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Rapport

JusFone

A Smartphone for Everyone

Report no. 1027

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"JusFone – en smarttelefon for alle"

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Summary

Introduction: In recent years smartphones have become increasingly common, but few seniors have acquired them. The concept smartphone, JusFone, is meant to be a senior friendly smartphone. It has an innovative keyboard, and a user interface based on the principles of universal design. In this project we have user tested the JusFone keyboard with seniors, as well as conducted a number of related research tasks.

Goals: The chief goal was to conduct user testing of the concept phone JusFone on seniors to generate feedback to be used in further product development, as well as contribute to the general development of accessible mobile phones. We had four sub-goals:

- User testing of a prototype of the JusFone keyboard with seniors.
- Map what functions seniors would like in a smartphone, and what services they would like to use.
- Disseminate findings.
- Use the project as a basis for a possible application for a bigger project.

Methods: We conducted a total of 13 user tests of the keyboard was conducted — 5 one-on-one and 7 in a group setting. Further, we conducted a focus group on the topic of smart phones and mobile services. A qualitative approach was used in the user tests and focus group. We also conducted an Internet based survey about seniors and mobile phones, and as part of the dissemination activities we organized a full day seminar focusing on how to make accessible smartphones and apps.

Selected results: *User testing of JusFone keyboard:* The JusFone keyboard was quite well received by the test persons. The prominent positive aspects of the keyboard were: direct access to all letters and numbers, effective for editing, and good for writing longer texts and texts consisting of letters, numbers and different symbols. Several informants favored the JusFone method to other input methods. The keyboard holds promise for persons with reduced hand function as an alternative input method. Some areas that need improving are spacing between keys, size of letters and improved editing functionality by adding a Delete button.

Mobile Phone Survey: Certain groups of seniors use mobile phones in ways that are similar to younger user groups. They have similar sets of needs and desires when they are shopping for new phones. Apps are slowly taking hold among groups of seniors. Increasing the battery life and making buttons easier to use (e.g., making them larger) would address the issues that some seniors have when using their mobile phones. Using their phones as a method of payment is of interest to seniors. Despite privacy and ethical issues that are involved with tracking, the majority of respondents are interested in GPS technology, whether it is for getting help when they are lost, or to help when they are travelling in unfamiliar areas. There is a moderate wish to use the mobile phone as a journal for storing health information or to receive physiological data on the phone from body sensors.

Conclusion: Overall, we are pleased with the project. We achieved all the goals that we set out to reach. In doing so we produced some new knowledge about seniors and mobile phone usage, gave important input to the further development of JusFone – and we were able promote the inclusive design of smartphones through the seminar, this report and future publications.

Norwegian summary

Introduksjon: I de senere år er det blitt mer og mer vanlig med smarttelefoner, men få eldre har anskaffet de. Konsept smarttelefonen, JusFone, er ment å være en seniorvennlig smarttelefon. Den har et innovativt tastatur, og et brukergrensesnitt som er basert på prinsippene om universell utforming. I dette prosjektet have vi prøvd ut JusFone tastaturet sammen med seniorer, samt utført en rekke andre relaterte forskningsaktiviteter.

Mål: Hovedhensikten var å gjennomføre brukertesting av konsepttelefonen sammen med seniorer for å få tilbakemeldinger som kan benyttes til videre produktutvikling. I tillegg ønsket vi å bidra til den generelle utviklingen av tilgjengelige mobiltelefoner. Vi hadde 4 delmål:

- Brukerteste en prototype av JusFonetastaturet sammen med seniorer.
- Kartlegge hvilke funksjoner seniorer ønsker å ha på en smarttelefon, og hvilke tjenester de ønsker å benytte.
- Spre funn.
- Bruke prosjektet som et mulig utgangspunkt for en søknad til et større prosjekt.

Metoder: Totalt 13 brukertester ble gjennomført – 5 en-til-en og 7 gruppe tester. Vi gjennomførte også en fokusgruppe på temaet smarttelefoner og mobiltjenester. En kvalitativ tilnærming ble benyttet for utprøvingene og fokusgruppen. I tillegg utførte vi en internetbasert spørreundersøkelse om seniorer og mobiltelefoni. Som en del av spredningsarbeidet avholdt vi et heldagsseminar om hvordan man lager tilgjengelige mobiltelefoner og apper.

Utvalgte resultater: *Utprøving av JusFonetastaturet:* Tastaturet ble ganske godt mottatt av testpersonene. De viktigste positive aspektene bed tastaturet var: Direkte tilgang til bokstaver og tall, effektiv ved redigering og bra for å skrive lengre og sammensatte tekster som består av bokstaver, tall og ulike symboler. Flere av deltakerne foretrakk JusFone fremfor andre input metoder. Tastaturet virket lovende som en alternativ inputmetode for personer med redusert håndfunksjon. Noen aspekter kan forbedres, for eksempel større mellomrom mellom taster, størrelse på bokstavene og forbedret redigeringsfunksjonalitet ved å inkludere en Slett tast.

Spørreundersøkelse om mobiltelefoner: Visse seniorers bruk av mobiltelefon ligner på yngre gruppers bruk. De viser lignende behov og ønsker når de skal anskaffe ny mobiltelefon. Apper er sakte i ferd med å bli mer populære hos seniorer. Lengre batteritid og større taster på telefonen er ønskelig. Å bruke mobilen som en betalingsmetode er av interesse hos mange av respondentene. Til tross for personvern og etiske problemstillinger involvert ved sporing, så var flertallet av deltakerne interessert i GPS-teknologi – enten for å få hjelp når de har gått seg bort eller til assistanse når de reiser til fremmede steder. Det var moderat interesse for å benytte mobilen som en helsedagbok og for å knytte telefonen opp mot kroppssensorer.

Konklusjon: Vi er fornøyde med prosjektet, og vi oppnådde alle mål. Ny kunnskap om seniorers buk av mobiltelefoner ble dannet, vi bidro med viktig input til videreutviklingen av JusFone, og vi fikk fremmet inkluderende utforming av mobiltelefoner gjennom seminaret, denne rapporten og fremtidige publikasjoner.

Preface

We would like to thank the other partners in the project, Richard Chan and Seniornett, for all their efforts, the good co-operative spirit and their positive approach to the project. Further, we would like to extend our gratitude to the reference group for their invaluable input – and of course to all the informants who generously gave their time and input. Last, but not least - we would like to thank the Norwegian Research Council's IT-Funk program for supporting the project with funding.

Contents

1 Introduction

1.1 Background

Seniors have lower mobile phone ownership, and use their mobiles less than younger people (Kurniawan 2006). Research shows that seniors want basic mobile phones with limited functionality, large keys with large numbers, simple menus, and large characters on the display (Ornella & Stephanie 2006; Kurniawan 2006; Mallenius et al. 2007). To satisfy this demand a number of so called "senior friendly" mobiles have become available (see for instance models from Doro and Emporia). They offer basic functionality and often have a characteristic appearance. Some research indicate that seniors view such mobiles as stigmatizing, and would rather use regular models as long as they are easy to use (Fundell, & Richter 2008).

In recent years so called smartphones have become increasingly common. In 2011 the prognosis for mobile phone sales in Norway indicates that smartphones will comprise 70% of all new phones sold (Amundsen 2011a). Updated figures indicate that this is to a conservative estimate (Amundsen 2011b). A smartphone differ from regular or so called feature phones by offering more computing ability and connectivity, by running complete operating systems and by allowing the running of third party applications using advanced APIs (Wikipedia 2011).

Smartphones have been perceived as expensive and relatively complicated to operate. Few seniors own smartphones (Nodeland 2010), and a typical smartphone may appear to be the totally opposite to what seniors apparently seek. Consequently, many seniors can be excluded from using such devices, and they miss out on the functionality smartphones provide. As mentioned smartphone usage is proliferating, and by 2013 it is estimated that more people will access the Internet with smartphones than with conventional computers (Gartner in Bjørndal 2010).

Because they are flexible and programmable, smartphones can for instance be used as a personal terminal in health care technology (Armstrong 2009). This is very relevant for many seniors. There are many examples on how smartphones are utilized in health care technology, e.g. in diabetes care (Årsand 2009), for daily medicinal management (Helal et al. 2003), dementia care (Dale 2010), in Smarthome set ups (Helal 2003), as a safety alarm (Gay & Leijdekkersa, 2007), with body sensors (eHealth Europe 2007), and in fall detection (Cognita 2010). These set ups can make life easier and safer for their users. It is therefore desirable to develop smartphones that seniors can use. This will enable them to access the functionality and services smartphones can provide - health care technology included.

1.2 JusFone

The entrepreneur, Richard Chan, has come up with a senior friendly concept smartphone named JusFone. The idea behind JusFone (see Figure 1) is to make a smartphone that can be operated by virtually anyone. The phone is meant to have a user interface that is based on the principles of universal design. JusFone's proposed innovative user interface is hoped to be of great help to many people who may have difficulties operating smartphones – including seniors and people with disabilities.

Figure 1 Illustration of the JusFone concept phone.

The approach of JusFone for seniors and other target groups is to avoid "the dumbed down path," i.e., simplifying to very narrow and limited functionality and applications. There are already many such devices on the market. JusFone sets out to avoid isolating the target groups from main stream usage. The goal is to provide a device such that the target groups can exploit the applications and offerings that current main stream ICT provides.

JusFone has a clamshell design to simplify placing and receiving calls, avoiding keypad locking issues, gives screen protection as well as ensuring that all background operations are assuredly terminated when the clamshell is closed. It is meant to retain many of the good "old traditional" phone functionality combined with modern smartphone design and features.

It has a touch screen for multimodal operation, and an innovative full keyboard (keypad size) allowing access to the whole alphabet (see Figure 1 and Figure 2). The physical form and mechanical characteristics of the keyboard is meant to cater for and improve the physical accessibility for several user groups, and strives to be in accordance with the notion of universal access. JusFone has a simple menu system, and a number of programmable shortcut keys for easy access to a number of important functions. It can be commanded to switch over to be in a fully smartphone mode with the retention of the use of the keyboard.

The use of such technology in health care settings is going through a rapid development, and there is a need for personal terminals which can easily be operated so that the users can connect to and utilize health care technologies. It is the belief of its inventor that JusFone is well suited as a personal terminal used in conjunction with electronic health care technology.

It is essential to try out the JusFone concept on real users, as well as conduct further development in cooperation with relevant user groups before a commercial product can be launched. User testing and providing documentation for further development have been the main purpose of this project, but before we list the goal and part goals of the project; a swift review of related works is needed.

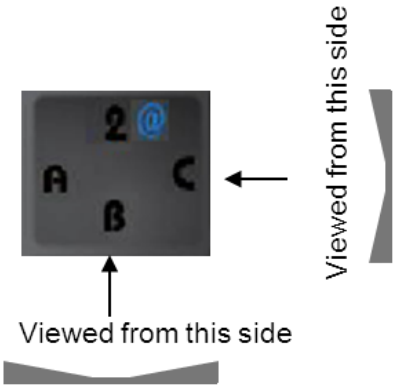

Figure 2 Different views of a key from the JusFone keyboard.

1.3 Related Work

There has been little focus on making a usable and accessible smartphone that caters to the needs of all, regardless of age and functional ability. In the project Personal Social Assistant the developers are making accessible software that can run a standard smartphone (Verstockt 2009). The software consists of an interactive diary, a photo based GPS, a health application, and a social Internet application. There are other similar projects that adapt the user interface of existing phones (Lorenz & Oppermann 2009; Helal et al. 2003). Guidelines have been compiled that describe the design of inclusive mobile phones (Hellmann 2007), and there are design guidelines for specific disabilities such as blindness. (Tiresias 2010). We have not been able to locate other projects where the objective has been to make a universally designed smartphone from scratch, as is the case with JusFone.

It must be mentioned that efforts have been made both by Apple, Google, Nokia and others manufacturers, to make usable user interfaces and to a certain extent include accessibility features both within the OS and through third party software. Our impression is, however, that they do not allow for universal access and use, and that further effort is required to design more inclusive smartphones.

1.4 Goals and Target Group

The main and sub-goals of the project are detailed below, and the main group of users we wanted to focus on. We have also mentioned the groups of people we envisage would take the most interest in the findings of the project.

1.4.1 Goals

The chief goal of the project was to conduct user testing of the concept phone JusFone on seniors to generate feedback to be used in further product development, as well as contribute to the general development of accessible mobile phones.

To accomplish this we had four sub-goals (SG):

SG 1: User testing of a prototype of the JusFone keyboard with seniors.

SG 2: Discuss the structure of the JusFone menu system with seniors to collect their opinions on it and to obtain input on how to improve it.

SG 3: Map what functions seniors would like in a smartphone, and what services they would like to use with such a phone – amongst others health and care services.

SG 4: Disseminate findings.

SG 4: Use the project as a basis for an application to the Ambient Assisted Living program or similar national or international R&D programs.

1.4.2 Target Groups

The target group for JusFone is everyone who wants to use smartphones, but we have a special focus on seniors and their wishes and needs. The findings in the project should be of general interest to all who take an interest in user friendly and accessible ICT, including developers, mobile phone manufacturers, end user organizations, researchers, students et al.

1.5 Project Partners, Organization, and Reference Group

In this section we present the partners in the project, how the work was organized, and the projects use of the reference group.

1.5.1 Project Partners

The Norwegian Computing Center (Norsk Regnesentral - NR) is a research foundation with many decades of experience in ICT research. NR has both technological, user and methodological knowledge and competencies. NR's three main ICT research areas are Security & Privacy, Smart Information Systems and eInclusion & Universal Design, and this project falls with the domain of the latter research domain. NR has previously participated in research on accessible mobile technology, and has contributes with research skills and know-how in the project. NR has also been the project leader and managed the project. Senior Researcher Øystein Dale (project leader) and Researcher Trenton Schulz have conducted the work for NR.

Richard Chan graduated in Electrical Engineering from Queen Mary College, London University. He has many years experience from research, product development, sales and marketing of communication system and networks. Richard was one of the founders who developed and produced Vistel, a portable text telephone for the deaf and hard of hearing from 1979 to 1986 in Great Britain. Vistel was a de-facto standard for deaf communication in Great Britain. He has held positions as system manager, project manager, sales and marketing manager and business development manager at ITT, Alcatel and Thales as well as was the CEO of Transmex Systems Ltd. He is currently a consultant in Sales and Marketing with focus in the Asean region. He has since 2007 worked with universal design of a mobile phone user interface on a hobby basis, and has with his own private resources developed the JusFone concept.

Seniornett (SN) has since 1997 worked for inclusion of seniors in the digital age. They have established more than 100 local clubs across Norway, and the clubs run courses on how to use computers and the Internet. The clubs also function as a meeting place for seniors. The membership is around 6000 with approximately active volunteers. In 2009 SN held computing and Internet courses for approximately 18 000 seniors. SN takes part in R&D related activities on a regular basis. Their role in the project was to recruit seniors to the different activities and to contribute with general input to project through the reference group.

1.5.2 Organization of Work

NR has conducted the research activities, organized the seminar and managed the project. Richard Chan has designed and built the prototypes of the JusFone keyboard, as well as contributed to the research activities and product development. SN has recruited users for the focus group, user testing and assisted in the Internet survey, as well as contributed with their knowledge and experience to the project. The project was reported to the Privacy Ombudsman for Research at the Norwegian Social Science Data Services as standard procedure.

1.5.3 Reference Group

A reference group consisting of user organizations, professionals, and researchers with expertise in the areas of mobile phones, accessible ICT, design, the user interface needs of seniors, and assistive technology assisted the project. The participants, area of expertise, and affiliation are listed in Table 1. We held two reference group meetings. Their purpose was to assist and advise the project planning, execution and interpretation of the results. We are grateful to the input from the reference group.

Table 1 The members of the JusFone reference group

Organization	Participant	Area of expertise
Telenor	Knut Kvale	Telecom and research
Nasjonalt Senter for Telemedisin - NST (retired from NST during the project, but stayed on in the reference group in agreement with NST)	Geir Østengen	eHealth
NAV SIKTE	Ragnar Simonsen	Assistive technology and accessibility
Deltasenteret	Dagfinn Rømen	Universal design
Seniornett	Tore L. Larsen	ICT and needs of seniors
Seniorsaken	Unni Hagen	The ICT needs of seniors
Bojo Tveter	Tore Simensen	Assistive technology
Arkitektur- og designhøgskolen i Oslo	Kjetil Nordby	Design
ENCAP	Gjermund Johre	Telecom and mobile development
KARDE	Riitta Hellmann	Universal design, accessible mobile phones and research

1.6 Overview of Research and Development Activities

The following research and development activities were conducted in the project:

- The manufacture of three prototypes of the JusFone keyboard.
- User testing of the JusFone keyboard.
- Survey of seniors and mobile phones.
- Focus group on seniors and mobile phones including mobile health technology and services.
- A seminar on the inclusive design of smart phones.

These are further detailed and provided with their results in the next sections.

2 Research and development activities

2.1 The Manufacture of Three Prototypes

Richard Chan manufactured three prototypes of the JusFone keyboard based on his own specifications (see Figure 3). The keyboard has a USB interface, and the keys are concave rocker keys. They provide easy and direct access to the alphabet, numbers, most common punctuation marks, and dedicated keys for shortcuts and phone control.

A variant of the keyboard can be a standalone device connected to a computer or a tablet to provide an alternative input method, or it can be integrated in a mobile phone. Its purpose is to provide easy input of text, numbers and other characters to ICT equipment. It can be of particular assistance to persons with reduced hand function or persons with other disabilities and for vocational usage where user gloves are an impediment.

The keyboard can be used in situations where space limitations demands small physical devices and in harsh environments. The construction and design of the keyboard can very easily be adapted to provide handheld ex-proof variants inexpensively.

The keyboards were used in the user testing phase of the project.

Figure 3 The prototype JusFone keyboard.

2.2 User Testing of the JusFone Keyboard

With the advent of smartphones and mobile apps there has been an increased demand for inputting text, numbers and other characters in mobile phones. The trend in smart phones in recent years has been the widespread use of touch screens and on-screen keyboards with no physical keyboard built in to the terminals. This is not desirable and suitable for all, and there are still many people who for various reasons would like to have a physical keyboard on their mobile phone. One such group is seniors. The JusFone keyboard is an attempt to accommodate this wish, and to simplify text input in mobiles. In addition the JusFone keyboard is meant to make it easier for niche groups, e.g. persons with reduced hand function, to operate their mobile devices.

2.2.1 Purpose

The purpose of the user testing was try out the JusFone keyboard with seniors, and to use the experiences gathered in further development of the keyboard. Further, we wanted to compare the JusFone keyboard with other relevant input methods. These were:

- A basic standard mobile keypad with large keys and large numbers/letters (see Figure 4).
- An on-screen keyboard on a mobile device – iOS on an iPod Touch (see Figure 5).
- An on-screen keyboard on a Windows tablet PC (see Figure 7).

2.2.2 Set up

The test persons were recruited through Seniornett's members. Information pamphlets (see Appendix A) were distributed, and Seniornett made contact directly with possible participants. Each participant signed an Information & consent form (see Appendix B), and received a gift card to the value of 500 Norwegian kroner for taking part. The test persons were from 65 up to 80 years of age, and the gender balance was even. Their self-assessed computing skills were medium to high levels of experience.

A total of 13 user tests were conducted. These were done with three different set ups:

1. Seven seniors with no disclosed disabilities conducted, as part of a focus group, user tests with the JusFone keyboard completing various tasks, and conducted the same tasks on a Windows tablet PC using an on-screen keyboard (see Figure 6)
2. Five seniors with no disclosed disabilities conducted individual user tests with the JusFone keyboard completing various tasks. The JusFone keyboard was connected to a Dell laptop. They conducted the same tasks with a Doro mobile phone with a basic standard mobile keypad with large keys and large numbers/letters and on an on-screen keyboard on a mobile device (iOS on an iPod Touch).
3. One person with reduced hand function used the JusFone keyboard in lieu of his normal PC keyboard over several days, and kept a "diary" detailing the experiences with the keyboard.

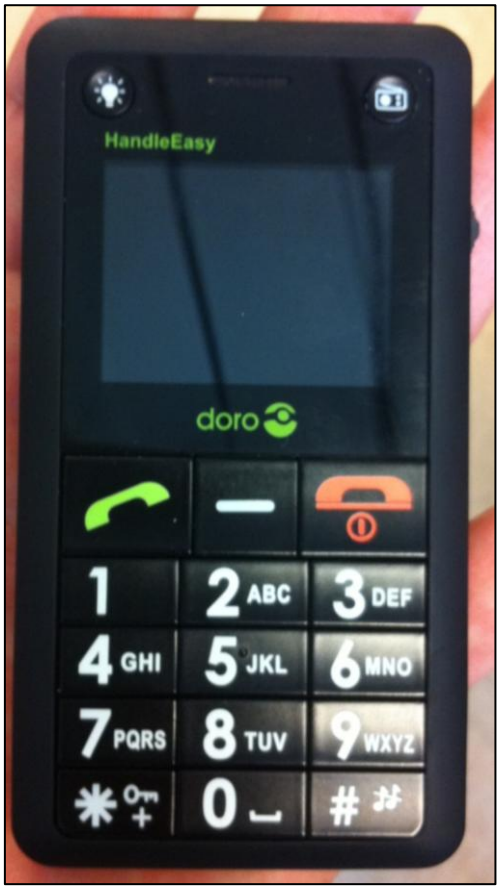

Figure 4 The Doro large key keyboard.

Figure 5 The on screen keyboard on the iPod Touch

Figure 6 The set up for testing the JusFone keyboard.

The seniors in Groups 1 and 2 were videotaped, and the usability software Morae was used for screen and audio capture. The test set up is illustrated in Figure 6. In Group 1 a researcher conducted the testing, while in Group 2 two researchers conducted the testing (one interviewer and one observer).

In Groups 1 and 2 the participants solved different tasks, and answered concrete questions from a test protocol (see Appendix C). The protocol was adjusted based on the experiences in Group 1, and to accommodate the different comparisons between input methods conducted in Group 2. The tasks consisted of writing text, numbers, symbols and punctuation marks with the different input methods. The participants were encouraged to think aloud, ask questions and to make comments.

2.2.3 Analysis

In part using the usability software Morae, a qualitative analysis was conducted by the researchers on all the material collected (video, audio and electronic and handwritten notes). For 1) and 2) the observations made and the participant's comments were categorized and summarized. A summary was made of the diary notes taken down by the participant with reduced hand function.

2.2.4 Results

Here are the results divided up by each device that was evaluated.

2.2.4.1 JusFone keyboard

The keys on the JusFone keyboard are concave, and to ease usage the users can place and rest their fingers in the middle of the concave surface, and rock in four different directions to depress the desired key, e.g. letter 'a' at nine o'clock or West, letter 'b' at six o'clock or South, 'c' at three o'clock or East (see Figure 3). One thing that was noticeable was that the informants did not use this rocking method, but rather pressed directly on the letters on the edges of each key in a pecking manner. When asked to use the rocking method some found it easier, but the majority quickly reverted back to the pecking method. Several pointed out that the concave design could be of benefit to persons with hand tremors or other hand impediments, because one could use the "well" as a finger guide and resting place. It was expressed by some that the keys were firm and comfortable to press.

The seniors were positive about having direct access to all letters and numbers, and to the fact that all characters, symbols and punctuation marks are visible. On many other mobile keyboards these may be hidden in sub-menus and requires prior knowledge to their position and may require multiple key presses to access. The visibility and ease of direct access was mentioned by several as especially important during the more intricate writing tasks. The alphabetical layout was a beneficial according to some.

The test users mentioned that it was easy to edit text with the JusFone keyboard. It was for instance pointed out that it was easier to move the cursor using the JusFone keyboard as compared to touch screens. They highlighted that one of the advantages with the JusFone keyboard is that it is bigger than conventional mobile keypads, and that one gets direct access to all letters. It appeared that the informants who were dissatisfied with their own input method on their mobile phones, were somewhat more positive to the JusFone keyboard. This was especially the case for the ones who had touch phones.

The majority said it was easy to use the JusFone keyboard. They expressed that it was easy and intuitive to understand how to use it, but that it would still be useful with some instructions and a manual for beginners. The use of multiple characters per key was not a problem, and it was an advantage that different colors were used to separate different types of characters.

Some of the test persons mentioned that they initially had to do a bit of searching for symbols and punctuation marks as they were not familiar with their placement. They said, however, that this is something one gets used to. It was pointed out that the keyboard was large and bulky. It was also brought to our attention that one of the symbols was impossible to access as it was placed on the same key and opposite to the Shift function. As its use relied on depressing Shift it was impossible to access it without having activated the Sticky keys function, which we unfortunately had not implemented during the user trials.

There were some suggestions from the seniors on how to improve the keyboard. Some of these were:

- Slightly bigger and more readable letters, and especially symbols and punctuation marks
- Slightly more space between the keys

- A Delete button in addition to the Backspace when editing
- Native terms on keys, e.g. the Norwegian *mellomrom* instead of "space" on the Space key.
- Should be lighter, smaller and more aesthetically pleasing (Note! This was the first prototype of the device).

Our impression is that by and large the JusFone keyboard was well received by the seniors, but that there are some aspects which need improving.

2.2.4.2 Doro

The Doro device pictured in Figure 4 has large keys and large numbers. In addition to the keypad it has a scrolling wheel and some other keys required for its operation. It is targeted as a "senior phone", meant to cater to the needs of elderly persons. We wanted the informants to try it, as a comparison to the JusFone keyboard. The experiences are summarized below:

- The keys were considered large and comfortable
- It was considered especially suited for writing short texts and for dialing numbers
- The seniors mentioned that it was difficult to tell if you were in letter or number mode, as the indicator for this was small.
- The fact that the informants found it very cumbersome to access certain symbols which were hidden in sub-menus and requiring many key presses or use of the scrolling wheel appeared to impact negatively on the overall impression.

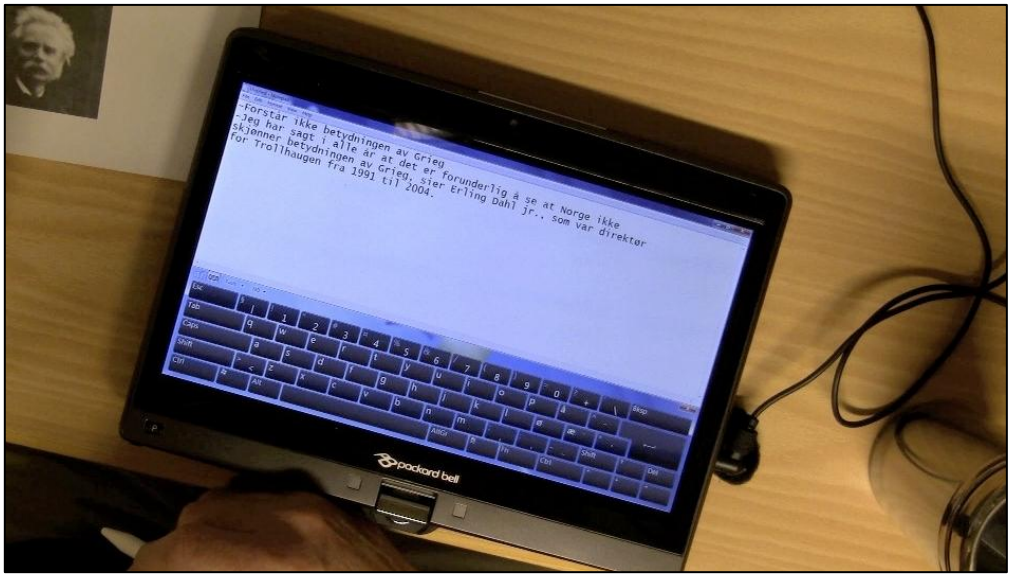

Figure 7 The on-screen keyboard on the Windows Tablet PC

Figure 8 The iPod Touch

2.2.4.3 The iPod Touch

The informants also tested a second-generation iPod Touch running (at the time – March 2009) the most recent version of iOS for this device (see Figure 5 and Figure 8). This represents the identical on-screen keyboard found on the iPhone, and similar to many other popular touch based smart phones. Here follows a summary of the informant's use of the iPod Touch:

- The seniors found the keyboard to be small – it was referred to as "Lilliputian" – and it was easy to accidentally press neighboring characters
- It was easy to make typing errors, and editing was challenging for some
- It was difficult to access certain symbols as they were placed in sub-menus
- The keyboard displays capital letters despite being in lower case mode
- Some informants tried to use their fingernails to improve accuracy, but as the screen is capacitive this did not work.

2.2.4.4 On-Screen Tablet Keyboard

The seniors also tried an on-screen keyboard on a Windows Tablet PC (see Figure 7). This worked reasonably well, and there were not many comments, besides the Space key being somewhat difficult to access.

2.2.4.5 Comparison and Preferences

A comparison as judged by the informants between the three keyboards is given in Table 2.

Table 2 Comparison between JusFone, Doro, iPod Touch, and tablet on-screen keyboard.

Feature/activity	JusFone keyboard	Doro	iPod Touch	Tablet on-screen keyboard
Key and character size	Adequate sized keys; letters somewhat small	Large keys and letters	Small keyboard and letters	Adequate sized keys
Ease of access to characters	Direct access to all letters & numbers. Some symbols and punctuation marks require two key presses	Some symbols in sub-menus – cumbersome to access	Some symbols in sub-menus – cumbersome to access	Gap between spacebar and bottom of the screen made it very easy to miss key. Reflective screen also caused problems.
Editing	Easy to edit	No particular comment.	Editing can be difficult	Editing was difficult, one gave up
Writing	Well liked – especially for longer texts and complicated writing combining letters, numbers, symbols and punctuation marks	Well liked – especially for shorter texts and to dial numbers. Cumbersome access to certain symbols in sub-menus	Easy to make mistakes due to small characters positioned close together	Missing the spacebar resulted in many errors. Many times discovered after other words were written.

We only asked the informants (Group 2; N=5) who took part in the one-on-one testing for a preference between the devices. Two preferred the JusFone keyboard; two the iPod Touch and one the Doro. On a direct question if they would like to obtain the JusFone keyboard two were interested, and one would consider it in future if the need would arise due to reduced hand function etc. The two others believed that the keyboard was better suited for persons with specific handicaps like shaking of the hands or motor disabilities.

2.2.4.6 Diary Data

To examine how the JusFone keyboard performs for a person with reduced hand function, one informant who suffers from hand tremor used the keyboard in lieu of his standard PC keyboard for a couple of days. The informant took written notes documenting his experiences.

From the outset he noticed that the bulkiness of the keyboard resulted in an awkward writing angle. He used a book to change the angle, but the awkward angle did still cause some problems throughout the trial. He said: "It is very different from using a standard keyboard on a PC", and: "I suppose you have to use it and get used finding your way around". He noticed he had to look more down at the keyboard while writing, and he noticed increased fatigue and shaking in his right hand after one hours use.

After a few days use he said: "It is quite easy to place your finger in the right place… I believe that if you use it a great deal it will become easier. If you have problems with your hands or arms it is easier to use [than a standard keyboard]. I find it a lot easier to use than a touch screen. I cannot use touch screens".

Despite the testing being unstructured and the documentation anecdotal, the trial did show some promise that the keyboard can be used with niche populations, such as persons with reduced hand function.

2.2.4.7 Conclusion

The relatively low number of user test performed and certain methodological issues means that one needs to be cautious in the conclusions drawn. That aside, the user testing revealed many positive attributes of the JusFone keyboard. Direct access to characters, ease of editing, alphabetical layout, intuitive to use, and the visible display of all characters were among some of the positive feedback provided by the informants. There was also some room for improvement, such as more spaced out keys and slightly larger letters. The keyboard held its own in comparison with other input methods, and came out favorably in several areas. Further development and refining is needed for the device to be released as a commercial product, but these initial user tests show a great deal of promise.

2.3 Survey of Seniors and Mobile Phones

One of the goals of the JusFone project was to run a survey about seniors and mobile telephone use. The survey had four sub-goals. First, map out senior citizen's use of mobile phones. Second, map out the difficulties they experience when using mobiles. Third, determine what seniors look for when buying a new mobile telephone. Finally, find out what new additional mobile services would they be interested in. These services were targeted at health or other types of assistance.

2.3.1 Set up

The survey was carried out online. We used Enalyzer, an online survey service. We cooperated with Seniornett to recruit informants. Seniornett put up an announcement on its front page of its website. Seniornett also sent an email to all its members to fill out the survey. They also posted and sent out a reminder after a week. So, the informants were self-selecting, either Seniornett members or those that read its web page. Self-selection limits the ability of how much we can generalize the results to the general senior population, but it gives us a picture of how a specific group uses mobile telephones. The questions from the survey can be found in the Appendix D of this report.

2.3.2 Participation

The survey ran for a little over two weeks (31 March–15 April 2011) and had 338 respondents. We collected age and gender, but otherwise each respondents answers were anonymous. Of these 338 respondents, 279 fully finished the survey, while the rest stopped somewhere in the middle of the survey. Answers for those that did not otherwise complete the survey are included.

We asked the users to identify their age, gender, and self-appraised level of technology competency. For age, 48 people (16%) were 65 or under, we set a cut off age of 50. 82 people (27.3%) were between the ages of 66–70. 84 people (28%) were 71–75. 55 people (18.3%) were

76–80. 26 (8.6%) people were between the ages of 81–85. We also had 5 (1.6%) that were over 86 years old. As we mentioned above, there was a design issue in our survey that may have kept people under 50 (or over 200) from completing the survey. The oldest people that answered were 89 and the youngest was 51. 72 years was the average age, the median age, and also the most respondents of any single age.

The split between men and women was 56% to 44% women. Given that there are statistically more seniors that are women than men, it seems we may have an over representation of men in our sample. We are not sure why this happened; it could be that Seniornett has more men than women in their membership. It could also mean that men were more interested in answering our questions.

For competency with technology, the majority of people (65%) said that they had average competency. 13% said they had low competency, while 18% said they had high competency and 1% said they had no competency. It should be noted that this was a self-evaluation of the respondent's own competency with technology, there was no what average competency entailed.

We are satisfied with our range in age and gender. One of our goals was to find out the mobile habits of people over 60 years of age and most of the people who took part in the survey are in that age range, but it is difficult to know how representative they are to the general population. One other thing to remember is that the people that answered the survey are Seniornett members. This helps explain the level of competency of our respondents. A Seniornett member is more likely to be interested in technology and aware of trends in mobile phones than a senior on the street. It is also fair to assume that the respondents were especially interested in the topic, since participants were self-selecting. We may also assume that many of the respondents are likely to be above average competent with mobile telephones and interested in them even when compared to the average Seniornett member. This limits the generalizability of the findings. We are not too concerned with gender split, but it would have been nice if more women had answered.

2.3.3 Results

What follows is a quick summary of the results. Discussion of the results follows in Section 2.3.4.

2.3.3.1 Mobile Phone Use

An overwhelming majority (98%) of our respondents have mobile phones. A majority of these people's (70%) mobile phone can be considered a “traditional” mobile phone with the traditional 12-key number pad showing numbers and letters as depicted in Figure 9. The other choices are interesting. 10% said that they had a touchscreen, 11% said they had a full keyboard with access to all the letters, and 8% said they had both a touchscreen with a full keyboard. Taken together this means that 18% of the respondents—almost one in five—are using a touchscreen on their phones.

We also asked the most common functions they used on their mobile phones from a list of alternatives we had provided. Unsurprisingly, an overwhelming majority uses their phones to call (98%) and to send and receive text messages (92%). But, a majority also uses their mobile phones to take pictures (64%) and to send and receive multimedia messages (MMS) (52%).

Figure 9 A “traditional” mobile phone with a 12-key number pad showing numbers and letters. (Image source: Photos.com, a division of Getty Images)

Other popular uses that were named included using the calendar (45%), sending and receiving email (19%), listening to radio stations (17%), and checking information online (for example, weather and newspapers) (15%). Rounding out the list were several items under 10%. These included listening to music and installing applications (both at 8%), and using the GPS for navigation (7%). Using social media (Facebook, Twitter) and playing games both came in at 6%. Finally, we had 7% choose “other.” When asked to specify what the other feature was, the majority of them wrote “alarm clock.”

We also asked respondents if they had installed application on their phones. 15% said yes; 81% said no, while the rest were unsure. This contradicts what we had said above; we discuss possible reasons below.

2.3.3.2 Mobile Phone Difficulties

We asked the respondents what difficulties they had using their mobile phones. These were selected from a list of possible difficulties that we had provided. 36% said they had no specific problems, but the rest all had different issues. The top two problems, both at 29%, were that buttons were too small and short battery life. The third most named issue was that it was difficult to see the writing on buttons (19%). Tied for 18% were problems hearing the conversation on the phone and complaints that the menu systems were too complex. Another 14% said they had problems hearing the phone ring. 9% of the respondents had problems working the other buttons on the mobile phone. This included the power button, locking the keypad, or adjusting the volume.

There were several complaints about screens. 17% said that the screen was too small, while 12% said that the writing on the screen was too small, and 7% said that the screen was too dark.

Regarding touchscreens, 5% felt that the touchscreen was too sensitive, whereas 3% felt that it was not sensitive enough.

About 8% choose "other," but there was no unifying theme for them. Several wrote that they were happy with their mobile phones and several complained about difficulties to see the screen in full sunlight. A couple respondents named poorly written instructions. Otherwise, these other answers were quite varied.

We also asked if respondents had connected their mobile phone to a PC. 33% said that they had will the rest had not. Of these 33%, we asked them why they had connected their mobile to a PC. Most of them (91%) had connected their phone to transfer pictures or video over the PC. 38% connected to upgrade their phone. 36% did it to have a backup copy of the respondent's phone's information. 18% had connected to transfer music, while 16% installed apps from their PC. 14% listed "other" reasons. Of these reasons, the most common listed was to either synchronize their phone with some information on the PC (be it addresses, calendar, email or other things) or to use the phone as a modem to get access to the Internet.

We also asked if all respondents with phones if they had connected their mobile phones to another mobile phone using Bluetooth. Fewer than 38% had done this, 60% had not with 3% being unsure.

2.3.3.3 Purchasing Mobile Phones

We asked our respondents what they would look for when buying a new mobile phone and asked them to select items from the list. Again, there was no surprise that being able to make phone calls and to send text messages placed at the top of the list with 78% of the respondents choosing it. A majority of the respondents also felt that it was important to have a phone that was easy to use (62%) and that the phone should have excellent battery time (61%). Other items that many felt was important were the mobile phones price (48%) and the size of the screen (43%). An interesting thing to note was that 46% of the respondents said that buying a certain brand (e.g., Nokia or Samsung) was important for them, while 20% felt that it was important that they did not have to learn something new. 32% of the respondents wanted to have direct access to all the letters on phone (in other words, a full keyboard). Other areas that some respondents felt were important included large type on the buttons (32%), large buttons (30%), or just felt that the size of the phone mattered (25%). 25% were concerned about special functionality on the phone (for example, to take pictures, use GPS, browse the World Wide Web or play games). 24% felt having a physical keyboard was important, while 23% felt that having a touchscreen was important. Rounding out the survey was 14% that wanted to install apps and 11% that were concerned how the phone looked. Finally, there was an open field, the most popular answers were all related to the camera, so it seems that we should have made this more prominent than just grouping it into "other functionality" choice.

Another item we asked the respondents was what size they wanted for their mobile phones. The majority said that they preferred an average size mobile (53%). Nine percent felt that the phone should be as small as possible, while six percent felt that the phone should be larger than average. 28% felt that size was not important and 4% were not sure.

We were also interested if the form of the phone was important. We had them choose between the classic "candy bar" form versus a clamshell telephone. The pictures that we used are

depicted in Figure 10. 46% said that the preferred the clamshell phone instead of the "candy bar" (42%). However, there was 13% that wrote in comments saying they preferred a touchscreen like the iPhone or a phone that they can slide open.

2.3.3.4 Future Uses

We had several ideas for mobile services that had come up over the course of our research both inside and outside of the JusFone project. The presented the items as the following questions:

1. Use your mobile phone to pay, for example the same way as a bank card or credit card.
2. Use your mobile phone as a device for registering health measurements like blood pressure, pulse, and blood sugar levels from sensors on your body.
3. Use your mobile phone as a health journal to register items like exercise, nutrition, and medicine?
4. Use your mobile phone as a safety alarm?
5. Let others be able to track your mobile phone to be able to find you if you are lost or need assistance?
6. Use the mobile phone to communicate with health service providers to, for example, receive results from medical tests, renew prescriptions, or make doctor or dentist appointments?
7. Use mobile phone as a remote control at home to control the TV, other entertainment devices, lights, temperature, doors, blinds, etc.?
8. Use mobile phone to look up maps, read tourist information, and navigate to unknown places, etc. when you are traveling?

Figure 10 Respondents were asked to choose which form they preferred: A clamshell telephone (A) or a candy bar telephone (B). (Image Source: Photos.com, a division of Getty Images)

We asked the respondents to mark if they were very interested, somewhat interested, not interested, or not sure for each of the questions.

For using the mobile phone for paying, 50% of the respondents that were interested in it (30% that were somewhat interested, 20% that were very interested), 42% were not interested, and 7% were not interested. A majority (31% very interested and 39% somewhat interested) were also interested in using the mobile phone as a safety alarm with 19% not interested and 11% unsure.

Using the mobile phone as a tool for registering health measurements or as a health journal was received with moderate enthusiasm by our respondents. A majority (58% and 64% respectively) were not interested in using this technology at all. There were some that were very interested (21% and 20% respectively) and even fewer that were somewhat interested (10% and 8% respectively). The rest were unsure (10% and 9%). This lukewarm response is somewhat surprising since this type of use of the mobile phone is something which is often reported as being of interest to seniors, and is being worked on in a number of health projects. We have some theories as to why this was not so popular with our group in Section 2.3.4.

Another item that was moderately received was the idea using the mobile phone as a remote control in the home to control home entertainment systems or for basic environmental control of lights, curtain, doors, etc. 51% of the respondents said they were not interested in this at all. 10% were unsure, while 26% were somewhat interested and only 13% were very interested in mobile phone remote control.

One item that that many were interested in was allowing people to be tracked if lost or in the need of assistance by using their mobile phones with 78% of respondents expressing interest (30% very interested, 48% somewhat interested). 17% were not interested and five percent were unsure. 70% were also interested in having a better facility for communicating with health service providers (31% very interested, 39% somewhat interested), with 26% not interested and 4% unsure.

Respondents were also positive to having more tourist information on their mobile phones. 64% were interested in this with 35% somewhat interested and 29% very interested. 24% were not interested and 11% weren't sure.

2.3.4 Discussion

The survey has several interesting points that are worth some extra discussion. For example, our respondents seem to be very interested in using MMS and taking pictures. This flies in the face of conventional wisdom that would say seniors are only interested in using the simple functions on the phone. Yet, our respondents are likely very interested in using mobile phones and would have figured out how to use these functions. Other explanations might also work even if the respondents were not elite users. One is that seniors may receive lots of pictures from their children of their grandchildren. At least anecdotally we have seen MMS usage goes up once there are newborn children in the family. They need to be easily shared with a closed group. Another reason could be that seniors want to share pictures they take with the camera on the phone. It certainly makes sense that respondents are using the camera functionality on the phone as most phones now have cameras. Chase Jarvis' title for his book on iPhone photography may say it best, *The Best Camera is the One That's with You*. This use of the camera

also makes sense since some respondents felt it was an important deciding factor when looking for a new phone. It was interesting that several felt it was necessary to add this as a specific comment, even though it was available as another choice in the same question.

Another issue to look at is the discrepancy in the question of installing apps. It was chosen by only 8% when they were given a list of items, but when asked the question directly, 15% said that they had installed Apps on their phone. Part of the reason for this discrepancy could just be the design of the survey. When looking at the list of items of what they use their phones for, they may have overlooked it in the list or they thought that they *don't* use the phone to install applications, but have then installed some other way. When asked directly, it also includes other ways of installing applications (e.g., from a connection to a PC). Indeed there was a significant amount of those had connected their phone to a PC to install programs.

While it may seem that the number that install apps is small, we need to also remember not everyone we surveyed likely has phones that have can have apps installed. We saw a strong correlation between those that had answered yes to the installing apps question and those that had one of the newer phones, (i.e., those that had a touchscreen or a full keyboard). So, it shows that these respondents are not reluctant to use the new functionality on their phones when they have them.

On the other hand, it seems that not many of the respondents use digital music. There were twice as many respondents that that listened to the radio than listened to music. It could be that they prefer to listen to the radio, have problems getting music on their phone, or they don't have a phone that can handle playing music. If we were more interested in their music listening habits, we may have asked if they had a digital music player (e.g., an iPod), how often they used that, and if they change the music on it often.

It is also worth noting the relative disinterest in using the mobile phone for recording health information through sensors or as a health journal. It is somewhat surprising given that there are a number of projects and services focusing on this (see for instance Årsand 2009; Dolan 2011; and a number of apps on both Apple iPhone App Store and Google Android Marketplace). On the other hand, it may be that the respondents are simply healthy and do not see a need for such functionality.

One service that did receive a lot of interest amongst the respondents was the idea of being tracked when they are lost or need assistance. This is interesting because there have been a great deal of focus on using GPS tracking for family members that suffer from dementia and the potential privacy and ethical issues surrounding it (see for instance Datatilsynet 2009; Landau, Werner et al. 2009; Robinson, Hutchings et al. 2006; Robinson, Hutchings et al. 2007; Robinson et al. 2007). Here, we had a majority of the respondents that were interested in having this service available. Yet, it could be that they do not have the desire to have this ability on all the time. It could be that they only want this ability when they are in these situations, i.e. lost or in need of assistance.

2.4 Focus Group

We held a focus group with eight members of Seniornett. The main goals were to discuss the JusFone keyboard, senior's use of mobile telephones, what sort of things seniors look for in

possible smart devices (like mobile phones or tablets), and possible mobile services that they may find useful. The focus group ran for about 95 minutes.

The first part of the focus group was a discussion about the JusFone concept and how this might be helpful to seniors. This lead to several suggestions that would be useful in general for the phone, for example making the device durable was desired, ensure that it was washable and be could handle things like crumbs and jam when being used. It should also be able to handle issue of being dropped or the eventuality of someone vomiting on the device.

There were also concerns about things like theft of the device and about charging the device. These issues are important; part of the idea is that the device is personalized to specific needs. Losing the device may be dangerous to the user's health, especially if it is the method that helps remind the user to take medicine or to help with navigation. The group felt it was very helpful if there was an easy way for the device to inform you where it was.

The group named several services that they thought could be useful for seniors. One is the reminder service. This service would be very helpful for seniors and all the medicine they must take. Yet, the service could be more helpful if it did not just remind them *when* it was time to take medicine, but also *what* should be taken. This service could also be extended to order renewal of prescriptions or at least set up the doctor's appointment. This is a source of frustration for many elderly, remembering when they need to organize a refill.

Another suggestion was to create apps that not only address physical issues, but also cover mental and psychological aspects. One participant suggested an app that would show old pictures that would help remind seniors about when they were young (for example, showing an old potato peeler or iron). Another addition could be that it could play old children's songs and have the lyrics roll past on the screen. This would give the users an opportunity to remember the lyrics and sing along. This can be helpful for people suffering from dementia. Another suggestion would be an app that could build a "wish concert" where users enter in their desires and it builds a concert based on their wishes and shows pictures or films based on the input. The app could also help in providing more information about different languages or places. The app would need to be much easier to use than current services like YouTube.

A participant suggested a learning function for mobile devices. Every once in a while, the user would receive a message with a tutorial about how to use a certain service or functionality on the phone. This should be in the form of video and it should be possible to connect it up to a larger screen so that it would be easier to follow along. The device could analyze the patterns of use by the user and decide what sort of new features the user would find useful.

There was a discussion about how a device would work and how to interact with the device. There was a bit of a division between participant's opinions about touchscreens and keyboards. Some thought touchscreens were easy to use, while others felt there were difficult. One of the participants had problems that his hand shook uncontrollably and he had problems using many touchscreens. This led into a long discussion about universal design and accessibility.

Overall, the focus group was very useful for discovering senior's opinion about mobile devices, services, and technology. One point raised by a participant was that sometimes the uptake is

difficult not because it makes life easier for the elderly, but it instead makes life easier for the children and they force the decision on the elderly.

2.5 Seminar on the Inclusive Design of Smart Phones

We organized a full-day seminar in an attempt to raise the awareness of the need for inclusive design of smart phones, and to create an event to present the results from JusFone. The seminar title was: "Smartphones for everyone: a seminar focusing on the universal design of smart phones". In the seminar we wanted to look closer at what it takes to design smart phones, mobile software and apps in a manner that makes them accessible to all irrespective of age or disability. The target groups were developers and other stakeholders from the public and private sectors, researchers, user organizations, and everybody who takes an interest in universal design of mobile apps and smart phones.

The seminar was conducted on 18 May 2011, and was attended by approximately 40 persons. In addition us presenting the results from JusFone, invited speakers covered a host of relevant topics and areas including accessible mobile web design, accessible apps, assistive technology for mobile phones, accessible mobile security solutions et al. The seminar program is included in the report as Appendix E, and the presentations can be found on the NR webpage: http://www.nr.no/pages/dart/course_material_smartphone

3 Conclusions

The main conclusions that can be drawn from this project are:

3.1 User Testing of the JusFone Keyboard:

- The JusFone keyboard was quite well received by the test persons.
- The prominent positive aspects of the keyboard were:
  - Direct access to all letters and numbers,
  - effective for editing,
  - good for writing longer texts and texts consisting of letters, numbers and different symbols.
- Several informants favored the JusFone method to other input methods.
- The keyboard holds promise for persons with reduced hand function as an alternative input method.
- Some areas which need improving are spacing between keys, size of letters and improved editing functionality by adding a Delete button.

3.2 Mobile Phone Survey

- Certain groups of seniors use mobile phones in ways that are similar to younger user groups.
- They have similar sets of needs and desires when they are shopping for new phones.
- Apps are slowly taking hold among groups of seniors.
- Increasing the battery life and making buttons easier to use (e.g., making them larger) would address the issues that some seniors have when using their mobile phones.
- Direct access to keys (such as what can be achieved with the JusFone keyboard) is something that some seniors would welcome.
- Using their phones as a method of payment is of interest to seniors.
- Despite the controversial issues that are involved with tracking, some seniors are interested in GPS technology, whether it is for getting help when they are lost, or to help when they are travelling in unfamiliar areas.
- There is a moderate wish to use the mobile phone as a journal for storing health information or to receive physiological data on the phone from body sensors.
- The participants were self-selected from Seniornett, and this may affect the generalizability of the findings.

3.3 Overall

Overall, we are pleased with the project. We achieved all the goals that we set out to reach. In doing so we produced some new knowledge about seniors and mobile phone usage, gave important input to the further development of JusFone – and we were able promote the inclusive design of smartphones through the seminar, this report and future publications.

4 Future work

4.1 Need for further research?

We have conducted limited research activities on focused areas partly related to JusFone, and partly concerned with seniors and mobile phones. Further user testing is needed for the JusFone keyboard for ensure an even better fit with user needs. Further, due to a need to limit the scope of our work, we did not conduct any user interaction in terms of the proposed user interface of the JusFone software. Future user testing is of course required of the software. Given the stunningly fast spread of smart phones and the similar and slightly larger tablets, further research to ensure inclusive design of such devices and their Apps are urgently needed.

4.2 Further development of JusFone

Richard Chan will use the knowledge and experiences from this project to further develop JusFone. Concrete alterations and improvements have been made to the keyboard, as well as changes to the user interface. He is in contact with various industrial partners for realization of the one or several products based on the JusFone concept.

4.3 Dissemination

Besides the report at hand and four presentations at the above mentioned seminar, we intend to submit two articles for peer reviewed publication. One will focus on the topic of smartphones and accessibility in general, and draw upon several aspects and findings of the project. The other planned article will focus on the findings from the survey on seniors and mobile phones.

4.4 Main project application

We will monitor national and international research programs to see if future funding for further development of JusFone is possible.

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A Promotional Pamphlet

Norsk Regnesentral

Har du lyst til å prøve ut et nytt tastatur?

Vi inviterer deg til å delta i et forskningsprosjekt om mobiltelefoni. Vi søker personer 60 år eller eldre som har lyst til å være med å prøve ut et nyutviklet tastatur. Deltakere mottar et gavekort på kr. 500.

Bakgrunn

Mobiltelefoni brer stadig om seg, og telefoner blir mer og mer avanserte. Vi er opptatt av at selv avanserte telefoner, også kalt *smarttelefoner*, skal kunne brukes av alle som ønsker det. Hensikten med prosjektet er å skape kunnskap som bidrar til å utvikle en smarttelefon som flest mulig kan bruke. Som en del av dette arbeidet ønsker vi å prøve ut et nyutviklet tastatur. Tastaturet er ment å forenkle betjening av blant annet mobiltelefoner.

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Prosjektet heter *Jusfone*, og er et samarbeid mellom forskningsinstituttet Norsk Regnesentral, Seniornett og gründer Richard Chan. Det mottar finansiering fra Norges forskningsråd.

Praktisk informasjon

Vi søker personer som er 60 år eller eldre som vil hjelpe oss med å prøve det tastaturet. Du vil bli bedt om å gjennomføre noen praktiske oppgaver, samt svare på spørsmål rundt disse. Det hele vil ta ca. 1–1 ½ time.

Du vil motta et gavekort på kr. 500 som takk for at du deltar.

Utprøvingen vil foregå i Norsk Regnesentrals lokaler rett ved Blindern i Oslo, eller et annet egnet sted etter nærmere avtale.

Foruten at du må være 60 år eller eldre og kunne uttrykke deg godt på norsk, stiller vi ingen krav til verken forkunnskaper eller teknologierfaring. Redusert håndfunksjon er ingen hindring, men du må være i stand til å kunne trykke på ulike tastaturer.

Utprøvingen vil foregå i **uke 9 og 10, 2011**.

Meld din interesse eller få ytterligere informasjon, ved å kontakte:

Prosjektleder Øystein Dale tlf. 9578 0139 og e-post oystein.dale@nr.no
eller
ForskerTrenton Schulz på tlf. 2285 2568 og e-post trenton.schulz@nr.no

Norsk Regnesentral
Norwegian Computing Center
Postboks 114, Blindern
N-0314 Oslo, Norway

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B Information & Consent Form

Norsk Regnesentral

Informasjonsskriv og samtykkeerklæring for deltakelse i forskningsprosjektet "Jusfone – en smarttelefon for alle".

Vi vil gjerne invitere deg til å delta i et forskningsprosjekt om mobiltelefoni. Vi søker personer 60 år eller eldre som har lyst til å være med å prøve ut et nyutviklet tastatur.

Bakgrunn

Mobiltelefoni brer stadig om seg, og telefoner blir mer og mer avanserte. Vi er opptatt av at selv avanserte telefoner, også kalt smarttelefoner, skal kunne brukes av alle som ønsker det.

Hensikten med prosjektet er å samle inn informasjon som kan bidra til å utvikle en smarttelefon som flest mulig kan bruke. Som en del av dette arbeidet ønsker vi å prøve ut et nyutviklet tastatur. Tastaturet er ment å forenkle betjening av blant annet mobiltelefoner.

Prosjektet er et samarbeid mellom forskningsinstituttet Norsk Regnesentral, Seniornett og gründer Richard Chan. Det mottar finansiering fra Norges forskningsråds IT-Funk program.

Praktisk informasjon

Vi søker personer som er 60 år eller eldre som vil hjelpe oss med å prøve det tastaturet. Du vil bli bedt om å gjennomføre noen praktiske skriveoppgaver på ulike tastaturer, samt svare på spørsmål rundt disse oppgavene.

Det hele vil ta ca. 1–1 ½ time, og vi vil gjøre video- og lydopptak, samt ta notater under utprøvingen. Du vil motta et gavekort på kr. 500 som takk for at du deltar.

Avhengig av hva som passer deg best vil utprøvingen foregå i Seniornetts lokaler i Nedre Slottsgate 13, 0157 Oslo (i Sentrum), eventuelt på et annet egnet sted etter nærmere avtale.

Foruten at du må være 60 år eller eldre og kunne uttrykke deg godt på norsk, stiller vi ingen krav til verken forkunnskaper eller teknologierfaring. Redusert håndfunksjon er ingen hindring. Utprøvingen er planlagt gjennomført i uke 10 og 11, 2011.

Personvern

Deltakelse er frivillig. All innsamlet informasjon vil bli anonymisert og behandlet konfidensielt. Alle opptak og notater slettes ved prosjektslutt eller senest september 2011. Ingen utenfor prosjektet vil ha tilgang til den informasjonen du gir. Informasjonen vil bare bli brukt som grunnlag for analyse og rapportskriving i prosjektet, og til vitenskapelig spredning i form av artikler og foredrag. Det vil ikke være mulig å identifisere enkeltpersoner i prosjektrapporten eller fremtidige vitenskapelige arbeider.

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Du kan trekke deg fra prosjektet og/eller kreve personopplysningene som er gitt, slettet når som helst uten å oppgi grunn. Prosjektet er meldt inn til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste A/S.

Før intervju og observasjon begynner, bes deltageren om å samtykke ved å undertegne på at man har lest og forstått informasjonen og at man ønsker å delta.

Kontakt en av de undertegnede dersom du har spørsmål rundt deltakelse i prosjektet.

Vennlig hilsen

Øystein Dale, forsker og prosjektleder
E-post: oystein.dale@nr.no
Telefon: 95 78 01 39

Trenton Schulz, forsker
E-post trenton.schulz@nr.no
Telefon: 22 85 25 68

Samtykke

Jeg har lest og forstått informasjonen over, og gir mitt samtykke til å delta i undersøkelsen.

_____ _____

Sted og dato Signatur

C Protocol from the User Testing

Intervjuguide Jusfone brukerutprøving

Instruksjoner:

- Du skal utføre noen skriveoppgaver på tre ulike tastaturer, samt svare på spørsmål mellom hver oppgave.
- Det er ingen rett eller gal måte å gjøre det på – vi ønsker å høre hvordan du synes det er å bruke de ulike tastaturene
- Du vil få opplæring i bruken av de ulike tastaturene du skal prøve.
- Fortell gjerne hva du tenker, gjør og forstår eller ikke forstår underveis.
- Ta den tiden du trenger!
- Det kan hende jeg stiller spørsmål, eller ber deg gjenta hvis jeg ikke oppfatter eller klarer å følge med på hva du gjør!

Oppgaver:

1. Lek med tastaturet

Ta litt tid og leke med tastaturet. Prøv gjerne å skrive ord, tall og ulike tegn.

Hvordan opplever du å skrive med tastaturet?

2. Kopier en ferdigskrevet tekst

Se på teksten under fra en artikkel om Grieg. Skriv det utvalgte avsnittet med tastaturet!

– Jeg har sagt i alle år at det er forunderlig å se at Norge ikke skjønner betydningen av Grieg, sier Erling Dahl jr., som var direktør for Troldhaugen fra 1991 til 2004.

3. Skriv en kort melding

Skriv en melding til en venn som beskriver hvordan været er i dag. 1 setning er greit, 3 setninger maks!

SNU OVER ARKET!

4. Skriv et telefonnummer

Skriv nummeret til Norsk Regnesentral (velg selv om du vil ha mellomrom):

22 85 25 00

5. Skriv et matematisk regnstykke

Skriv det følgende regnstykket:

(8 + 9) * 37 - 64 / 30 = 626,87

6. Skriv en lang tekst

Gjenta oppgave 2!

D Questions from the Survey

The following are the list of questions used in the survey. If a question had an option for additional answers (other than yes, no, don't know), those answers are included too.

1. How old are you?
2. What is your gender?
3. How would you describe your computer competency?
   - Low competency
   - Medium competency
   - High competency
   - No competency
4. Do you have a mobile telephone?
5. How do you interact with your mobile phone?
   - Traditional mobile keyboard with numbers and letters
   - Touchscreen
   - Full keyboard with all letters
   - Both touchscreen and keyboard
   - Other
6. What do you use your mobile phone for? You may select more than one alternative.
   - Call
   - Send and receive SMS
   - Send and receive MMS
   - Listen to music
   - Take pictures
   - Calendar
   - Send and receive email
   - Surf the Internet, for example, to read newspapers on the Internet or check the weather
   - Follow social media, for example Facebook and Twitter
   - Navigation with the built-in GPS
   - Listen to radio
   - Play games

- Install applications (Apps)
- Other (please specify)

7. Which functions, for example SMS and email, do you wish to have their own buttons for (quick keys)? You may select more than one alternative.
   - SMS
   - Internet
   - Calendar
   - No preference
   - Other (please specify)
8. What difficulties do you have when using your mobile phone? You may select more than one alternative.
   - Insensitive touchscreen
   - Over sensitive touchscreen
   - Screen is too dark
   - Difficulty to use other buttons on the telephone (for example, power, locking the keyboard, volume)
   - Writing is too small on the screen
   - Difficult to hear the telephone ring
   - Screen is too small
   - Difficult to hear conversations
   - Complicated menus
   - Writing on is too small on buttons
   - Buttons are too small
   - Short battery life
   - Other (please specify)
9. Have you connected your mobile phone to a computer before?
10. What was the reason your connected your mobile phone to the computer?
    - Transfer pictures or video
    - Transfer music
    - Upgrade the software on the mobile phone
    - Make a backup copy of the content of the phone
    - Install applications
    - Other (please specify)

11. Have you used Bluetooth on your mobile phone to connect to other mobile phones, computers, hands-free headsets, or something similar?
12. Have you installed programs or applications (also called apps) on your mobile phone?
13. What is the most important for you when you will buy a new mobile phone? You may select more than one alternative.
    - Appearance
    - Opportunity to install apps
    - Avoid having to learn something new
    - Touchscreen
    - Physical keyboard
    - Special functionality, for example, Internet access, take pictures, use GPS, play games
    - Size
    - Large buttons
    - Large writing on buttons
    - Direct access to letters on buttons
    - Buy a brand that I am familiar with, for example Nokia or Samsung
    - Price
    - Battery life
    - Easy to use with easy menus, etc.
    - Call and send SMS
14. What size do you desire in a mobile phone?
    - As small as possible
    - Medium size
    - Large
    - Size is not important
    - Don't know
15. Which design do you prefer for mobile phones?
    - Clamshell phone
    - Classic candy bar phone

The next set of questions asked if the respondent was very interested, somewhat interested, or not interested in each of the statements below:

16. Using a mobile phone to pay, for example, the same way one uses a bank or credit card?

17. Using a mobile phone as a device to register health information like blood pressure, pulse, or blood sugar from sensors on your body?
18. Use a mobile phone as a health journal to register items like exercise, diet, and medication?
19. Use a mobile phone as a security alarm?
20. Let others track your mobile phone to be able to find you if you are lost or are in need of assistance?
21. Use your mobile phone to communicate with health service providers? For example, to have results from medical tests sent to you, renew prescriptions, or schedule appointments with doctors?
22. Use your mobile phone as a remote control in your house to control the TV and other entertainment devices, lights, heating, doors, blinds, etc.?
23. Use your mobile phone to see maps, read tourist information, or to help navigate when you are in unknown areas when you are traveling?

The final sets of questions were open-ended.

24. Do you have any other new ways that a mobile phone can be used that were not named above?
25. Do you have any additional information you wish to add?

E Seminar Program

We have included a copy of the program for the seminar that was held in combination with the project. The actual presentations themselves are available online at:

http://www.nr.no/pages/dart/course_material_smartphone

SMARTTELEFONER FOR ALLE!

Et seminar med fokus på universell utforming av mobiltelefoner

PROGRAM

Tid	Tema	Foredragsholder
09.00	Velkommen og introduksjon	Norsk Regnesentral (NR)
09.15	JusFone en smarttelefon for alle	Øystein Dale & Trenton Schulz—NR, Richard Chan—RichChan
10.15	Pause	
10.25	Development best practices and accessible design Insights from the mobile world	Shwetank Dixit—Opera Software ASA
11.00	Tilgjengelige mobilapp'er på iPhone	John Eivind Hallén—Shortcut AS
11.35	Tekniske hjelpemidler for mobiltelefon	Stein Erik Skotkjerra—Provista
12.05	Lunsj	
12.45	Venter på toget! Funksjonshemmet "på nett" med mobile grensesnitt	Morten Tollefsen—MediaLT
13.20	Brukervennlig når brukeren får bestemme!? Om utviklingsprosessen av en diabetesdagbok for Smartphone	Geir Østengen—Konsulent/Tidligere Prosjektleder ved NST
13.50	Pause	
14.00	VoiceOver på iPhone	Trenton Schulz—NR
14.25	Standard smartphone-apper som kognitive krykker	Kari Steindal—Nasjonal kompetanseenhet for autisme, Oslo Universitetssykehus
14.55	Oppsummering	NR
15.00	Vel hjem!	