Usability of a mobile Internet-based support for communication and information sharing between patients and care providers

Jelena Mirkovic, Haakon Bryhni,Cornelia M. Ruland

jelena.mirkovic@medisin.uio.no

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Introduction

- One of the high priorities for health policy goals in Norway, as in many other countries, is to improve collaboration and communication between health providers and patients and empower patients to take a more active role in their own health management process.

- Web based and other innovative information and communication technologies could provide information delivery to patients at the point of need.

Patient support system

- At the Center for shared decision making and nursing research we are working on development and deployment of IT support system for communication and interaction between patients and care providers.

- CONNECT (*Care Online: Novel Networks to Enhance Communication and Treatment*) project

- Our main goal is to provide patients with user-friendly interfaces adaptable to multiple platforms tailored to particular roles and user preferences where patients can access the same system independent of the communication terminal and platform they are using, e.g. a tablet PC, any stationary PC or a mobile phone.

Previous work in CONNECT project

- Choice
  - Tablet PC application used in hospital environment
  - Enable patients to report their symptoms, health problems and concerns, rate the degree of distress and prioritize their needs for care.

- WebChoice
  - Web application used outside the hospital during rehabilitation and between treatments
  - allows patients to monitor symptoms through the Internet over time, provides access to evidence-based self-management options tailored to their reported symptoms as well as a communication area where patients can ask questions to a clinical nurse specialist and exchange experiences with other cancer patients.

Mobile WebChoice

- Mobile access to the patient support system

- Provide access only to limited number of functionalities:

  - Messaging module

  - Registration of problems

  - Access to advices regarding registered and general problems

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Development process

- We utilized user-centered design principles in the application development processes in which end-users influenced how a application design takes shape.

- Phases:
  - Development and evaluation of the application interface design
  - Low fidelity usability testing with patients
  - Development of user interface
  - Expert review
  - High fidelity usability testing with patients

Phase 1: Development and evaluation of the application interface design

- Developed and revised the first version of the application design screenshots

- Used guidelines from literature and given by mobile device and mobile operating systems manufacturers.

- Design of the mobile application adjusted to be similar to Web version.

Phase 2: Low fidelity usability testing with patients

- Usability testing with low fidelity prototype to receive feedback from potential future users in the first phases of application design development.

- Identified main user requirements and needs, and interface was adjusted before beginning of the application development.

Phase 3: Development of the mobile application

- Used Java Platform, Micro Edition (Java ME)
  - One of the widespread developer platform for mobile devices
  - Enable great flexibility and development of new features
- Enable application to dynamically change the interface according to the screen size of the device
- Goal to make the interface flexible and readable regardless of the mobile phone limitations
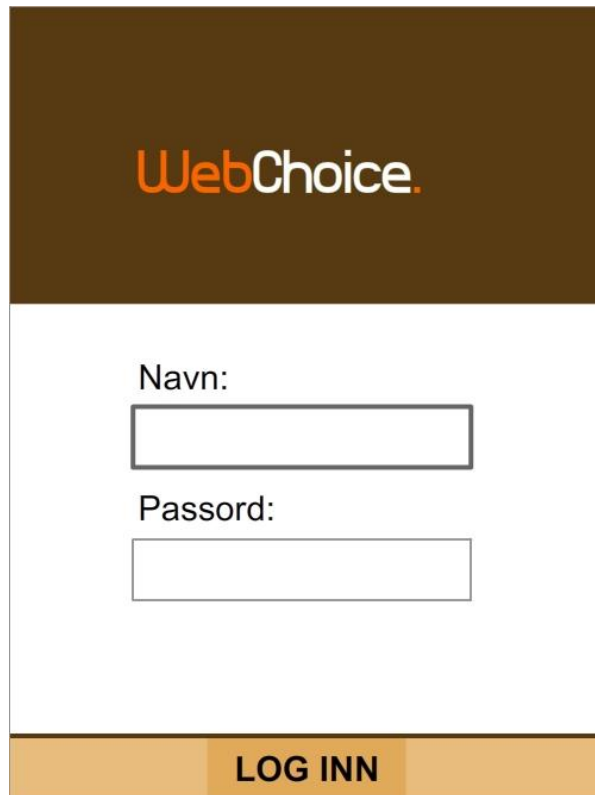- Additional support for touch screens

Phase 4: Expert reviews

- Participated nurses from Center of shared decision making and nursing research who were previously involved in development and research work on other patient support tools.

- Heuristics evaluation utilized – both heuristics for general PC application and specific mobile application characteristics

- The evaluators were asked to test the application and note all nonconsistencies with the guidelines.

- Based on received feedback final corrections and adjustments were made on the application before start of usability testing with patients.

Phase 5: High fidelity usability testing

- When we addressed all usability requirements and problems that were identified through previous phases we began with high fidelity usability testing.

- Task test was performed for gathering firsthand data, identifying usability issues in Mobile WebChoice application, and receiving feedback from participants regarding usefulness and acceptance of the application.

- 10 patients participated in the usability testing
  - between 30 and 60 years old
  - in treatment for breast cancer

- During the testing we perform quantitative and qualitative data measurements.

Screenshots – login and main menu

Screenshots – Registration process: problem selection

Screenshots – Registration process: selecting level of bother and importance

Screenshots – Receiving advices functionality: selecting advice

Screenshots – Receiving advices functionality: preview of advice

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Screenshots – Messaging functionality: mail preview

Screenshots – Messaging functionality: write and send mail

Phase 5: High fidelity usability testing - Results

- Majority of participants were very positive regarding the mobile application as part of the patient support system.

- All of participants thought that the system is useful.

- After the first contact with the mobile application most of the participants thought that if they are given the opportunity they would use it to monitor their health conditions in addition to the web version.

- Through testing we identified some small usability issues, but in general participant were able to understand and use the application.

- Most of the tasks were not to complicated to perform according to their opinion.

Phase 5: High fidelity usability testing - Results

- Participant did not find some other functionalities missing on the mobile application.
    - One patient's regarding this said: "Basics were there. For me, as a not so frequent user of a mobile phone, it is very important to keep the application simple also. Too many choices would probably make it more complicated and I would get lost often."
- As good features of the mobile application participants among other stated that it is: easy to use, very clear, has options and interface that is similar to standard mobile software.
- Participant that had previous experiences with other parts of the support system noticed that two versions are very similar and that also help them to understand the task better.

Phase 5: High fidelity usability testing – Results - usefulness

- "Yes, this would help me because it would say to me when to go to the hospital immediately.... This application could give me a marker when to call and when to wait. Also I can send the message and say that this is a high priority for me and get the answer."

- "Now I am often in places where I do not have a PC, or sometimes it is not that easy for me to contact the doctor. And I have a lot of time, so the mobile solution in this situation is a good idea. It is accessible and available. And I have a lot of time to explore."

- "I think it is a good system and I would be happy if it will be in use. Because, often when I have problems in my daily life it is not always that I am in front of the PC, and the mobile phone I always have near me. So I can use it to get some advices on problems. I think it is a good project, but I didn't know before that it was possible to have this options on the mobile phone."

Phase 5: High fidelity usability testing – Results - usefulness

- "It was very new for me and interesting. At first I thought I would not be able to perform it. …. I am very satisfied with the mobile application, and I think it could be very useful. I think if I have some problems I would first try to resolve it on the mobile phone and then if that do not help than I would call a doctor. "

- "In general it is OK. It provides a lot of information. It enables monitoring your conditions from day to day, and not just what is bothering you today.

Conclusion 1/2

- During development process we identified what are main user's requirements and needs from these kind of applications by utilizing user-center design principles and involving end-users and experts in development process.

- As a conclusion we saw that the mobile application that we developed as part of the patient support system has very good acceptance by group of ten breast cancer patients.

Conclusion 2/2

- From results of previously organized clinical trial conducted as a part of the CONNECT project that showed "less symptom distress, depression, and better self-efficacy for the patients that used Internet support system through the WebChoice application" [1] we can see how access to the patient support tool can provide great advantages to patients.

- Providing access to the patient support system over different terminals (mobile, web) will enable more flexibility and mobility of patients and higher utilization of the system because patients are not any more constrained on specific time and place when they can use the system and as a result it could provide faster recovery of patients and higher efficiency of healthcare providers.

[1] *Ruland, C. M., Borosund E., Varsi, C. User requirements for a practice-integrated nurse-administered online communication service for cancer patients. Studies in health technology and informatics, 221-225.*

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THE END

Jelena Mirkovic, Haakon Bryhni

Department of Informatics, University of Oslo, Oslo, Norway

Cornelia M. Ruland

Center for Shared Decision Making, Rikshospitalet, University Hospital, Oslo, Norway

jelena.mirkovic@medisin.uio.no