

Maximizing Opportunities for User-Centered Design in Acute-Care: Introducing the Focal Wall

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Abstract. Digital health is a promising development in the pursuit of patient centered care. Technological developments, like patient portals, are providing new opportunities for patients to engage in their own healthcare journeys, increasing access to health data and practitioners in many cases. The primary objective of this research is the establishment of an in-patient portal for a new children's hospital through a collaborative design process. This paper details experiences from the first phase of this multi-year project and in particular methodological solutions that have been developed in order to meet the challenges of engaging acute care patients, families, and practitioners in user-centered design within such a demanding context..

Keywords. User-centered design, patient portal, nursing, digital health, patient engagement

1. Introduction

Despite global efforts to position patients at the center of healthcare delivery significant challenges persist in operationalizing this ideal model of care. While progress has been made with the establishment of patient advisory councils in many health systems and the emergence of patient-oriented health research, traditional care models and approaches persist. As the digital health evolution accelerates however, there is hope that technology may deliver on some of the long-standing promises of patient and family-centered care. Technology development has provided a further way to engage patients, families and practitioners through the introduction of user-centered design (UCD) into health [1-2]. This paper details experiences from a patient portal study at a new children's' hospital with a focus on the practicalities of attempting to sustain a period of UCD in a busy acute care setting.

1.1. Patient Portals

Patient portals have been introduced in many different healthcare settings as a tool to engage patients and encourage them, and/or their family caregivers, to be more active participants in care processes and decisions by providing secure electronic access to

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essential health data [3-5]. As this technology has evolved access that was primarily targeted to outpatients has also become available in acute in-patient settings [3,4,6]. Increasingly patients are able to use their own mobile or other computer devices to view this information as well as allowing other trusted family or team members that same ability. Portals are a primary example of a technology that should be developed and introduced through a UCD process. However, these approaches are still not routinely applied in health or consistently reported in publication on portal development making it difficult to determine adoption reach [6].

1.2. User-Centered Design

UCD is a common feature in software development and other human factor design [2]. Grounded in the principles that govern human-computer interaction, the application of this iterative process is meant to deliver a more useable and effective product [2]. Although UCD has been featured in health literature for several years widespread use remains elusive. This lack of partnered design, with both patients and practitioners, is believed to be a key factor in technology adoption, sustainability, and scalability challenges. In order to minimize these risks in the development of a pediatric portal for a new children's hospital UCD principles were embedded into a multi-phase research project that began with the identification of portal priorities of families and practitioners.

2. Methods

This multi-year project is guided by an intervention mixed methods framework [7]. In this type of study design qualitative data are essential in supporting the development and introduction of an intervention and provide critical contextual data to interpret factors influencing outcomes and/or to expand on final results [7]. This paper highlights unique UCD method development from this first phase of this work. These methods were supported by the use of an interdisciplinary framework created by the study team uniting the qualitative methodology of Interpretive Description, founded in nursing, with an analytic framework using tools and best practices from the computer science software development life cycle [8]. When the project began, the primary means of data collection for this first phase of the study was intended to be semi-structured interviews and focus groups, typical features in UCD [9]. Individual interviews can aid in establishing desired foundational features and teams of users can be gathered to work through storyboarding, or mock designs of the planned technology. However, very early in the research process the team was confronted with a significant challenge to these plans, driven by the intense and competing demands of the acute care setting.

Recruitment challenge in hospitals is not a new phenomenon [10-11]. However, with evidence mounting about the effectiveness of UCD in improving the uptake, ownership and sustained use of new health technologies, it is increasingly important to be able to access users in these settings. To overcome the constraints of traditional qualitative semi structured interviews we pursued the development of a five-minute digital download [10]. Essentially, instead of a standard interview format, five focused questions were delivered through multiple stations set up in different units in the setting. Equipped with tablets, participants would complete a consent, be guided through the questions, recorded by the tablet, and typically be completed on average within five minutes. This approach proved extremely effective on in-patient units as well as the hospital's outpatient clinic [10], but

following this successful means of data collection similar challenges arose in arranging focus groups. After repeated attempts to gather groups, we devised another new approach to reach families and practitioners in acute care by considering existing movement patterns through these settings and where participants might have an opportunity to address key research questions. This kind of methodological flexibility is often critical in sustaining UCD by adapting to user needs in the design process itself [9] and, in our research gave rise to the focal wall, the primary subject of this paper.

2.1. Focus Group to Focal Wall

The data gathered during the five-minute digital download sessions provided a comprehensive list of functional and non-functional portal requirements that family members and practitioners desired in an inpatient portal. Typically, this kind of data could be used in storyboarding sessions where users create paper prototypes of the technology with drawings or other images. However, storyboarding sessions can be lengthy and the research team wanted to create a ready opportunity for practitioners and family members to provide further feedback on the portal features. To accommodate this, four focal walls were constructed out of coroplast material depicting a large mock-up of the patient portal (Figure 1).

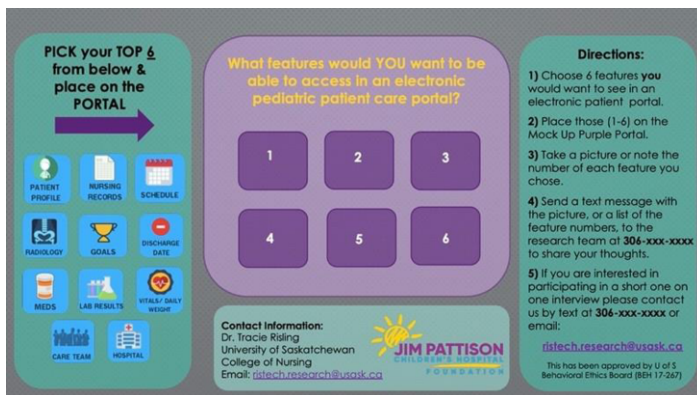


Figure 1. Focal Wall Patient Portal.

A short set of instructions directed participants to select their top six portal features from a set of nine labelled images that depicted: 1) Test and lab results; 2) Healthcare team names and pictures; 3) Patient care plan; 4) Calendar reminders; 5) Health record data; 6) Hospital navigation and procedures; 7) Medication information; 8) Patient vital signs; and, 9) Communication connection to healthcare team. These items were chosen following analysis of data obtained through the five-minute digital download sessions. The participants moved their selections into the middle section of the focal wall where they were secured by velcro and then texted a picture of the wall to the research team. Everyone who submitted an image was provided with a five-dollar coffee card from their choice of hospital vendor.

The focal walls were available in the family waiting room and staff areas of the neonatal intensive care unit, and the pediatric outpatient department waiting room over several weeks. This allowed family members and practitioners to engage in the research as their time allowed while waiting for appointments or intensive care visits. In order to

accommodate all interested participants those who may not have had data to transmit images or a phone with a camera were able to simply text the six numbers of the features they had selected. When participants texted the image or corresponding number set the research coordinator responded asking if there was interest in participating in a short phone interview. Those who completed the interview were compensated with an additional \$5.00 coffee card.

3. Results

The final focal wall sample was (N=30). Of those participants, 60% agreed to participate in a follow up interview (N=18). Once the feature data was tallied some clear preferences emerged among the nine available choices ranked here in descending order of selection:

- Test and lab results [30 selected]
- Patient care plan [27 selected]
- Medication information [25 selected]
- Health record data [24 selected]
- Patient vital signs [20 selected]
- Healthcare team names and pictures [19 selected]
- Communication connection to healthcare team [16 selected]
- Calendar reminders [15 selected]
- Hospital navigation and procedures [4 selected]

The interviews provided additional insight into why the top choices were preferred and, using the same five-minute format from the initial interview set, also allowed the team to explore views on the actual introduction of the portal and the increasing presence of technology in acute care.

The focal wall results were integrated into the phase one data set through the use of the aforementioned interdisciplinary framework designed by the study team. The framework organizes data needed to direct the portal build by the software team but also allows for further qualitative exploration providing insight into potential barriers of the eventual adoption and use of the portal by families and practitioners, as one example. To our knowledge the use of a focal wall is a unique approach in UCD as a tool to manage focus group recruitment challenge. An inaugural run in this research has proved the focal wall does have value in advancing opportunities for UCD in acute care settings.

4. Discussion

Accepting both the necessity of engaging practitioners, families, and patients in the UCD of emerging acute care technologies and the realities of the demands that these settings place on all parties created challenge and opportunity in this research. The trial of a focal wall in place of a focus group revealed both strengths and limitations of this approach. Among the positives was the freedom the wall afforded participants. There was no pressure to engage in the research, and it was available 24 hours a day, seven days a week, capturing moments of time that emerge in an acute care day for both families and practitioners. Although patients were not targeted in this first trial of the focal wall owing to the young ages of the units used in this research phase, this approach could certainly be modified to engage a wide age range of participants, adapted and installed in a

playroom or teen lounge for example. The strong visual elements seemed to be a draw and because the features were depicted visually as well as in writing, it can support improved accessibility. The prominence of the instillations on the wards also instigated technology conversations acting as a primer for the change dialogues that would have to accompany any large-scale adoption of a patient portal in this institution.

Focal wall challenges included the tendency of the velcro features to disappear. Extra pieces were prepared in anticipation of this eventuality and the research coordinator found something needed to be replaced one or two times per week on average. A clear limitation of the approach was that participants had to have a cell phone or smart device in order to share their data with the study team. Given the frequency with which velcro pieces were having to be replaced, plans to try and provide a phone at the wall locations were put on hold for this trial. While the visual impact of the focal wall was a strength, it was also challenging to try and provide succinct yet comprehensive instructions as well as promotional messaging. After a slower start to data collection, smaller posters with the coffee card incentive were placed at each site to promote participation. These elements can be refined in future iterations of this tool. Finally, the focal wall, while useful in determining priority portal features, did not provide the full functionality of a traditional storyboarding session. For this research, that further discussion of usability is being incorporated into the final proof of concept phase that will see a small group of nurses and families beta test the initial portal design.

5. Conclusions

Patient portals are still a fairly novel technology in pediatric acute care, and the development cost of this type of integrated digital tool is significant. There are many examples of similar technologies, such as electronic health records, that have faced substantial and costly adoption, sustainability and/or scalability challenges after simply being dropped into systems. UCD is an established approach to improve functionality, quality, usability and acceptability of technology [9] and is increasingly shaping not only the resultant technology, but healthcare itself [1]. This evolution is something nurses must be a part of, but urgent education needs must be met in this area for the profession to increase awareness and advocacy for inclusion in future design opportunities. UCD requires an investment of both time and money, things often in short supply in acute care settings. Creative approaches may have to be employed in order to facilitate this critical engagement, but this is preferable to continuing to advance health technologies without the input of the practitioners that will have to implement them and patients that will be expected to use them.

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