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D3.2 SALIG++ SOLUTION EVALUATION

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1. Introduction

The present document describes the results of the Task 2.3 titled “Solution evaluation”. The objective of this deliverable is to explain how the user interface of SALIG++ all-in-one device could be improved to be useful for seniors with cognitive impairments, informal caregivers and formal caregivers.

2. Background

Seniors with cognitive impairments might need several devices for support in everyday activities. There is a lack of easy-to-use, portable all-in-one devices that could be individually adapted to seniors with cognitive impairments needs, wishes and requirements. There is also a lack of knowledge how to develop and match assistive ICT solutions to meet the needs and requirements of seniors with cognitive impairments. The idea behind SALIG++ is to develop an easy-to-use platform based on ICT to support everyday activities at home for seniors with cognitive impairments, their informal caregivers and formal caregivers. The SALIG++ project intends to develop an easy-to-use solution with several functionalities integrated in one device. The intention is that informal caregivers and formal caregivers could support seniors with cognitive impairments remotely via the SALIG++ platform when needed.

There are many aspects to consider when designing a product for seniors with cognitive impairments, for example cognitive, physical and psychosocial aspects that can influence the functioning of a new design. It has been suggested that development of assistive ICT for seniors with cognitive impairments requires a holistic person-centered approach with seniors involved in order to develop useful and easy-to-use products. A variety of design methods can be used to guide the design process and to gain insight into ways in which the proposed product will be used and challenges that might limit use. We have used a modified Inclusive Design method that includes users in the design process. The method comprises four phases: (1) examine the need of the senior, (2) develop a requirement specification of the design, (3) create a design concept, and (4) develop and evaluate a prototype and define a detailed plan for the final product.

In phase 1 senior’s need of an all-in one device for cognition was examined through a scope literature review of studies related to design of assistive ICT for seniors with cognitive impairments. In order to validate the results from the scope literature review focus groups were conducted with persons with cognitive impairments, informal caregivers and occupational therapists working with persons with cognitive impairments. This led to an understanding of the problems, possibilities and needs that seniors with cognitive impairments might have in using assistive ICT as support for their impairments. Based on the findings in phase 1 a preliminary user requirement specification was developed in phase 2. Next in phase 3 a preliminary design concept was developed using PowerPoint. Several versions of the design concept were discussed in detail by an expert group. It was an ongoing process of feedback to the developers and the design was amended until a version was accepted. After that a first preliminary mock-up was developed.

3. Objective

This evaluation of the SALIG++ all-in-one device mock-up aims to examine the utility of SALIG++ all-in-one device mock-up for seniors with cognitive impairments. Two questions were formulated:

1. How did the participants perceive that the functionalities of the mock-up could meet the needs and requirements of seniors with cognitive impairments?
2. How did the participants perceive that the design of the mock-up could meet the needs and requirements of seniors with cognitive impairments?

4. Methods

4.1 Mock-up

The purpose of the mock-up was to visualize an all-in-one device for end-users in an early stage of the development and examine how the mock-up could be improved to meet the needs and requirements of seniors with cognitive impairments. The first mock-up was not meant to be a functional product and it was not possible to navigate through all functionalities. The following eight functionalities were included in the mock-up: Contacts, Calendar, Monitoring, Video Call, Pill Box, Care plan, Help me, and Settings (see Figure 1). The mock-up was demonstrated in an Ipad.

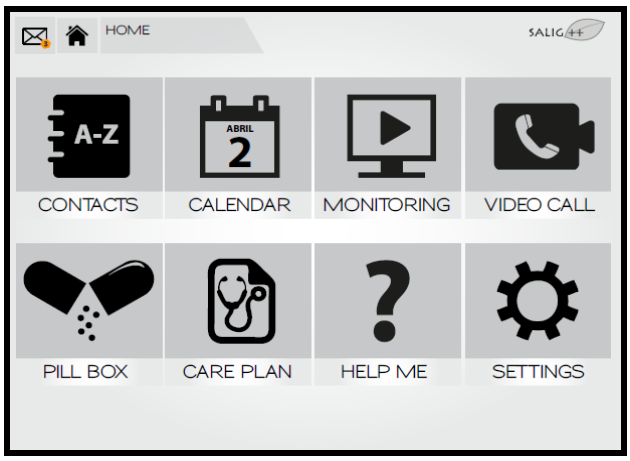

Figure 1. Image of the functionalities in the mock-up.

4.2 Functionalities in the mock-up

Contacts

- Contact circle with pictures, names and role to the senior with cognitive impairments
- Alphabetic search system

Calendar

- Daily, weekly and month views
- An example of a scheduled activity with reminder

Monitoring

- Picture of status for windows and doors (open/closed)
- A symbol for eating (plate and cutlery)

Video call

- Contact circle with pictures, names and role to the senior with cognitive impairments
- Alphabetic search system
- An example of a video communication call

Pill Box

- A picture of the compartments in the Domedic pill box

Care plan

- Headlines for current and previous care plans

Help me

- No information

Settings

Personal
- Edit: name, role, email, telephone and mobile number

Functionalities selected
- Options: Contacts, Calendar, Monitoring, Video call, Pill Box, Care plan, and Help me

Look and feel
- Options: Language (English, Spanish, Dutch and Swedish)

Help me
- No information

Contacts
- Edit: Email, picture, SMS, telephone call

Calendar
- No information

Other functions
- Options: written or voice reminders, jingle (three options, no demonstration provided)

4.3. Participants in the solution evaluation

A convenience sample was chosen to evaluate the mock-up. It has been recommended in the literature that seniors with cognitive impairments should not be involved in an early phase of the development of assistive ICT. Therefore, only two seniors with cognitive impairments were recruited. It has been recommended that health care professionals working with seniors with disabilities should be involved in the development of assistive ICT. For that reason nine health care professionals working with seniors with cognitive impairments were chosen to understand the target seniors' needs and requirements.

Occupational therapists were invited to participate, as they were believed to have valuable knowledge of the topic as they have a central role in prescribing assistive technology for cognition. Nurses were also invited as they could add increased knowledge about the functionalities "Pill Box" and "Care Plan". Nine health care professionals and one informal caregiver were included and scheduled for the evaluation of the mock-up. Potential participants were recruited through a rehabilitation unit and a geriatric clinic in Stockholm. All participants provided their signed informed consent.

4.4. Data collection

This study had a qualitative design with interviews that were based on an interview guide with questions focusing on the design and the functionalities in the mock-up. Every interview started with a short explanation of how the evaluation of the mock-up would be conducted. After that the functionalities in the mock-up were presented. The functionality “Pill-box” was not developed. It was only possible to view a picture of a medicine dispenser. Furthermore, the functionalities “Care plan” and “Help me” were not developed. For that reason the participants were asked to elaborate on seniors with cognitive impairments needs and requirements of these functionalities. They were also interviewed about how relevant the functionalities in the mock-up were for seniors with cognitive impairments and what was missing. One researcher carried out the interviews and the other researcher recorded the participants’ responses. The interviews lasted between 45-60 minutes. After 12 interviews the material was considered to be rich enough to shed light upon how to develop and improve the functionalities and the design of the first mock-up and no more participants were recruited.

4.5. Data analysis

First, the interviews were read through. Data that described important issues regarding the design and functionalities was identified and transcribed. After that the data was coded and the codes were given names close to the participants own wording. Thereafter, the codes from each interview were compared and merged with codes from all interviews. This comparison resulted in categories that described how the mock-up could be improved to be useful for seniors with cognitive impairments.

5. Results

The results from the interviews revealed that SALIG++ all-in-one device should be attractive, comfortable to use and fit into the seniors’ lifestyle. It should not be stigmatizing or draw attention to the seniors by making them appear different in any way. All participants liked that the required functionalities were installed in one device in an Ipad. They were also positive to the use of a touch-screen even if it might be difficult for seniors with impaired motor skills.

The most important requirement was that the device should be easy and self-instructive to allow intuitive use and only communicate necessary information. It should also be easy to navigate in the menu and the alternatives should be clear and easy to interpret. Other important requirements were that the design should be flexible and taking into account the seniors’ individual needs and skills. Furthermore, the participants pointed out that it is important that the technology is reliable. Aspects regarding the functionalities and design of the mock-up that were identified are presented below.

5.1 Requirements of the functionalities in the SALIG++ all-in-one device

Notifications

- No icon (Envelope) for notifications
- Voice reminder should be distributed 1, 2 or 3 times (selected in settings as default)
- A written reminder should be displayed on the screen

- Written reminder should be displayed until the senior has tapped the reminder on the screen
- Informal caregivers and formal caregivers should be notified via SMS and/or email (select in settings as default)

Contacts and Video calls

- Contact and Video call should be merged
- Contact list
- Make telephone calls, video calls, email and SMS
- Contacts should only be added and edited in “Settings”
- Circle function is too difficult for seniors with cognitive impairments to use
- Contacts could be categorized in groups (favorites, family, friends etc.)
- Maximum ten contacts for video calls
- A picture of the person who is calling should be displayed on the screen

Calendar

- Shared calendar
- Receive voice and written reminders for scheduled activities
- Check scheduled activities and reminders in the calendar

Options:

- Enter and edit activities, reminders
- Schedule repeated activities. Use a drop-down menu, for example with following options: Daily, Monday-Friday, Saturday-Sunday, Weekly, Yearly
- Receive a voice message when tapping a scheduled activity
- Choose which activities that should be confirmed
- Receive reminders to confirm a chosen activity
- A function to tap the reminder text message to confirm a chosen activity
- Check if chosen activities are confirmed (by tapping an “overview confirmation box”)
- Informal caregivers and formal caregivers could be notified via SMS and/or email if an activity is not confirmed
- A shared “To-do-list”

Monitoring

- Monitoring of equipment in the home that might cause danger

Options:

- Notification if the senior with cognitive impairments falls
- Notification if the senior with cognitive impairments does not eat on a regular basis
- Senior with cognitive impairments, informal caregivers and formal caregivers can check the status of lights, refrigerator, coffee machine and iron remotely
- Informal caregivers and formal caregivers can turn off equipment and lock doors remotely

Pill Box

- Synchronized with an electronic, portable pill box with a reminder function

- Informal caregivers and formal caregivers can receive SMS or email if the medication is not taken

Options:
- Medication schedule
- Information if medication should be taken with food
- Check next scheduled dose of medication
- Check if medication is taken
- Purpose of taking medication
- Picture of medication for recognition

Care plan

- Access to current care plan
- Several care plans could be confusing
- Preceding care plan could be of interest

Help me

- Emergency call to 112
- Support call to a preselected informal caregiver for non acute problems

Settings

- This functionality is mainly intended to be accessed and used by informal caregivers and formal caregivers

Personal

Options:
- Register more than one telephone number to informal caregivers and formal caregivers
- Choose one telephone number as default and if no answer it should automatically switch to another telephone number

Functionalities selected

- Choose and set up individual functionalities

Look and feel

- Set font size
- Choose colour style

Help me

- It is important that the telephone rings until informal caregiver or formal caregiver has answered

Calendar

- Possible to edit without using the pen symbol

Options:

- Lock access for seniors with cognitive impairments to edit
- Only display current month view
- Add pictures, videos and voice messages
- Choose from list or upload an own jingle

Other required functions in the functionality “Settings”

- Record own reminders
- Choose 1, 2 or 3 voice reminders after 5, 10 and 15 minutes time interval as default
- A drop-down menu could be used to set time for the reminders and intervals
- Adjustable volume for voice reminders, alarm signals and video calls
- A digital or analog clock that should be displayed in all menus
- Login with fingerprints or voice password
- Choose ringtone
- Reminders for charging the battery

5.2 Requirements of the design of the user interface

User interface

- Easy to use and understand
- Use the same language and concepts
- Remove unnecessary, steps, details and decorations
- Do not use similar text and background colours.
- Do not use patterned background
- Use light background colour with black text
- Use standardized graphical symbols that are easy to understand
- Use upper-/lowercase letters in order to increase readability
- Use the same font (Sans-serif fonts such as Helvetica, Arial or Verdana are preferred)
- Do not use italic font.
- Do not use shadow effect
- Include headlines in the pictures
- Improve contrast (sunshine, bad lightning etc.)
- Avoid arrows or drop-lists
- Display actual day and date in all menus (e.g. Monday 29th September 2014)
- Digital or analog clock seconds should not be displayed
- Clock should be placed on the left side on the top of the screen

Calendar

- The format of the calendar should be displayed as large as possible
- Saturday and Sunday columns should be displayed in a different colour
- Past time should be displayed in a contrasting colour
- Day, Week and Month boxes should not look like headlines
- Blank cells in the Month view should be grayed out
- The actual date should be highlighted in the Month view

Monitoring

- “Safe at home” could be a more appropriate name

Pill Box

- Easy-to-use and understand, attractive, fit into the seniors’ lifestyle, not be stigmatizing, not draw attention to the seniors’ by making them appear different

Settings

- Easy to upload pictures and add contact information
- Default recorded voice reminders should be short, nice and clear
- Selected functions should be evenly displayed over the screen
- Seniors with cognitive impairments should only have to login the first time
- Informal caregivers and formal caregivers should login each time

Option:

- Login with fingerprint or voice password

6. Conclusions

The results provided important information how the SALIG++ all-in-one device could be improved to be useful for seniors with cognitive impairments, informal caregivers and formail caregivers. The next step is to improve the design and functionalities in an iterative process with end-users and experts until a prototype can be developed to be tested in a smart home environment by end-users.