

## Using Video for Observing Interaction in the Classroom

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*The richness of information in video recordings enables researchers to capture some of the complexities of learning experiences but there are costs as well as benefits to be taken into account. A recent piece of research which used video recordings as a principal source of data provides a starting point for discussing broader issues of data collection and analysis and for providing advice on using this observation technique.*

Technological developments such as video camcorders and the even smaller palmcorders have made the use of video for recording observations in the classroom much easier. Recording on video is not a substitute for other forms of data collection but it offers a number of advantages, such as the permanence of the record, the retrievability of data to share with others, being able to check findings and easy reinterpretation. However, video recording is only one of a number of means of observation. Researchers need first to consider more general issues about observation as a technique for gathering information and how to select what to observe, whilst bearing in mind that using video introduces another set of issues for consideration.

What follows is in three parts. The first is on why one might chose to use video. The second consists of 'handy hints', practicalities before, during and after recording to take into account when using video as a source of information in educational settings. The final section discusses analysis.

Some questions to ask before deciding to use video:

- ❖ What is the purpose of the video? Is it primarily for presentation or analysis?
- ❖ What is the value of using video in the specific context?
- ❖ Is particular information required which cannot be gained from another source?
- ❖ What are the difficulties of using video in the particular context?
- ❖ How will video recording complement other methods of data collection?

### WATCHING PUPILS USING CD-ROMS

The focus of our study was groups of pupils using a CD-ROM in the course of their secondary school science course. Why did we decide to use video recording? Video is particularly suitable for fairly detailed analyses of language and interactions. The fieldwork was undertaken during

science lessons at a large secondary school. Groups of three pupils aged 15–16 used a CD-ROM in which Darwin's experiences in the Galapagos Islands were used to teach the principles of natural selection. The CD-ROM was developed in three different versions but all have basically the same content and state the task (to explain the variation in the wildlife in the Galapagos and write the answer in the software's notepad) in exactly the same format. The main difference is that the users' experiences vary depending on which version they have. What we wanted to explore was the impact of the different versions on how pupils navigated through the CD-ROM and how design features interact with pupils' learning strategies.

We wanted video material to use for both presentation and analysis. Knowing you are likely to use the material for presentation, as a means of eliciting feedback from other students and teachers or for sharing with other researchers, may influence decisions about audio and video quality. It is always worth aiming for the highest quality possible, especially if it is likely to be the subject of repeated reviewing for analytical purposes.

### USING VIDEO FOR DATA COLLECTION

Our objective was to capture on video two groups using each of the three versions of the CD-ROM. Two recordings on videotape were produced in each session: one showed the group of pupils at the camera, with a camera positioned to capture talk, movement, gesture and machine interaction; the other showed the screen image, taken from the computer via a scan converter. (Using a scan converter means that the signal from the computer is recorded directly onto video without the need for a camera. This eliminates the screen flicker which is unavoidable if using a domestic video camera to record what's on the computer screen. It is a box the size of a paperback book, available for about £300. See <http://www.vinemicros.com/>). These sources of information were supplemented by a wealth of others including an interview with the teacher, a questionnaire for the pupils on their experience and confidence with computers, and a test of pupils' recall of the material.

### **CAPTURING INTERACTION AND UNOBSERVABLE PROCESSES**

As we were interested in the pupils' interactions with the computer and with each other, we needed to be sure that we captured their discussion. As a microphone attached to the video camera is not suitable, we used an external microphone to improve sound quality and thus make transcription easier. The microphone needs to be discreetly positioned as its presence seems to be more distracting than that of the camera. (Another researcher who had experienced this described how he used a non-functioning microphone in a prominent position, and a smaller, working microphone less obtrusively positioned to solve this problem.)

One of the problems of using observation as the main form of data collection is that there are a number of unobservable processes (eg thoughts, attitudes, feelings and perceptions) which all represent potentially important sources of data. Intra-group discussion will make some of these more explicit but it is also necessary to develop a procedure for gaining access to less public processes. Questionnaires, interviews, informal conversations and stimulated recall sessions (in which selected parts of the video are played to participants and their comments invited) can all help to provide this information and offer a check on validity of findings.

Video is often associated with a naturalistic approach to data collection but the presence of a video camera inevitably introduces an element of artifice. We tried to ensure that the situation was as natural as possible by exposing the pupils to the CD-ROM when they would have covered Darwin and evolution as part of the syllabus. This meant that we could observe how the teacher introduced the topic to the class. However, the situation in which pupils used the CD-ROM had to be controlled to some extent so that we could minimise background noise levels and other distractions. The video recording therefore took place in a preparation room adjacent to the science lab but as text books, cleaning equipment and teachers' belongings were kept in the room, we were frequently interrupted. The room was extremely narrow and it was difficult to manoeuvre, especially as we had a lot of equipment.

The audio-visual equipment was in place before pupils started and, although the presence of a camera provoked some comment at the outset of sessions, it was forgotten surprisingly quickly. One reason for this was that the computer was a greater source of interest and the focus of attention; their involvement with the CD-ROM was such that pupils lost any self-consciousness within minutes. Once the image had been framed, a sound check conducted and the camera focused there was no need to move the camera as the group was relatively static whilst using the CD-ROM. This decreases the source of distraction; if you need to move the camera's position or attend to it for other reasons the pupils' attention is drawn to it again.

### **PRACTICALITIES**

The following list of handy hints is not exhaustive as circumstances vary so much, but it should be used as an initial checklist.

#### **Before recording**

- It will be necessary to gain permission from the headteacher and the relevant teachers. It is also advisable to gain parental permission for any student participants and this can be quite time-consuming. This is essential if the video is to be used for presentations or clips from it are used on the World Wide Web. The ESRC has a model consent form (see <http://www.essex.ac.uk/qualidata/forms/appendb.htm>) which can be amended for video recordings.
- If you haven't had time to obtain permission from all parents it may be possible, with the headteacher's consent, to video the students in such a way that individuals are not identifiable, but whether this will provide the data you need depends on your focus of interest. I have used close-ups of the computer monitor, which show the image seen by the students and their gestures, with just an audio track to capture their discussion in such situations.
- Using video in the field is much easier if there are two people. There are usually tight time and space constraints and being able to share setting up and putting away the equipment makes it much easier to log the relevant information and put participants at their ease. Time can be saved by colour coding cables and sockets and by taking a wiring diagram if using a lot of equipment. It's also worth making an equipment checklist to use both when collecting and returning equipment.
- Take masking tape for taping down the multitude of cables and make sure participants are aware of potential dangers. Take extension leads. Always use a tripod unless the flexibility of hand-held shots is essential. An external microphone is usually necessary. Take spare batteries for the microphone.
- If using a domestic video camera, use S-VHS or Video 8 tapes for quality.
- Consider the framing of the image in terms of what is likely to be of most interest. A lot of background clutter can make repeated viewing unpleasant. A screen can be used to cut this out and can have the benefit of blocking out the sun and the potential for screen reflections.
- If you are planning to mix the videos by using a split screen or inserting a window, set up the camera shot so there is a dead space suitable for inserting the edited image. If you are planning to mix two sources of video (eg from the computer and of the students) make sure that you can synch the sound easily.
- Always try to do a dummy run *in situ*. If that isn't possible, simulate the set up and check everything works.

- Obtain information about the names and ages of students if you will need this later.

### ***During recording***

- Most cameras will superimpose a timecode and this makes transcription and analysis much easier. It is essential if the tapes are to be copied and shared with other researchers. If time code is unavailable or was forgotten it can be added to copies done on an edit suite. Otherwise, make sure the tapes are viewed on a video player which has a real time display.
- Use a clapperboard or equivalent at the beginning of every recording session. This ensures identification of the video even if the labels have come off.
- Don't record more than you can transcribe and analyse.
- Take copious field notes to supplement the information provided by the video. It is worth trying to catch as much speech as possible as it can be difficult to interpret out of context. Field notes can capture whispers and asides not picked up by a microphone.
- Avoid interruptions by putting a notice on the door that filming is in progress.

### ***After recording***

- Time spent on careful labelling and logging of videos can save fruitless hours of searching later. Always label the video at the time: when flustered it is tempting to decide to do the labelling later, but it is then easily overlooked or the information forgotten. The ESRC has a summary sheet which can be used as a template for logging (see <http://www.essex.ac.uk/qualidata/forms/appenda.htm>). As part of this process, organise a good cross-referencing system to other data.
- Transcription is extremely labour intensive. If notes of gesture and information other than speech are required or if transcribing group discussion allow up to 20 hours to transcribe each hour of video. The ratio is even higher if very detailed transcription is required but it isn't usually necessary to transcribe everything. Viewing the material and deciding which sections need transcription is adequate for some purposes. You may decide that time sampling will provide enough information, eg transcribing a one-minute section at five-minute intervals.
- Always make back ups and use them for transcription and general viewing. Only use master tapes for producing edited versions. If the masters are on S-VHS or Video 8 it is usually adequate for copies to be on VHS tapes as they are cheaper.
- When analysing the video, first impressions are very useful. But, if time allows, it can also be very revealing to return to the videos some time after the event for a fresh interpretation.

## **ANALYSING VIDEO MATERIAL**

### ***Making 'sense' of the data***

One advantage of video is that different methods of analysis can be applied to the same raw data and the video could, for instance, be subject to different techniques by different researchers. In the research described, some of the analytical procedures were anticipated, the need for others emerged later, but the video combined with a wide variety of other sources of data has enabled us to follow up interesting paths of enquiry. This is not as easy with field notes as they tend to be more idiosyncratic and are more difficult for people other than the scribe to interpret. Nevertheless, this richness can be overwhelming: there is so much information that it can be difficult initially to focus attention. At the time of writing, we have finished transcribing the audio and video sources and we are in the process of analysis. We have produced charts of the different routes through the CD-ROMs and how long pupils use each section. We will use these to inform subsequent analyses which will provide both qualitative and quantitative information. We are interested in both the learning and the software – the cognitive processes engendered by design features of the CD-ROM and how these are represented through the pupils' talk and in their written notes – and this will require a number of analytical approaches.

### ***Flexibility of analytic framework***

Because video can be viewed as many times as required, it is possible to delay making final decisions about analysis until the researcher is confident about the appropriate approach and which aspects will be highlighted. This is not possible to the same extent if observational fieldnotes are the only source of information because the situation they record is so fleeting; it is not possible retrospectively to decide to focus on some other aspect. However, using video does not mean that the researcher can simply 'point and shoot' and defer decisions on analysis until much later. It is necessary to have *some* ideas about how the material will be used or you risk discovering that the video does not provide the information needed. The researcher is able to search back and forth throughout the entire recorded corpus for instances of both rare and frequent events, and interpretative judgements can be postponed or constantly modified. This obviates the need to make instantaneous decisions about the importance of particular incidents or risk overlooking key features, common problems with unassisted observation in the field, but it is an extremely time-consuming process.

### ***Viewing recordings***

It is advisable to review each session's recordings on the same day and take further notes to supplement those taken in the field while events are still fresh in the mind. Realistically, however, extensive use of video is quite demanding in terms of carrying equipment, setting it up, and the usual

stresses of observation in the field, so it is not always possible or desirable to spend more time reliving the events of earlier that day. As with other forms of data collection, it is worth avoiding the temptation to amass piles of material. It is more efficient and fruitful to visit the field less frequently in order to maintain familiarity with the material and conduct initial analyses in the intervening periods.

The main problem with storing most of the material for analysis on video is that it is relatively inaccessible. Browsing through field notes looking for specific instances or patterns is straightforward but this is not possible for video; reviewing has to operate in real time. Using fast forward does not solve this problem as much of the data is often in the soundtrack. In our study, because the participants were generally static, it is not possible to identify particular incidents visually. Software which helps with locating events on video exists (see <http://www.soc.surrey.ac.uk/caqdas/index.html> and <http://www.noldus.com/products/observer/index.html>) but computers on which video can be played are still relatively unusual and the software does not remove the need for initial viewing and coding. Future developments will make this process more efficient.

Another drawback to analysing information in this way is that the final product is at two removes from the original source of data, which in this case was pupils using a CD-ROM. Not only has this been captured on video with all its attendant problems (such as presence of the camera, microphone and researcher; what was visible or not) but analysis requires extrapolating an even more selective version of what was happening from the incomplete version represented by the video recording. It is easy to be seduced

into thinking that the 'reality' of the situation has been captured and that it is adequate to extrapolate from this information. This is another reason for using additional data sources.

Using video can bring your research alive. Presentations of your research are much more interesting if the audience can see the interactions you are discussing. Similarly, it is much easier to share and discuss emergent findings with other researchers and practitioners if you can review interesting or problematic sections and other researchers can test the validity of your findings by analysing the same video material. Just remember not to be over-ambitious in the quantity of video you amass and make sure that you have permission from all participants.

#### Further reading

Simpson, M. & Tuson, J. (1995) *Using Observations in Small-Scale Research*. Edinburgh: SCRE.

If you are interested in the analytical methods we used with this video data there are a number of research papers in which they are described. These can be found at <http://meno.open.ac.uk/meno/meno-pubs.html>

Heath, C. (1997) The analysis of activities in face to face interaction using video. In Silverman, D. (Ed.) *Qualitative Research: Theory, Method and Practice*. London: Sage.

Mackay, W. (1995) Ethics, lies and videotape... *Proceedings of the ACM Conference on Human Factors in Computer Systems (CHI '95)*, Denver, Colorado, May 7th–11th, pp138–145. New York: ACM Press.

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