Sensory dimensions of decision-making and the trouble with Telehealth

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Abstract

Government rhetoric about the new National Broadband Network (NBN) positions it as a panacea to access to resources and opportunities in Australia. While the NBN appears to be an elegant solution to geographical, technological, and economic inequalities across Australia, it brings into question whether the technologies that operate over this network can provide an equality of quality. This paper examines the use of videoconferencing in healthcare, and its implications for expert judgements. It argues that while Telehealth makes medical care available where it may otherwise have been limited, there are concerns over its reliability due to the limitations placed on the sensory information available to consulting doctors. This paper is based on qualitative interviews that were conducted as part of a larger study with 92 participants in 4 occupational groups.

Key words: Expertise, senses, Telehealth, rural health

Introduction

Government rhetoric about the new National Broadband Network (NBN) positions it as a panacea to access to resources and opportunities in Australia. It connects rural and remote areas with the cities, and Australia to the world. In doing so, it claims to positively contribute to the health of Australians, particularly those in rural, remote, and disadvantaged communities, by increasing medical access and effectiveness in an efficient way. While the NBN appears to be an elegant solution to geographical, technological, and economic inequalities across Australia, it brings into question whether the technologies that operate over this network can provide an equality of quality. In other words, can this technology actually provide access to the expertise that it says it does?

This paper examines the use of videoconferencing in healthcare, and its implications for expert judgements. To examine this issue, I first explore the role of the senses in expert doctors’ understanding. Taking the example of Telehealth, I then examine the problems experts experience when perception is limited to isolated sensory modes. I argue that while technologies such as Telehealth make medical care available where it may otherwise have been limited, there are concerns over its reliability due to the limitations placed on the sensory information available to consulting doctors. This paper is exploratory, and aims to briefly highlight some issues for further discussion and research.
Methods

The findings reported here are drawn from a broader ethnographic study on the sensory practices and processes of four occupational communities including doctors, musicians, adventurers, and Morse code operators. My focus was particularly on hearing within these communities, though I remained aware of the broader sensory context. The study took place over an 18 month period, and involved in-depth semi-structured interviews with a total of 92 research participants. The data reported on here specifically draws from the interviews with 15 doctors. The participants were not limited to speciality or locality. Interviews lasted between 30 and 240 minutes, and were recorded and later transcribed with the consent of participants. Ethics approval was obtained for this research.

The senses in expert understanding

Often thoughts of knowledge (and its study) focus on discursive, theoretical, and scientific examples. Classical sociologists writing on knowledge such as Mannheim and Mills held an interest in the currents of thought that affect ‘reality construction’ in the public and private spheres (McCarthy, 1996: 3). Equally, the natural sciences tend to be recognised most freely as knowledge (B. Smith, 1988: 1), and have also come to be the object of sociological enquiry (Knorr-Centina, 1999; Kuhn, 1962; Latour and Woolgar, 1979; Rouse, 1987). However, these knowledges do not capture knowledge making and knowing practice in its entirety.

Increasingly, taken-for-granted knowledges are coming into focus, and are demonstrating that knowledge is messy, located (Turnbull, 2000), specific to small social groups (Knorr-Centina, 1999; Wenger, 1998), personal (Glaser, 2001), and much of it not simply extracted or written down (Duguid, 2005; Klein, 1999; Polanyi, 1966). The senses represent one area of knowledge that has tended to escape attention, particularly in occupational contexts (Hockey, 2009: 478). For example, while the role of social actors in the production of scientific knowledge has been highlighted, scholars have remained largely silent on the social processes that shape sensory perception as if scientists’ ‘observations’ (ie seeing, hearing) are objective, neutral, and unbiased, as empiricist philosophers have argued (Hume, 2000; Locke, 1975).

While often taken for granted, the senses are acquired and specialised, and particularly for experts, they are vital tools for decision-making. As Ingold argued, the ‘skilled practitioner consults the world, rather than … rules, propositions, [or] beliefs … for guidance on what to do next’ (Ingold, 2000: 164). However, professional judgements in fields including medicine are often assumed to be absolute. As American physician Jerome Groopman observed: ‘Most lay people imagine a pathologic diagnosis to be objective and definitive. But often … very competent pathologists can view the same specimen and arrive at different conclusions’ (2000: 204). This variation in outcomes is due to the vital role of intuition and sensory perception in medical decision-making.
In interviews, doctors described the judgements they made on a day-to-day basis as responses to subtle and highly nuanced sensory cues. What began as a structured patient examination became the ‘foot of the bed’ or the ‘hi doc’ test. This expert ability to perceive health and illness relied on the senses. As one doctor interviewed explained: ‘If you eyeball a patient from the end of the bed, you take in a whole lot of stuff subconsciously about their breathing, their colour, all of these things’. It was also observed that a decision to operate on a sick child could be based on sensory judgements, rather than the more recognisable running of tests or the survey of a patient history. As one surgeon explained: ‘Sick kids look sick. If they look sick then they will need a surgical intervention, and you might not know necessarily what you are doing, but they just don’t look right’. An example of the limits of theoretical knowledge was also given. One doctor recalled that despite five years of medical training, he was unable to identify a jaundiced patient when it was first encountered. While he knew that jaundice was an indicator of pancreatic cancer and knew its presentation was a yellowing of skin tone, he had not yet learnt to perceive yellow. He reflected that you can learn about certain pathologies and their indicators formally, but it is ‘on the wards that you start to acquire an understanding of what a “flushed face” means, or whether someone is “blue”.’

In a contemporary culture of risk aversion, alarm bells may be easily rung by comments that a child may be operated on as a result of little more than a surgeon’s feeling. In a sense, understanding how surgeons can conduct surgery requires ‘us to hold together two ideas that professionalism often presents as contradictory: expertise and instinctive decision-making’ (E. Smith, 2008: 19). As the example of the missed diagnosis emphasises, while potentially uncomfortable and infrequently acknowledged, the sensory aspects of expert judgements are necessary for speed and precision in decision-making. A bigger risk to patient outcomes, then, is that limitations are placed on the sensory information available to a consulting doctor.

**Technology as a limit on expert judgements**

Given Australia’s location, and its populations in rural and remote areas, there is a push towards technologically-driven opportunities that facilitate economically viable, equal access to services and expertise. Telehealth is one of the pillars of the new *National E-Health Strategy* which is positioned as a service delivery tool to improve rural and remote, and disadvantaged community access to health care (2008: 12). It is particularly being used to facilitate the monitoring of rural and remote patients with chronic health conditions where access to continuous specialist care can otherwise be limited (Moffatt and Eley, 2010; Wakerma et al., 2008). While it is heralded as an environmentally friendly, cost-effective approach to preventative medicine and rural and remote medical services (Conrad, 1998; Darkins and Cary, 2000; Finkelstein, Speedie, and Potthoff, 2006; Mitchell & Pezzullo, 2010; Noel, Vogel, Erdos, Cornwall, and Levin, 2004), it is not without controversy (Ellis, 2004; Liaw and Humphreys, 2006). An aspect of this technological solution that appears to have been paid little attention is the change to the sensory experiences that it introduces, and the implications of these changes for medical practice.
Doctors who participated in this study expressed significant concern over their capacity to make their highly nuanced judgements as experts in their fields when using Telehealth systems. Their concerns were due to reduced visual and aural inputs, with other sensory experiences removed entirely. One doctor, for example, was critical of technologies that could record a patient’s heart sound so it could be emailed to a consulting cardiologist, on the grounds that taken out of context this kind of information was well-nigh useless. Another doctor interviewed had been using Telehealth as part of his patient care strategy in the area of Drug and Alcohol for a few years, and spoke at length of his experiences. The located and responsive aspects of expert knowledge bring into question the efficacy of technologies such as videoconferencing that mediate and alter experiences. To demonstrate the issues Telehealth introduces, I will give the reflections of one user at length.

One of the problems identified with Telehealth was the limited resolution of the video, and its impact on what could be visually perceived. The doctor explained that with the limited resolution ‘you can’t get skin textures and colours accurately’. Limited bandwidth also negatively impacted perception, as ‘the rate of change for facial expression is inadequate, and you can’t see pupillary response very well’. The net result of these attributes of the videoconference was that ‘all of these subtle things that you don’t know you’re actually looking at can’t be accessed’. He described his visual experience as ‘a bit like DVD up-scaling’. This analogy was brought to mind because he had to ‘try and upgrade to high definition by sort of filling in the gaps for this person’. This allowed ‘increased resolution of the person because you have seen them before’. For this doctor, this was like talking to a friend on the telephone, and being able to ‘see’ them, despite the visual input. However, this could be dangerous in a context of making an assessment of a patient who was less known than a good friend and perhaps more variable.

Another concern with Telehealth was that the technology also compressed sound, with the implication that not all the needed information was transmitted. This could mean that attributes of a person’s voice like an ‘edge’ may not have been perceivable. The doctor described a woman who used amphetamines: ‘When you see her in the flesh, there are other tones, often higher tones, that don’t seem to come across in Telehealth’. Equally, the correction of sound levels (which aim to ensure a consistent, easily perceivable audio input), also have the impact of excluding certain critical information. He was aware that he missed ‘little’ sounds such as sighs that could be picked up ‘when they’re in the room’.

While the videoconference transmits a picture and a spectrum of sound, other sensory inputs were identified as omitted entirely. He shared: ‘You don’t have smell, you don’t have touch, you can’t listen, and also, you don’t get eye contact’. He continued:

With what I do you need the subtleties. They can look at you on the screen, but you can’t get that, whatever the experience is. When someone looks at your eyes, they are actually looking at your iris, but if they are making eye contact, they are looking just behind, almost as if they are looking at your retina.

In other words, satisfactory listening and eye contact were simply unavailable, despite the transmission of a picture and sound.
In response to the problems of Telehealth, a nurse was in the room with the patient at their end of the videoconference. After the appointment, the doctor was able to speak with the nurse who could ‘say whether he was really twitchy, or looked really crook, or he was uncomfortable – stuff that I wouldn’t pick up on’. While the idea here was that the doctor still had ‘eyes in the room’, they were not his expert eyes or ears. Additionally, perception was also limited by this altered social context, as patients did not relate to the absent doctor as they normally would. The doctor explained: ‘There have been times, too, where the nurse has been in the room with them, and they will have a conversation as if you’re not there, so you’re really not part of a three-way dialogue’. Because of these complications – that the assisting nurse did not possess the same sensory expertise to form judgements, and that the presence of a third party changed the social interaction – he had more faith in improving the technology than working with a team.

Reflecting on his experiences, the doctor ultimately had concerns about his capacity to assess correctly the health of a patient:

If someone was to say “you have made these decisions about whether someone was suitable to have take away doses of methadone based on your feeling about how you interacted with them” and then they go away and overdose, there would be a question about whether you should have relied on that assessment.

While descriptions of health care provision over format as ‘monitoring’ and ‘management’ suggest that life and death decisions may not be made on the basis of these interactions, this professional’s experiences demonstrate the range of contexts the technology is being used in practice, and the potential issues that can emerge from its use. Accurate and safe decision-making can be a question of having all of the sensory inputs available, and the observations of this user strongly suggest that these necessary sensory inputs are being compromised. Such technologies can have a use when used as a supplement (not a replacement), but are more suited to some contexts than others. For cases where fine sensory discriminations are being made, they can be very ineffective.

Conclusion

The sensory aspects of knowledge are vital to decision-making, to the extent that gaps in sensory information are gaps in understanding. New technologies such as videoconferencing are being embraced in areas such as health for their capacity to provide services in an affordable way. However, this technology is better suited to some applications than others. In the example of Telehealth, the capacity to make judgements about the health and wellbeing of patients is potentially undermined because the technology does not allow for fine sensory discriminations. There are good reasons why such technologies are being embraced, such as the ability for care to be given when none would be available otherwise, but the implications of its use and possible strategies to increase its effectiveness deserve further attention. In its current manifestation, the observations of doctors using this technology suggest that
we would be kidding ourselves if we thought that Telehealth was affordable and delivered 'equal' outcomes.

Bibliography


