Enhancing the Social Inclusion of Seniors by Using Tablets as a Main Gateway to the World Wide Web

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1 ABSTRACT

Internet access has become such an important requirement for our daily lives that the United Nations proposed to give it a status of a human right in 2011. Still Internet usage in Europe varies strongly depending on regional aspects, age and qualification. Elderly people are among the user group that is affected most by the digital divide because of technical, social and economical barriers. This paper covers the question whether the current generation of tablets has the potential to reduce these barriers, especially for older users. Two main studies were undertaken to evaluate usability and acceptance of a chosen tablet and to investigate longer-term effects of tablet usage. The results of the studies show high satisfaction and acceptance rates among the target group and suggest a stronger focus on senior specific applications for tablets as well as initiatives to target the higher information demand regarding tablets in special and technological solutions in general of the older user group.

2 INTRODUCTION

Internet access and usage has become a very important part of our daily lives. Although nearly 100% of Europe's population between 14 and 30 make use of Internet based services regularly, access for the older generation above 65 is still limited to a comparatively small group of only 30% according to studies of GFK Austria [1] and the Initiative D21 in Germany [2]. The resulting digital divide excludes especially older people from parts of social life. The most prominent reasons for the digital divide are high technological, economical and social barriers that hit especially people with a low affinity to technical solutions. Among these barriers are according to [3,4]:

- High acquisition and maintenance cost especially in rural areas where Internet availability is low,
- Strong Respect for new technical solutions because of low personal experience and fear of dependence on technical support of technically versed people such as younger relatives,
- High complexity and hence low learnability of technical user interfaces, especially when it comes to personal computers

2.1 myTablet–the project

MyTablet is a research project that was undertaken in 2011 by the Austrian non-profit research institute CEIT RALTEC and got nationally funded by the "Internet Privatstiftung Austria (IPA)". The project's goal was a scientific evaluation of a current tablet computer concerning the suitability as a device to support older people to access the Internet. This idea is based on the hypothesis that tablets are easy to use for seniors since they contain a touch based user interface, which offers less functionality and hence less complexity in comparison to user interfaces of commonly used operating systems. Furthermore tablets lower the acquisition costs since they eliminate the need for a wired infrastructure at home.

2.2 Regional aspects of the mytablet project

Access to the World Wide Web is rare among older people living in cities and the problem aggreviates in rural areas when physical access to network structure is limited. Tablets could be a solution to lower the digital divide since they could tackle several aspects at once:

- providing physical access by using wireless broadband, which is, in comparison to access via the local land line, largely available also in rural areas. (see also [5])
- reducing the technology entry thresholds by providing an appropriate user interface also for unexperienced users such as older adults and people of neal-illiterate social classes.

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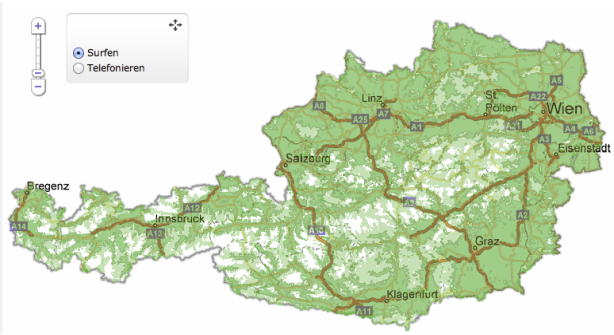

Fig. 1: 3G coverage of the leading Austrian 3G provider (green = up to 40mbit)

Tablets provide a wide range of applications that target to enhance the mobility of users, Apple's "Appstore" for example holds two categories called "navigation" and "travelling" that together provide the users with functionalities such as car navigation, ticketing for public transport, car parking aids and ticketing, city travel guides, etc. The easy availability of those functionalities can lead to a better information distribution also among older users.

3 EVALUATION OF A TABLET

Two main usability trials were conducted. Within a first short-term trial, where eleven older people took part, the usability and acceptance of a chosen tablet was evaluated. To evaluate whether or not the so gathered results can be maintained over a longer period of time, field trials were carried out with four of the eleven test subjects. In these trials the test participants received a tablet for the duration of one month each with the condition to document the usage.

3.1 Usability Study–short-term trial

The main goal of the short-term usability study was to rate the usability together with seniors and evaluate, which functionalities can be used intuitively or after only a short introduction on the device.

Central research questions were:

- How do the trial participants experience the usability of the tablet's user interface in particular and the usability of the device in general?
- Are basic and common functionalities such as web browsing and e-mailing easily learnable; how much explanation and introduction on the tablet is necessary?
- What are general pros and cons on this technology (in comparison to usual PCs or Laptops) in the eyes of the older target group?

3.1.1 Description of trial participants

Eleven seniors (four male, seven female) with an average age of 71 years took part in this first trial. Younger people (age < 60) and technically experienced ones (by means of a questionnaire on technical affinity) have been excluded from the study.

The final group of trial participants included six people without knowledge about PCs or web services at all and five people with basic experience in working with a PC.

3.1.2 Test setting

As test setting a preconfigured and, as far as possible, especially to the needs of the target group customized iPad v1 from Apple was chosen because of the high availability on the market.

The tablet featured a reduced set of nine very common and basic applications offering functionalities such as:

- web browsing
- email client
- Google maps application
- YouTube–video portal

- Access to the online store of a big Austrian food store chain
- Picture viewer
- Bookmarks to websites for weather information, news and Google search

The following figure shows an image of the test setting during the usability study.

Fig. 2: Trial participant and test setting during the usability study

3.1.3 Test flow

Single user interviews were used during the usability trial with each user in sessions taking up to two hours. The trial was split into three parts:

(1) Introduction with explanation about the project and hands-on tutorial on the tablet for approximately 30 minutes

(2) Main part including tasks that were executed by the test user while using the „thinking-aloud“ method [6,7] and obtrusive observation [10] by the research team.

(3) Final qualitative questionnaires regarding the subjective usability, acceptance and satisfaction of the user as well as general feedback about the used tablet.

During the main part the trial participant had to fulfil certain tasks embedded in the framework of possible real-life scenarios. Each task was composed of several consecutive steps that needed to be completed correctly in order to fulfil the task. The execution of these test tasks was observed and evaluated by the researcher team and generated the main results of the first trials. Among the tasks were typical strategies used to obtain information such as „undertaking a web research using Google“ or „reading of a received mail“ or „gaining information about the weather forecast“ using a specific weather application.

3.2 Field Trial–long-term trial

Validation of the gathered results of the short-term trial and gaining information about the long-term use and satisfaction regarding the tablet device were the main reasons of the field trial.

3.2.1 Description of trial participants

Four users of the usability study where randomly chosen for the user group of the long-term trial. Users with even only basic experience where excluded from the list, since the focus was laid on inexperienced users. Finally four women living in Schwechat and Vienna and aged in average 69 years took part.

3.2.2 Test setting

In order to allow the users to experiment with the functionalities of the tablet, the test setting was altered after the usability trials. In addition to the applications installed for the usability trials, around 30 applications were evaluated and chosen that matched the interest of the test participants.

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Fig. 3: main screens of the user interface during the field trial

The field trials were conducted either in Vienna or in Schwechat, Austria.

3.2.3 Test flow

After an additional lesson on the usage of the device for a duration of two hours, each test user received an Apple iPad v2 for the total duration of 1 month. During this time the users did document their tablet usage in a diary and had the possibility to contact a project team member in case of problems with the device or questions regarding the project.

4 RESULTS

The results shown in the following chapters are a summary of information and experiences gained during the short-term usability and the long-term field trial and can be split up into results gained during the tests by interpretation of the users' behaviour and results gathered by retrospective analysis of questionnaires.

4.1 Evaluation of the general usability

If asked about the general usability, all users of during the short-term tests and the long-term trials concluded that they find the tablet would be „easy to use". Problems were found in the fact that applications are provided by various developers resulting in a heterogeneous user experience across the applications. This issue was also raised earlier by Raluca Budiu and Jakob Nielsen in [11]. Nevertheless, during the final interviews all users declined the statement „it was too time consuming to learn the different functionalities".

Some users showed an initial fear in using the tablet caused likely by a general high respect regarding the usage of new technology, but that feeling vanished during the first hours of usage, which helped them to explore new functionality on their own. Most users stressed out that the tablet is not intimidating to them since it does not look like a complex machine and particularly liked that it is possible to return to the (well known) main screen by simply pressing the only button on the device at any given time.

English language is not commonly understood by older people and can not be completely avoided during the use of tablets even if the local language of the device is set to the native language, since many terms used in the World Wide Web and IT in general are Anglicisms not well known among German speaking seniors.

All trials were conducted using the UMTS capability of the device, which provided a satisfying connection to the test participants; all of the users declined the question that the device seems to react too slow. One participant particularly remarked the positive point that the tablet also works at her secondary residence in lower Austria and liked to travel with the tablet.

4.2 Evaluation on the ease of learning

It took around 40 minutes of training prior to the first trial until the research team felt confident that the participant is able to understand and fulfil simple tasks on the device such as looking up the weather using an provided „app" or checking the emails on its own. Another hour of training was given to the four test users selected for the field trials until the test participant felt confident to use the device without help alone. During the field trial all together nine meetings of roughly one hours duration were conducted to provide additional help. Four of these meetings (one per test participant) were pre-planned and conducted after the first two weeks of usage; the other five meetings were needed to answer specific questions that arose during the usage.

During the final interviews novice users mentioned that the usage needs some experience, but they were confident that they are able to learn how to use the tablet if given enough time. To learn new functionality (apps) of the tablet in self-study was rated as easy by two of the four participants of the field-trial, one was unsure, one found it rather difficult. One of the most central found problems was the difference in usability between applications that results in the need to learn and understand each new application again.

4.3 Evaluation of usage patterns

To evaluate the usage of single applications the test participants were asked to fill out a diary on a daily basis regarding their usage behaviour. Most prominently used during the trials were games and riddles for brain fitness followed by information services such as Google search and weather forecasts.

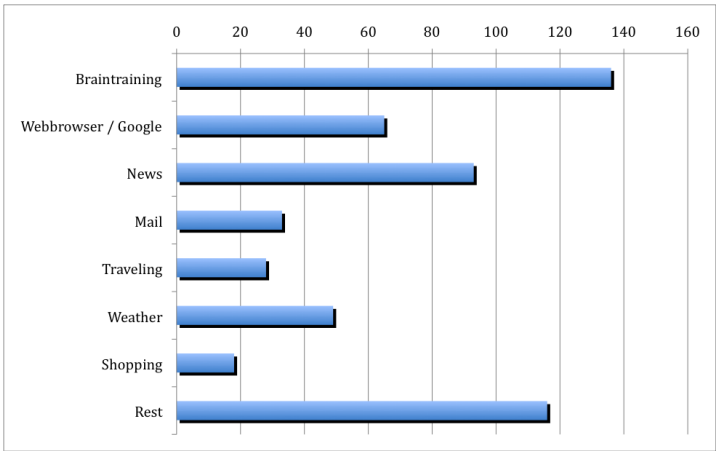

Fig. 4: usage statistics of the applications used

83 test days were included in the evaluation; by using several applications a day, values higher than 83 could be reached. The assumption that the level of usage will decline over the test periods because of losing initial interest based solely on the novelty of the device could not be validated. In contrary, the users tended to use the tablet slightly more often and for a longer time duration since during the field trials they experienced new functionalities they can use.

5 CONCLUSIONS & OUTLOOK

The results of the undertaken usability studies showed that tablets really can lower some of the barriers of accessing the Internet and hence make it easier to use online services independently for people who are inexperienced in using the Internet. The most essential advantage of tablets over common PCs seems to be the non-technical look and feel accompanied by the simple touch based navigation of the devices, which lowers the barrier to adopt the new technology.

During and after the trials all participants stated that they had a positive impression of the tablet used; during the final interviews some said that they now feel more confident in using technical solutions in general.

Barriers were found that can not be overcome by using a tablet. For this study the device had to be preconfigured and technical support was given during the field-trials. This initial set up and occasional support during the usage is needed and needs to be given by a friend, a relative, a carer or an institution.

5.1 Acknowledgements

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