

Innovation through Design game- A development process

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Abstract

This study examines the development of an mHealth solution to help avoid non-adherence amongst users of prescription medication. The most frequent cause to non-adherence in medical treatments is neglect. With the increasing use of smartphones, this solution model based on a smartphone application is believed to have the potential to offer an appropriate solution to this problem. The design phase was designed around an User Innovation Management approach which included one workshop. This workshop consisted of a design game session alongside a Wizard of Oz inspired sketch session. These sessions provided insight into the necessary functions and requirements for the application. The users expressed their wishes for alarm and calendar functions to organize their prescription plans, and an automatically updated medication list of their prescriptions through the Shared Medication Record. Despite the potential lack of informants, it was reported that the chosen approach helped discover a new way of establishing contact between the primary and secondary sectors to the users which in the end is supposed to prevent the non-adherence in the treatment plans.

Keywords: mHealth, medication, medical adherence, Community Based Participatory Research

Introduction

In the Danish healthcare system, one third of all patients are considered non-adherent in medical treatment [1]. Pubmed defines the term medication adherence as: “*Voluntary cooperation of the patient in taking drugs or medicine as prescribed. This includes timing, dosage, and frequency*”. The lack of medical adherence can affect the treatment outcome [1]. This has the potential to incur longer sick leaves, as the treatment will not work as intended. In addition, it is difficult for the health professional to assess the patients' health conditions. This can lead to cancellation or modification of the treatment, which may end up harming the patient further [2]. In order to overcome this problem the Danish government introduced, the Shared Medication Record as one of the primary solutions [7]. The Shared Medication Record is responsible for the communication between all sectors with important information regarding the user's medication and treatments. The program is currently designed to focus on the healthcare professionals and their internal communications. The only public entry to the system is through a webpage login that at best is cumbersome and at worst impossible to use on mobile devices. Combined with smartphones and their capabilities becoming a greater part of our daily lives, we choose to focus on developing a solution within the mHealth paradigm [3]. Through using the User Innovation Management (Hereafter: UIM) approach as the backbone of the project, we intend to engage prescription medication users in a design game to gather the relevant insight to

make the necessary requirement specifications, and finally, to construct a working high-fidelity prototype [4].

Materials and Methods

Recruitment Strategy:

Participants were recruited from a voxpop conducted in one of the downtown pharmacies in Aalborg. The questions used in the voxpop were based upon what literature indicated were the main issues [1]. The voxpop consisted of twelve clients who reported problems regarding their medical treatment and how they structured their intake. Of the twelve respondents approached, four yielded suitable and had the desire to participate in the timeframe we would be working under. The participants were all women and ranged in the age between 20 and 40 years old. The requirement for participation was that they had to be under treatment with three to four prescriptions. There would be no other requirements to the participants, since the goal of our intended application is for a wide range of people in different treatments and situations.

Process:

To support the development process we chose to include the project planning and management method UIM.

UIM is a method for cooperating with users at the early stages in design processes, that helps discover innovation grounded in users needs and values. This user-driven innovation process was divided into three phases: co-operation, context and conceptualize [4]. In the co-operation phase, the focus was on selecting users alongside creating a plan for the innovation process. The context phase is focused on generating insight into the current problems and needs and generating visions for possible futures. In this project, the context phase had its fulcrum around voxpop sessions and a design-game that was established early on. The voxpop sessions helped generate insight into the current problems and helped construct scenarios which were part of the design game. As the perspective is shifting in approach from designing for users, to one of designing with users, there is a need for new ways of thinking and working [8]. Since the early 1990s, authors have suggested games as guiding metaphors for the interplay between designers and users [8]. The aim of design games is to help facilitate a cross-disciplinary design process. To frame design activities in a game format improved the idea generation and communication between participants [5]. Traditional games in general are frequently based on strength and skill, but in design games the players seldom compete in order to win. Design games within a participatory design setting often have participants with different interests and preferences [5]. Design games are, however, good at downplaying power relations amongst the participants, and factors that might otherwise have had an impact on the idea generation [8]. Lastly, in the concept phase, the objective is to manifest design ideas with

the data gathered from the previous phases. In this phase, a Wizard of Oz inspired workshop was conducted, where the goal was to create a high-fidelity prototype along with the users [6].

Results

In the first phase, we established cooperation with users alongside structuring the next phases of data gathering. Through several voxpop interviews, we managed to get an insight into the user's daily life and their daily problems with medication intake. These insights and problems were used to develop scenarios that were part of the design game. These scenarios were obligatory in the completion of the game since they managed to stimulate innovative thinking [4]. To create a good atmosphere amongst the participants, the use of icebreakers in form of funny questions, where they had the opportunity to win rewards if successful in completing the course there was set out for them [4]. Through the design game, we managed to identify three patient-centered functions: an alarm function, a calendar function and a search function.

Alarm function: It was important to several of the users to be able to organize their day. They proposed to incorporate an alarm function, which can be used to alarm the user with pre-defined timestamps for medication intake.

Calendar function: The need to incorporate a calendar was high among most of the users since they often forgot when to buy new pills. The calendar should have the option for users to write small notes, and therefore work as their main calendar, because having separate calendars - one for medication and one for everyday life, would be irksome.

The search function: The shared medication record which is the Danish healthcare information system where patients have the option to check their current ordinations, was something the patients had little to no knowledge about. To help the users gather information about their ordinations, the search function was implemented. This function should be split up in two parts, where one gave the option to search in current prescription by connecting to the Shared Medication Record. This way it automatically updates as soon as the practitioners prescribe or update medication ordinations. The other part of the functions gives the users the option look up on other forms of medication.

Discussion

The use of a design game with scenarios resembling daily life situations has given us the opportunity to understand the users' values and needs. Based on the collected data, it is now possible to establish system requirements, which reflects the users' solution models. We anticipate that this approach can be implemented in other development situations in the mHealth paradigm. The users, regardless of prior knowledge, were important actors in identifying key functions and needs.

Therefore, it is important not to underestimate the potential User Innovation Management and design games, has to offer to new innovation projects in the future. The Design game contributed to an environment, where the users had the opportunity to be innovative in a fun and creative way. It is important to create a safe environment where the users are not afraid of being innovative and to think aloud. In order to do this, we experienced that icebreakers had an effective way of making the users feel comfortable.

To conclude on our innovation process, our next step will be creating a high fidelity prototype, to be the focus of a usability test with another set of informants and an expert in usability design.

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