

A Heuristic Evaluation of a Telehealth Solution from the Danish TeleCare North Large-Scale Randomized Trial

Pernille Heyckendorff Lilholt^a, Morten Hasselstrøm Jensen^a, Ole Kristian Hejlesen^{a,b,c}

^aDepartment of Health Science and Technology, Aalborg University, Aalborg, Denmark

^bDepartment of Health and Nursing Science, University of Agder, Agder, Norway

^cDepartment of Computer Science, University of Tromsø, Tromsø, Norway

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a progressive lung disease in which the airways are damaged making natural breathing challenging. Many COPD patients experience acute events, exacerbations, characterized by significant worsening of lung function and symptoms for more than one day. COPD has a significant effect on mortality, health care costs and quality of life. TeleCare North is a large-scale, cluster randomized trial that will be implemented in 2013-2015 in the North Denmark Region. The project consists of a cross-sectional design where the municipalities, general practitioners (GPs), the North Denmark Region and Aalborg University collaborate in the development of a telehealth solution (named Telekit) for COPD patients. The aim of this study was to usability test Telekit, so that COPD patients easily can access the solution and benefit from its functions.

Materials and Methods

In this study an evaluation method called heuristic evaluation for testing the usability of a telehealth solution was used. The objective was to capture and predict obvious problems with the solution by using knowledge from experts in the area of usability. Telekit is an internet-based monitoring and treatment system that consists of: a tablet (Samsung Galaxy TAB 2), a fingertip pulse oximeter (Nonin, onyx II % SpO₂), a blood pressure monitor (Model UA-767, plus BT-C) and a weight (not included in the heuristic evaluation). To ensure that all aspects of the Heuristic Evaluation served adequately the procedure was tested in a pilot test. Five experts (2 women, 3 men), including the expert from the pilot test had an educational background as engineers. The average age of the experts was 29 years (min 25, max 36). They evaluated the solution individually and judged its compliance with Jakob Nielsen's 10 general principles for interaction design, called "heuristics". The experts got an overview of Telekit and its capabilities from constructed scenarios. They continuously evaluated the various dialog elements of the solution and compared them with the heuristics. When usability problems were discovered, the experts had to categorize them into Rolf Molich's classification of problems.

Results

Based on the lists of usability problems, the experts identified a total of 152 problems in Telekit. Each expert identified between 22-40 problems. 86 (49%) out of the 152 problems were only identified once. 3% of the problems were found by all experts, 4% by four experts, 8% by three experts, 36% by two experts. The experts with most experience within usability identified the highest number of problems. Not all heuristics were applied by all experts - heuristics such as "*User control and freedom*", "*Recover from errors*" and "*Help and documentation*" were only applied by the three experts with most experience. However, in total all heuristics were used, but the three most frequently used were: "*Match between system and the real world*" (32%), "*Consistency and standards*" (13%), and "*Aesthetic and minimalist design*" (13%). The most widely used classifications were: "*Improvements*" (40%), and "*Minor problems*" (43%).

Discussion

The goal of a Heuristic Evaluation is to discover usability problems in an existing design (so these can be solved). The study lasted ten hours, two hours per expert, which indicates that the method produces results quickly. The findings indicate that Telekit needs an improvement. Especially the design of Telekit has to be improved or redesigned. It is important that the solution is user-friendly because otherwise people will not use it. It is also important to strive for good usability in order to ensure satisfactory clinical outcome. Therefore, close attention to users and the human issues involved are essential as well. In conclusion, usability testing approaches like the Heuristic Evaluation gives the opportunity to reveal severe usability issues, which in worst case could cause implementations to be unused.

Acknowledgments

I will like to thank the experts who participated in the Heuristic Evaluation.

Address for correspondence

Pernille Heyckendorff Lilholt, PhD student
Email: phl@hst.aau.dk