

Briefing Paper No. 3

Virtual Reality and its Application to Healthcare

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With Dawn Goodwin, Lewis Hyland, Steven Martin, Rachel Prentice, Irene Swarbrick, and Sian Taylor-Phillips.

This briefing paper summarises the discussions of a workshop that took place at the University of Warwick on May 24th – 25th 2010. It was the third of four workshops funded by the Economic and Social Research Council award ‘Biomedical Visualisations and Society’ and organised by Julie Palmer and Frances Griffiths. The workshop series aims to give early-career researchers the opportunity to explore the social and political implications of a range of technologies of biomedical visualisation and to create an international network of researchers in the field.

The third workshop focused on virtual reality (VR) and its application to healthcare. The workshop combined presentations from Julie Palmer and Rachel Prentice, with a guided visit to the Digital Laboratory (University of Warwick) with Vinesh Raja and Mitan Solanki, and peer discussion.

Virtual Reality and its Application to Healthcare. Dr. Julie Palmer (University of Warwick)

Julie Palmer introduced VR technology and a range of applications to healthcare including: training, assessment, surgical rehearsal and treatment of phobias. She introduced the idea that virtual reality technology embodies or enacts particular ways of knowing about the body as well as particular constructions of professional groups and expertise. Therefore VR is open to analysis of the underlying values and understandings of the body and of medical practice (Johnson 2005). To elaborate on this point, Julie described in brief how the body is rendered into data and algorithms in order to ‘inhabit’ the computer (drawing on Prentice 2005). Finally, Julie posed the question ‘what is realism in this context?’, noting that realism can include ‘unreal’ viewpoints and isolated body parts.

Key Ideas:

- Virtual reality technology is connected to digital radiography (MRI, CT) in so far as it relies on data generated by these technologies (amongst other data sources).
- ‘Realism’ is understood in technologically specific ways and, in the context of VR, can include ‘unreal’ perspectives.

Guided Visit to the Digital Lab with Prof. Vinesh Raja and Mitan Solanki.

Participants visited the [International Digital Laboratory](#), University of Warwick. First, Mitan Solanki gave an introductory presentation, outlining key areas of research in VR in relation to health. Vinesh Raja and Mitan introduced us to three technologies that are being developed at the Digital Lab: virtual surgery, a virtual breast and an orthopaedic model. Participants had the opportunity to experience VR technology and to talk to the engineers about the design process and the challenges of VR technology development, particularly around soft tissue modelling and haptics. However,

participants noted reluctance on the part of the engineers to talk in technical detail about the research and design process. The source of this reluctance was unclear but may have been due to assumptions about cross-disciplinary communication.

Key Ideas:

- Embodied experience with the technology has the potential to ground further theoretical thinking.
- VR technology was more imperfect than one might be lead to believe by the hyperbole around VR in the literature.
- Participants experienced the laboratory as a gendered space.

Swimming in the Joint: Surgery, Technology, Perception. Dr. Rachel Prentice (Cornell University).

Rachel Prentice presented a paper about minimally invasive surgery. Minimally invasive surgery, and the need to learn to perform these procedures, has been the inspiration for much virtual reality technology and surgical simulations. Drawing on her ethnographic fieldwork, Rachel argued that it may be advantageous to abandon the concept of representation when thinking about certain kinds of imaging, and instead think about how we inhabit 3D space. She argued that there has been an over-privileging of the visual and the cognitive and drew attention to the embodied work of minimally invasive surgery. Rachel offered us a series of case studies of surgical ‘moments’ from her fieldwork to illustrate her arguments: a bile duct resection, an elbow surgery, and a shoulder surgery. Her accounts emphasised touch, gesture, kinaesthetics, verbal navigation and embodied knowledge. When vision was described, it was vision extended by surgical instruments (probes and scopes). She described surgery as seeing and acting together, with technological mediation: surgeons see to intervene, and intervene to see.

Key Ideas:

- An analytical move away from privileging the visual to thinking seeing/feeling together is proposed.
- 3D imaging may prompt a move away from thinking in terms of *representation* to *inhabiting* 3D space.

Discussion

Discussion was wide ranging, reflecting on the different sessions of the workshop and issues arising. We discussed what ‘counts as ‘virtual’ and ‘simulation’ and the boundaries of these categories. We discussed the promise of VR for medicine, both in terms of the hyperbole in the literature and our own imaginings. We questioned the dislocation of VR from social context and asked what kind of tasks transfer successfully from VR to ‘real life’. We considered the medical context and the traditions of teaching and learning within this. Workplace culture, tacit knowledge, and communication skills are all aspects of medical practice that also need to be conveyed alongside

technical skill. We noted that the drivers for the development of VR come from both within and outside of medicine, especially from the military and engineering and questioned how this shapes the technology and its implementation.

Suggested directions for further research:

- The history of surgery could be further developed, paying attention to changes over time in technology and practice.
- Patient interpretations of images of their own bodies (e.g. during endoscopy) are poorly understood. Should patients see their images? In what circumstances? What kinds of images?
- What is the effect of using VR in training and rehearsal on performance and behaviour of medical staff?
- How realistic does VR have to be to be useful in healthcare?
- What is the function of the hyperbole around VR? For whom is it beneficial?
- What are the global and local drivers for the development of VR? (technological challenge, funding patterns, the military, the gaming industry?)

Works Cited

- Johnson, E. (2005). "The ghost of anatomies past." Feminist Theory **6**(2): 141-159.
- Prentice, R. (2005). "The anatomy of a surgical simulation: The mutual articulation of bodies in and through the machine." Social Studies of Science **35**(6): 837-866.