Doctor, patient and computer—A framework for the new consultation

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Abstract

Purpose: The use of a computer during general/family practice consultations is on the rise across the world, yet little is known about the effect the use of a computer may have on the all important physician–patient relationship. This paper provides a framework for further analysis of computers influence on physician–patient interactions during general practice consultations.

Methods: This is an observational qualitative study informed by hermeneutics and the phenomenological tradition of Irving Goffman, based in Australian general practice. A single digital video recording of 141 patient encounters over 6 months was made and imported into a tagging software program to facilitate analysis. Through an iterative process several keys and behaviours were described for doctors, patients and the computers in the interaction.

Results: Physicians tended to fall into two categories; unipolar—those who tend to maintain the lower pole of their body facing the computer except were examination of the patient or some other action demands otherwise, and bipolar—those physicians who repeatedly alternate the orientation of their lower pole between the computer and the patient. Patients tended to demonstrate behaviours that focused on the physician to the exclusion of the computer (dyadic) and included the computer in the consultation (triadic). The computer was also seen to influence the physician–patient interaction passively or actively.

Conclusion: In describing and categorising the behaviours of the computer, in addition to the humans in the consultation, a framework is provided for further analytical work on the impact of computers in general practice.

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1. Introduction

Computerisation of the family practice space is now almost complete in Australia, with 93% of doctors using a computer on their desktop for prescribing [1], due to a combination of government initiatives and doctor driven demand for computer prescribing [2]. This has come about rapidly, increasing from 60% reporting the same level of computing five years ago [3], and it represents the most significant computerisation of the clinical encounter since the mass computerisation of the United Kingdom’s National Health Service in the 1980s. Computers are now used in all facets
of the consultation—prescribing (98%), recall systems (78%), progress notes (64%) and decision support (20%) [1].

While it appears that computerisation improves clinical practice [4] and, by implication, clinical outcomes, surprisingly little literature exists on the direct effects of computerisation on the physician–patient relationship itself [4]. Evidence suggests that different technologies and their methods of implementation have a tremendous effect on if technology is accepted, how it is used and, consequently, how it affects users [5,6]. It is tempting to assume that any shift in focus of the physician and patient from each other would signal a lessening of the physician–patient relationship. Nevertheless, if we accept the clinical benefits that emerge from computer use, it behooves us to explore the ways in which computers can be incorporated into, and even benefit, the existing relationship.

The Australian general practitioner (GP) ushers the patient into the room at the start of the consultation, and sits at a desk on which a computer screen resides. The patient is seated beside the desk, or less commonly across the desk. Physical examinations take place on the other side of the room, on a couch provided for that purpose. Any printed material generated as a result of the consultation is usually produced by the physician in the room while the patient is present. Australian GPs have expressed concern that the presence of computers may have a detrimental effect on the physician–patient dyad [3]. For this reason we explore the interaction between physician and patient, and identify the ways in which the computer can be understood to influence that interaction.

Emphasis on the physician–patient relationship has undergone a renaissance over the past fifty years, as the deficiencies of the predominant biomedical model became apparent. In 1956 Michael Balint began his work exploring the importance of the relationship as a therapeutic entity in its own right [7]. Thomas Szasz [8] at the same time characterised several different models of the relationship embodied in the interaction. Similar emphases on the relationship were significant in the development of the “biopsychosocial” model of care [9], with its expanded view of the domains of illness and healing. Today, these models have evolved into the concept of “Patient Centered Medicine” (PCM) [10]. The application of PCM in the consultation, or more correctly consultations that can be described as “patient-centred”, are held to produce better physician–patient dyad. It also extends the existing literature in the area by drawing on social theory to frame analysis. The theory provides a starting point for analysis while our hermeneutic approach ensures that the consultation is explored in its entirety, not merely as a collection of theoretically interesting concepts.

2. Method

Theoretical work on the medical consultation is thin [20]; nevertheless, theory has much to offer our understanding of these quintessentially human interactions. We have chosen Ervin Goffman’s dramaturgical theories of human interaction to help us explore the phenomenon [21]. Goffman views social interactions as one would a theatrical play; humans interact with each other according to perceived roles and accepted rules of behaviour, much as one performs a scripted play. For Goffman, the interactions are socially determined and based on rituals. Such an approach is well suited to the somewhat formalised setting of the medical consultation. Each actor is defined by his/her role, and produces a performance guided by that role. In this context the computer is understood to be an actant – a non-human actor – that acts in ways prescribed by its role.

The risk with any theory is to ignore evidence that does not fit the preconceived concepts or force the evidence to fit where it does not. For this reason we adopted a hermeneutic approach to analysis. Hermeneutics describes a comprehensive interpretive process [22] that treats the data as a distant thing and paradoxically assumes a relationship between the reader and the text. Hermeneutics thus describes the “rules” by which a researcher engages with the text or data they are studying. Important to this approach is the hermeneutic circle, where the researcher sequentially engages with the data at different “scales”, thus the meaning of the parts is derived from their context in the whole, and the meaning of the whole is derived from the parts. Through these cycles meaning is interpreted [23]. What is described here is the framework we used to analyze the data as part of that circle.
We chose an observational method, rather than seeking an experiential view of the actors. Our intention would be that the information from this study would then be used in other studies, as a means of framing the information thus obtained. Traditional research methods rely on deductive or inductive logic to create conclusions, we have used retroductive logic [24]. Retroductive logic allows us to assume the existence of that which we wish to describe, and see if it can thus be described.

Twenty GPs agreed to allow a single session of consulting to be videotaped (2.5–3 h). GPs in this study were recruited by three Divisions of General Practice, federally funded support organisations for general practice [25]. Using this network we were able to target GPs who were significant computer users – defined as using clinical software for progress notes, as well as prescribing and test ordering. Each GP videotaped a single consulting session. We generated 141 consultations for coding. A further 34 consultations were lost due to technical difficulties (failure of camera technique), and 17 due to patient refusal (Table 1). Non-consenting patients tended to be female, and often requiring an intimate examination. This refusal rate is lower than that previously reported [26].

Each session of the consultation was then transferred to digital format on an Apple Macintosh computer, which allowed the researchers to tag specific micro actions (gaze direction, etc.) in the videos as well as observing the flow of the consultation [27]. This tagging allowed sequential viewing of individual consultations, as well as comparisons across consultations. Initially both a general practitioner (CP) and a sociologist viewed each consultation. From the first round of viewings we developed a theoretical framework that helps us conceptualise the consultation and that we use the iterative hermeneutic approach to classify data. Using hermeneutics, on the first pass a framework of the overarching keys was developed. The application of these keys was then tested by a second researcher reviewing the videos. The framework was then tested several times on three reference groups; the extended research team, a wider group of academics, and several times with practicing clinicians. Adjustments were then made to the framework; in this case three keys for physician and computer were conflated to two. A similar process was undertaken with the behaviours. This process continued until no further changes were suggested. Once this process was complete, there was little discordance between observers as to describing behaviours. Ethical approval was given by the University of Melbourne Human Research Ethics Committee.

### 3. Results

Both the actors (human participants) in the interaction and the actant (computer) were classified according to their “key” or style; a term derived from Goffman that describes the attributes of each actor/actant which influence the flow of the interaction, akin to a musical key signature [21]. A further classification was made on the basis of the “behaviours” or observable actions that have identifiable meanings within the context of the interaction. The typology developed from analysis is shown in Table 2.

### 4. The keys

Keys describe overarching themes of the behaviours exhibited by the actors in their relationships. For physicians, their key was the style they exhibited in every consultation. Patients were only seen for one consultation, so that observation can not be made, but the patient’s key was stable throughout their consultation. Unlike physicians and patients, computers could, and usually did, exhibit both of their keys within a single consultation. Repeated viewings of the video-taped consultations reveal two dominant keys for each actor and the actant.

### Table 1 – Characteristics of the sample

<table>
<thead>
<tr>
<th>Sample (20 GPs)</th>
<th>Lost-technical</th>
<th>Lost-consent</th>
<th>Useable consultations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male 13</td>
<td>17</td>
<td>13</td>
<td>103</td>
</tr>
<tr>
<td>Female 7</td>
<td>15</td>
<td>4</td>
<td>38</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban 10</td>
<td>16</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>Rural 10</td>
<td>16</td>
<td>11</td>
<td>81</td>
</tr>
<tr>
<td>Practice size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solo 3</td>
<td>5</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>2–5 Physicians  12</td>
<td>26</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td>&gt;5 5</td>
<td>1</td>
<td>5</td>
<td>46</td>
</tr>
<tr>
<td>Total consultations</td>
<td>192 (from 20 GPs)</td>
<td>34 (18%)</td>
<td>17 (9%)</td>
</tr>
</tbody>
</table>

### Table 2 – Classification framework

<table>
<thead>
<tr>
<th>Actors/actant</th>
<th>Keys</th>
<th>Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>Unipolar/bipolar</td>
<td>Engaging</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disengaging</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cogitating</td>
</tr>
<tr>
<td>Patients</td>
<td>Dyadic/triadic</td>
<td>Screen controlling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen watching</td>
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<tr>
<td></td>
<td></td>
<td>Screen ignoring</td>
</tr>
<tr>
<td>Computer</td>
<td>Active/passive</td>
<td>Informational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prompting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distracting</td>
</tr>
</tbody>
</table>
The physicians are classified unipolar or bipolar on the basis of where the lower pole of their body faced during the consultation. All the physicians who participated in the study maintained a consistent key for the entire videotaped session, suggesting it was the way they conduct all consultations. Unipolar physicians have a lower body orientation that predominately towards the computer, and they often ask questions motivated by the computer or input information during the consultation. In this sense they are seemingly being driven by the needs/presence of the computer. Their body language consists of the presence of torque, where the lower part of the body is oriented in a different direction to the upper. By contrast, bipolar physicians clearly indicate switches of focus with significant lower body shifts – using these shifts to indicate “computer” time versus “patient” time. Interestingly, we found no instances of the physician’s lower pole remaining facing the patient, while they used the computer, only the reverse.

Analysis of the orientation of patient’s body and their conversation suggest that patients are either dyadic, viewing the interaction with the physician as their predominant concern, with the computer seen more as a tool, or triadic, where the patient is happy to deal with the computer as an integral, if not equal, partner in the consultation.

Unlike the physician and patient, whose keys remain consistent throughout the consultation, the key of the inanimate computer changed throughout the consultation according to the requirements of its programming and the needs of the consultation at that time. Computers are categorised either active or passive. Reminders and dialog boxes that popped up during the consultation, actively demanding the physician’s attention, characterised an active key. In contrast, passive key occurred when the computer influenced the consultation simply by its presence, as in a consultation where the patient requires the doctor to check results contained within the program.

### 4.1. The behaviours

Behaviours differ from keys in that they are discreet actions, rather than an overarching style. Behaviour can be employed variously within a consultation, whereas, a key was maintained throughout the consultation regardless of individual behaviours. Significantly, actors with different keys could engage in identical behaviour, but an actor did not change their key. In summary, each actor can demonstrate three categories of behaviour, at different times and in response to the particular stage of the consultation.

Physicians can seem to engage the patient in the consultation, by turning their gaze towards them, or involving them in conversation, for instance. Conversely, they can also choose to disengage, shifting their attention away from the patient and towards the computer. In certain situations physicians appear not to engage with either computer or patient. They might stare at the computer for no clear reason, ranging from brief glances to quite long periods of attention, but for no obvious purpose, for example. We named this cogitation, because the doctor appeared to be taking time out from the consultation to think.

Regardless of whether the patient’s primary orientation is towards the physician (dyadic) or inclusive of the computer (triadic), they can exhibit three distinct behaviours. In the first of them, screen watching, the patient focuses his/her attention on the screen. This is evident through both gaze and small shifts in posture. The second behaviour, screen controlling, takes that focus further by bringing the computer (through its surrogate, the screen) into play in the consultation. Patients may point to the screen early in the consultation, advising the physician to search for test results, for instance. In the third, screen ignoring, the patient will deliberately disregard the screen, even to the extent of turning his/her body away. More subtle examples involve placing one’s bent arm like a barrier between the screen and oneself.

The computer’s inanimate nature precludes intentional; nevertheless, it exhibits three distinct behaviours that can influence the flow of the consultation. At times the consultation is shaped by information provided by the computer, for instance clinical information (test results), administrative information (recalls). We have called this informational behaviour. On other occasions the computer, whether in active or passive mode, serves only to distract one of the other actors, to break the frame of the consultation at that time. Consequently, such actions by the computer are known as distracting. Where the keyboard has not been touched for some time the computer may initiate a screen saver. Such an action, despite its passive nature, can be distracting for both physician and patient. In one case, the patient exclaimed over the pictures on the screen and the physician responded by saying that they were taken by her on a recent holiday. Finally, the computer can exhibit prompting behaviour. This is a common feature of medical software and integral to decision support systems. The computer, for instance, may indicate that this patient is overdue for an annual vaccination, thus motivating the doctor to provide that service.

### 4.2. Example

The following photographs were taken of actors reproducing actual consultations from the data. The asterisks mark the timing of the still shots with the transcript. The computer screen shot is also only an example, as this method did not allow recording of the screen as well.
The physician and patient had not met before, but the patient had previously attended this family practice. From the commencement of the consultation, the patient indicated by posture and gaze that he was willing to include the computer in the interaction, and therefore, was classified as a triadic patient. His gaze rarely shifted from the screen, and thus he can be said to have engaged in screen watching behaviour. He did not, however, act or say anything else to draw attention to the screen and therefore, cannot be said to have exhibited screen controlling behaviour. Having introduced herself and with her body facing the patient, the physician reached for her sphygmomanometer; however, she glanced at the passive computer screen while doing so and noticed that some patient information was out of date. Distracted by the missing information, she interrupted her plan of taking the patient’s blood pressure and reoriented her lower pole towards the computer. The change in her lower pole classified her as a bipolar doctor; one who repeatedly shifts her body between patient and computer. The computer while having provided no prompt and hence while passive at this moment has clearly distracted the physician.

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All the keys and behaviours were well represented in the sample. 12/20 of the GPs were bipolar, and of 141 consultations, 82 (58%) were with patients who were classified as triadic. Active and passive computer styles were identified in most consultations, as were examples of all behaviours.

5. Discussion

This study builds on a growing body of work that examines the physician–patient relationship in the context of increasing computerisation [13,14]. It follows a line of research that describes the relationship as a triadic one, in which the three actors are given equal attention. Equal does not mean that they are the same, nor does it mean that the physician–patient relationship should cease to be viewed as a dyad. But that such a framework has been posited means that it must also be tested. Lacking from the discussion to date has been a framework for that discussion to take place. By starting with an assumption that each actor has behaviours that can be described, we were first able to describe doctors, patients and computer behaviour. As described in the introduction other studies, while mentioning the triadic relationship, have primarily looked at doctor behaviours. Using a single camera method has limitations in identifying some details of micro-behaviours, particularly in identifying computer behaviours. Having one researcher medically qualified and familiar with the programs assisted in this. Ideal is a multichannel recording system [28], but with extra channels comes proportional increase in analysis time. Our method also has the advantage of dealing directly with the data, rather than transcriptions as other studies have done [29].
Summary points
What was known before:

• General practice in several jurisdictions is heavily computerised.
• Concerns have been raised about the impact of computers on the doctor–patient relationship.
• The concept of a “triadic relationship” has been proposed.

What this research adds:

• The computer can be shown to exert an influence on the human actors.
• That influence can be categorised.
• Those behaviours can be examined in relation to the human behaviours.

We have attempted to be value neutral in our observations, in respect of what might be judged as desirable performances. The formulation of a managerial versus interpersonal style of interaction and further in the future. Technologies, such as touch screens and voice recognition, will comments and modifications to this framework. Different framework to allow for discussion and research. We welcome computer behaviours encased alongside human, we have a nation behaviours posited by Als [18] can be seen as engaging behaviours. Missing from previous descriptions is an analysis of the computer contribution.

What is missing from this paper is a detailed analysis of the occurrence of these behaviours, their frequency and nature. The detailed analysis of the existing data in this regard, in the context of several elements of the consultation (the first minute [30], information flow, behaviours during printing), is the subject of other papers.

Australian family physicians have expressed concern about the effect of the computer on the physician–patient interaction. In the United States, Ventres et al. [17,31] have deemed the presence of an examination room computer of sufficient import as to warrant conducting ethnographies. Importantly, consultations should not be judged on a single element, but on the performance of the interaction as a whole. If the new consultation is to be viewed as a triad, as Scott and Purves suggest [13], then the behaviours of all three actors warrant description and further research. By describing a framework that has computer behaviours encased alongside human, we have a framework to allow for discussion and research. We welcome comments and modifications to this framework. Different technologies, such as touch screens and voice recognition, will change the interaction further in the future.

6. Conclusion

All new technologies carry risks and benefits. The computerisation of the health space is only going to continue apace, and with it the presence, and therefore influence, of the computer on human interactions is going to increase. There is risk that computers will dehumanise the consultation. There is also risk if we exclude the computer on the basis that it will dehumanise the consultation. If the dynamics of the consultation are to be understood both now and in the future, when computers will play an even greater role in the general practice consultation, then an understanding of this triadic interaction is imperative.

Acknowledgements

Dr. Pearce was supported by a National Health and Medical Research Council Fellowship, and the research was supported by a Royal Australian College of General Practitioners Informatics Scholarship. Neither had any role in the decision to submit this manuscript. Author contributions: The study was undertaken by CP as part of a Ph.D. study. He developed the initial framework, which was critically reviewed and modified by the other authors. First draft of the paper was prepared by CP and the other authors all had input in developing the final text.

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