staff/'A' Level student production The Louvre and Orsay discs Opensoft control
School Support	FL co-ordinator IT technician
Further Developments	Art 'A' Level students producing presentations with authoring software

CHAPTER 4: GEORGE STEPHENSON COMMUNITY HIGH SCHOOL

BACKGROUND

George Stephenson Community High School is a 13-18 school with 950 students. Two hundred and twenty students are currently in years 12 and 13, following a variety of courses including 'A' Levels, 'A/S' Levels, CPVE, Business courses and BTEC. In addition, all year 12 and 13 students follow an Entitlement Course with a wide range of options, ranging from Performance Arts to Cooking for Pleasure.

The school, five miles north of Newcastle-upon-Tyne is situated in a new town, now some 30 years old, based upon an area of long established coal mining villages. The catchment area is mixed. Students are drawn from surrounding mining villages with long-defunct pits, local authority housing estates and good quality private housing. Unemployment in the area is high. The school enjoys a rich social and academic mix, although there are very few children from ethnic minority groups.

ANALYSIS OF LEARNING NEEDS

The school's IT co-ordinator assessed the position of the school in relation to previous experience with interactive video.

The school had a Domesday system, with the Domesday discs running on Nimbus. Although the system had been in the school for a number of years, it had been used in a very limited way and eventually had been abandoned when hardware problems arose.

Awareness of interactive video throughout the school was limited and the attitude of the staff who had used the Domesday system seemed to be negative and rather sceptical. The project support at George Stephenson was therefore determined by the need to focus on raising awareness across the school and raising the profile of interactive video. A new resource centre which would house a range of technology-based equipment was planned for the future.

The interactive video project would provide the school with a platform to evaluate the needs of the staff and the effectiveness of video disc as a flexible resource, allowing decisions to be made in relation to equipment purchase for the resource centre. A financial investment was necessary but the purchase would be determined by the outcome of the project.

An analysis of hardware requirements would be made at a later stage in the project. It was essential that a decision to purchase hardware was made within the time constraints of the project, allowing staff training and management strategies to be developed.

CURRICULUM PLANNING

Presentations to the staff aimed to involve at least one representative from each subject area and were designed to:

- cover all areas of the curriculum, showing clearly the range of discs available for individual subject areas
- focus on different hardware platforms and compatible software
- reflect future developments
- demonstrate the flexibility of the video disc for group presentations, as an information resource base, to present interactive learning material, and as a multi-media resource used to create presentations and teaching material.

The presentation, relating to case studies and examples of effective applications within Flexible Learning strategies, reflected a resource capable of making an important contribution to student-centred learning.

CURRICULUM IMPLEMENTATION

At this point in the project an application relevant to the Modern Language Department was identified for integration within the teaching environment, allowing the staff involved a period of practical exploration. The school was temporarily provided with an IV system based on a BBC Master (IVIS), a copy of Siville and the original version of Opensoft, an authoring package.

A programme had to be selected from the IVIS project because the school was limited by the system it was using. The Modern Language department was already using a flexible approach to teaching and was committed to the integration of new resources into the learning environment. Siville had been a popular and successful programme and offered video and still images suitable for authoring.

The original Siville programme, based on a shopping expedition in a small French town, was introduced to a group of low ability pupils in year 10. The pupils' initial suspicion soon gave way to enthusiasm. They were clearly motivated by the material and were anxious to use the technology in other subject areas.

The video content contained on the disc related directly to text-based material from a book used to support the French syllabus for years 7 and 8. After basic training which took place during non-teaching time, the French teacher used Opensoft to access images and video from the disc, producing a teaching module that complemented other resources.

A new Flexible Learning co-ordinator was appointed halfway through the project and, once in place, disseminated information through FL support group meetings, subject-based meetings and other internal management structures.

At this point an interest in interactive video had been stimulated and staff from a wide range of departments were showing a positive interest in viewing discs specific to their subject area.

The Flexible Learning co-ordinator suggested that the interest in interactive video had encouraged some members of staff to attend the Flexible Learning support group.

After discussions with the headteacher, the FL co-ordinator and the IT co-ordinator, a decision was made to purchase the Philips 2000 IV workstation. The system has a dual standard disc player, capable of running both NTSC and PAL video discs and is based on a PC platform. It will support generic training discs, which are particularly relevant for post 16 students, as well as a number of authoring packages.

The final project visit involved a training session with the IT co-ordinator to ensure ongoing internal support. The equipment was based in the new resource centre and managed through a booking system by the IT co-ordinator and librarian. Further developments were to be supported through:

- Flexible Learning support groups
- cross-curricular groups such as the Library Steering Group
- information circulation to departments
- INSET focusing on interactive video
- encouraging departmental bidding for funding.

Closing snapshot of George Stephenson Community High School

IV System	Philips 2000 IV System with a dual standard video disc player and CD-ROM
Location	Central resource area
Project Areas	French Siville, using original software teaching staff developing material with the original version of Opensoft
School Support	FL co-ordinator IT co-ordinator
Further Developments	English, Science, History.

CHAPTER 5: RUFFWOOD COMMUNITY SCHOOL

BACKGROUND

Ruffwood Community School is an 11-16 county mixed comprehensive with 1,200 pupils, the largest in Knowsley Metropolitan Borough. The pupils come from a community where the unemployment statistics are amongst the highest in the country. Ruffwood has a tradition of effective pastoral care in conjunction with the local community. Over the last three to five years the school has reoriented its emphasis in the direction of curricular-led innovations. These include:

- the acquisition of Reading for Meaning skills in year 7
- the use of resource bases within English, Modern Languages, Health related-fitness and Reading for Meaning
- contributions to the curriculum through the development of interactive technology modules.

ANALYSIS OF LEARNING NEEDS

The Flexible Learning co-ordinator at Ruffwood has been committed to developing the use of interactive video as a flexible resource since the school purchased a Domesday system in 1989. The Domesday system is controlled by an upgraded BBC computer and was designed to run a number of discs specific to that system, including the Domesday discs, two double-sided discs with images, video, text, data and statistics produced during the 1986 census. The programming software was stored on the video disc. The system was therefore designed with technical specifications to cope with the unique storage format.

Although the Domesday system had been placed in the library and had been used successfully with the Domesday discs and Volcanoes, the FL co-ordinator had recognised that video discs could be used more widely across the curriculum and offered flexibility to support flexible teaching and learning styles. A small group of staff had tried over the years to extend the flexibility of the system and to generate interest in other departments but had been frustrated by technical problems. To make any significant progress they had identified the need for external support.

More recently the school had also purchased the Archimedes 3000 interactive video system which was sold as a package with the Energy, Radiation and Risk and Probability discs. This was offered as a low-cost system by ELTEC and had been subsidised by Acorn

and British Nuclear Fuel which had sponsored the production of the three discs. The school's IT policy was heavily weighted towards using Archimedes systems and a number of software packages were already being used. Although the school had not been involved in the interactive video in School Project (IVIS) the Flexible Learning co-ordinator had managed to acquire a number of the discs and was eager to make use of them with authoring software.

The aims of the school's interactive video project were to:

- re-kindle interest in interactive video (which had been shown when the Domesday system was first introduced)
- investigate ways in which the Archimedes system could be used
- raise awareness of the potential of interactive video as a teaching aid.

Taking into account the equipment and software that was already available in the school, the project was designed to:

- develop the potential of the Archimedes system through the authoring package Genesis II. (There are a number of other software packages available that have facilities to author video disc on the Archimedes.)
- investigate new IV packages designed for the Archimedes system
- extend the use of the Domesday equipment.

A presentation to subject leaders was given at a curriculum board meeting.

CURRICULUM PLANNING

The presentation, outlining the project support and demonstrating the potential of video disc, was aimed at subject leaders with a view to identifying a project team and some specific curriculum-based objectives. Following the presentation, the staff were asked to bid for project support time and to submit brief proposals outlining possible projects.

The successful bids involved developing learning material with the Design and Technology, Humanities and Physical Education (PE) departments. The projects involved both teachers and pupils in the production of material.

The equipment was based in the IT resource centre. Project development sessions were planned to fit into non-teaching time and were supported by the learning resource manager.

As the school had already made a commitment to using Genesis II (a software authoring package produced by Oak Solutions for the Archimedes) the team decided to investigate its authoring capacity with video disc. However Genesis II did not incorporate a user-friendly interface to control video disc. Video disc could be controlled through the Genesis Script but this was complicated and time-consuming for classroom use. Oak Solutions agreed to produce a video disc control interface which could be accessed from within Genesis and pasted onto pages created through Genesis.

Staff and pupils involved in the project spent some training and planning time with the project support team which involved the Flexible Learning co-ordinator and learning resource manager as well as external project support.

CURRICULUM IMPLEMENTATION

The aim of the Physical Education project was to develop an interactive video resource to support pupils learning to play tennis. The pack was created by year 10 pupils by linking Genesis pages together with 'hot buttons' to access short video clips showing the students' specific tennis skills.

The project formed part of the pupils' GCSE PE assignment and was also used to support practical aspects of the PE syllabus. To make effective use of the tennis skills module during PE lessons it would have been an advantage to have placed the equipment in the PE department, offering the pupils quick access to relevant skill areas.

The teacher involved in the project identified other low-cost sports discs which could be presented in the same way using the software designed by the pupils as a shell.

The Design and Technology project involved two members of the department in the production of a programme which introduced pupils to oblique, isometric and orthographic drawing methods. Genesis pages were created with text and scanned images, buttons linked to sections of video from The Design disc (IVIS). The teachers who designed the application thought that it would be an ideal way to present work to pupils who had missed particular areas of the syllabus.

Cross-curricular links were made with coursework required for the 1993 IT GCSE syllabus. As a result of the projects using Genesis II, a brief instruction guide was produced to support staff using Genesis II with video disc and a booklet was produced to guide pupils through the module on tennis skills.

Teachers in the Humanities and Geography departments wanted to extend their experience of IV and encourage the use of video disc throughout their departments.

Awareness sessions were organised focusing on the Domesday discs, Volcanoes, the Geography disc and the Somme, a new disc produced to run on the Archimedes. The content of all four discs was found to be relevant to the curriculum.

Volcanoes was used within a case study by years 7 and 8 as a resource for interrogation. An advantage with Domesday and Volcanoes is the facility to download text and data to a printer. The Domesday discs were used by year 7 within a modular unit on local studies to examine regional developments.

The teachers involved in the project thought that the discs made a significant contribution to learning, providing an additional relevant stimulus through a flexible resource which was easy to use. Future plans are to use the Geography disc (IVIS) with years 10 and 11.

STUDENT FEEDBACK

Some comments made by the pupils in response to working with the Design and Technology programme on drawing methods were:

- "Seeing the video helped me if I made a mistake because I could keep going back over the material."
- "I enjoyed using it because it taught me more about front view and side view and all about perspective on video."

A comment from one of the pupils who produced the tennis skills module was:

- "I am using interactive video to produce my essay for GCSE sport. I have enjoyed using it because I think that I am one of the few pupils that can use the authoring package Genesis."

Closing snapshot of Ruffwood Community School

IV System	Archimedes/Domesday
Location	IT resource centre/library Departments are able to book equipment
Project Areas	<i>Design</i> Staff production IVIS Design disc, Genesis control <i>PE</i> Staff / GCSE student production Play Better Tennis, Genesis control
School Support	FL co-ordinator IT co-ordinator IT technician
Further Developments	Maths, History, Geography.

CHAPTER 6: A COMPARATIVE STUDY OF INTERACTIVE VIDEO AND CDI WITHIN 'A' LEVEL ART BACKGROUND

The CDI study, which was an extension of the interactive video project, was designed to compare CDI and video disc technology within the 'A' Level Art syllabus.

A number of CDI applications and video discs containing video, still images, audio and text were used to support students studying 'A' Level Art in two 11-18 comprehensive schools.

The aim of the study was to investigate and compare the potential use of selected art video discs with a number of CDI art applications and reflect on the contribution that the use of CDI and interactive video can make to the teaching and learning environment. The project focused on the following areas:

- How interactive video and CDI systems allow access to multi-media resources.
- Content descriptions of each disc.
- How the resources were introduced and supported.
- Location of the systems.
- How the applications were used within the 'A' Level syllabus.

An analysis based on feedback from staff and students focused on the following issues:

- Access and manipulation of material.
- Quality, quantity and relevance of images.
- Comparison with other material already available in the school.
- Time requirements.
- Hardware and software prices.

Although the project was not an in-depth study relating to pedagogical issues, some conclusions have been drawn that reflect issues relating to integration and potential.

The Art project was based at Northallerton Grammar School and Calder High School. Staff in the Art departments at both schools were immediately impressed by the quality, quantity and relevance of the images on the Art video discs for their curriculum area. The general opinion was that the discs, used as a flexible resource, could make a significant contribution to the 'A' Level Art course. They were also interested in evaluating the potential of a set of new CDI Art titles which were available on the commercial market with the Philips CDI system.

Teaching staff were aware of the potential of CDI through their involvement earlier in the year in a brief evaluation of a new CDI application 'Welcome to Work'. The evaluation process gave the schools a brief preview of a CDI system and the structure of a new application.

Both schools were in the process of developing and extending resource centres and had purchased PC-based interactive video systems through involvement with the project. In order to extend their resource provision and investigate the potential of CDI each school purchased a Philips CDI system with a set of five Art applications from the Great Arts series.

The schools also selected a number of video discs which had recently been produced in France.

Calder High School purchased:

- The Louvre; Paintings and Drawings and the Orsay disc.

Northallerton Grammar School purchased:

- The Louvre; Paintings and Drawings, Sculpture, Antiquities and the Picasso Disc.

The Art 'A' Level syllabus used by the schools included an element requiring a working knowledge and appreciation of Art History. The project group from Calder High School contained five students and the group from Northallerton Grammar School contained four. Both groups were of mixed gender and were in the first year of a two year 'A' Level art syllabus.

DISC DESCRIPTIONS

The video discs selected by the schools were purchased as resource discs without software programming.

Each video disc was supported by a detailed document cataloguing each individual work of art and video sequence by frame number. The document is structured, allowing quick reference to particular artists or periods of Art History. In a matter of seconds a work of art can be identified and accessed by frame number, using either a remote control device or authoring software. Each of the Art video discs was priced at approximately £90.

LOUVRE (VOLUMES 1-3)

The Louvre series contains more than 5,000 works of art and 35,000 detailed images with video commentary in French and English plus video sequences featuring some of the Louvre's most famous works.

Volume 1. Paintings and Drawings contains 2,500 European paintings and drawings from the late Gothic period to the mid-19th century.

Volume 2. Sculpture and Objects d'Art includes 970 examples of European sculpture and objects d'art crafted in a variety of materials.

Volume 3. Antiquities presents ancient art and artefacts from Egypt, Greece, Rome and the Near and Middle East.

ORSAY

The Orsay Museum disc provides a collection of 11,000 still images illustrating over 2,100 works of modern art produced between 1848 and 1914. The disc illustrates works of art from the painting, sculpture, photography, architectural design, decorative arts and furniture collections. The video disc is double-sided and features an hour long narrated tour of the museum and its collection.

PICASSO

The video disc covers the life and works of Pablo Picasso, illustrated through a 57 chapter presentation covering all aspects of his work through drawings, paintings, photographs, ceramics and bibliographic documents. This disc does not contain a commentary.

The CDI applications selected were purchased as an Art Option Pack within Philip's School 2000 offer. An interactive CDI application incorporates images, audio, graphics, text and data with software control on a single CD disc. Educational applications tend to be presented in two ways, either as an interactive teaching resource, guiding the learner through structured teaching points, or as an information resource bank with structured

branching routes to images and information. The route to the teaching point or information is determined by the software design.

The following titles were investigated as part of the project:

- Harvest of the Sun

This examines the art and life of Vincent Van Gogh. The menu and branching structure allows access to Van Gogh's studio, and the six critical periods of his life. A visit to the gallery presents a selection of images accompanied by music by Debussy, Frank, Chabrier and Bizet.

- The Renaissance Gallery

This presents the masterpieces and music of the Italian High Renaissance. Images such as Giotto's frescoes or the Sistine Chapel are accompanied by digital recordings of Palestrina, Gabrieli, da Milano and others.

- World of Impressionism

The World of Impressionism presents treasures of art, music and history. It includes an interactive map of 19th century Paris, a musical accompaniment from Debussy and Ravel and works of art by artists such as Monet and Renoir.

- The Renaissance of Florence

This presents a route through the art, music and architecture of 15th century Florence.

- French Impressionists

French Impressionists covers 19th century Paris, presenting artists and their friends, lovers and critics.

TRIALING THE SYSTEM

The technology was relatively new to both staff and students and therefore required external support during the initial introduction. The project support in each school during the introductory period was provided by an external consultant/adviser, the class teacher and a member of the technical support staff.

The staff and students were introduced to the potential of each system and the contents of the discs. Time was allocated to demonstrating authoring software and supporting the

students with the production of their programs. The subject teachers and the support staff were involved throughout the introduction, developing their own knowledge of the systems and software and also providing subject-specific guidance to the students.

The schools were each allocated four visits for external support. The amount of time which was allocated to training was similar in both schools but varied in relation to the systems.

The CDI system can be set up quickly and easily. The applications are stand-alone, pre-programmed interactive resources. They are controlled through a hand-held remote device and do not require specialist technical support. The time requirement at the introductory stage is determined by the amount of information relating to the content of a disc and the design or user-friendliness of the programme. For example, the Art discs used in the project had very little information regarding content and structure.

Using the full potential of an interactive video system requires a small amount of specialist support. Interactive video is a flexible technology which can be used in a number of different ways. To exploit the full potential of the technology, a demonstration of the system's flexibility and an introduction to authoring software is essential. The discs or applications which are produced for the video disc player are usually well indexed and catalogued providing individual frame numbers, support documentation and guidance. The details contained in the documentation provide the user with a clear picture of the disc contents and structure. Once the system has been set up and the software has been loaded, preferably onto a hard disc, accessing the programs through a menu is relatively simple.

Integrated interactive video programmes, produced as Open Learning resources, are usually clearly documented and have well designed user friendly interfaces. A good example of a well designed programme is 'Secrets of Study'. The content and structure of this programme can be identified quickly and the user interface demands no prior knowledge of computers or keyboard skills.

Extending the use of the interactive video system requires a small amount of time for awareness raising (no more than two hours for a complete overview). Time is also required for familiarisation and training in the use of authoring packages which may be used to create teaching and learning modules or staff/student presentations. The authoring software can be used to restructure the video disc images by adding text and graphics or to produce bar codes containing commands to run certain sections of the video or selected still frames. Authoring packages are available for all the main hardware

systems. They offer a more flexible use of the system and enormous potential as a teaching and learning resource. If the initial support is introduced within the curriculum, the development of skills can be part of a meaningful project involving subject teachers, students and technical support staff.

Within the four days allocated to the schools, the amount of time spent introducing an authoring package to teachers, students and support staff was approximately two hours, with another three hours of close support.

In both schools, student projects were designed to incorporate the use of CDI and interactive video by the subject teachers. The development of software skills was an integral part of the Art project.

IMPLEMENTATION

At Calder High School the students were divided into groups of two and three and each took the task of producing a beginners' guide to an important area of Art History, focusing on the Renaissance in Italy and Post-Impressionism in France.

The aim was to use the systems for a presentation which would combine text and visual material on screen, with prepared statements from the students.

Each group began by having a trial session with each of the systems, but it was agreed by the students that the Renaissance group would use CDI and the Impressionism group the interactive video. The work was new for both groups as they had not been asked to investigate Art History before.

At Northallerton Grammar School the Picasso and Louvre video disc materials were used in conjunction with a proposed trip to Paris which year 12 and 13 students were about to make. It seemed appropriate that the material should be used by the students to gain information about things that they might see in the galleries.

Year 13 students were focusing on the Personal Studies element of their course and it was a very useful addition to library resources to have the facility to browse through huge amounts of visual information.

The CDI systems were used in a separate cross-curricular project focusing on gender issues. The discs were used to provide background information on images of women for Art, Media Studies and Sociology students.

In addition, the systems were also used for students as a resource for information and image gathering for a portrait project.

Teachers in both schools felt that the material on both the CDI and video discs would make a positive contribution to a number of curriculum areas, including cross-curricular IT attainments, History, Media Studies, Critical Studies, Music, English, General Studies and Sociology.

STAFF AND STUDENT FEEDBACK

Feedback on the video disc from the teaching staff at Calder and Northallerton was extremely positive. Comments included:

- “The quality of the screen images was excellent.”
- “The quality and quantity of the material was impressive, particularly the way it focused on detail, encouraging student analysis.”
- “Compared to other material, slides are the nearest equivalent. The video discs have far more images and do not present physical problems of organisation.”
- “The video discs present an opportunity that is closer than anything else to visiting a gallery.”
- “The interactive video system is potentially a very powerful tool to access images and create programmes.”
- “It is useful to give access to masses of visual images, allowing choice of direction according to interest. The catalogues of images with the discs were very useful.”
- “Using a large monitor, the system could be used for full class teaching.”
- “Using the additional facilities of an authoring programme is staff-intensive. The students need a considerable amount of initial support until they become familiar with the software.”

Comments on the CDI system included:

- “The CDI system was aimed at a different audience.”
- “The discs contained simple factual information with a pre-programmed choice of route.”
- “The technology was not intrusive.”
- “The system with a larger screen lends itself to full class teaching as well as to individual or small group work.”
- “Students were able to work independently on the system without technical support.”

The following are some comments made by students:

- “I liked both systems, but found they both had different uses or potential. I thought the CDI could be used really only for learning about the pictures or artists, as it was much better than reading a book. I also liked the way you could skip around (it was not just like a video), but one thing I didn't like was that you couldn't do much besides sit and watch. I thought the CDI was very user-friendly.”
- “For a beginner, the CDI system was easier to use than the IV system, but after practice the IV system was just as easy. We found that both systems were a lot better than any other resources available in school but if someone was researching the Renaissance in depth they would still need to refer to books. The CDI's strength is that it is easily accessible and understandable to a student studying a subject for the first time, whereas the IV system goes a lot further in depth and detail, making it more useful for a serious student.”

The students reported that the laser system became easier with practice, although using authoring software was difficult at first. They also thought that the quantity and quality of the images on the video discs were excellent. A quicker access route to the images can be achieved through a simple hand held remote device or bar codes and a light pen.

The students found the CDI system easy to use and good for limited browsing.

CHAPTER 7: SUMMARY AND GUIDELINES

At the end of the IV and CDI project, participating schools had learned much about the contribution that technology can make as a flexible and valuable resource in the classroom. A series of key areas emerged as crucial to the success of any such technology-based educational initiative.

The following factors were considerations in each of the schools:

1. Management and Co-ordination

A successful project using external support depends on good co-ordination, management, communication and dissemination within the school.

2. Awareness Raising

Each school used external support to raise awareness across all departments, which resulted in an increased interest in and support for the projects.

As a result of the presentations, the profile of Flexible Learning was in general raised with positive results.

3. Computer Platforms

A computer platform can be specifically adapted to control and fully integrate video disc images on a single screen or it can be linked to a video disc player and a second monitor with a low cost cable.

The choice of computer platform should relate to the needs of the pupils and teaching staff, and the material which is available to run on the particular platform.

A major advantage for interactive video has been the development of easy-to-use authoring packages and bar code software which have the facility to control video disc.

All major computer platforms support multi-media authoring packages suitable for teacher or student use. This innovation has created a learning resource which is more flexible allowing low-cost video discs to be used to meet a wide range of curricular requirements.

A fully integrated interactive video workstation allowing computer software to be overlaid on the video image is still an expensive option but will support a wider range of material.

It is not always necessary to purchase a complete IV workstation to incorporate the flexibility of video disc as an effective resource. With the right information and advice the technology can be adapted to meet specific needs, often reducing costs.

4. Access to Equipment

Access to the equipment may depend on some of the following factors:

- The number of systems available.
- Technical and teaching support.
- The content of the material being used.
- The demand for open access to the system .
- Physical constraints of the school buildings.

5. Internal Support for Staff and Students

It is essential that staff and students have support from within the school to use the technology to its full potential. A training programme is an important element necessary for consistent and continued development.

6. Staff and Student Development Time

One of the major implications relating to the implementation of a new technology is the increased demand on the time of the support staff as well as the need for staff and student training and development time.

The experiences of participating schools highlight the following approaches to allow teaching staff project development time:

- Funding from the staff development budget for a group of teachers to work as a team.
- Timetabled non-teaching time.
- Working alongside pupils on joint development projects, within class time.

7. Identifying Key Curriculum Areas for Implementation

The development of a technology-based project within a specific curriculum area may be influenced by some of the following issues:

- School policy targeting subject areas for development.
- Staff development.
- Discs and software available to support specific areas of the curriculum .
- Staff interest.

8. Dissemination of Information and Skills

The dissemination of information across departments may be channelled through structures supporting management or departmental meetings, internal newsletters and INSET. A sound technical support structure within the school is essential for the dissemination and the future development of skills.

9. Continuing and Future Developments

All schools involved in the project have strategies in place for further projects using interactive video and CDI.

Although each school has a sound foundation on which to build, external advice and support is still an important element necessary for continued development.

Schools will still need a source of up to date information and advice relating to:

- New video discs and software.
- Technology developments.
- Developments in schools at a national level
- Projects and evaluations supported by the Department for Education, National Council for Educational Technology and the National Curriculum Council
- Updating skills.

Issues relating particularly to the development of the technology require research, up to date advice and meaningful support.

10. Hardware and Software Decisions

Although interactive video is still a relatively expensive technology, video discs and software are now more realistically priced for education. It is also possible to update and adapt existing equipment without a great deal of expenditure.

Companies are increasingly offering 'school' systems that provide well designed hardware platforms combining more than one delivery system i.e. interactive video, CD-ROM and CD Audio.

American video discs, which are produced using the NTSC format have an enormous user-base in the United States and are sold at prices that are comparable to commercial video tape. Although the home market dominates sales in America, schools and colleges use video disc extensively and many of the educational titles are now available in the UK at low prices. It is therefore worth investing in a dual standard video disc player which will run UK European and American standard video discs. Most of the hardware production companies are now offering dual standard video disc players to support PAL and NTSC.

Another cost-effective option to control video disc is through bar codes. There are a number of software packages available which allow commands to the video disc player to be printed out in this form. The bar codes can be read by a remote bar code reader or a reader connected to the video disc player which will produce a quicker response. Bar code software is available for most hardware platforms and providing the frame numbers for the required sections of video or the individual images are documented, the bar codes can be produced on a computer independent of the video disc player. The delivery system has three elements; a video disc player, a monitor and a bar code reader and provides simple control at a lower cost. The interactivity and the effectiveness of the resource will depend on the teaching and learning environment and the material incorporating the bar codes.

When the needs of the school have been identified and a decision relating to the computer platform and technical specifications have been made it is wise to seek advice on prices and research the available options thoroughly.

FEEDBACK FROM PARTICIPATING SCHOOLS

Although the introduction of interactive video and CDI had implications for staff development and training it was seen as a catalyst for change, effectively demonstrating the important contribution interactive multi-media can make to Flexible Learning. A consistent outcome of the projects was the enthusiastic response from both teachers and students at not only having access to video, still images and audio relevant to their learning needs, but also at being able to manipulate and control the images for individual or group requirements.

CONCLUSION

Interactive video and CDI used to their full potential represent a flexible, exciting, 'media-rich' resource, which can support and encourage student-centred learning and student-centred teaching methods. Integrating and developing the potential of these new technologies requires commitment, expertise and appropriate support.

Schools hoping to integrate new multi-media technologies into the curriculum face not only difficult decisions relating to equipment and material but also a range of teaching, learning and management issues.

APPENDIX 1: IV AND CDI TECHNICAL BACKGROUND INTERACTIVE VIDEO

Delivery of an interactive video programme which combines video disc and computer software requires a system which includes a video disc player, a monitor, a computer with an interface card (enabling the media elements to work together and be delivered through one monitor), keyboard and a mouse. An expensive element within this system is the interface card. The card is necessary to mix the media on one monitor. If two monitors are used the card is not an essential component. A low-cost cable link will produce the output of images from the video disc on a video monitor with computer-generated text, data and graphics shown simultaneously on the computer monitor.

A system with computer integration will deliver full-screen motion video, still images, audio, computer generated text, data, graphics and programmed control. The application could be a pre-programmed teaching or learning module, or the creation of a multi-media presentation through a software authoring package.

Authoring packages provide a user-friendly software interface, allowing the video disc images to be edited and reassembled with the addition of text and graphics. Files can be created and then linked together presenting a branching structure.

The computer is not always necessary for the effective use of video disc technology. A video disc can have up to 34 minutes of full-screen moving video, 54,000 still images or any combination of the two on one side of a 30 cm disc. The disc can also have two different audio channels across the same images. Each frame can be held as a still image and has an individual frame number. Through a control device the frame number of any image can be accessed and a series of still and moving pictures can be retrieved in any order. Access to the frame is almost instant.

Images can be controlled and accessed by a simple hand-held remote device or through a light pen sending a command from a pre-programmed bar code. In each of these cases a computer is unnecessary. The delivery system is a video disc player connected to a monitor by a single cable.

COMPACT DISC INTERACTIVE

Compact Disc Interactive is a multi-media platform based on the 12 cm optical compact disc. The CDI disc stores up to 650 MBytes of data or 72 minutes of stereo CD Digital Audio. CDI integrates text, still images audio and animation on one disc. The

introduction of full-screen moving images will be available in the near future. The hardware is based on a single box which connects to any TV monitor and stereo system. It is a stand-alone integrated system (with no external computer) and has its own microprocessor and operating system.

CDI applications allow the user to access and interact with the disc's multi-media content through pre-programmed routes. CD Audio and CD Photo discs will also run on a CDI system.

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Calder High School

George Stephenson Community School

Ruffwood Community School

APPENDIX 2

INTERACTIVE VIDEO METHODS OF INTRODUCTION AND IMPLEMENTATION

Data Collection 1.1

Name.

Date.

Position/Role in implementation process

Position/Role in school

School

Title of any interactive video projects and details of projects if applicable.

If you would you like the data relating to your school to remain confidential please tick.

YES

Some questions offer a choice of pre-selected answers. Please use the space below the selection of answers to add further information.

Please answer open questions as fully as possible.

1. Introducing interactive video to the school

1.1 In which year was interactive video introduced to the school ?

1.2 Why was interactive video introduced to the school ?

1.3 Was interactive video introduced to the school by :

an internal member of staff
an external consultant/adviser ? (Please tick).

1.4 How was interactive video introduced to :

the senior management

the staff

the pupils ?

2. Systems

2.1 How many of the following interactive video hardware platforms are being used?

IBM/PC Compatible
Macintosh
Acorn

(Please put the number used beside the platform).

2.2 Are the discs being accessed through:

pre-programmed software (software controlled package)
authoring software (allows creation of presentations)
bar code (without computer)
remote control device (without computer)?

(Please tick if any of these forms of access are being used).

2.3 Is interactive video used as part of a lesson or as support for a lesson :

every day

two or three times a week

once a week

only occasionally

not used at all ? (Please tick).

3. Software

3.1 Which discs and programmes are being used ?

3.2 Why were the discs selected ?

3.3 Are the discs being used in any of the following ways:

single users

small groups

large group presentation

to create presentations by students ? (Please tick)

4. Integration and implementation

4.1 If any of the following were chosen to use interactive video explain why they were chosen:

particular members of staff

particular subject areas

4.2 Who were the key members of staff involved in the implementation process and what were their roles ?

4.3 If the school had external support during the introduction and implementation period describe the nature of the support given and what advantages it offered.

5. Time and Support

5.1 How has time been allocated and used to support the implementation and development of interactive video ?

5.2 Describe the support structure in place for :

staff

students

6. Issues related to successful implementation

6.1 Where are the systems being used most effectively:

the library/resource centre
an independent resources centre
the classroom ? (Please tick)

6.2 What has influenced staff to adopt the use of interactive video ?

7. Teaching and learning

7.1 Has the introduction of interactive video helped to support change or affected the teaching environment in any way?

8. Development

8.1 How will the use of interactive video be extended and developed?

8.2 What will restrict the development of interactive video ?

9. Key Issues

- 9.1 List the key factors which you consider to be important to the successful implementation of interactive video.

Please add or attach any further information or comments.

APPENDIX 3

COMPLETE DATA ANALYSIS FROM QUESTIONNAIRE

Interactive Video Methods of Introduction and Implementation

1. Introducing Interactive Video to the School.

<u>School</u>	<u>When?</u>	<u>Why?</u>	<u>Involvement of External consultant/expert</u>
1	1987/8	IVIS	Y
2	1987/8	IVIS and F.Learning Project	Y
3	1987/8	IVIS/Staff-QMS	Y
4	1991	Flexible Learning Project	Y
5	1991	Flexible Learning Project	Y
6	1992	NCET Project	No
7	1992	NCET Project	Y
8	1992	NCET Project	Y
9	1992	NCET Project	Y
10	1992	NCET Project	Y
11	1993	NCET Project	No
12	1993	NCET Project	Y
13	1993	NCET Project	No
14	1993	Grampian PE/Staff-QMS	Y
15	1993	Grampian PE/Staff-QMS	Y
16	1993	Grampian PE/Staff-QMS	Y
17	1993	Develop resources, in/house	Y

Notes: Spread of experience, projects and support.

2. How Interactive Video was introduced to the school.

	Senior management	Staff	Students
1	Demo by IT coordinator. Whole day staff workshops	One to one Whole department	One to one Small groups
2	External consultant and staff working group.	External consultant and staff working group.	Specific subject areas by staff involved in working group
3	INSET within school by seconded teacher	INSET school by teacher/senior management	By staff within the curriculum
4	Internal Flexible Learning manager introduced the senior management.	External consultant by INSET to groups, Internal IT support technician to individuals	Specific groups in two departments with support of ext. consultant and IT technician.
5	Ext. consultant and F. Learning coordinator presentation and regular meetings.	Demonstrations using cascade method on INSET training days.	Small specific groups as research tool by ext. consultant & learning resources tech
6	No	No	Internal members of staff to small groups
7	No	INSET provided for Maths Dept. by NCET	Small groups, specific classes for projects.
8	IT organised through cross curricula working party interested faculties invited.	INSET during Maths faculty meeting. Wider school use through INSET to faculty reps.	Whole school demos. Special interest lunchtime group. Small group work
9	NCET training	NCET training	Fragmented process
10	Correspondence and phone to adviser	Head to senior management to staff	As part of their assigned work
11	No	3-staff development sessions. IT adviser	Class teacher part of normal lessons
12	Member of staff from another project school	Head and specific teacher introduced to staff	By class teacher to specific groups.
13	No	INSET to Maths dept. and IT staff	By the class teacher
14	No	By Head of PE and External consultant.	By Head of PE. to very specific exam groups.
15	Ext. consultant regional INSET	Ext. consult. workshops-target middle managed	N.A. The disc is for staff development.
16	INSET provided by Grampian	By Senior Management to staff	Only staff use up to now
17	INSET day	INSET day	Resource centre staff as part of learning prog

Notes.

3. Hardware Systems

	IBM/PC	Mac	Acorn	Interaction				Amount of use		
				Soft.	Auth.	Bar.	Rem	Every day.	2/3 week.	Once week. occasionally. no
1			8	Y	Y	Y		Y		
2		3	1	Y	Y	Y	Y			Y
3	2		1	Y	Y			Y		
4	1				Y					Y
5	1				Y					Y
6	1		1	Y					Y	
7	1		1		Y					Y
8	1		1	Y			Y	Y		
9	1		1	Y	Y	Y				Y
10	2			Y	Y	Y	Y			Y
11	1			Y				Y		
12	1			Y			Y		Y	
13	1			Y				Y		
14	1			Y	Y					Y
15	1			Y						Y
16	1			Y					Y	
17	1	1		Y		Y				Y

Notes. Abbreviations : Soft; Pre programmed software Auth; Authoring software
 Bar; Bar code reader Rem; Remote control device

4. Software

	<u>Which discs?</u>	<u>Why selected?</u>	<u>How are they used?</u>			
			Single Y	Small group Y	Large group Y	Presentation Y
1	G, V, L+E, E, D, RA, S, BoS	Curric. needs.	Y	Y	Y	Y
2	V, G, Ch, S	Curric. needs.		Y	Y	
3	V, Ch, S, D, SDA, QMS	Available through project	Y		Y	
4	P, L, WGP, G	Curric. needs Art+Geog.		Y		Y
5	O, VG, L	Curric. needs.		Y		
6	The World Of Number	Provided by NCET.	Y			
7	The World of Number	Provided by NCET		Y		Y
8	The World of Number. East, ILP	Provided by NCET	Y	Y		Y
9	The World of Number	Provided by NCET	Y			
10	The World of Number	Provided by NCET	Y	Y		Y
11	The World Of Number	Provided by NCET	Y	Y		Y
12	The World of Number	Provided by NCET	Y	Y		Y
13	The World of Number	Provided by NCET	Y	Y		Y
14	HG PE.	Dedicated curric. need	Y	Y		Y
15	HG PE, QMS1, QMS2	Offered-regional adviser		Y		Y
16	QMS1, QMS2, SDA, HG PE	Offered-regional adviser		Y		Y
17	GQ89, HV, Bio Sci : VB, MM	'A' Level and GCSE need.	Y	Y		

Notes: Abbreviations: G; Geography V; Volcanoes L+E; Life and Energy E; Earthquakes D; Domesday
 RA; Russian Art S; Seville P; Picasso East; Eastenders BOS; Battle of Somme Ch; Challenges L; Louvre
 WGP; Worlds Greatest Paintings ILP; Acom Science O; Orsay HG PE; Higher Grade PE VG; Van Gough MM; Mitosis+Meiosis
 QMS; Quality Management of Schools SDA; Staff Development Appraisal VB; Viruses+Bacteria VG; Van Gough GQ; Great Quake

5. Key Staff Supporting the Introduction and Implementation

	<u>External Support</u>	<u>Senior Management</u>	<u>Subject Specialist</u>	<u>IT /Flexible Technical</u>	<u>Staff Development</u>
1	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y
3	Y	Y	Y		Y
4	Y	Y	Y	Y	
5	Y		Y	Y	
6			Y	Y	
7	Y		Y		
8	Y		Y	Y	
9	Y		Y	Y	
10	Y	Y	Y		
11			Y	Y	
12	Y	Y	Y	Y	
13			Y	Y	
14	Y		Y		
15	Y	Y	Y		
16	Y	Y	Y	Y	
17	Y		Y	Y	

Notes. The categories emerged from responses to an open question.

6. Time and Support

	<u>Staff Time Allocation</u>		<u>Staff Support</u>	<u>Student Support</u>	<u>Location of Systems</u>		
	<u>Allocated</u>	<u>Minimum/None</u>			<u>Lib./res.centre</u>	<u>Classroom</u>	
1		Y	Head IT/IT Tech./pupils	Other pupils/Class teacher		Y	
2	Y		Resources manager	Classroom teacher		Y	
3	Y		Assistant head/Regional staff	Classroom teacher	Y	Y	
4	Y		IT Support Assistant	IT Support/Classroom teacher	Y		
5		Y	Resources Centre technicians	Resource Centre technicians	Y		
6			Y	None	Classroom teacher	Y	Y
7			Y	None	None		Y
8			Y	Maths teacher	Maths teacher	Y	Y
9		Y		None	None	Not used	
10		Y		Adviser/NCET	Classroom teacher		Y
11			Y	2nd in Maths dept.	Classroom teacher		Y
12	Y			Classroom teacher	Classroom teacher		Y
13		Y		IT staff/Maths dept	Classroom teacher		Y
14		Y		None	Workbook	Y	
15	Y			Sen technician /Ext.support	School coordinator	Y	
16	Y			Minimum/None	None	Y	
17	Y			Res. centre staff/Co.learn. res.	Resource Centre Staff	Y	

Notes. The categories emerged from responses to an open question.

7. Integrating Interactive Video into the Curriculum. Key Factors.

	<u>Provides relevant material</u>	<u>Supports resource based learning</u>	<u>Encourages use of IT</u>	<u>Extends existing resources</u>	<u>Motivates students</u>
1	Y	Y	Y	Y	Y
2	Y				
3		Y		Y	
4	Y		Y		
5	Y	Y			
6					
7		Y			Y
8	Y	Y		Y	
9					
10	Y			Y	
11		Y			Y
12					
13	Y				
14	Y	Y			
15	Y	Y			Y
16					
17		Y			Y

Notes: The categories emerged from responses to an open question.
To support resource based learning effectively the programmes must be accessible and easy to use.

8. Developments and Restrictions

	<u>Areas of Development</u>	<u>Development of authoring</u>	<u>Development of hardware</u>	<u>Restricted by:</u> <u>Time</u> <u>Funding</u>	<u>Other Restrictions</u>
1	Special needs	Y		Y	
2			CD ROM	Y	
3	Pupil access			Y	
4			CDI	Y	No. of systems
5				Y	
6	Extend use in Maths			Y	
7				Key staff leaving	Needed in classroom
8	Maximise use of discs		Equipment failure	Y	
9			Equipment failure	Y	
10	Selected subjects			Y	
11	Maths club			Y	No. of systems
12	Other subjects			Y	
13	With IT dept.			Y	Space
14		Y		Y	
15	PE.			Y	
16				Y	
17	GNVQ. Health and Social Care	Y	Use of Bar Codes	Y	

Notes: The categories emerged from responses to an open question.

9. Key Issues

When asked to list the key issues which are considered to be important to the successful introduction and implementation of interactive video the following areas were identified and are listed in order of importance :

70%	INSET/Staff Training/Time
58%	Well designed/reliable software
35%	Easy access to systems
29%	Appropriate disc content
29%	Support material
17%	Key member of staff for support
12%	Culture reflecting a flexible approach to learning
12%	Support of senior management
12%	Staff and student motivation
12%	Reliable hardware
6%	Funding for training and resources
6%	Accountability to outside influence

APPENDIX 4

TRANSCRIPTION OF INTERVIEWS

INTERVIEW WITH JD

AH Could you give me a little bit of detail about the project you have been involved with and the number of schools that are involved with it.

JD Right, the Carnaud Metal Box project is with the benevolent fund and the benevolent fund was set up to help employees or employees' children.

And basically they have always helped the employees with broken legs and disabilities.

And then they came across the problem that they had got the proceeds of the sale of two houses and the charities commission wouldn't allow them to do anything else with the money, except an educational type project.

So with half a million pounds in a budget they basically then thought well how can we help educationally?

They wanted to work with new technology and they wanted to work with employees' pupils.

So we set up a proposal that took in interactive video with training technology, training generic programmes, you'll have to sort this out later.

AH That's OK.

JD Training generic programmes and worked with some of their factories.

They identified the factories they wanted to work with and they've put them in a series around the country.

And they started small, so they started with four and that went out to another four in phase two and a third four in phase three.

It was a 2 year project and they extended that to 3 years because they realised they wanted to provide support for people just coming on board rather than just dumping systems down and leaving them.

AH Right OK.

Has the funding then provided equipment for the schools?

JD Yes, the funding has provided a Project Manager to manage it, which is me, and then equipment in the form of two complete interactive video systems in each school.

JD When we say complete, we have gone for the multimedia PCs with CD ROM drives and sound cards in.

They have also gone for up to 4 pieces of generic courseware.

So I suppose a total of about £11,000 per school.

When we got to phase 3 there was supposed to be a phase 4 and they decided not to and what they said was 'we'd rather put more resources into the schools we've already got'.

And that came out from some of the discussions with some of the senior management team, rather than just extend more schools.

So at the moment what we are doing, we have got all 12 schools up and running and some of the phase 1 and one of the phase 2 who've really been working well are now getting a 3rd machine and more courseware.

AH Right, does courseware include interactive video and CD ROM?

JD The only CD ROM courseware is 'Hotel Europa'.

The rest, unless they got them free with the systems because of the Philips offer early on, and the Philips offer with Air School 2000 was World Atlas and Comptons and what else did they get, Timetable History.

AH From the external funding, has any money been put into the school for staff development so that they could actually buy time?

JD Yes, by the end of phase, by the time phase 2 had really got going, so we had phase 1 in, where are we now we're January 94, phase 1 was July 92, phase 2 was sort of February 93 and phase 3 was September/October.

We had a meeting with phase 1 and 2 and the co-ordinators were ready to take forward phase 3, and phase 2 people and phase 1, said 'look one thing we think would help us would be to have more time' and time is a problem in the national curriculum and everything is so, the project the said, the steering committee of the benevolent fund said I could use some

of the project money to pay some supply cover,

So I have just done that, I've negotiated it with the schools and they've all perhaps given a day back.

JD So that I've now got, for instance, all of my phase 3 schools ie having about 2 days supply cover.

How they use it, like one of the schools is going to use it as 4 half days, another one is going to have one day and have 4 people out on that day.

So it's up to them, but basically about £200 worth.

AH And will they be working with you on those days?

JD No, I don't want to be involved at all in that, that's up to them to work in there.

AH They are managing it themselves?

JD Yes, they know what curriculum needs, which staff need time.

Sometimes it's just a matter of having more time to get to know materials more.

Other times it's how to integrate it into their curriculum materials that already exist, to get the confidence to let go with the pupils.

It seems to help push it forward quicker.

AH Right, so, I mean, the schools were pre-selected in a way by the project, by the company?

JD Yes, first phase schools was negotiated with the factory co-ordinators and the LEA's.

But the LEA link didn't really work very well so we forgot that in the next, and so it's purely by the factories.

And most of the time they pick one next door to themselves, but a couple of times they have said look we've helped them enough so let's go further afield just down the road a bit further.

But generally they're within a 10 minute drive of the factory.

AH So in that case, did you have to introduce the school to interactive video?

JD In all but one case, yes.

AH How did you do that?

JD Right, so when we've identified the school we then had a day whereby two people from the school came down to a day.

So we'd have 8 educationalist and 4 factory people at a school one day event.

JD On that day we would have about 5 interactive video systems with all the different training resources, we identified on a short list, being quite useful.

AH Where did you hold that then, where was that held?

JD Different hotels, we tried to get a hotel where they didn't have too far to travel.

The interactive video systems were provided by Apricot Longmore or IIS because they were going to get the sales.

Literally by the end of the day they had come to know what IV was, simply because they were using training.

They didn't know about it to start with, it didn't worry them, and they selected 4 titles to forward, not complete module sets, just one module in a set and so basically it was about £1,000 a disk.

They selected 4 disks they wanted and then, when it went into the schools I ordered the machinery, always ordered them a trolley as well and a 4 way adaptor, having learned from early projects and it went into the schools.

When it was in, it was set up by a hardware company who provided on-line support for the year.

Then we would design a day where I would go up, they then worked the day themselves, I didn't pay for that day and they brought out people at different periods to be introduced to it.

And it was purely the internal

(break in tape)

..... So basically the awareness days are up to them to design, who they want to get involved and I'll just go and support the day.

One thing I do do on the day though is have a session with the person

who is going to monitor the machine because we do have a logging software on the front end and it's important that the person knows how to monitor that software.

JD So I have a sort of techi session with one person in the school and the rest is just curriculum.

AH OK, so when you set up the introductory days, when members of staff came to you, which members of staff came and how were they chosen, how were they selected?

JD That depended on the school, but it usually was one of the senior management team and it varies, occasionally they'd send the Head of IT but that wasn't always the best person, that depended on the character of the person in the school.

I tried to avoid, I tried to talk them out of that if I felt the Head of IT was just a techi but if the Head of IT had a sense of something, they felt they ought to have an IT person there, if not it would be someone in charge of curriculum.

So usually a senior management and then somebody on the curriculum or IT front for the second person.

And they would then choose which materials they felt would support what went on in their school.

So for instance, people who ran Business Studies had no problem they went for the Business Studies ones.

If not they had to think now who's going to use it and if they've got an active English department it might work, if they haven't, which departments were in other words going to be able to go and run with it and they tried to choose departments that would in their schools.

AH Right, so one of my questions was, you know, how was the material and the courseware integrated and were subjects, staff and courses targeted?

JD Always, yes, I think that's the only way to get it moving.

AH OK, how involved with it were the management, the senior management within the school? Were they co-ordinating, what was going on once you got in there?

JD That varies considerably on the size of the school, I reckon and if you get a big school then they drop off and they delegate and that always isn't a good thing.

AH So you felt it's important, you feel it's important that they are there?

JD Yes, but if you get a school with 1500 to 2000 pupils you haven't got a hope of keeping them there.

And that gets a problem I think and in both schools that are large we've lost sight of the senior managers.

In all the schools that have been 600 and 900 the senior managers stay with it and keep it as a priority and it's important and it works then.

AH So your main contact has been with a particular member of staff that has been dedicated as the co-ordinator?

JD Yes, the co-ordinator, who is usually someone who is in charge of the curriculum or the Head of IT and occasionally in one of the schools it's turned out perhaps to be the subject teacher who runs with it all the time.

But whenever I go into school, I would say on 10 of the 12 schools the Head always knows when I'm around and will always pop round and say 'Oh I'm glad you're here and how is it, is it going well and are you getting what you want from us?'

And I think that's important that they are there and that's seen to be, it's important for the school that the Head's seen to be taking a part still.

AH Right, so the systems are in school and you've got a co-ordinator in place and you've got courseware that's been identified, set up, you then to into the schools.

How did you work from your first visit in the school then with the staff, the subject staff that were going to be involved and the pupils eventually that were going to use the systems?

JD Totally leaving it to them, and just, I have a factory co-ordinator as well and the factory co-ordinator did tend to pop in perhaps more at the beginning to give support.

But really it's entirely up to the schools and then I start picking up, you know, figures coming back from the, every month I get the software downloaded on how many users and that's when I pick up and perhaps fax the school or ring the school and sort of pick up on what's going on.

AH Right.

JD I pop in, I can't pop in with 12 schools perhaps more than once a term so it's a matter of then working out where to go and who to see and generally encourage them really and perhaps show them where other

schools are doing things, to encourage them to contact the other schools and they are very bad at doing that.

JD They all think they are going to do it and they all think they can swap ideas and none of them get round to it.

The only people who have actually rung each other on these projects have been librarians.

AH Really, that's interesting.

JD Teachers just don't get round to it.

AH OK, when the resources were integrated have they, they're being used in different schools aren't they?

JD Yes they are.

AH And that was left entirely up to the school where they felt the systems would work?

JD Yes, they all tend to think, oh library to start with, and then you have to open up different areas and you tell them the different ways.

One of them usually ends up going straight into a curriculum area and one into a library.

If the curriculum area is active and good then it gets good use and I think that's important and it's working.

If the curriculum area is weak, no I don't have a problem with that because where it has moved into curriculum it's gone in and been needed and been used.

It's the libraries where I think it's got the issues to work out.

AH And is that because having a resource like that in a library is affecting the nature of the normal teaching pattern do you think?

JD I don't know, I think there's some, I think there's some big fundamental problems with the teaching styles.

I think that, it surprised me that actually a couple of the schools I've got, and they're the large schools as well, the teachers won't, aren't happy with group teaching and they are very much into I'll have my 30 pupils.

So they can't let go, so they definitely won't use a library resource.

JD If you get down to the smaller school, say smaller, the more easy managed, some of them have got group style.

But they still won't often let a group go out to the library, so that's a problem.

So you've already got a problem that you've got to arrange to move to the room.

Then it depends on the philosophy in the school as to whether the library is a teaching room or not and whether you can get in there.

So the other way of doing it is to, to open up to a more flexible style of learning whereby you trust your kids to go off and flexibly you know, and use it there.

But that really needs some librarian assistants to be able to, be able to set up the system, to put the disk on because you do have that, because of their value they're often locked away, so it doesn't seem to work very often.

So there are all these different issues coming in to how it will work or won't work in a library.

It will work sometimes in lunchtimes, but then it tends to be that they're happy with CD ROMs because at that point then the IV are longer training programmes and longer simulations.

So CD ROMs they can go and dip in and find what they want for their homework.

AH Have you found that the schools that you've been working in, that the nature of the library environment has changed to accommodate this type of resource?

JD I think they're changing anyway.

It almost needs going through each individual library in each school and saying how, I mean.

AH It's a whole, a completely different area isn't it really?

JD But it is fascinating the way the libraries are where they want them and the libraries are where they don't get used enough. And it's because there isn't anyone taking responsibility for pushing and implementing, it's seen as a general resource but people then see

JD a blank screen, like your computers off there and they think oh I'd better not turn it on and what happens and they're just not, it's not somehow...

AH So its the support, and what about the environment itself, the sort of the

JD Well, that varies, if the library's big enough and there's space, they don't mind the audio but some libraries are carpeted and that works, some aren't.

And the whole environment, it's very varied in the 12 I've got, you know.

If they've got a librarian who's keen, it's got a chance, but even then they prefer the CD ROMs because they can relate to them because they see them as an encyclopaedia reference they say oh I need that, I need that sort of access and that resource.

They don't see the need of a school curriculum teaching package as such, I don't think, because that's not for them, that's for the teachers.

So they won't jump in and turn and put that one on necessarily because that's not their role.

AH So if it's a resource base of information, you think they're more likely to use it in a library because then it's going to be accessed more or less on a one to one situation?

JD By people just coming in, yes.

AH But where it's actually in a teaching module, which is more likely to be used by a group.

JD And groups are required to go for it as part of their learning within that.

AH Yes it needs to be in a classroom or a resource centre where they can actually talk and.....

JD It does.

AH I think that's the type of pattern I've seen emerging as well.

JD But I don't think schools realise that, that's the thing, and therefore they still want to put them in the library because they see it as being an access where everyone can get to but what they don't understand is that people aren't going to use it.

AH Yes

JD But that's only really just coming through with these programmes, more and more.

I didn't see it with IVIS so much.

AH What about the, we've talked about the, about the teaching styles there and the fact that you don't think some the teachers are accommodating the new technology in the way they teach.

What about the learning styles, are the children, the pupils that are using it accommodating it, are they comfortable with it?

JD They have no problem.

Yes, they'll be fine on it.

They'll just go straight in and dive in and find what they need.

And some of the teachers have set up work sheets like there was a and there was a particular part on programming a robot which is needed for the national curriculum technology so in fact they are told where to go to on that disk.

And they are told, you know, run the programme, set it up and do this, so they are on a worksheet.

So that style of learning is set for them by the teacher in a sense.

But they still, when we've asked them and done some research, they still prefer it, than just sort of not being in control of their learning.

But pupils just like to sit down and discover and learn don't they and they're happy.

AH Yes, and the time allocation that the teachers have said they need; why do they need it? What is it that they need to do with the time?

JD Where is that, at the beginning, when they need to know it or when they are using it with pupils?

AH No, when they are starting to integrate.

JD Some of the disks are easy and have no problem because you can dip in and out.

And if you can dip in and out, like 'Start your own successful small

business', you can dip in go and have a look at, put together a business plan or something and go out, and you can be on the system 10-15 minutes.

So that's more manageable I think for a group and you can do that.

I think the problems come there that if you've got a group of 30 and you're only doing business plan for 4 weeks in your syllabus then you've got a problem, which we've had with CAL anyway, how do you get through all the groups in that time before you need to go onto your next topic.

Is the topic on the disk small enough to fit into a small topic if you see what I mean, to work and I think it does with that.

The 'Financial management managers number 1' which is the balloon making simulation that can take an hour and a half or more to do, in fact it can take longer if you go back and forwards and that's more of a problem in managing it because one of the teachers comes out and says will there's no booking marking and how are we going to do it because we've only got 55 minute lessons and things; but it will always be a problem.

AH How have they worked through issues like that then?

JD They've realised that kids don't mind starting again if they've got there and we've all had to say to them look with something like that if you write down the important data the second time they go into it they don't need to go into it all again and they can do it, kids will fly through and they'll do it.

But it's a worry that teachers have but in fact it isn't a worry for kids.

An then the other ones, you know, they find other ways like one of them suddenly said 'oh well economics in the 6th form I do have them for a whole morning' so there are ways round it in some schools.

Other schools do have barriers of timetabling, I believe there are ways round these things.

But it might require a bit more preparation up front from the teacher to help fit it in to their schedule.

AH Have you had to spend any time training in a formal sense of the word, training the staff?

JD On how to use it or on what the content is?

AH On the whole ethos of using interactive video.

JD No.

AH So they've familiarised themselves with the systems and packages?

JD Totally, and they will go with it if they're comfortable with group work teaching and flexible learning styles, if they're not they won't.

AH So if the projects actually going to buy them time, they're going to get a supply teacher in to give them some time, what do they need the time for, what's the most important issue?

JD For developing how to go onto the disk, where they want them to go, what to do with that material, to fit it in to other things that are going on, like in business studies they have a whole series on making your own business plan.

And they have one school I have got, has got a series of 10 Archimedes around the room, they're all putting together their own.

Well you've got to actually then say you don't want them discovering where that business plan is.

So they've got to set up reference sheets as to where things are on the disk for the kids to know so that they can shoot in and out and find what they need.

And they just need to familiarise themselves with the disks enough, so they know what's on the disks to support the pupils.

And it's really that time, it's familiarisation and it's creating the, find the right answers, so you know the right answers.

AH So it's preparation really?

JD Preparation totally, yes.

AH OK lets move on to support. What sort of support structures are in place in the schools for the staff and the pupils?

JD The pupils, just the staff that runs them.

Support structures vary within each school.

The schools that have got technicians for interactive technology areas, information technology generally are way ahead now and half my schools have now got a technician and that really does help because if

you've got a Head of IT who's having to do everything and teach they can't then support everybody and run around.

So where you've got a technician that is the crucial support to really help people get the confidence to go.

AH And have you managed to involve the technicians in the schools that have them?

JD Yes, the technician is the one who takes over all the logging and usually the one who does it with all of them.

AH How do you see then, the use of the system actually being extended and developed; do you see it being extended and used beyond the use of generic training packages?

JD Yes, they are using it more and more for CD ROMs, definitely, they are picking up on those more and more.

They won't pick up on the IV very much because they can't afford the training packages.

They might be tempted into the staff training materials because there's a budget, they might be able to justify in £200 - £400 for QMS and appraisal.

That might be a option but they're definitely not going to go on for the training materials and there aren't many others around.

What they're not going to do is, they're not going to go into all three and then barcoding this lot.

AH Why?

JD Because they've not been opened up to it as a creative package.

They've had it shown to them as a piece of curriculum material in a sense.

It may not be the style that they need and therefore they've got to familiarise and prepare but it's there.

If you start say barcoding and authoring then what you are saying is get it into a different style.

AH You're talking about training then aren't you?

JD Yes you are, and these people are not the people who will need it for that.

So they're not likely to buy resource disks.

What they're looking for though is other support materials and CD ROMs are going in there.

They're all picking up, especially the ones in the library, they're all picking up on Encarta, Musical Instruments, all Microsoft packages and they're just buying all those so apart from that, no.

AH Do you think it would, I mean, if they were opened up to the use of barcoding or authoring so that the students could use it as a creative element, do you think that would extend the use of the system?

JD I think it would put it into problems from where the systems have been sited.

Because I think you really need a different style of teacher than we're using and a different style of use.

I don't see the need for it in Business Studies here.

AH That's quite interesting actually, because the 5 schools that I was involved with on the flexible learning project were all introduced to IV through authoring.

So it's quite interesting isn't it?

JD The different ways, yes.

AH And I think that needed to be done actually, to sort of just have a look at it.

JD Well this lot won't go that way, because what we're doing here, if we've given it to people who were almost technically phobic almost, then there's no problem.

But if you start generating things you're having to then get into the working bit.

AH But it was all, I mean a lot of it's linked up with costs, prices.

I mean the schools that I worked with were interested in going down the generic course not the generic courseware the authoring route, because the costs were so low.

JD Absolutely I'm sure this lot wouldn't have gone there if we hadn't have had this project, but they've been handed the top quality on a plate.

I can't see them going back to finding it out.

They had so little time to familiarise themselves with what's been given to them they certainly wouldn't sit there and make up their own now.

AH This is a really open ended one, I mean this is personal considerations but what do you consider to be the key factors to successful implementation of IV, if you've got to brainstorm this?

JD I was going to say brainstorm across, I've got notes on it for the senior management I mean I just think support got to be one and that has got to be really active and in a sense I'm providing that support as well into the schools.

You've got to be on top of them, you've got to push them because people otherwise will sit there and they won't mean to but it won't be used and they'll just be putting it off because it's not under that national curriculum guideline necessarily there, and if they're a bit hesitant it won't go.

So I think senior management support is one of the crucial ones.

What else do I think, oh I've got masses of notes on this at home.

AH Send me the notes.

JD Yes, I think I will, I think I'll dig those out on what I've written before because I mean I think we all agree don't we on costs and time and help and ...

AH And are you saying that you don't think schools are going to run much further with IV then unless they actually get material given to them basically?

I mean, that's saying it's the costs isn't it?

JD Yes.

I don't think it will be running in schools, no.

If a school was asked to buy one today it wouldn't necessarily.

I don't see why they should.

JD I would if I were a school for staff training but I can't see what I would,

and as a Geography teacher I might do if I knew the resources that were around and I was prepared to do barcoding.

But it's not necessarily that cheap, you've got to have your computer to generate your barcodes, you've got to buy those sort of things so it's not going to be easy to pull it all together still, unless you get to Bruce Wright and get a package.

AH So as a way of introducing a school to multimedia it's been quite a good vehicle?

JD Its been brilliant, and there have been masses around haven't there.

But as a commercial viability I think it will be CD ROM that will go.

INTERVIEW WITH RM

AH I'm really looking at the type of support structure that you've got in place.

I think probably if we go back historically a few years I'm interested to know why the support structure was initially set up.

RM Well, really about the mid eighties about 86 our Director Jimmy Graham got interested in interactive video and at that time Ron Roscoe had been offered a secondment to support Art in the schools and he'd expressed an interest as well.

So his role began to change, to look at things like the Doomsday Project, the IVIS Project and so on.

I was also seconded at the time to look at computers in Language Arts and at the end of my secondment I was asked if I would like to stay on as a permanent member of staff, working more closely with the interactive video side of things.

So really since 1987/88 there have been 2 of us involved, full-time, to support interactive developments within the schools and that's meant both of us looking into some of the national programmes of development.

Like, I worked on Management Times, Appraisal Interviewing and RPBE stuff.

We also support the schools within this authority and more recently offering our services out with the authority.

AH So have you been almost able to set up your own agenda?

RM Absolutely, and very much so, and part of it evolves constantly depending upon the demands of the schools.

To begin with what I wanted to do was to focus on two particular sites and to see what I could achieve with offering a lot of support to schools.

So I chose two schools, Old Mackem Academy and Deboyd Academy and spent a lot of time there working on site.

The Old Mackem Model, as we call it now, is well up and running. So what I did, as development officer going in and facilitating developments and working with teachers, working with students and so on.

RM That role has now gradually been taken over by the Senior Supervisory Technician, Ann McEnzie, who has actually been on maternity leave and is back this week.

But her role now is working, not just in the secondary schools, but with primaries all of which are of very close proximity to the school.

So she does things like in-service training for staff, not just interactive video but hardware, to the primary schools, she works with primary children.

She offers in-service courses and offers a tremendous amount of support that the schools have been totally grateful for.

All of that is co-ordinated by the Deputy Head Teacher, Joan Sadler, so she is a wonderful facility.

She sees clearly where the needs are and provides the time often buying in staff cover to release staff to work on projects.

AH Where does the funding come from for something like this?

RM Well, the schools you heard Joan talking about, what's it called, school focused money.

Each school has some money that they can use in a variety of different ways and Joan is a firm believer that if you want things done you really need to buy in cover to allow the staff to do things properly.

You will hopefully see her tonight actually, she should be along to the network group, so you should get a chance to have a chat with Joan.

But, Old Mackem Academy, this one that has done most in terms of providing us an infrastructure of support with this person, Senior Supervisory Technician being the key person in the whole process.

AH And you were the external consultant the came in.....

RM I am the external person that came and got them started.

But now I very rarely go into the school, I mean there was a time when I was always there, every day, but now it's only the odd occasion that I go in. I was in recently.

I was doing in-service, the PE staff, with the new IPPE disk and was in recently introducing a group of staff to QMS.

So, they were actually hoping to organise something worthwhile this week, when Ann is back from maternity leave.

But they have quite a lot of hardware within the school here.

They have couple of IV systems and they work quite a lot with the old BBC ones as well.

AH Are both the IV systems PC based?

RM Yes

AH Are the systems in that particular school your focusing on, used in a whole variety of different ways?

RM Yes

I mean there is quite a lot of curricular use with the old BBC, well there was, its now broken down and unfortunately they say they can't be fixed and they used to bill quite a lot in the French department.

They use challenges a lot because I'd re-written a lot of their files to focus in using the English classroom and also the guidance area, for children talking about truancy or issues like that.

And that was really successful.

Doomsday I think is still used in primary, quite considerably. But more and more we are looking at trying to re-package the older disks for use on the PC.

AH So what about the use of authoring, is that used in many of the schools at all?

RM Well there's more and more interest now in using PC Opensoft for authoring and at Old Mackem has used it quite extensively we, when we're using the old BBC Opensoft we had our own interactive video club every week and the kids stayed back once a week.

I used to run it to begin with and we showed them how to use Opensoft and they created their own files.

They were even beginning to take on commissions from staff.

AH You covered that on video didn't you?

RM Yes that's right.

AH Yes I've got your video.

RM And Ann has continued with that.

I think she really needs perhaps a little bit more training now in the latest version of PC Opensoft because it has much more mileage but it's having your handbook out for that so maybe I'll but up the money.

AH What about staff using it?

RM It 's lapsed slightly since Ann's been off on maternity leave.

Because she is so clearly associated with the systems and she takes a very pro-active role.

She will say 'we've got this video disk, I know that you are free at such a time, why don't we get together and I'll show you and I'll talk through how you might use it in your classroom and so on.

That has now been missed since she's been away, but now that she's back.....

(break in tape)

AH need to be identified with a person in each school.

RM The other school I mentioned, they are Deboyd.

They were up and running very successfully when I was going in and out.

As soon as I stopped involvement, because the aim was to get the school self-sufficient, that I would be on call if they needed me, but really they should be able to cope by themselves.

That never happened at Deboyd.

They were never prepared to take that over.

So that now, they have still got the BBC one up and running and it's used quite a lot in the Art department but other than that, nothing.

They've recently taken delivery of their PC version to support appraisal training but they haven't come into the phase yet.

RM They'll be in the next phase at the appraisal. So I'm hoping that once this starts they might begin to use it a bit more.

But I have got a teacher out there at the moment who is doing one of the college courses in IT.

She is actually a languages teacher.

And she rang up and asked if she could have some training in Opensoft because for part of her course she has to produce something, a file or something, so she wants to do Opensoft files.

So I've done a session with her and I'll keep in contact there and see how she is progressing.

AH What about barcoding, do you use any barcoding?

RM We have a couple of systems but we found it was very unsatisfactory.

I put out a barcode system with a package, out to one of our schools in Aberdeen, Bank Head.

The Business Studies department had expressed an interest because John Bonnington of Central Region had produced a video disk, which was filmed in this area by our video crew, on competency in Hotel and Catering trades.

It covers things like reception skills, serving in a bar, in a restaurant and so on. It's actually quite good.

And its aim was actually that it would be used for training in hotels or for students of catering colleges, stuff like that.

And we thought that it might relate quite closely to the ISBQs, to modify

courses.

It's got bigger modules running in schools.

So the Business Studies department expressed an interest and they've had the barcode system for quite some time and they were actually very impressed with the reception skills part of it but they got totally frustrated with the barcode.

So slow, it doesn't always pick up when you swipe the light pen and they just gave up.

So he phoned me and asked me to come and collect the system and I had a chat with the principle teacher who identified with me the areas that he felt were appropriate and really good for use and I've undertaken to re-write that in Opensoft so that they can then run it off their school IV system.

AH That's interesting.

RM So hopefully I'll get started with that, maybe next week.

AH And what about using the laser disk player with the remote control for large group presentations, do you ever come across that?

RM No, not at all in fact.

With the BBC system the monitors are opposite the televisions, they are much bigger and we could use this quite successfully with fairly large groups, but with the PCs obviously not.

But we don't find that a problem, in that at the moment we are not really using curricular packages among the IV systems, apart from the PE ones and we're really finding, with the PE disk anyway, it lends itself particularly well to small group use and to individual use which the teachers are managing to sort out quite happily.

AH I'm quite interested in looking at something like the laser disk player and the laser disks as a substitute in some cases for tape and tape based material and just resource material as well.

I was wondering if you actually introduced interactive video to a school, covering all of those areas of the whole sort of flexible range of uses you can make of interactive video disk, from remote control, to authoring, to generic packages: whether that helps it to be more accepted in the learning environment or not.

RM Yes, I think really the way that we would go into the schools is not looking at the flexibility of IV it's looking at how it would directly relate to something in the curriculum.

And I think that that has to be the main way forward.

But teachers are often very enthusiastic about IV if they meet it on a course; but trying to get them to embed it into their own curriculum is quite difficult because of the lack of appropriate video disks, it's certainly with the Scottish curriculum and the PE one, as I said earlier, is the only one that exists at the moment, there is nothing else.

And although of course we would have access to say the maths disks or whatever, it's still not related closely enough to the Scottish curriculum and then you're back to this whole issue of re-packaging it with Opensoft and all these other things which we really don't have time to do.

AH So it's really the tailored nature and the interaction that's important to the introduction, you think?

RM Yes

AH That's interesting.

I mean what have you found, if you're actually going to a school that hasn't used interactive video before, if there is a format that you've developed now, how do you introduce it and implement it?

RM Well, in this authority, interactive video is going into schools for a particular purpose anyway; primarily to support staff review and development at present training.

So because of national structure and regional structure that sort of pre-empted what otherwise we might have done.

And because for most people, if they haven't met IV before, they would meet it in the sessions on the SOED funded 3 day training course; progressive training, a residential course, 2 tutors and they use IV as one of the workshops.

AH And where do you hold those sorts of courses?

RM Those are held in hotels, it's all funded by SOED. In fact there's one coming up next week, 3 days residential at a hotel beside the airport.

This is for the phase 2 schools, Makeland and Stuart will talk to you about that at the next visit.

So they see IV, they see schools for appraisal interview package and after that they are offered a one day training session which again I run.

Tony and I were seconded for a year to do training sessions together around the country.

I think he still does some of them in other places and I always do the Grampian ones.

So they get a whole day in front of the hardware with the schools for appraisal interview package.

AH That's in the school?

RM That's in Summerhill, at the Centre in Summerhill.

And that works extremely well, it's quite well received.

And then they always know that they have Ron and myself to call on if there is any sort of problem.

Sometimes they will invite you into schools to do further training. Usually they are quite happy to get on with things themselves.

But it depends very much on the people who've been trained as the tutors; some of them are extremely enthusiastic about using it.

Some of them will use it first of all in the appraisal training programme on site to raise awareness, to set the climate for a staff review in the school.

Others will use more paper-based material and then build up to the use of IV.

It's very much according to the needs of the school and the individual personalities involved.

So, as I say, for many people that would be the way in.

As other ideas come on stream we offer appropriate training to the people involved.

Like the higher grade PE disk, it comes on stream, people are made aware that it exists and they are offered the appropriate training which is then negotiated.

So, as I said earlier, it could be me going for two hours and doing something, it could even mean me being there for a day and doing something.

And it's always embedded into higher grade courses which are organised with the PE adviser and are contributed to rules.

In fact we had such a response of enthusiasm that the PE adviser also offered a day on Opensoft, which again I ran because people wanted to see the wider possibilities.

So that was so successful that we would repeat it in the new financial year.

AH When you actually come into a school and you're working with the subject specialists, how do you draw in the support staff, the other support staff that the school will need, and the technical staff and the library staff?

RM Well that's done separately through our Technical Services Manager.

Through him we negotiate technician training days and we've done three now.

So that in the first batch we offered the schools which already had IV hardware on site, they were offered a place on the course.

And now we've covered the whole authority.

So that in all the secondary schools somebody has actually been trained.

AH Do they actually get involved with the sessions when you come into the school as well so if you're working along with PE staff.....

RM Often they do, if I'm working with the PE staff there is often a school technician who will come along just to see, they've all seen the package so they know it, but often they'll come to be reminded of it or whatever.

Or they'll keep in contact by telephone for instance and if they want any more help and support they know that we will go out and help them.

AH So when you actually withdraw from the school to an extent, although you are always there at the end of the phone, but when you actually withdraw to let them, to move forward with it themselves, who tends to be the key person that's left in place to monitor or move the developments along?

RM It depends very much on the organisation of the school.

I believe strongly that there has to be somebody from the senior management team who has overall responsibility because that person has

the clout, if you like, within the school to organise the facility, to encourage and so on.

RM So you've seen here, John Imrey the Deputy Head Teacher, has an overview.

At Old Mackem, again a Deputy Head Teacher and so on.

Sometimes though you have a very keen Staff Development Co-ordinator.

Now, when schools come into appraisal training, or staff review as we call it, they have to appoint a Staff Development Co-ordinator to take on board the needs of the individuals as they go through the review.

And in some schools that person really becomes the key to it all.

I've actually been talking to Makeland this week about the possibility of organising some more awareness raising courses for the Staff Development Co-ordinators, so that they will come to Summerhill and spend the day or a couple of days looking at the various packages that we offer, they can borrow from us, with a view to just raising their awareness and helping them to provide the appropriate sort of support mechanism to the staff.

(Break in tape)

..... provision within the authority.

There will be a number of closure days within the authority where all schools are closed particularly in-service training but there will be regional sessions running.

There is also school based in-service days, the schools can identify days and use them for whatever purposes.

And there is also personal development time when teachers, every year, have a number of hours that they have to negotiate with whoever is coordinating it, exactly what they want to do.

AH Are the hours negotiated once the timetable has been set up and supply staff are brought in to cover the

RM Well it happens out with the school day PPD usually, I haven't been involved with a school, I haven't been a member of staff since PPD has been running, so I am not totally clear about how it operates in schools but certainly teachers have to indicate an area that they are interested in.

I know one school for instance, it was one teacher who came out to English teachers with computer meetings and we went to Edinburgh and Glasgow for all those meetings and that was part of her personal professional development.

She could then go back into the school and help others and so on.

RM So, it gives teachers a time, a set amount of time in a session, not a tremendous amount, but a little bit, that they can identify something that they want help with, then that can be organised either on a school based basis or on a regional basis.

AH The schools that have actually got the students using interactive video, other schools are quite used to the flexible approach to learning as their standard teaching, already set up in a way that they can incorporate the use of interactive video quite easily.

RM Yes, I think that it would normally be used by a teacher with a small group or with a whole class to begin with and then very much the students would take over on their own.

But the whole curriculum in Scotland now is very much constructed around independent learning, small group activities and so on.

So I think the release of technology supports that flexibility.

AH It sits into it quite comfortably.

RM Yes it does, and particularly when most of our technology ends up in libraries for instance.

Most of the hardware, well this one isn't, but most of our IV systems are trolleys.

That's the trolley that goes along with that.

So we encourage people to move around in the school with, usually the library as the base site.

So it can be used in a variety of flexible ways.

AH Have you introduced IV into a school that isn't particularly comfortable with a flexible approach to learning at all?

RM Not really no, I think everyone here is, it's not anything new, the students come and go into the libraries they use cut and paste on the computers, clip art, all sorts of different things and the use of IV is only

part and parcel of that.

AH Certainly with being involved in flexible learning programmes in England I've found that using IV can actually be a catalyst for change but then it is much more difficult to embed it into a school or even introduce to a school if they are not used to working in a flexible environment.

AH You don't seem to have that

RM I don't see that as a problem at all.

I mean, there are some teachers, perhaps in the younger stages and there are one or two in the secondarys who are perhaps slower to move along towards more flexible models of learning, but generally not.

It's just an acceptable that's the way that it's done here.

AH When you are introducing it to the school, you have got a format really, that you have your awareness session, which could be in different locations and you introduce the management to it and it's a sort of cascade effect to the actual teachers that will then be involved and you also pull in more support staff which can be library based or technical.

RM So, we need to feel within a school that there are people on site who can offer immediate support if that's necessary and I think that it's beginning to work quite well.

It's now working to the degree that in fact next week a letter will be going out from the Director to all secondary schools reminding them that if hardware is requested by a primary school for the purpose of training then we must be allowed to put out the hardware to the primary.

Because we are now in the situation where people don't want to give up their IV hardware or people are beginning to fight over it because it really is becoming so popular.

We are hoping that the introduction of CDI into the primary sector will help ease the burden on the IV systems that are out there.

AH Do you see the CDI systems and the CDI disks actually replacing IV eventually?

RM In the primary sector I think that is definitely the way forward. I mean there are quite nice packages available, only for entertainment at the moment, but there are some quite good things that you can use in the primary schools.

There are a number of initiatives at the moment through SOED as well to produce CDI and I'm just waiting on information on that.

At the 'Review in Action' day that Stuart Wilson and Mick McDran(?), we have done two of these now, based around the schools appraisal interviewing.

RM We used both interactive video and CDI, CDI's with primaries, and there was such a degree of enthusiasm.

Primaries were saying 'how much does this cost?' and we explained well we can get it at such and such a price through a specific grant but if you want to buy it it's 'x' amount of money and they were saying 'well we can't afford that'.

So, we are actually in the process of thinking about putting together an information pack which will go to schools.

I contacted Tony van de Kyle, asked him for an update on all CDI packages that are currently in production with timescales and so on because we felt that it is important to show that this is being supported at national level and things are coming out which would be of direct relevance to the Scottish system and hopefully when we get the pack put together we can put them out to all the schools and I think a lot of them will want to purchase independently.

So that's quite good.

AH So although they won't need as much technical support they still need that support structure with introducing the application to the staff that are facilitating it.

RM That's right.

And certainly the schools with the appraisal interviewing package, it does transfer very nicely to CDI.

Other packages, though for instance the Hartley PE that you've seen this afternoon, it simply could not be translated into CDI because a lot of that involves the student writing their own material, doing tasks on stream through the keyboard or compiling their own multimedia essays and obviously that facility would not be available on the CDI.

AH So that's your extra value for money almost, isn't it, the flexibility of the system and the fact that you can extend the use of the material.

RM That's right.

AH What about any schools that haven't developed the use of IV, that have had a system and it hasn't moved forward, it's stopped being used?

What are the main factors, I don't know whether that has happened, but if it has

RM Well obviously some interactive video systems are used much more than others.

It depends a lot on the timescales within the school.

It depends on their priorities, if they have not yet come into appraisal training for instance, you tend to find that the hardware is sitting there vastly under used.

Or maybe they are only using the CD ROM facility even that, I mean that's fine, but it comes in bursts.

All of a sudden they are into appraisal training and suddenly everybody wants access to the hardware and that will maybe go on for a month and suddenly it will go quieter again.

But until we have more packages which are of direct relevance to our curriculum I think that's always going to be the situation.

AH Do you think that there will be a continued development of packages for the IV system?

RM I would like to think so.

RM SOED philosophy from day one with IV production was that it had to be targeted at staff development.

In many ways, looking back I think that was the right decision to make because we were targeting, in the first instance, head teachers, secondary schools, senior managers, under managers and so on.

Ordinary teachers for own appraisal training.

And when you get people in schools, teachers, schools using the technology for their own purposes, their own staff development purposes, then they have an interest awareness of the potential for IV within the curriculum.

So the first question they ask is what have you got for my subject and usually we have to say well I'm terribly sorry there really is nothing at the moment, but hopefully the research that's ongoing at the moment in

Scotland will indicate that that is a perceived need now with teachers.

I certainly hope that SOED would produce more packages which have certainly the staff development dimension to it but also the curriculum dimension.

AH You haven't used very many resource disks without software attached to them.

RM Sometimes yes, but usually again we would use Opensoft to use something if a teacher has identified a particular disk say Avec the French one has been particularly important the we can perhaps try and get some software to go along with it rather than just leaving it so open ended.

AH What about the Art disks, things like that?
Have you used those at all?

RM Not extensively I must admit.

AH They are what I class as a typical resource disk, that could stand alone, probably with the.....

RM We use the Van Gough one a lot and it's in the Art Department all the time, students would just come in and go on that.

AH Would they have their own system in the Art Department?

RM Yes, a BBC one normally.

But I think we need to invest a bit more money in some of the packages and allow schools to access it.

But it is only recently in Grampian that we have had the level of hardware provision that we now have.

So obviously, this is an ongoing thing, that we are going to have to look quite closely at the possibility of setting up a software library, a video library that the users can borrow.

AH So you wouldn't expect the schools to purchase their own disks?

RM Well the situation is changing so rapidly at the moment with regard to budgets that we would certainly hope to provide something on a regional basis and maybe eventually be able to charge them for accessing packages, that sort of basis.

But those are issues that we are currently looking into at the moment.

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