

User Requirements for a Practice-integrated Nurse-administered Online Communication Service for Cancer Patients

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Abstract. This paper describes the use of participatory design methods in the development of a nurse-administered online patient-provider communication (OPPC) service that is designed to be integrated into routine clinical practice. The OPPC service let patients stay connected with expert nurses and other health care providers to ask questions and receive advice from home. Through focus groups, workshops, heuristic evaluations and usability testing, we identified patients' and clinicians' (nurses' and physicians') user requirements, factors important for successful adoption, implementation and maintenance of the OPPC service, and usability. This paper shares important insights from these participatory design processes that may be helpful for other researchers who wish to implement clinical applications into routine practice.

Keywords. Participatory design, patient-provider communication, Internet support. Heuristic evaluation, Usability

1. Introduction

A number of studies have provided evidence that Internet support and online patient provider communication (OPPC) systems can effectively help patients to manage their illness (1,2). In a recent randomized clinical trial (RCT) we tested a multi-component Internet support system, called WebChoice, with 325 breast- and prostate cancer patients from all over Norway. Preliminary results after 9 months follow up show less symptom distress, depression, and better self-efficacy in the experimental group. The WebChoice feature that was valued most by study patients was the online support from the expert nurses in cancer care who responded to patients' questions and concerns within 24 hours (weekdays). While often serious in nature, most of the questions could be answered by the online nurses without seeking additional counsel from a physician or other health care professionals. As questions and worries often are the reason for why patients see a doctor, a nurse-administered OPPC service may reduce patients' needs for office visits, speed up recovery and reduce health care costs.

WebChoice and its OPPC service was used as a stand alone application in the RCT. Integrating it into regular care could improve its potential to support patients even more. However, transferring a system from a RCT under controlled conditions into routine practice requires attention to basic operational questions, the organizational and

professional context, and work flow of the clinical practice settings where the OPPC service is to be used. Many information systems have failed because users' judgments about a system's feasibility, time requirements, and usefulness in clinical practice were neglected (3). Internet support systems may have been found effective under well-controlled conditions, but that does not mean they fit into the contextual details and needs of practitioners in heterogeneous practices (4,5).

Therefore, the purpose of this paper is to describe the participatory design methods, including research-practice networks, focus groups, workshops, heuristic evaluations and usability testing we used to adapt a nurse-administered OPPC service to patients' needs; care providers' requirements; and the workflow and infrastructure of clinical practice.

2. METHODS

2.1. Establishing a Research Practice Network

Implementing an application such as the OPPC service into routine practice represents a considerable organizational change. Success is highly unlikely without in-depth knowledge of the professionals, setting, culture and practices where it is to be implemented. We therefore, established a practice-research network from the start. Practice research networks consist of practitioners, developers and researchers. They bring together the knowledge that clinicians have about their practice setting and patients, the workflow, routines they use and why, and what is clinically relevant to them; and the expertise of developers and researchers who know the system, and research methods (5). Our network for the OPPC service consists of nurses and head nurses from the five clinical units who are committed to use and test it as part of their practice and members of the research and development team.

2.2. Workshops with Clinicians

We conducted a series of consecutive workshops with members of the network that focused on two main aspects:

1. User requirements for the OPPC service.
2. Predisposing, enabling and reinforcing factors related to successful adoption, implementation and maintenance of the OPPC service in clinical practice.

In the first workshop we asked users about specific requirements for the OPPC service to fit into their practice, as well as about factors they considered important for successful use and maintenance of the system. Participants were asked to write down their ideas on small pieces of paper (Post-its). All ideas (totally 88) were posted on the wall and discussed in the group. The group came up with many excellent suggestions that the design team would not have thought of alone. Workshops were audio-taped.

One week after the first workshop the group met again and presented a synthesis of previous ideas along with preliminary sketches of the OPPC service that were discussed and revised. In consecutive meetings new moments and functionalities of the OPPC came up, but after several meetings ideas were exhausted. During the next month another unit decided to participate. Another workshop with 4 nurses from

that unit was arranged. To obtain user requirements from physicians we convened small meeting/workshops at each unit. Physicians were presented with a preliminary version of the OPPC system and asked for comments and requirements from their perspectives.

2.3. Focus Groups with Patients

We conducted a set of 2-hour focus groups with patients who were representative of patients in participating units in groups of 6-8. Similarly to the workshops with clinicians, the focus was on requirements for the OPPC service, and on providing feedback to system prototypes. Participants provided informed written consent and completed a short demographic form at arrival. All sessions were audio-taped.

Examples of user requirements resulting from workshops and focus groups are displayed in the tables below.

Table 1: Examples of user Requirements

Nurses	Patients	Physicians
The OPPC service is operated independent of person	Answers as soon as possible, preferably by the end of the day	Positive to be able to answer the patient directly.
An interdisciplinary support group is connected to the team	Notification on the cell phone when a new message arrives	Positive to let answers go via the nurse, to save physician time
A central messaging board can forwards messages to other health professionals, if necessary	The OPPC should be answered by a nurse, patients don't think that physicians will answer	Some: Skeptical to let nurses answer. "How do we know that answers are good enough"?
Option to attach files and send links	Links to quality web sites	Everybody around the patient should have access to the OPPC
Frequent asked questions	Frequent asked questions	Want only to see messages that nurses forward to physicians.
Ability to see if patient has opened a message. Not all did want this option		Some did not want to see if a patient has seen an answer. Said this is patients' responsibility
Access to standardized answers and options. Can use elements of old answers if available		
Reminder deadlines for answers		
Automatic message to patients that message was received		
Option for drafting a message		
Option to send comments to other care providers		
Possibility for statistical analyses of the messages, e.g. FAQ		
Easy system log on or health care providers and patients		

Table 2: Predisposing and enabling factors identified by nurses and physicians

Nurses	Patients	Physicians
Leadership commitment	Very motivated to use the solution due to many unanswered questions	Resources to serve the OPPC must be available
Time and resources available to serve the OPPC	Want to have somebody to ask questions at home, not only access to general information on the Internet	The system needs to be patient friendly, and represent the future
Practical training of users	Rather messages by mail than by telephone	Not take over responsibilities for following up patients from local hospitals
Help needed in formulating standard answers	Contact with specialist, not only general practitioners	Possibility to generate new information from old messages for the patients
	The OPPC should be administered by nurses	

2.4. Expert Reviews

Ten nurses and programmers performed an expert review, or heuristic evaluation of a preliminary version of the OPPC service according to Nielsen's usability criteria (6) after initial training. An expert review entails a structured walkthrough of typical tasks; analysis of interface architecture; critique of detailed design issues, including page layout, controls, color, wording; and a prioritized list of selected and specific recommendations for design changes. All participants tested the patient and provider sides of the interface. 50 recommendations for improvement of the provider interface and 40 for the patient interface came up and were implemented into the system.

2.5. Usability testing

Along with the refinement of the OPPC service system we conducted usability evaluations with care providers and a small sample of patients representative of future OPPC users. This is an iterative process to test a system and then using the test results to change it to better meet users' needs. Sessions are videotaped. We use Morae™ software for automatic recording and analysis of all events on the screen, such as when the user clicked a link, pressed a key, opened a dialog box, or viewed specific text. We made sure that testers represent varied end-user characteristics such as age, level of education and previous computer experience.

3. Discussion

This paper shares insights from the participatory design processes used in adapting a nurse-administered OPPC service into regular practice. Through practice-research networks, workshops, focus groups, heuristic evaluations and usability testing, we were able to address important implementation questions and identify and fix problems before the system is tested with real users. That most suggestions came from nurses is not surprising as they are the primary clinical users of the OPPC service and participated more than others in the development process. Physicians commented little

on the OPPC solution itself, but expressed different attitudes towards expert nurses answering patients' questions. While some were very positive, others were concerned about the quality of nurses' answers. However, some of the skeptics in the beginning became more positive after a while, primarily because of the argument that this would save them time. This illustrates that users' requirements do not always harmonize and may need to be negotiated; and that attitudes, interdisciplinary collaboration and culture may play a role in the adoption of the OPPC service in interdisciplinary practice. Also, not all implementation questions can be solved through participatory design methods. Other questions need to be addressed by domain experts, such as technological issues, data security and confidentiality issues, and more.

While participatory design methods increase the likelihood of a successful implementation into practice, the ultimate test is its real-life use. Therefore, the next step in our research is to evaluate the OPPC service as part of clinical practice on patterns and frequency of use; clinicians and patients' perceived usefulness and ease of use; impacts on organizational change and interdisciplinary collaboration, cost-effectiveness and health care utilization, and a set of patient outcomes. If the nurse-administered OPPC service is shown to be effective, it could have broad applicability. As cost concerns and shortages of health professionals continue to press, this could become a viable health care supplement and means to improve care quality for many patients.

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