THE E-HEALTH ACCELERATOR: DEFINING END USER NEEDS

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INTRODUCTION

New e-health technologies are being developed at a rapid rate. While these technologies have the potential to revolutionize the way healthcare is delivered, ensuring they are adopted and embraced by end users is critical to their success. In order to create quality e-health products that will be adopted, developers must meet the needs and wants of end users[1,2]. This can be a major challenge as user needs for these new technologies are often not clearly understood[3].

To address this issue, the British Columbia Institute of Technology (BCIT) has created an "e-health Accelerator"- an initiative aimed at helping small and medium sized (SME) e-health vendors better understand the strengths and weaknesses of e-health products in terms of usability and end user needs. The e-health Accelerator engages end users (patients and healthcare professionals) directly in the evaluation process. End users share first-hand experiences, provide insight into how the technology might be used in a practical setting, and help identify potential design issues that might hinder successful deployment. Ultimately, this information helps developers create better products.

In this phase of the e-health Accelerator, three on-going e-health projects are being conducted. Usability data from these projects will be shared with a number of Canadian SME e-health vendors in an effort to help improve the quality of Canadian e-health technologies, help Canadian developers bring competitive e-health products to market, and increase the adoption of these technologies amongst end users.

Two of the projects being conducted in this phase of the e-health Accelerator focus on understanding the usability issues of e-technologies from a nursing perspective. These projects involve nursing students and faculty in the BCIT School of Health Sciences, and include evaluating an electronic medical record system in the BCIT Nursing Simulation Lab, and investigating the usage of mobile devices for nurses and nursing students.

The third project under this initiative involves the evaluation of the VCare Residential Gateway, a remote patient monitoring and home safety system. This paper presents the methodology used to evaluate the Gateway system with seniors with chronic illness, and outlines how these results will be shared with e-health vendors to impact future development of e-health technology.

EVALUATION OF THE VCARE RESIDENTIAL GATEWAY

Purpose

This project aims to assess the usability of the VCare Residential Gateway from the perspective of seniors with chronic disabilities - a target market for this technology.

The evaluation aims to get a better understanding about a number of usability factors including:
- ease of use and intuitiveness of the technology
- applicability/ usefulness of the technology
- user acceptance and perceptions
- potential barriers to adoption
- how well the technology meets the needs of end users
- other features that could be included in the system to benefit end users
- training and support required
- privacy and security concerns
- physical usability issues
- potential impact of this technology

The Technology

The VCare Residential Gateway is a remote patient monitoring and home safety device developed by Virtual Health Systems (VHS), Alberta. It is designed to be the center of an intelligent home for seniors and people with chronic illness who live unassisted in the community. The VCare Residential Gateway uses a tablet style computer as a hub to put

health and home security monitoring technologies at the resident's fingertips. The tablet is designed to be mounted on the wall in a resident's home and is operated using a touch screen. The VCare Residential Gateway interfaces with a range of physiological monitoring technologies (eg. blood pressure, oxygen saturation, and heart rate monitors), home safety technologies (eg. security cameras, door locks, and motion detection) and environmental control technologies (eg. controls for lights, house temperature, and radios). In addition, the VCare Residential Gateway has video-conferencing features that allow residents to participate in remote consultations with health professionals.

Figure 2. The BCIT Living Lab

Figure 1. The VCare Residential Gateway

Set up

The VCare Residential Gateway evaluation will be conducted at the BCIT Living Lab. The Living Lab conducts applied research that improves the "fit" between people and their daily living and working environments by studying people's interaction with technology, products, and services. The facility contains a large experimental studio that can be configured to resemble any built environment and is equipped with video, audio and screen recording equipment, as well as a 3-dimensional motion capture system for full scale bio-mechanical analysis. The Living Lab also contains a viewing theatre with one-way glass which allows observers to unobtrusively monitor evaluation activities.

For this trial, the Living Lab will be configured as a living area that might be found in a typical residential home.

Methodology

BCIT researchers worked together with VHS to develop a detailed protocol for the VCare Residential Gateway usability evaluation.

For each session, recruited participants will be required to complete a series of tasks using the VCare Residential Gateway. Each evaluation is expected to last 2 hours, and will include:

a) an introduction and general overview of the Gateway
b) a trial data collection with two wireless physiological monitoring technologies (eg. heart rate, blood pressure, oxygen saturation)
c) the review of patient health information
d) a simulated remote nurse/ physician consultation using the video and audio remote consultation system
e) a door phone/ security application
f) a home environment application (eg. controlling lights, room temperature)

Upon completion of each task, participants will be asked a series of questions to elicit feedback.   A final questionnaire will be administered at the end of the session to elicit more general feedback about the technology.

Participants

Participants for the evaluation will be recruited primarily through flyers placed in offices of medical practitioners. Ten seniors (65 years +) of varying gender and age with chronic conditions such as diabetes, chronic obstructive pulmonary disorder and congestive heart failure will be selected to participate

in the user trials. All seniors must be living independently in the community. In addition, participants will be screened for their existing comfort levels and experiences with technology in an attempt to recruit participants with a varying range of technological expertise.

Data collection

All trials will be video and audio recorded for future analysis. Cameras will be set up around the Living Lab to record user facial expression, interactions with the VCare Residential Gateway equipment and a general overview of the testing environment.

Evaluation techniques will include behavioural observation, written questionnaires, and semi-structured interviews. Written questionnaires include Likert-scale ratings, as well as open ended questions.

Data Analysis

All trial data will be collated. Results from Likert scale rated questions will be analyzed using descriptive statistics. Open ended questions and results from the semi-structured interviews will be collapsed and analyzed by BCIT researchers to identify common themes.

RESULTS /SHARING OF DATA

Results from the VCare Residential Gateway evaluation and the two nursing initiatives will be summarized and shared with SMEs participating in the e-health Accelerator in a written report. Additionally, SMEs will be invited to participate in a workshop/ video conference in which feedback will be sought on project results. Discussions will centre on how these results can be used to impact future directions of innovation and development, as well as what process changes need to be put in place for successful end user adoption.

At the time of submission, this work is still in progress. Results, conclusions and recommendations will be presented at the conference.

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