

Partnering in Digital Health Design: Engaging the Multidisciplinary Team in a Needs Analysis

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Abstract. Using participatory co-design methods and in partnership with consumers we have developed a mHealth application to support heart failure self-management. In the first phase of the research we conducted a needs analysis with clinicians. The objectives were to define the features to perceivably support self-management and the clinical requirements in preparation for its implementation as an adjunct to existing multidisciplinary care. Interviews were conducted using the 'Rose, Thorn, Bud' technique from Design Thinking together with a brainstorming session with post-it notes. Six sixty-minute interviews and one email exchange with seven clinicians produced 154 data points in total; 97 relating to self-management support and 57 to clinical relevance. Analysis of these data points resulted in design implications articulated in a design brief for use in subsequent co-design workshops. Our discussion focuses on a critique of the technique, which appears to be useful for this stakeholder group although concerns of adequately representing complexity emerged. This method was considered inadequately comprehensive for use in the needs analysis with patients and family. The authors encourage further research evaluating in-hospital processes for co-designed health technologies.

Keywords. Participatory design, co-design, healthcare professionals, needs analysis, requirements

Introduction

We have co-designed a mHealth (mobile health) application to meet the challenges of people living with heart failure to self-manage their condition. Our development followed a co-design and iterative process working together with local clinicians, patients and their families [1]. Participatory co-design amalgamates design tools with an alternative way of thinking, in order to bring healthcare staff and patients together for healthcare improvement [2]. The various methods of co-design and the many stakeholders potentially engaged in co-design processes means that co-design in healthcare is practiced differently [2]. The main critique of co-design is 'it simply takes too long' so accelerated methods are emerging [2]. This is especially significant when choosing a needs analysis method which would be efficient and effective for the clinical stakeholder group in considering their busy workloads. In the provision of safe, specialised heart failure care from a healthcare provider perspective, the novel

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intervention needs to align with existing policies, guidelines and current healthcare delivery models. Ultimately, clinicians were deemed most appropriate to gather these needs to incorporate into the design.

The aim of this phase of the research was to conduct a needs analysis with multidisciplinary team members who care for people with heart failure, prior to the design of the mHealth application. Specific objectives were to gather information regarding self-management support features of the application itself and the clinical requirements in planning for the application's successful implementation. This paper reports and critiques the process of the nurse-led needs analysis conducted with clinicians.

1. Process

In this mHealth design project the lead researcher conducted face-to-face interviews with clinicians from a variety of clinical backgrounds, to gather information regarding their perspectives and opinions. The setting was an acute hospital campus comprising a public hospital, private hospital and out-patient clinic. Averaging 60 minutes in length, interviews were conducted on the hospital campus over a two-week period in August 2017 and included an overview of the project. Clinicians invited to participate were healthcare professionals providing regular care for patients with heart failure from specialised nursing, medical, and allied health backgrounds. See table 1.

Table 1. Clinicians participating in the needs analysis.

| Nursing | Medical | Allied Health |
|---------------------------|--------------|-----------------|
| Two Nurse Practitioners | Cardiologist | Physiotherapist |
| Clinical Nurse Consultant | | Pharmacist |
| | | Dietitian |

Six of the seven interviews were conducted face-to-face with the seventh conducted via email exchange. Two broad questions were asked which aimed to uncover a) the perceived features for self-management support to benefit people with heart failure and b) the clinical requirements for the application to complement existing care.

1.1. Needs Analysis; Self-management Support Features

The first question asked of clinicians was; *How do we support heart failure self-management at our health service?* Using the problem framing technique 'Rose, Thorn, Bud' as a method for analysing challenges and opportunities [3], clinicians were asked to document their responses to the following question prompts; *what is done well*; *what is not done well*; and *what could be done better*. Initial coding by clinicians - by writing directly on red, blue and green coloured post-it notes - represented their opinions as positively, negatively or having potential to improve heart failure self-management, respectively. See table 2.

Table 2. 'Rose, Thorn, Bud' technique to gather clinicians' perceptions of heart failure self-management support, question prompts and corresponding colour code.

| Rose, Bud, Thorn | Prompt | Colour-code |
|------------------|---------------------------|-------------|
| Rose | What is done well | Red |
| Thorn | What isn't done well | Blue |
| Bud | What could be done better | Green |

Ninety-seven data points (responses) were collected from seven clinicians representing 30 positive, 33 negative and 34 as having potential. Data was transcribed

verbatim into a Microsoft Word table, colour-coded as per table 2, printed and grouped by colour. Working with the same colour, data points were assessed and placed alongside similar ones resulting in several clusters. Each cluster was labelled with a summary statement elicited from analysis of the responses contained within it. The summary statements were refined by the research team to accurately represent an overview of these findings.

Table 3 represents clinicians’ perceptions of how heart failure self-management is supported in our health service and the associated ‘design priority’ for the application’s development; to *leverage* what is done well, *address* what isn’t done well and *expand* on what could be done better. Design priorities were verbs assigned by the research team in the practical application of this technique to the creation of digital health. A poster was generated containing these findings as a way of visualising the existing state of affairs and emergent patterns [3], prioritising discussion points for the next phase of the design; the co-design workshops.

Table 3. Support for heart failure self-management from the perspective of clinicians.

| | What is done well | What isn’t done well | What could be done better |
|-----------------|--|--|---|
| Design priority | Leverage | Address | Expand |
| Examples | In-patient care; written educational information | Follow-up; connected care; regular education | Individualised care planning; medication management |

1.2. Needs Analysis; Clinical Requirements

In the same interview session, clinicians were asked the question; *The application needs to be clinically relevant to our health service: How can we do that?* Clinicians were encouraged to think about the broader healthcare context in which the application would be implemented, including considerations for recommending an application for the purpose of self-management support. Thoughts and ideas were documented directly onto post-it notes by interviewees.

Fifty-seven clinical relevance data points were collected from seven clinicians. Using the same data analysis process reported above, data was clustered and each cluster was labelled with a summary statement representing its content. The findings were that clinicians believed it beneficial for the application to be a hub for evidence-based information specifically for educational purposes and using ‘patient-friendly’ language and visuals, include or track patient data, contain a tailored care plan with a focus on medication management and include the multidisciplinary team. These findings, together with the self-management support findings needed to merge to form a list of implications for design.

2. Design Implications

The main outcome of this work was to define the design priorities as input for the next phase of the research; conceptual design and iterative development of the mHealth application. Based on a total of 154 data points collected, together with a concurrent ethnographic study of patients and family members into their daily life with heart failure, the research team defined a brief representing design implications. See figure 1. The implications for design regarding heart failure self-management features were to; address

medication and symptom management challenges; involve some kind of self-care plan; and manage all stakeholders well. The design implications to ensure clinical relevance were; an evidence-based resource that would be useful, simple and easy to use. A poster containing the brief was later used in participatory co-design workshops as the mainstay in the applications' design and development.

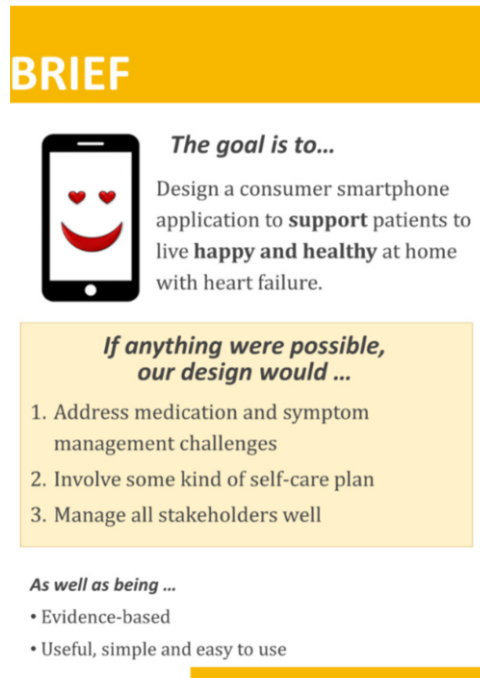


Figure 1. Poster representing the design brief.

3. Discussion

The co-design process in healthcare offers an opportunity to reflect on service experiences, identify design priorities and devise changes for healthcare improvement [2]. In a needs analysis with clinicians, capturing the current reality of care delivery from a variety of perspectives through the 'Rose, Thorn, Bud' technique was mostly beneficial but had its limitations.

Interviews were efficiently conducted on the hospital campus with no need for audio-recording or a lengthy data analysis process. The technique supported clinicians coding their own responses at the point of data collection. Clinicians easily understood the exercise and quickly provided responses, limiting their time away from patient care. Completing this task individually mitigated the challenge of getting all participants in the same location at the same time, as this technique is commonly executed in a group setting. With diverse perspectives, each clinician had the opportunity to express their thoughts and opinions, uncovering insights which otherwise might not have been uncovered using a single view point. As this was the first of many co-design interactions, rapport with the nurse-lead was established and was considered a beneficial priming

opportunity for the project as a whole. The interview provided a forum for clinicians' thoughts to develop prior to the time-limited design workshops where the conceptual design needed to be refined.

It is not clear however, whether the 'Rose, Bud, Thorn' technique accurately represented the complexity of self-management and its many interrelated factors. To mitigate this, we decided to represent the main findings of the self-management support question in poster format in addition to the design brief. It was later uncovered that providing this detail enabled workshop participants to understand the collective perspectives of clinicians more accurately while progressing through design activities. It is also to be noted that a concurrent needs analysis was conducted with patients and family members using a different methodological approach and is not the focus of this paper.

It was imperative to converge the findings into clear implications for design. Visual communication - through poster presentation - was useful in representing the abstract concepts elicited through the needs analysis, making a tangible representation which captured the complexity of clinicians' work and perceived impact on patients' self-management support within the health service. The goal was defined at the project's inception; to design a consumer smartphone application to support heart failure self-management. This needs analysis process clarified the design priorities as the team proceeded through the subsequent design activities. With the growing interest and support for co-design for healthcare improvement, the authors support the improved access to resources to engage with co-design activities, such as the recently published resource; *Experience Based Co-design: A Toolkit for Australia* [4]. Future research by this team will include a user-experience study to be conducted with a new group of volunteer patients and a process interrogation phase with all stakeholders.

4. Conclusion

A needs analysis was conducted to gather information regarding the requirements of a mHealth intervention to support heart failure self-management from the perspective of healthcare professionals. Clear, succinct design implications resulted from the analysis of 154 data points collected from seven clinicians representing the priority features for self-management support and the clinical requirements to be a safe, effective adjunct to existing multidisciplinary care. The 'Rose, Thorn, Bud' technique was simple and effective for use with this stakeholder group, while the research team used other methods in a needs analysis with patients and family members. Visually representing findings in poster format provided focus for the conceptual design activities succeeding this work. While initial feedback from participants support the efficient co-design processes of the interview techniques identified in this paper, evaluation of the effectiveness of this process to produce an effective application will follow.

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