

Empirical Sensibility in Design Workshops of Healthcare Infrastructures

Pernille Bjørn and Nina Boulus-Rødje
IT University of Copenhagen
pbra@itu.dk, nbou@itu.dk

Abstract. Socio-technical infrastructures are essential for healthcare work, however when hospitals decide to replace their analog artefacts with digital ones, it changes the basic conditions of the work. We know little about the transformation process by which new technological opportunities are created and negotiated before being implemented in practice. In this paper, we focus on the work conducted during 22 design workshops, where healthcare professionals and designers collaborate to customize an EDIS system for a paediatric emergency department. When infrastructures are replaced, we risk dissolving critical connections and introducing complexities. Thus, we argue that bringing empirical sensibility into design workshops can help foresee the possible future risk of cutting connections.

Introduction

The idea of using research in order to change or improve technologies and practices is grounded within several disciplines and approaches, including for example, Participatory Design (Mumford 2006), engaged scholarship (Mathiassen and Nielsen 2008), Action Research (Bjørn and Boulus 2011), and ethnography for design (Randall, Harper et al. 2007). We draw inspiration from the above mentioned disciplines and ask: what kinds of skills and sensibilities are required for the researcher to engage practitioners in design workshops where the focus is on the creation of new socio-technical infrastructures?

This paper reports from an action research project conducted between December 2006-November 2008 in a paediatric Emergency Department (ED) in

Canada (e.g. Bjørn, Burgoyne et al. 2009). The goal of the project was to understand the complexities of the collaborative practices within the ED, and to support the design of Emergency Department Information Systems (EDIS) which constituted an electronic patient tracking system and an electronic triage system. The study includes 98,35 hours of observations, 14 formal interviews, informal interviews with 35 ED staff, and participation in 22 design workshop (each lasting for 4-8 hours with 3-12 participants – in total the first author spent 132 hours in workshops) where the EDIS was customized to support the work in the ED. Finally, observations were conducted in order to see how the implementation of the EDIS impacted the work practices. This paper will not focus directly on the EDIS system or the work practices within the ED; rather, the focus is on the design workshops. In particular we identify the critical skills and analytical sensibilities which the action researcher brings to the design workshops.

Analysis

To identify what kind of activities and skills ethnographers contribute with in design workshops, we examined the data from our empirical case and identified three main activities conducted by the researcher. The three activities are: noticing and articulating practice; crafting arguments; and making analytical links. Together, these activities summarise what we refer to as sensibility, which a skill action researchers can bring to design workshops.

The design workshops were organized by vendor application specialists and the health authority and included a core group of ED staff and the action researcher. At the beginning, it was the application specialists who set the agenda by presenting the discussion topics, and then asked the ED staff for their opinion. The design workshops were directed at two main components of the IT system: The patient tracking system which was to replace the existing whiteboards and parts of the paper flow, and the electronic triage template which was to replace the paper-based triage practices. One of the key discussions in the design workshops was about the electronic tracking board and consultant visits.

Consultants with different professional disciplines (e.g. orthopaedician or obstetrician) are called to the ED to examine different patients. Arranging a consultant visit constitutes three steps: First, the nurse calls the relevant ward and leaves a message; then, the consultant calls the ED back to hear about the inquiry and to see if it requires a visit; finally, the consultant visits the ED patient. In most cases, patients who require consultant visits need several visits from different consultants. Prior to the electronic whiteboard and patient tracking system, the process of arranging consultant visits was managed with the help of an arrow symbol (Bjørn and Hertzum 2011). An arrow pointing downwards indicates the completion of the first step in the process. When an arrow pointing up is added to the same previous arrow, it signals the completion of the second step. Finally,

when a string across the arrow is added, it indicates the visit was done. Next to the arrow, the professional discipline of the consultant would be noted down (e.g., ORTHO). With this system, it was easy to see the progression of the process because everybody has access to the trajectory; meaning the process through which the three steps were followed (or not). With a quick glance at the arrows on the whiteboards, staff could learn which steps were completed: did the nurse leave a message for the consultant (in the *past* tense), did the consultant call the nurse back (*present* tense), or will the consultant visit the patient (*future* tense). As can be seen here, the arrow system included information about the time and, therefore, signals the status of the different activities.

During the first design workshop it became clear that the electronic whiteboard was not designed in such a way that it indicated the trajectory of activities by leaving traces of their progression. Instead, the electronic whiteboard was designed as a to-do list. This implies a two-step mechanism where, once an activity was completed, its traces were deleted from the whiteboard. This lack of access to the traces, or rather the historical information about the progression of the activities, is highly problematic and could potentially lead to medical errors because future activities depend on this information. E.g., information that the patient had had #2 out of the 4 morphine doses ordered by the physician would disappear from the whiteboard. This information would still be recorded in the patient medical file, but it would not be visibly available to all staff. This design issue was raised by the researcher and the nurses, and triggered a lengthy discussion, which ended with a design revision that—although keeping the two-step mechanism—provided access to historical information. However, while this solution solved the problem regarding access to historical information, it only partly solved the consultant visit concern.

As was mentioned earlier, patients often require different visits from several types of consultants from different wards. It is, therefore, important for the nurses to keep a record of which consultant was contacted, who called back and who had already visited the patient at the ED. Already early in the process, the action researcher saw this challenge of distinguishing between the types of consultants and flagged it as a concern. It was, however, not taken seriously by the application specialists, in spite of the several attempts of the researcher to constantly raise the issue. It was not until four months later that a solution to the problem of multiple consultants was found. The solution, however, did not result in design revisions of the system, but rather in modification of current practices. Specifically, it implied defining workarounds even before the system was taken into use. Defining workarounds for future use of the new IT system requires familiarity with current practices and technological opportunities. It also requires the ability to link and, not least, to foresee how future practice might develop, while at same time acknowledging and accepting that the IT system will not accommodate previously identified important practices.

To sum up, if we zoom out from the concrete issue concerning the consultant visit, the practices performed by the action researcher within these workshops falls under three main areas. Firstly, she noticed and articulated the current practices of the ED staff during the workshops; secondly, she crafted arguments about what she saw as potential issues; and thirdly, she grounded her understanding of the practices within the analytical links she made between the current and future practices.

Conclusion

In this paper we argue that trained action researchers who bring their analytical skills to design workshops can contribute with what we are labelling here, empirical sensibility. Empirical sensibility comprises the practice of noticing and articulating users current practices in the light of future envisioned designs. It concerns the skill of crafting arguments demonstrating the possibly unanticipated impact new technologies have on current practices. Empirical sensibility is the skill of making analytical links between current and future practices, technologies, and infrastructures. These are critical in particular when designing technologies in healthcare. Healthcare practice is highly complex and heterogeneous, and therefore, requires analytical understanding of connections. However, displaying empirical sensibility during design workshops does not mean that it will necessarily impact upon design. To have direct impact, the action researcher needs to have a defined foundation and the ability to craft convincing arguments and carefully explain possible conflicting future scenarios.

References

- Bjørn, P. and N. Boulus (2011). "Dissenting in reflective conversations: Critical components of doing action research." Action Research Journal.
- Bjørn, P., S. Burgoyne, et al. (2009). "Boundary factors and contextual contingencies: Configuring electronic templates for health care professionals." European Journal of Information Systems **18**: 428–441.
- Bjørn, P. and M. Hertzum (2011). "Artefactual Multiplicity: A Study of Emergency-Department Whiteboards." Computer Supported Cooperative Work (CSCW): An International Journal **20**(1): 93.
- Mathiassen, L. and P. A. Nielsen (2008). "Engaged scholarship in IS Research." Scandinavian Journal of Information Systems **20**(2): 3-20.
- Mumford, E. (2006). "The story of socio-technical design: Reflections on its successes, failures and potential." Information Systems Journal **16**: 317-342.
- Randall, D., R. Harper, et al. (2007). Fieldwork for design: Theory and practice. London, Springer.

