'Acted Reality' in Electronic Patient Record Research: A Bridge between Laboratory and Ethnographic Studies

Lesley Axelrod, Geraldine Fitzpatrick, Flis Henwood, Liz Thackray, Becky Simpson, Amanda Nicholson, Helen Smith, Greta Rait, Jackie Cassell

‘Acted Reality’ in Electronic Patient Record Research: A Bridge between Laboratory and Ethnographic Studies

Lesley Axelrod[1], Geraldine Fitzpatrick[2], Flis Henwood[3], Liz Thackray[1], Becky Simpson[6] , Amanda Nicholson[4], Helen Smith[4], Greta Rait[5] and Jackie Cassell[4].

[1] Human Centred Technology Lab, Uni of Sussex, Brighton BN1 9QH UK. [2] HCI Group, Technical Uni of Vienna, Favoritenstrase 9-11, A-1040, Vienna, Austria. [3] School of Applied Social Science, Uni of Brighton, Falmer, BN1 9PH, UK [4] Brighton and Sussex Medical School, Mayfield House BN1 9PH, UK. [5] Dept. Primary Care and Population Health, UCL Medical School, London NW3 2NF UK. [6] PLAYOUT http://www.playout.co.uk

Abstract. This paper describes and reflects on the development and use of ‘acted reality’ scenarios to study variability in General Practitioners’ (GPs’) record keeping practices, particularly their use of free text and coded entries. With actors playing the part of patients and in control of certain elements of the interaction, the acted reality approach creates a bridge between the controlled but often unrealistic laboratory setting and the arguably more ‘realistic’ but often messy world observed in traditional ethnographic studies. The skills and techniques of actors were compelling, helping to develop and sustain interaction, whilst keeping the process on track and providing rich data. This paper discusses the benefits and challenges of working with actors in this specific context and argues that the acted reality approach might be applied elsewhere in HCI research, especially in contexts where there are multiple individuals involved, but where the behaviour of one user is of special interest.

Keywords: acted reality, electronic patient records, HCI, virtual patient, drama.

1 Background and Study Context

Electronic patients records (EPRs) are well established in the UK, especially in primary care. EPRs allow entry of both codes (for example, prescription or diagnosis) and free text (for example, doctors’ notes or copies of letters), but their construction and use varies enormously depending on contexts of use. As with paper records, resulting EPR entries may support clinical practice at the point of care but can often appear ‘messy to outsiders [8]. In the UK, data from primary care EPRs are available for health researchers to access via databases such as the General Practice Research Database (GPRD). Anonymisation of data is difficult and costly, especially for free text data, so secondary users typically rely on coded data alone, with unknown amounts of relevant data remaining concealed in free text entries. This inaccessibility

of free text data to health researchers may lead to misleading estimates of incidence and prevalence of disease and subsequent need for provision of care [14,21].

This paper reports on a methodological innovation developed for use within the large multidisciplinary Patient Records Enhancement Programme (PREP), which aims to find ways to extract useful research data from the free text entries of primary care EPRs. Our project comprises four work streams, one of which involves HCI user studies in the field, to explore and understand the context in which records are constructed in primary care, and the factors affecting the variability of data entry practices, particularly with respect to coded and free text entries. This work stream puts users at centre stage, drawing on HCI and wider socio-technical research. It is aimed at better understanding of, and support for development and use of health information technologies. Such research has an increasingly important role to play in understanding how technologies function in practice and in informing the design of systems that are cost-effective, support work practice and help deliver improved care.

HCI approaches used in health settings include large-scale studies and *in situ* observations of clinical practices with real patients, vital to show how computerised health record systems impact on communication in the consultation process [9, 13]. Ethnographic research, in particular, has been very instructive in pointing to the complexity and contingent nature of health care work [2] and has provided a useful counterbalance to laboratory-based studies that seek to control such variability and complexity. In this paper, we describe and reflect upon the development and use of what we term 'acted reality' scenarios which use professional actors playing the part of patients to help control variability in primary care medical consultations. We argue that the use of acted reality scenarios helps to bridge the gap between the controlled, but often unrealistic, laboratory setting and the arguably more 'realistic' but often messy world observed in traditional ethnographic studies. We describe the process used to develop acted reality scenarios and reflect on the benefits and challenges of using such scenarios in the context of an ethnographically-informed 'user study' and on how such an approach might be applied more widely within HCI research.

The use of drama and actors is not new in HCI research, which has a long tradition of exploring complex topics in various settings, using a degree of artifice or dramatic interpretation [5], for example, paper, cardboard or video prototypes, mock-ups, role-play [3,10,18], personas [6], storyboards, Wizard of Oz (WOZ), forum theatre [12] and Body and Place Storming [15]. Applied theatre [1] has explored concepts via audience immersion and participation (participatory theatre, e-drama, promenade theatre, interactive dramatic installations or enactive cinema [22]) and to elicit people's views about 'privacy and prejudice' arising with the use of EPRs [16]. Newell et al [12] suggest one use of drama in HCI research is "a well briefed actor replacing a user within (particularly early) usability testing". We have extended this method beyond the study of usability to seek an understanding of how actors might be used to better understand variation in work practice (here, record keeping in the health domain). In our case, the actor as patient is not the user of interest but is employed specifically to help reduce patient-side variability as we seek to explain variation in primary care doctors' electronic record keeping practices.

An alternative to the use of professional actors as patients could have been the use of a 'virtual patient' of some kind. Health professionals working with EPRs already collaborate across hybrid ecologies that involve physical and digital domains [7]. For example, digitised manikins are used for learning resuscitation techniques, online scenarios may supplement work experience placements and 'serious' digital games can support training [19]. Virtual patients have levels of fidelity, for example, cartoons, text linked to real images, or embodied conversational agents (ECAs) [17]. Virtual world scenarios, with hospitals and clinics populated by virtual staff and 'medbiquitous' patients that have adaptable standards for different uses, are sometimes employed [11]. However, a particular challenge is the design of virtual patients that can respond appropriately to unexpected contingencies that often arise in medical consultations. Here professional role-playing actors can really add value.

Work of professional actors in medical education is well established, particularly in examinations of medical students and doctors, where actors play the part of patients, providing a standardised repertoire of responses [4,23]. Method acting, [20] that involves actors taking on thoughts and emotions of the character and drawing on their own life experiences, can be particularly useful in medical contexts. Actors who are additionally experienced in role-play and able to operate without a director's script, are able to react and *ad lib* in a scenario, rather than merely performing a role. We describe building on traditions from medical education and HCI research, working with professional role-playing actors to develop acted reality scenarios for use in our study, followed by reflections on how the acted reality approach played out.

2 Developing and Using Acted Reality Scenarios

PREP is concerned with the documentation practices of primary care health professionals, who create and use EPRs, making the resulting data available for secondary users, particularly health researchers. In choosing an approach, we dismissed using simulated laboratory settings that lack connection with authentic practices and rich contexts in which health care staff develop and use recoding systems. Studies of real consultations offer authenticity, but we would need very large numbers of similar patients in order to find enough with the same profiles and illnesses to enable us to compare GPs' recording practices in the context of specific medical conditions. Ethical considerations prevent us from asking real patients to visit numerous GPs, in order to facilitate such comparisons. Role-play by medical students was also considered, but their lack of acting skills might impair the process. We decided to work with professional actors, already experienced in both medical exams and role-play, to act as patients. We developed two patient personas with contrasting medical conditions, outlined in Table 1, to offer contrasts and challenges in the recording process. These were used by the actors in the acted reality scenario, where the same actor would consult with different GPs, enabling us to observe how GPs go about conducting and documenting the consultation using their particular EPR systems.

Working with the National Institute for Health Research, Primary Care Research Network, South East (NIHR PCRN-SE), we recruited six GP practices with contrasting organisations and using different EPR systems. Four GPs from each of the six practices agreed to take part in the two simulated consultations (providing 48 simulated consultations in all). Both University and NHS Ethical and Research Governance approvals were obtained from the relevant authorities. The actors were paid industry rates and we compensated for NHS staff time used. GPs were given information sheets that detailed the project and informed consent was gained.

Two patient personas were developed to offer significant contrasts and challenges in the consultation and recording process (see Table 1.) We iteratively developed and refined the persona scripts, with doctors and then with actors. As we could not be sure what questions GPs might ask, scripts had to be comprehensive before being sent to actors. Unclear or inconsistent details led to further refinement - for example, the script did not give non-verbal instruction and our 'arthritic' actor wanted to know how someone with such symptoms would move. We created 'dummy' medical histories, consistent with the personas and we worked with practice staff to install usable versions on each EPR system. In case GPs requested a physical examination, we provided actors with pictures that illustrated their condition (of swollen finger joints for rheumatoid arthritis and an inflamed throat for sore throat). We developed briefing notes for GPs telling them to act as normally as possible, to expect typical patients and to ask to examine patients if they so wished. A pilot consultation was videoed and studied by the research team and further refinements were made.

Table 1. Persona variables – symptoms by condition (arthritis, sore throat).

Medical Symptoms	Rheumatoid Arthritis	Sore Throat
Gender	female	male
Medical history	more history	little history
"Red flag" symptoms	present	not present
National clinical guidelines	apply	do not apply
Condition type	chronic	acute
Follow up	likely to be required	may not be required

Acted reality consultations were captured on video, using two cameras placed to give a close up and full body views of the patient-GP combination. On-screen activity was captured with ACA Screen Recorder software. Post-consultation walkthroughs of EPR entries, with the GPs, sought to understand their rationale for data entry. Data relating to the GPs' experiences and training were gathered. Resulting field notes, video and walkthrough and other data were collated and analysed. Video was edited with 'picture in picture' of screen capture, ready for input to NVivo, along with data from other sources such as staff interviews, observations, real consultations etc., ready for subsequent thematic analysis. While the development and use of acted reality scenarios was largely very successful in highlighting variability in GPs' record keeping practices using EPRs, and reasons for that, the focus of the rest of the discussion is the analysis specific to the role of the actor and the acted reality aspects of the study method, not on EPR data recording practices.

3 Reflections on the Use of Acted Reality Scenarios

Developing personas and scripts with our wider team, including actors themselves, proved to be very effective in producing realistic and robust scenarios through which actors could enact the reality of the selected medical conditions with GPs. Regular monitoring, review and discussion were needed to check actors' interpretation of roles. Through piloting (rather like a rehearsal) and later 'performances', the actors alerted us to points where the persona proved fragile, enabling us to improve upon it. The development of the dummy patient records on the different GP EPR systems also added to the convincing 'stage set' enabling roles to be played in context, although the decision to provide only minimal back history for the 'sore throat' patient worked less well as these consultations sometimes took longer as GPs spent time recording 'new patient' information.

Providing briefings for GPs offered them much needed reassurance about the overall process and encouraged them to act as normally as possible. For example, we were aware that GPs often do physical examinations and were concerned they might feel constrained in doing so when knowing they were working with professional actors. We spent time explaining that they should proceed as they would in any other consultation and could ask to examine the actor-patients if they so wished.

GPs' experiences of engaging in acted reality scenarios varied. Most were impressed by the way the consultations worked and described the experience as feeling 'realistic' and 'quite compelling' and one GP 'almost forgot it was not real', although he said that it took a few moments to 'get into it'. Although they knew they were dealing with actors, GPs often commented on 'the patients' needs' and concerns. Some clearly found the interaction easy while others found the process caused trepidation. While it was recognised that actors would need a few quiet moments prior to starting sessions to study scripts and get 'into role', we realised that GPs also needed time to prepare themselves to perform effectively in the acted reality scenarios. While some GPs played along from the start, others were hesitant and, in these cases, the actors worked hard to draw the GPs into the scenario, using both spoken familiar phrases and body language to do this. The professional role-play actors played a critically important part in making the acted reality scenarios a success. They helped normalise the consultation; their confident handling included introducing themselves and greeting the GPs just as real patients do, showing their own vulnerability, and using their personalities to entice doctors to become players. The standardised personas were brought to life by the actors, who skillfully used both verbal and non-verbal means of communicating their symptoms to the GPs. For example, the actor-patient with arthritic symptoms held her hands as if they really were stiff and painful. In their real lives, the actors had personal experience of visiting doctors and either direct or indirect experience of the types of symptoms they were asked to present with. This added to the veracity of their performances and actors' individualised interpretations meant they presented convincingly as patients.

There were times when acted reality scenarios worked less well. Examinations of pictures of symptoms sometimes broke the 'spell' of the acted reality scenario and actors had to work particularly hard at drawing the GPs back into the performance at these points, often using a moment of exaggerated body language such as leaning in towards the GP to regain their attention. After the consultation, some GPs remarked that if the patient had been 'real' they might also have asked to make further physical examinations, for example of the feet, as well as the hands of the person with arthritic symptoms, but that they had proceeded without doing so on the basis that seeing the hands was enough. One GP broke into an 'aside' at the point of the physical examination. When presented with the photo, he stepped completely out of role, looked away from the patient, the photo and the computer and addressed the camera, saying 'this shows…… and of course if this were real I would also ask to examine……'. GPs sometimes followed unexpected lines of questioning, requiring the actors to think on their feet and *ad lib* an unscripted answer. We advised them to be vague if they were unsure of the best response, and this worked well as patients in real life sometimes give vague or imprecise answers to questions. In one early session, a GP asked the actor-patient with arthritic symptoms what the pain felt like. We had not scripted for this. She replied 'I'm not really sure how to describe it' – which is often the case in real life.

Actors described emotional effects from the consultation process, and after the performance was complete, they still 'felt' the symptoms they had been simulating and expressed their feelings about the consultation. They needed several minutes to get 'out of role' and start to be themselves again. Doctors may also need time to step out of role in order to be ready to reflect on their experiences. Time for this must be built in to study design.

Using professional actors in research such as this does carry costs, however. Role-play is a specialist discipline within acting and adding actors to the multidisciplinary team takes time, money and effort. There is extra organisational work in getting actors, technicians and researchers in place in pressurised real world locations where setting aside rooms and doctors' time is difficult and locations are not perfect.

4. Conclusions

In this paper, we have described and reflected upon the process of developing and using a novel acted reality method of working with professional role-play actors, in our case as part of a large multidisciplinary research programme that aims to extract useful information from free text entries in primary care EPRs. We wanted to understand working practices but sought to avoid both the controlled and inauthentic scenarios offered in laboratory-based research and the arguably more authentic but much more 'messy' scenarios observed in traditional ethnographic studies. Working with actors to build and repeat acted reality scenarios was devised as a method that would enable us to control the 'patient' aspects of the consultation in order to focus

on the doctors' working practices and identify factors shaping documentation practice that are not related to differences in patients and their symptoms.

Our experience of developing and using the acted reality approach suggests that drawing on the experience and skills of professional role-play actors, using a combination of dramatic methods, has much to offer in HCI research. Professional actors, experienced in role-play, can enrich scenarios and bring personas to life. Further, the actors' professional skills play a crucial role in engaging the 'users' of interest (here, GPs), in the performance, helping them to play their part, alerting them to moments where they step out of role, and taking steps to repair breaks in fidelity.

Our reflections suggest that, as computer systems become pervasive and often function in settings where there is more than one individual involved in interaction of interest, acted reality scenarios are a valuable method to help facilitate a degree of control over that interaction without resorting to a fully-controlled laboratory-based research design. In the acted reality scenarios described here, the actors are largely controlled, allowing the research focus to remain on the doctors. This could be very valuable elsewhere in HCI research where there are multiple individuals involved in interaction, but where the behavior of one type of user is of particular interest.

Many actors specialise in role-play in the medical domain, and there is no reason why some should not develop specialised acting skills that would be applicable in other HCI research domains. Our experience with acted reality scenarios also has implications for virtual patient design. For example, minor slips and errors and some vague responses could be built in to such systems to be used as adlibs or in response to unexpected actions by the user, without breaking with the storyline.

In this paper, we have reflected only on the *process* of developing and using acted reality scenarios in HCI research on electronic patient record use. On-going analysis is being conducted to assess how far this approach has added to our overall understanding of these practices. In particular, data from these acted reality scenarios will be compared with data collected in consultations with real patients to see if and how documentation and recoding practices differ. The use of acted reality scenarios also raises interesting questions about the potential for a particular type of 'Hawthorne effect' (where people alter behaviour because they are aware of being observed). For example, it would be interesting to know whether actors' presence in the consultation has an effect over and above any observation carried out by researchers via video recordings. Such knowledge will help contextualise any claims we might make on the basis of data derived from acted reality scenarios.

Acknowledgements. This work is approved by NHS Ethics Committee Brighton West (REC 09/1111/45 SRG/04/05/39 and supported by The Wellcome Trust (086105). The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. We thank Sussex NHS Research Consortium & PCRN-SE; all participants; the project team from Brighton and Sussex Medical School and Universities of Sussex and Brighton; and collaborators from PLAYOUT, University College, London, and the GPRD.

References

1. Ackroyd, J.: Applied Theatre: Problems and Possibilities. Applied Theatre Researcher. 1 (2000)
2. Berg, M., Goorman, E.: The contextual nature of medical information. Int. J. Medical Informatics vol. 56, pp. 51-60. (1999)
3. Brandt, E., Grunnet C.: Evoking the future: drama and props in user centered design. Proc. Participatory Design Conference, CPSR (2000)
4. Bosse, H., Nickel, M., Huwendiek, S., Jünger, J., Schultz, J., Nikendei, C.: Peer role play and standardized patients in medical training. BMC Medical Education 10,27 (2009)
5. Carroll, J. M.: Making Use: Scenario-Based Design of Human-Computer Interactions. MIT Press 2000
6. Cooper, A.: The Inmates are Running the Asylum. SAMS (1999)
7. Crabtree, A., Rodden, T.: Hybrid ecologies: understanding interaction in emerging digital-physical environments, Pers Ubiq Computing, vol. 12, pp. 481-493 (2008)
8. Fitzpatrick, G.: Integrated Care and the Working Record. Health Informatics J. 10, pp.251-252 (2004)
9. Greatbatch, D., Heath, C., Campion, P., Luff, P. How do desk-top computers affect the doctor-patient interaction? Family Practice 12,1, pp.32-36. (1995)
10. Light, A., Weaver, L., Healey, P. & Simpson, G. Adventures in the Not Quite Yet: using performance techniques to raise design awareness about digital networks Proc. DRS, Sheffield, July (2008)
11. Medbiquitous virtual patient working group website http://www.medbiq.org/working_groups/virtual_patient/index.html accessed 7.4.2011
12. Newell, A., Morgan, M, Gregor, P. Carmichael, A.: Theatre as an intermediary between users and CHI designers. CHI'06, pp. 111-117 (2006)
13. Newman, W., Button, G., Cairns, P. Pauses in doctor-patient conversation during computer use: The design significance of their durations and accompanying topic changes. Int. J. Hum.-Comput. Stud. 68, 6 (Jun.), 398-409. (2010)
14. Nicholson A. Tate A.R. Koeling R. and Cassell J.: What does validation of cases in electronic record databases mean? The potential contribution of free text. Pharmacoepidemiology & Drug Safety, 20(3) pp.321-324. (2011)
15. Oulasvirta, A., Kurvinen, E., Kankainen, T.: Understanding contexts by being there: case studies in bodystorming. Pers Ubiq Computing. 7, 2 (Jul.), 125-134. (2003)
16. RAE Privacy And Prejudice EPR views of young people (2010) http://www.raeng.org.uk/news/publications/list/reports/Privacy_and_Prejudice_EPR_views.pdf accessed 7.4.2011
17. Salazar, V. L.: (2009) Reducing the effort in the creation of new patients using the virtual simulated patient framework. WMED IEEE Workshop pp.764 -769. (2003)
18. Seland, G.: System designer assessments of role play as a design method: a qualitative study. Proc. NordiCHI '06 vol. 189. ACM, New York, NY, pp.222-231. (2006)
19. Stott .D.: Learning the Second Way *BMJ*, 335 p.1122-1123. (2007)
20. Strasberg, L. A Dream of Passion. http://www.leestrasberg.com/ accessed 7.4.2011
21. Tate A.R. Alexander M.G.R. Murray-Thomas T. Anderson S.R. and Cassell J.A. Determining the date of diagnosis – is it a simple matter? The impact of different approaches to dating diagnosis on estimates of delayed care for ovarian cancer in UK primary care. BMC Medical Research Methodology, 9,42. (2009) BMJ Open doi:10.1136/bmjopen-2010-000025
22. Ticka, P. Vouri, R., Kaipainen, M. Narrative Logic of enactive cinema. Digital Creativity. vol. 17, 4. pp. 205-212. (2006)
23. Ünalan, P., Uzuner , A., Çifçili, S., Akman, M., Hancıoğlu, S., Thulesius, H. Using theatre in education in a traditional lecture oriented medical curriculum. BMC Med Educ. 9,73. (2009) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2803161/ accessed 7.4.2011