The Use of Personal Video
Conferencing with Special Needs Pupils
from Three Schools Serving Rural Areas:
a case of successful adoption of new technology

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ABSTRACT This article will focus on the use of desktop (or personal) video conferencing to link groups of special needs children from three secondary schools in a rural area of Wales. The collaboration developed out of a Superhighways project which introduced video conferencing to a network of schools and which was aimed mainly at supporting geography teaching through the use of satellite images of the Earth. The link was used with the special needs pupils to develop communication and social skills and to overcome their relative isolation from other pupils with similar needs. The article will examine how the technology was used and identify factors that might have influenced its adoption amongst the teachers involved. (N.B. Throughout this article, the terms ‘desktop’ and ‘personal’ video conferencing refer to the same thing, i.e. a system consisting of a small video camera mounted on a desktop computer.)

Introduction

This article describes a personal video conferencing link-up between groups of special needs children from three rural secondary schools, which came about as a spin-off from a larger project aimed at using personal video conferencing to make the facilities of a Local Education Authority (LEA) curriculum unit accessible to teachers and their pupils.

The parent project involved setting up a network of personal video conferencing terminals by the Dyfed Satellite Project, an LEA curriculum unit based at Aberarad, Newcastle Emlyn in Wales, with the main aim of supporting geography teaching through the use of satellite images of the Earth. Initially, eight secondary schools were involved with this being expanded in later phases to involve 16 and then a final total of 27 schools. Each of the schools was provided with an ‘Intel Pro-Share(TM) personal
conferencing terminal with dial-up facilities for both personal conferencing and data/document sharing, using Intel Pro-Share™ software over ISDN. The network also allowed schools to access the Internet via the server at the centre. The project began in the autumn of 1994 when schools were invited to bid to participate and continued with schools having the equipment installed in phases, starting in the spring of 1995 through to the summer of 1997. The special needs video conferencing link-up developed within this project through an initiative taken by the teachers and managers in three of these schools.

During 1996 and 1997, the project was evaluated jointly by the author and staff from the School of Education at Leicester University, as part of the Education Departments’ Superhighways Initiative (EDSI) project and is reported on in full in the EDSI final report (EDSI, 1997).

To set this study in context, a brief review of the use of video conferencing with children and in education is needed along with a review of the use of information technology (IT) with pupils who have special educational needs.

**Video Conferencing with Children in Education: a brief review**

Whilst conventional video conferencing has been in use in education for over a decade, desktop, or personal conferencing, is a more recent development. The problems with conventional video conferencing have been highlighted in a number of instances and include difficulties arising from the formal setting. These give rise to constraints on teaching style, so that it leans towards a more didactic approach. As Dallat et al (1992) comment from their experiences of using conventional video conferencing in working with postgraduate students: “Teaching by video conferencing had, as expected, altered the tutors’ style of teaching ... there had been less activity learning” (p. 18). Abbott et al (1993) and Robinson (1993) also highlight the limitations both in terms of formality of setting and difficulties arising out of the technical constraints. Mason (1994) reviews the advantages and disadvantages of two-way video conferencing and concludes that “it does not make sense to use two-way video to lecture ...” and that “… small group tutorials should be the model for two-way video” (p. 81). She also predicts that, as the technology advances, the use made will shift from a lecturing mode towards a more interactive approach: “The advent of desktop video conferencing may also reduce the amount of video lecturing in favour of small group interactions” (p. 81). She further acknowledges the fact that whilst many students feel more comfortable with a teacher being actually present than in small group applications, “students can interact with each other across sites in a very natural and spontaneous way” (p. 80). The interactive nature of desktop video conferencing is commented on by
Edmonds (1996) when reporting on its use in a distance learning project involving small groups of pupils with teachers in Australia. The teachers and pupils involved all report that the face-to-face contact and the increased interactivity it generates is what sets it apart from other technologies used in distance education.

The ideal number of students using the facility differs for conventional and desktop use. Whilst the students involved in a video conferencing project in Ulster (Abbott et al., 1993; Mason, 1994) felt that eight was the maximum number when using the conventional set-up, five would seem the maximum number when using desktop video conferencing, given the small format of the screen.

Apart from ease of use, another advantage desktop video conferencing has over the conventional set-up for this type of work is that it does not need an environment of bright lights and closed windows to cut out extraneous noises, but instead allows a much more informal setting with pupils arranged around the equipment in a way that they can see each other as well as the screen, thereby lending the situation to more interaction. It is likely that the constraints imposed by the environment necessary for conventional video conferencing lead to extra stress experienced by the users. Students involved in the Ulster project were reported to suffer from ‘techno-stress’ if the sessions were not limited to under an hour (Mason, 1994, p. 107).

One aspect of video conferencing central to this study is the notion that the technology itself acts as a sort of buffer or distance which acts as a facilitating or in some cases an inhibiting factor. Moore (1992, cited in Abbott et al., 1995) talks of users having to overcome “transactional distance” which comes with the separation. This is seen as “a psychological and communications space to be crossed, a space of potential misunderstanding” (p. 77). Austin (1992) sees the ‘distance’ due to the technology as an aid to interaction when describing reactions of students to a video-conferenced debate they had taken part in where the distance is perceived to have aided the debate. Some found the distance was an advantage: “I felt it was easier to speak out when the ‘opposition’ was not actually in the room ...”. Another said that the distance prevented discussion “from getting too heated” (p. 30). In another context a proportion of students being tested through video conferencing said they felt more relaxed or at ease in the video setting rather than in the presence of a live tester (Clarke & Hooshmond, 1992). Abbott et al. (1993) talk of the distance of the tutor leading to a more relaxed interaction between the students and quote a student who talks of “the freer atmosphere during group discussion with the tutor at a distant site” (p. 129).

In the quite different context of a courtroom, studies have shown that the distance created by using a video link can have a positive effect on interactions involving children. Yates (1992), reviewing findings of a Home
Office study, talks of children showing less stress and anxiety when giving evidence via a video link compared to children in a conventional courtroom: “Furthermore their testimony was more audible and fluent as well as more consistent and less confused …” (p. 50).

Whilst some concerns had been expressed over the distancing effect and possible disruption to the dynamics of conversation when used in this context (Davies, 1991, p. 186), subsequent studies confirm that a live link was of clear benefit for children giving evidence (Saunders, 1995, p. 24). It would follow therefore that, with children who are easily overawed or lacking confidence, personal video conferencing may be of help in easing social interactions through being one step removed from reality and so alleviating anxieties involved in face-to-face interactions.

From the literature, it seems that personal conferencing has specific advantages in contexts where pupils are working in small groups and the style is interactive, the setting needs to be informal, and where the distance created by the technology may aid interactions that would normally be more difficult.

**IT and Pupils with Special Educational Needs (SEN)**

The Warnock Report (Department of Education and Science, 1978) made it clear that children with special educational needs could well require additional resources. Examples of where IT has been used to support such children to good effect can be seen in the literature. Chambers (1997), in his study of using interactive video (IV) with SEN pupils, gives examples of where IT is used to produce beneficial outcomes. He found that the pupils with special needs were able to grow in their self-esteem, develop a sense of ownership, work collaboratively and develop language through discussion using IT (IV). He also found it serves to motivate and provide positive experiences for those pupils who frequently experience failure and was able to contribute towards altering the behaviour of pupils who were frequently difficult to discipline. Equality of opportunity and accessibility of the technology were seen by teachers to be especially good features in that “the technology ... was immediately accessible to a group who perceived themselves as normally disempowered in such an area” (p. 37).

Earlier research indicates similar findings. Hawkridge & Vincent (1992) give examples of how IT may be used to encourage children with learning or emotional and behavioural difficulties (EBD). For example, Howard (1991, cited in Hawkridge & Vincent, 1992, p. 183) advocates the use of IT with children with EBD because it would “encourage such children to want to be involved in the learning situation, (and) develop their ability to manage social situations ...”. Mansfield (1991, cited in Hawkridge & Vincent, 1992, p. 179 [personal communication]) is similarly cited as advocating IT as “part of
a strategy to give pupils with moderate learning difficulties an experience of success in a new subject where they have had no experience of failure.

It is clear, therefore, that pupils with special educational needs stand to benefit in a number of ways through the use of IT in their learning, ranging from improving motivation, confidence and self-esteem to developing social and cognitive skills.

**The Dyfed SEN Link-up**

The special needs link-up came about through the programme of training set up within one of the schools as part of the parent project. The first round of training on video conferencing involved senior managers who had been designated by schools to take responsibility for the project as a condition of participation and this took place during early meetings at the Satellite Centre. At the outset each established a support group of interested staff and these were next to be trained. Most training was done on-line, usually in small groups. The amount of training varied from school to school but usually consisted of 2-3 hours spread over several weeks, supplemented where necessary by school visits from members of the project team and backed up by the school’s IT coordinator and technical staff. In one of the leading schools, a later phase of training was introduced in which teachers were asked to develop ideas for use in their own areas of expertise and come back at a later date to carry these out. The most successful and sustained use to come from this approach was the development of the inter-school link by the SEN department involving two other schools. In this development, ownership was very much in the hands of the teachers involved, with their role being to plan and implement the use of the link, while the role of the project coordinator and technical staff was that of supporting the initiative.

The link involved groups of special needs pupils from the three different schools communicating with each other on a regular basis. The conferencing took place every week with each group being able to access the link once a fortnight. The pupils were usually supervised and supported through the session by a special needs teacher. The special needs of the pupils mainly centred on learning difficulties but also included emotional and behavioural difficulties and other problems such as hearing impairment. At this stage, dissemination mechanisms were not in place and the special needs initiative remained limited to the three schools. As there was plenty of scope for exploration of uses between the three schools, little need was seen to further link up to other schools.

The main aim of the conferencing was to improve the pupils' social skills through facilitating contact with other pupils in similar situations, and thereby foster their communication skills, particularly in talking and listening. With some pupils, it was also intended that using the link would help boost their confidence and self-esteem. The intention was also to
motivate the pupils through the use of new technology and, for some, to use
the situation to focus and organise thoughts and actions. For other pupils,
the intention was to develop keyboard and writing skills and address specific
curriculum aims relating to local history and geography.

In addition, the video conferencing was to be used as part of a
behaviour modification programme for pupils with behavioural problems.

Data Collection

Data was collected as part of the EDSI evaluation during 1996 and 1997,
and was supplemented by further data collection focused specifically on the
special needs project in the three schools. Four rounds of site visits were
made in which both open-ended and semi-structured interviews were held
with project coordinators, IT managers, special needs teachers, care
assistants and groups of pupils who had used the video conferencing facility.
These were supplemented by additional visits throughout the period of the
trial to observe the facility being used, and by documentary evidence from
the schools. Initial interviews focused on experiences with the project, its
facilities, technical set-up, problems encountered, details of specific activities
and information on costs to the schools. Later interviews and observations
focused on individual case studies of how the pupils developed through
their use of the facility. Schools were also asked to administer a pupil
questionnaire on pupil use of IT and keep a log of project activities.

Interviews were also held with the project director and staff at the Dyfed
Satellite Project Unit. Altogether, 35 pupils, five special needs teachers and
three care assistants were involved in the special needs project, along with
IT managers, technicians and project coordinators from each school.

Case details of 16 of the pupils were built up, drawing on interview
evidence, project logs and observation of pupils, which also included teacher
observation. The cases, illustrating a range of special needs and the uses
made of the facility, are summarised in the Appendix along with quotes from
the supervising teachers. The cases are divided into five broad categories
relating to the aims and whilst most pupils fit clearly into one category,
others could fit equally well into more than one.

Discussion

From this evidence, it seems that the use of video conferencing succeeded in
meeting the aims for many of these pupils. Social and communication skills
have been developed in most with specific successes apparent in the speech
development of Pupils A and B. In interviews, pupils indicated that they felt
they had to think more carefully about what they were going to say, listen
more carefully, and speak more clearly if they were to be understood by
people from a different area.
Video conferencing appeared to be a good motivator for all in the sample, with this motivation being used quite specifically for modifying behaviour in one pupil and in getting six reluctant and disaffected writers to use the keyboard.

The video conferencing situation also imposes a structure which has less distractions and seems to help some pupils to focus and concentrate. Pupil E was able to focus and concentrate more readily and was less distracted than in a normal class situation. For Pupil F, the formal scripted situation allowed him to succeed in interacting where he would not have done under normal circumstances. The situation had a calming effect on Pupil M; as he focused his attention, his ticks and sudden movements diminished, and Pupil C, a Downs Syndrome child who normally found it difficult to sit still, was totally absorbed by the interaction and remained seated and focused throughout the sessions. It also had a physical consequence in the case of Pupil B, a visually impaired boy who would turn his head away to talk. After the experience of talking to a much smaller image on the screen and seeing himself on the screen, he learned to position himself and face who he was talking to. The structure of the situation also taught him the skills needed to hold a conversation and he showed a marked improvement in his communication skills.

Pupils had to learn the discipline of working with others and soon learned that they had to wait to take turns and not talk over each other because of the constraints of the sound system. Misbehaviour was not tolerated and peer pressure caused both Pupils G and L to behave sensibly during the sessions. Pupil interviews confirm that they felt that more self-discipline was needed to communicate over the link, such as in waiting their turn and allowing others to speak.

The situation helped Pupil O, a normally under-confident boy, to develop leadership skills and as the conferencing progressed, his confidence grew and he started to take a leading role in direct proceedings.

The use of this technology also served to boost the self-esteem of some of these pupils, probably as they were in a situation where they were able to experience success quite readily. It is also likely that they felt special because they had access to hi-tech equipment on a more regular basis than others. In a number of cases, the link was used specifically to help build confidence in normally withdrawn pupils. Pupil A, the girl with impaired hearing, felt sufficiently confident to speak for the first time over the link, Pupils O and N both developed their confidence sufficiently to enable them to communicate in a way that had not happened in a normal class situation, and Pupils H and I developed sufficient confidence to communicate in a way which they might not have done in a face-to-face situation. In these interactions, the notion of the distance created by the screen helping the interaction is referred to by supervising teachers. In fact, they commented specifically on this point:
I think it was because she didn’t feel threatened by having somebody actually there ... there was that distance between them. (Supervising teacher about Pupil A, Appendix)

The screen helped because it wasn’t actually a person ... (Supervising teacher about Pupil F, Appendix)

... this distance between the speaker and listener is helpful because I don’t think the pupils feel threatened by it. I think they feel more relaxed and uninhibited ... from the children with special needs point of view it’s very helpful. (Supervising teacher about Pupil N)

... the screen seemed to help ... they wouldn’t want to talk to somebody new, but when they were talking to a screen not a person they didn’t mind ... (Supervising teacher about Pupils H and I)

When interviewed, these pupils reported that they felt more at ease talking to others over the link than they would face-to-face. One pupil, when asked whether he would prefer a larger screen, said he would feel shy but felt more comfortable with the smaller screen format.

The view of all five teachers interviewed was that using the video link motivated the children, making it easier to get them to write and inspiring them to work. When interviewed, the pupils reported that they found using the system fun and exciting, that it was easy to use, and that they felt special because they were allowed to use the system.

One learning support teacher who was initially sceptical reported that she and the pupils had gained a great deal from the experience. She felt that it improved their social and communication skills and confidence, and also broke down their isolation by putting them in contact with other pupils with similar difficulties:

... to see other children with the same sorts of problems helped – getting children used to talking in different situations and to actually listen to what other people say – it’s the communication skills and transferring the skills they learn in the classroom to a new situation ... I think they are used to screens and are used to television – it’s sort of one remove from reality. (Supervising teacher)

These teachers were enthusiastic about the project and could see a lot of potential in extending its use to other pupils. There were, however, some misgivings over technical problems encountered which could lead to frustration amongst the staff and pupils if the link failed. As one supervising teacher put it: “... you’d organise it, you’d get your children down there, and you wouldn’t be able to use it ... the technology of it has to be absolutely spot on or it isn’t of value because you do waste time ...”.

It was also felt that more could be gained if there was time to plan a programme that specifically matched the pupils carefully to one another so
as to complement their needs. One supervising teacher commented: “... it’s getting time to plan it – you need to know about the people involved on both sides - you need really to put a programme together with a specific child in mind and prepare them for it which is something we tend not to have time for”.

Although many ideas for the use of the personal video conferencing were put forward during the development phase of the project in the schools, very few continued in the way that the special needs initiative was sustained. Reasons for this difference may be due to the different nature of special needs education in the secondary sector when compared to most other departments. Introducing innovation, particularly in the field of IT, is recognised as a particularly difficult change to implement. Casey (1996) considers innovation in areas such as computing to be “a much larger challenge than most school innovations, affecting all three dimensions of educational change identified by Fullan (1991): a change in attitude, classroom practice, and in the knowledge base possessed by the prospective user” (p. 16).

Fullan (1991) examines the criteria that teachers use in assessing any given change and summarises them in the questions posed below.

- Does the change potentially address a need?
- Will the students be interested?
- Will they learn ...?
- How clear is the change ...?
- How will it affect the teacher personally in terms of time, energy, new skill, sense of excitement and competence, and interference with existing priorities?
- How rewarding will the experience be ...?

(p. 127-128)

The comparative success of personal conferencing with the special needs pupils needs to be examined in the light of these criteria and dimensions of educational change.

Personal video conferencing allows a more interactive use of the technology and works best with small groups of pupils in an informal arrangement around the screen. The special needs link-up was particularly successful, probably because the approach adopted in special needs lessons usually involves small-group interaction. This meant that no significant changes in ways of working were required to use the technology, it had little effect on the teacher in terms of time and energy and it did not interfere with existing priorities.

A second probable reason for the success of the innovation was that it addressed a real need in that it was able to do things that were less easy in a conventional classroom and so the teachers could therefore see a real value in using the technology. Often, video links are used for pragmatic reasons, usually involving distance learning, rather than for sound pedagogical
reasons. This frequently means that video conferencing is seen as being second best when measuring “the effectiveness of teaching and learning against the norms of face-to-face” (Dallat et al, 1992, p. 21). In this case, however, it constituted another teaching and learning approach which achieved objectives that cannot be reached by conventional classroom methods.

Fullan’s other criteria also appear to be met in that the relative ease with which the equipment can be used means that the new skills the teachers need are acquired rapidly and the reward, in terms of their own sense of increased competence, interest and excitement, is matched by a similar pay-off with the students in terms of interest and motivation.

Of the three dimensions of change identified above, significant changes in two, classroom practice and knowledge base, were not required to introduce the innovation. The third dimension, attitude towards the new technology, needed to be positive before the innovation could take place. Research, however, shows that negative attitudes towards new technology are often the norm. For example, in one study, Persichitte & Bauer (1996) measured attitudes to new technology amongst school employees and found that a negative attitude towards computer-based technologies prevailed. Whilst it is normally difficult to get teachers to embrace change, the positive attitude displayed in the present study was probably due to the way in which the innovation was led in the schools so as to develop ways of using the technology from teachers’ own ideas. As one supervising teacher noted: “I think this took off because we had our own ideas of how we were going to use it and we were quite imaginative – and we were given positive encouragement from the school, from senior management”.

This sort of empowering leadership is highlighted by Louis & Miles (1990) who studied leaders in successful schools and found that these leaders supported and stimulated initiative taking in others, delegated authority and extended involvement so as to develop collaborative work cultures. A similar empowerment is advocated by Hoffman (1996) who, in his review of the North American literature on this topic, cites broad participation as a key factor in driving success in school technology integration. Certainly in this case, the teachers felt a sense of ownership and did not feel that the innovation was being imposed on them.

A further factor which separated this use from other proposed uses was the way in which the special needs departments of the schools involved worked with pupils withdrawn from their normal timetable. This meant that they were not restricted by timetable constraints and were able to organise and synchronise their sessions easily.
Conclusions

Of the pedagogical advantages of video conferencing, the notion of the distance acting as an actual aid to the interactions is one of the more central and rather surprising outcomes of this study. Instead of the technology acting as a barrier, it seemed to help some of the children interact. It appears that these pupils felt more secure talking to other pupils across the distance provided by the video conference than they would have done face-to-face. They also felt happier working with the small screen format rather than a larger screen and confirmed this when asked.

Another advantage is the way in which the technology forced the users to be pragmatic and alter their behaviour. Pupils who normally had difficulties in controlling the way they interact soon found that they could not shout out or talk over one another. They found they had to wait their turn, speak clearly, moderate their accents and think about what they were going to say beforehand. Austin (1992) talks of the rapid development of pragmatism being necessitated amongst his students as they improved their listening skills: “I realised how important it was to listen when someone is talking and not try to talk over the top of them as the video will not pick you up” (p. 29). Abbott et al (1993) found a similar pragmatism develop in their study, albeit with a very different group of students. Students learned they had to “look at the camera, project your voice ... don't move papers around or whisper to your neighbour when someone on the distant campus is speaking” (p. 142). Dallat et al (1992), also working with postgraduate students as part of the same project, report that the experience of video conferencing developed new skills and confidence. One student had “adapted to the new type of interaction that it required by making one's points quickly, precisely and audibly for the benefit of everyone and not just for the students at one’s campus” (p. 19).

For some of the special needs pupils who normally found it difficult to concentrate, the video conferencing context had a further advantage in that it acted as a focus and helped organise the way they thought and acted.

The technology also succeeded in involving pupils who normally found it difficult to join in. One such pupil kept very much on the periphery of the group and it took a number of sessions before he got more involved. Whilst it is recognised that there are always members who will hang back for fear of public ridicule (see Abbott et al, 1993, p. 118), in the case of these pupils it can be a major step to take to make even the smallest public showing. That is why it was such an exciting development to see these pupils using the conferencing equipment. An additional social skill development was in the way that some members of the group took on leadership roles in bringing in other pupils. This clearly fits in with earlier work that maintains
that using this type of technology can increase group cohesion and mutual support (Dallat et al, 1992; Abbott, 1993; Mason, 1994).

This case study highlights a number of key issues relating to the most appropriate use of personal video conferencing, such as its suitability for small-group work and its use in an interactive mode between groups of pupils.

It also confirms that special needs pupils stand to benefit in a number of general ways from the use of IT in their learning, as their motivation, confidence and self-esteem improve. There is also a set of specific advantages in using personal video conferencing with special needs pupils. In addition to developing skills in using IT and writing, it also helps develop a range of communication and social skills and enables the pupils to overcome their relative isolation by communicating with pupils in similar situations. Perhaps the most interesting finding is the way in which the distance created by the technology may make the pupils feel secure and how it aids interactions between them that would normally be more difficult.

The way in which the technology was taken on board by the teachers also highlights some interesting points. Because there were no significant changes required in practice or knowledge, it was easy to adopt. The attitude of the teachers was positive, probably because they developed the idea themselves and did not feel that the change was imposed on them.

The crucial factors in the success of this development appear to be the bottom-up approach adopted in developing the use and the way in which the use matched the needs and the normal mode of working of those involved.

It would seem, therefore, that personal video conferencing certainly has a future in education and particularly in those areas where teachers and children are used to working in small groups and to working interactively within a flexible timetable. An obvious future application would appear to be in overcoming rural isolation in small primary schools, where interactive small group work within a flexible timetable is the norm.

Acknowledgements

The research was undertaken as part of the Education Departments’ Superhighways Initiative evaluation in conjunction with University of Leicester School of Education. I am indebted to the teachers and pupils of the three schools involved, the director and staff of the Satellite Project at Aberarad, and fellow members of the evaluation team from the University of Leicester School of Education.
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