Refereed papers

Analysing the doctor–patient–computer relationship: the use of video data

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ABSTRACT

This paper examines the utility of using digital video data in observational studies involving doctors’ and patients’ use of computers in the consultation. Previous observational studies have used either direct observations or analogue videotapes. We describe a method currently in use in a study examining how doctors, patients and computers interact in the consultation. The study is set in general practice as this is the most clinically computerised section of the Australian healthcare system. Computers are now used for clinical functions in 90% of doctors’ surgeries. With this rapid rise of computerisation, concerns have been expressed as to how the computer will affect the doctor–patient relationship. To assess how doctors, patients and computers interact, we have chosen an observational technique, namely to make digital videotapes of actual consultations. This analysis is based on a theoretical framework derived from dramaturgical analysis. Data are gathered from general practitioners who are high-level users of computers, as defined by their use of progress notes, as well as prescribing and test ordering. The subsequent digital data is then transferred onto computer and analysed according to our conceptual framework, making use of video-tagging software.

Keywords: computers, consultation, physician–patient relationships, research methods, videotaping

Introduction

Not wrung from speculations and subtleties, but from common sense, and observation; not picked from the leaves of any author, but bred amongst the weeds and tares of mine own brain.

Sir Thomas Browne, Religio Medicci, 1643

This paper is intended to examine the utility of digital video data, in conjunction with appropriate software, in observational studies involving doctors’ and patients’ interaction with the computers that exist in surgeries. Using observational techniques in scientific inquiry is as old as those inquiries themselves. Yet in modern science, observational techniques are considered the realm of qualitative research, particularly in the field of anthropology and sociology. Observational techniques have traditionally used a human observer, either clearly identifiable or concealed by anonymity or physical structure, such as one-way mirrors. Audiotapes can also be seen as an observational method. New technologies have created other possibilities for direct observation of social interactions.

The study described here is based on an analysis of how doctors, patients and computers interact in the
consultation. The study was generated by general practice becoming the most computerised sector of the Australian healthcare system. Ninety percent of general practitioners (GPs) have a computer on their desk, up from 50% in the year 2000. Concerns about the effects of computers on the doctor–patient relationship have existed for some time, and in other health systems that have experienced similar rates of computerisation. However, the literature is ambiguous when it comes to establishing exactly how the interaction is affected by the presence of a computer. As early as 1988, patients were demonstrating satisfaction with the presence of a computer in the consultation space, with privacy as the only concern. Contrary to this finding is the work of McDonald and colleagues, who found that, whilst accepting of technology, patients are still suspicious of the effectiveness of a technology used on them. Nonetheless, it is quite likely that the next generation of patients and doctors will be more comfortable with technology and its impact on the doctor–patient relationship. Despite this, doctors still have concerns about the presence of computers in the room, with research from two Australian studies expressing concerns about the implications on privacy and the doctor–patient relationship. Two early studies have used video observation to demonstrate a number of issues in the use of computers in the consultation, and in particular that introduction of computers does change how doctors behave.

Video observation has two principal advantages over other observational techniques in that it records more information than could otherwise be captured (that is, density of information), and it allows retention of that information (that is, permanence). However, video recordings should not be seen as a total record of a social interaction; rather they constitute only part of a complete ethnographic approach, preferably informed by theory. Videotaping allows reviewing of the interaction at a number of sequential levels: the whole event, major constituents and then particular aspects of organisation within the event.

Video observation has been used to a limited degree in observing consultation behaviour. Two main models have been used: (i) using the video recording as a prompt for feedback from doctors and patients, and (ii) using the video as a source of data for an external observer. Reviewing the literature, Coleman summarised the advantages and disadvantages of using video observation. He concluded that there appears to be no change in doctor behaviour, although there may be a doctor selection bias. One 1988 Australian study that looked at this, however, found no such bias. Video recording is usually well tolerated by patients, with consent rates usually greater than 65% and often more than 80%. Patients are more likely to decline if they are younger, female and psychologically distressed. Video observation has traditionally involved a single camera/video stream, although more recently there have been attempts to combine both multiple streams with new software that allows pattern recognition. This system has yet to be used in a real consultation environment, and is resource-intensive. Whether there is an effect on patient behaviour by the intrusion of a video camera is difficult to study, but it is known that patients report having forgotten that the video camera was there. For these reasons, when choosing to examine the interactions between doctors, patients and computers, we chose a single-camera set-up, the detail of which will be described below.

Sample

GPs in this study were recruited by the Divisions of General Practice. Divisions exist as a federally funded support structure for GPs, and particularly over the past few years have had a significant role in supporting the uptake of computerisation on the desktop. Using the network we were able to target GPs who were high-level users—defined as using clinical software for progress notes, as well as prescribing and test ordering. Using this targeted system, our refusal rate of approached GPs is 34%. We have recruited and taped 20 GPs, 10 rural and 10 urban. Six of the GPs are female. GPs usually refuse due to a reluctance to be videotaped, or due to concerns that patients will not accept the presence of the camera.

Theory

As previously stated, it is not enough simply to watch videos and take notes. As with any observational study, the analysis should be supported by appropriate theory. Theory underpins the research by providing a framework with which to organise the data for easier interpretation. Biomedical trials, for instance, are based on logical positivist theories, although this background is usually implicit rather than explicit. Previous studies of this nature have used grounded theory as a theoretical approach. Grounded theory as espoused by Strauss and Corbin requires the observer to undertake the observations with a clear mind, and then uses an iterative process after each observation session to develop theory to guide further observations. This study takes a different approach and uses Ervin Goffman’s dramaturgical theories of human interaction to
provide a theoretical framework for the analysis. Goffman views social interactions as one would a theatrical play: that humans interact with each other according to perceived roles and accepted rules of behaviour, much as one responds to a scripted play. For Goffman, the interactions are socially determined and based on rituals. The involvement of a non-human player in the interaction has been discussed by Latour, who uses the term ‘actants’ to include human players and non-human players.

**Method**

As previously mentioned, we have chosen a single-camera technique for recording videos. Participating GPs have the research explained to them, and clinic staff are trained to hand out information to attending patients. Patients generally sign the consent form before entering the consultation room and show the doctor upon entry; they sign again at the end of the consultation. The second consent ensures that they are still happy for the data to be used subsequent to the completion of the consultation. This technique has been used in a previous study.

The camera used is a digital video camera, and is placed in such a position to capture doctor, patient and computer. However, the examination table is generally excluded from the camera’s view. Modern digital cameras allow for the setting of slow shutter speeds, which drastically reduces the screen flicker seen when taping cathode ray tube monitors. No such flicker exists with the newer flat-screen or liquid crystal display screens, which have a constant luminiscence. A wide-angle lens is used in situations when the camera is too close to the stage to see all the participants.

The GP is given the remote control at the start of the session and instructed to stop the tape only if the patient does not consent. The most common technical reason for lost consultations is the doctor forgetting to restart the camera for the next consenting patient. Once taping is finished, the tapes are transferred into digital format using video editing software on a Macintosh computer. The tapes are then wiped, leaving only the digital data. The resultant digital files are then suitable for importing into the tagging software. This software enables us to tag the consultation video according to our conceptual framework.

Tapes are viewed several times. The first viewing occurs when the tape is transferred to the computer, and a medically trained researcher does this viewing. The second viewing is by a sociologist. These viewings are for general impressions only, according to the conceptual framework. Both researchers then compare their impressions of the tapes, prior to formal coding. Comparisons are based on the conceptual framework. Having the medically qualified researcher balanced by the sociologist acknowledges that there is value in both having a detailed insider knowledge of the habitus as well as an outsider perspective. The tapes are then loaded into the tagging software and tagged over several viewings. The initial types of tags have been generated by the literature and involve gaze direction. The significant difference in this method to the previous studies is that this tagging process replaces the need for detailed transcriptions. Rather than attempt to represent what happens in the video on paper, the tagging allows generation of specific pieces of video that can be viewed and analysed in isolation, as well as still being part of the whole. Thus the richness of the data is preserved.

It is important to be clear that the software is not an analysis tool itself, but a sophisticated data management tool. Once tagged, the software can be searched by specific tags or specific combinations of tags. From the tags the software generates short videos for viewing and analysis. It is designed for video, rather than other techniques that adapt paper-based methods to the complexity of video.

**Results**

Each GP has been involved in videotaping a single consulting session. Twenty GPs generated 128 useable consultations. A further 34 consultations have been lost due to technical difficulties, and 12 (7%) due to patients not consenting. Non-consenting patients tend to be female, and often requiring an intimate examination. This refusal rate is lower than has been previously reported.

The ultimate objective of this study is to describe and classify the behaviours (both non-verbal and verbal) seen in the consultation. Prior to the tagging process, each video was watched by both researchers, and an overarching framework derived. Analysis will eventually be described in detail in four categories: interactions in the first minute, the gathering of information by the doctor and the computer, the giving of information to the patient by the doctor and computer, and the interactions during printing. These phases were tagged, as well as gaze. Using gaze as a proxy for attention in the consultation allowed closer analysis of individual behaviours. Gaze is tagged in two directions: doctor to patient or computer, patient to doctor or computer.

In Figure 1, we can see a screen capture from an episode of coding. The digital data (in this case from a staged consultation) is being played in the window on
the left. The right-hand window represents the selected tags. Each tag represents a desired element to be featured, and can be selected during play with a single keystroke. The bottom window is a timeline of the video with the tags marked – thus the specific frame selected is marked with three elements: gathering information, doctor gazing at computer, patient gazing at doctor. The linear representation allows easy viewing of the proportionate times for specific activities, and easy selection of short pieces of video (times when both doctor and patient are staring at the computer, for instance) for further analysis.

Discussion

There is much to be learned from the methods used in this study. While video is being recognised as a valid tool for ethnographic studies, its use has still to live up to its potential. The technological change that will make this easier is the advent of digital data, with its flexibility and ability to be manipulated by management software such as is described. However, as with any technology, it must be seen only as a tool and not replacing the important theoretical and methodological issues. Being aware of the possibilities does allow selection of appropriate methodologies. Many of the analytical techniques borrow from conversational analysis – where the nuances of speech are examined minutely. However, the context of that speech as seen on the video (for instance, is the doctor looking at the patient or looking at the computer) is just as significant, if not more so, than the length of the pause. Using Divisions of General Practice as a focus point for recruitment has ensured a high participation rate from an appropriate sample. The use of digital data has proven to be a well-accepted and versatile medium for observational research in this setting.

The patient refusal rate of 7% is acceptable, and the categories of non-consenting patients are consistent with those established in the literature. This level of acceptance should reassure those GPs who refuse on the basis of concerns about patient acceptability. Importantly, all the patient refusals have been before the consultation. No patient has changed their mind and refused once the content of the consultation is known. Making appropriate use of a theoretical framework allows for the development of a coding framework particularly suited to tagging specific aspects of the video. Use of the tagging software allows for easy implementation of a conceptual framework, and allows for multiple viewings, easy re-analysis if a new aspect occurs, and can generate short videos for micro-analysis. Using digital data is particularly suited
to easy manipulation of the frames; selecting specific sequences is easy, and fine-grain stepping through short pieces of the consultation is a matter of dragging the mouse. More work needs to be done on why patients choose to refuse consent and on the effective use of multiple streams of video, allowing closer match of screen activity to behaviour.

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CONFLICTS OF INTEREST

None.
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