

https://dspace.org/

Case Notes: SenPortal: Internet-Based Services for Senior Citizens

Von Solms, Rossouw; De Lange, Etienne

2013-12-15

http://hdl.handle.net/10539/19277

Case notes: SenPortal: Internet-based services for senior citizens: The African Journal of Information and Communication (AJIC), 13, 76-81. https://doi.org/10.23962/10539/19277

Downloaded from a DSpace repository. https://dspace.org/

CASE NOTES:
SENPORTAL: INTERNET-BASED SERVICES FOR SENIOR CITIZENS

Rossouw von Solms and Etienne de Lange,
Institute for ICT Advancement, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa, Rossouw.VonSolms@nmmu.ac.za

ABSTRACT: Countless senior citizens retired before computers and the Internet became prominent. In many cases, cognitive and physical limitations restrict them from enjoying the benefits and opportunities the Internet has to offer. The project discussed here experimented with measures to assist the elderly to utilise some Internet-based services. SenPortal, a single, sign-on, front-end system using facial recognition, was established to assist senior users to enjoy Internet-based services such as Gmail, Skype, Google, Wikipedia and Facebook without having to use any user ID or password. The article reports on a case study undertaken in the retirement village where SenPortal was developed.

KEYWORDS
Senior citizens, Internet-based services, facial recognition, single, sign-on, voice recognition'social networking

INTRODUCTION: SENIOR CITIZENS AND THE INTERNET
In a matter of a decade, the Internet has revolutionised the way in which people communicate, do business and socialise. Melenhorst and Bouwhuis (2004) state that most senior citizens never used Internet services in the workplace and may therefore avoid using them now. However, in the United States (US), the leading online activities utilised by senior citizens are

- Search engines – 59%
- Keeping in touch with family and friends – 59%
- Gathering of information – 47%
- News/current events/weather – 43%
- Travel planning and reservations – 41%
- Finance and online banking – 24%
- Payment of bills – 23%
  (eMarketer: Digital Intelligence, 2008)

Despite the benefits and advantages, it is important to be aware of threats, as Internet users are often targets for fraud schemes. It must also be taken into account that older people differ from the younger generation in terms of both cognitive and physical abilities, making it more difficult for them to remember usernames and passwords or to work with input devices such as a keyboard or mouse (Greengard, 2009).

OBJECTIVE
The objective of the research was to develop an environment for senior citizens to effectively and safely utilise Internet-related services, taking into account their cognitive and physical abilities. This article reports on the research exercise designed to empower elderly people to use Internet-related services in a secure manner, to improve their quality of life.

CASE STUDY METHODOLOGY AND CHRONOLOGICAL RESEARCH PROCESS
The research project was designed to empower senior citizens to maximally utilise the Internet. The longitudinal case study was conducted at a retirement village in Port Elizabeth, South Africa, over a period of 18 months from May 2009 to October 2010. The particular retirement village was selected as it was easily accessible to postgraduate students, the management of the village was cooperative and most residents have children or friends who would like to communicate electronically. The case study methodology was selected to ensure that the investigation was implemented in a natural setting, involving senior citizens (Benbasat, Goldstein & Mead, 1987).

The case study incorporated elements of action research. Two computer workstations, with dedicated ADSL line, were set up in a small room in the community hall. Access to the room was controlled, but keys were easily available. The longitudinal study utilised some of the iterative and reflective elements of action research. The experimental process is thus presented as a series of events and the research results, captured continuously throughout the process, are reported chronologically.

The study was undertaken in two phases: Phase 1 during 2009 and Phase 2 during 2010. A research student was responsible for designing the technical aspects of the project, such as the development of the relevant software components. A local coordinator at the retirement village was identified to act as liaison between the researchers and the senior citizen participants.

PHASE 1 (YEAR 1)

QUESTIONNAIRE 1

All the senior citizens were invited to an inaugural meeting by the local coordinator where the project was introduced and the first questionnaire, Questionnaire 1, was completed by those interested in participating. The objective of Questionnaire 1 was to determine the Internet-related services the participants would like to be offered and to assess their computer and Internet skills and experience to date.
Results from Questionnaire 1 can be summarised as follows:

- 22 senior citizens committed to participate in the project, of whom 21 were older than 70 years.
- 11 (50%) of these indicated that they had worked on a computer before, albeit on main-frame terminals in many cases, while the other 50% had never worked on any computer previously.
- The most common reason for not having used a computer was the absence of need, opportunity or training.
- Most respondents (85% of the 22) indicated that they are interested in learning to use the Internet because they have children and/or grandchildren overseas with whom they would like to communicate regularly.

Based on analysis of the results from Questionnaire 1, it was decided to make available Google, Gmail and Skype. For security reasons, it was decided not to promote electronic banking or any e-commerce services at this initial stage.

TRAINING SESSION 1

The participants were invited to attend a first training session two weeks after administration of Questionnaire 1. The researchers prepared user manuals for the first training session. Twenty-two participants attended the session, exclusively dedicated to the use of Google and Gmail. A Gmail account was created for every participant and they were asked to gather the email addresses of those with whom they wished to communicate. In the second training session, Skype was introduced and its use explained. Participants interested in using Skype were assisted to create Skype accounts. A software programme was run in the background, which captured data regarding which of the three Internet services were used by which participant and for how long. A logbook was introduced and participants were asked to record problems, frustrations and positive comments.

TRAINING SESSION 2

At the second session, 20 participants attended the meeting. A few positive stories were shared, but predominantly negative comments were received. Participants complained about general operating system oriented problems and user identification (user ID) and password difficulties. In most cases, participants became confused with the various user IDs and passwords for signing onto the operating system, Gmail or Skype. One participant, a retired IT professional, volunteered to act as system administrator and to assist the others. He would ensure that both computers were running continually to obviate the need for start up. Additionally, it was decided to develop a front-end system, called Electronic Senior Citizen (eSenCit) that would act as a single, sign-on system. Single sign-on is a user authentication process that permits a user to enter one username and password in order to access multiple applications or services (SearchSecurity.com, 2008).

eSenCit, as a single, sign-on system, was partially successful. Once a participant logged on to eSenCit with a unique user ID and password, the system provided the user with three options, Google, Gmail and/or Skype. Three large icons appeared on the screen and the user merely had to click on the appropriate block. Also, if Gmail was selected, eSenCit would automatically log the user into his/her Gmail account, with the need for further user ID and password. Unfortunately, this service could not be introduced for Skype because of security settings in Skype. Once logged into eSenCit, the user still had to log onto Skype with another user ID and password. It was decided that one computer would run with eSenCit and the other with the normal Windows interface.

QUESTIONNAIRE 2

After six months, a second questionnaire, Questionnaire 2, was administered to receive feedback from participants (see Table 1 below). Results from Questionnaire 2 reflected that about:

- 90% of the participants used Gmail at least once a week.
- 65% never used Skype, mainly because they did not have anybody to communicate with.
- 50% never used Google.

TABLE 1: SENIOR CITIZENS' RESPONSES

Questions asked	Result
Is access to the computer room too restricted?	Yes – 45%
	No – 55%
How dependent are you on the administrator?	Not at all – 10%
	I need help occasionally – 70%
	I only use the computers when the administrator is there to assist – 20%
Which computer do you use the most?	PC with eSenCit installed – 50%
	PC without eSenCit installed – 35%
Do you use the printer provided?	Yes – 35%
	No – 55%
On which services would you require more training?	Gmail – 40%
	Google – 55%
	Skype – 60%
Did the project add to your quality of life? Is the project worth it?	Yes, definitely – 85%
	Maybe a little – 15%
	No, not really – 0%

KEY STATISTICS YEAR 1

The data log statistics for Year 1 usage (seven months) were analysed. The following are some important statistics:

- A total of 8 387 minutes (139,78 hours) was spent using the available Internet services.
- Gmail was by far the most popular service, using 6 666 of the 8 387 minutes (79.4%).
- Eighteen of the 22 users were active on Gmail, while four users did not record any time using this service.
- Twelve users spent time using Google, while one user spent more than 15 hours on Google.
- Only seven of the 22 users used Skype, while 217 of the 270 minutes (80%) recorded for Skype were utilised by one user. On further investigation it was identified that this user (a grandmother in her 70s) had a son and grandchildren in New Zealand and a daughter in the US.

PROBLEMS ENCOUNTERED

At the end of Year 1, it was clear that the project had many advantages, as 85% of the participants indicated that it had definitely added to their quality to life (Table 1). However, the following problems were identified:

(1) The use of user IDs and passwords was identified as a major barrier to ease of use and a positive experience.

(2) Comments extracted from the logbook indicated that the users experienced many frustrations: "John (the administrator) not available", "Could not log in", "Couldn't get into Skype or Gmail", "Printer is printing very small".

(3) Gmail made some changes to their authentication system and eSenCit could no longer log in users directly. Thus the restricted version of single sign-on was nullified and users were again fully dependent on user IDs and passwords.

(4) The administrator moved away and was lost to the project.

It is apparent that the bulk of the problems recorded related to user identification and authentication. Users were dependent on the administrator for assistance, but this could be explained by their problems with authentication.

PHASE 2 (YEAR 2)

In Year 2, it was necessary that the user interface, the user identification and authentication process and printing facilities were improved and made more user-friendly. The objectives for Year 2 were discussed at a meeting with the participants and set as follows:

- The identification and authentication of users of the system, as well as individual services, had to be simplified, because there were problems remembering all the user IDs and passwords.
- Single sign-on had to be re-instated to cater for all services requiring user authentication.
- Two additional services, namely Wikipedia and Facebook, were to be introduced.
- Printing facilities had to be improved.

With these objectives in mind, a new eSenCit front-end system was built. This system, called SenPortal, would make use of facial recognition technology to identify and authenticate individual users, thereby necessitating very little interaction from the user's side. SenPortal would also include a single, sign-on system that would log users automatically onto Gmail, Skype and Facebook once identified and successfully authenticated.

Midway through Year 2, the first version of SenPortal was introduced on one of the two computers. All users were registered on the facial recognition system and their individual user ID and password captured onto the single, sign-on component of SenPortal. Wikipedia and Facebook were demonstrated and explained to the participants and added to SenPortal.

Figure 1 presents the initial SenPortal login screen that welcomes a user. As mentioned at the top of the screen, the user merely has to look into the web camera (webcam) for three seconds. SenPortal then identifes and authenticates him/her and a confirmation screen (see Figure 2) is displayed, where he/she confirms identification. This initial login screen in SenPortal (see Figure 1) also has another option, *Switch Interface*, whereby the user can switch to the traditional, Windows-based login screen.

FIGURE 1: SENPORTAL FACIAL RECOGNITION LOGIN SCREEN



FIGURE 2: SENPORTAL LOGIN PROMPT



Once the user has been identified and authenticated successfully, SenPortal will display the home screen of the system front-end (See Figure 3).

FIGURE 3: SENPORTAL HOME SCREEN



The SenPortal home screen makes the following available to the user:

- Quick links to Google and Wikipedia (middle, left of screen).
- Access icons to the five Internet services offered (middle of screen). If the user chooses Gmail, Facebook or Skype, he/she will be automatically logged into that particular service (with a user ID or password), with no additional login required.
- An alert window in the top left for new email messages.
- A log-out link in the bottom right-hand corner.

SenPortal successfully combined facial recognition, as an identification and authentication mechanism, with single sign-on. The benefits of SenPortal are:

- One-time login.
- Access to multiple services with further login.
- No need to remember any usernames and passwords.
- No blocking of user accounts due to too many incorrect login attempts.

THIRD REVIEW

Towards the end of Year 2, a final questionnaire, Questionnaire 3, was completed by some (not all) of the active participants.
Results from Questionnaire 3 worth reporting are:

- 85% of respondents use Gmail *often* or *very often*. None of the respondents reported that they never use Gmail.
- No participants indicated that they use Google *very often*, while about 30% indicated they *never* use Google.
- Only three participants actively use Facebook, Wikipedia is used *rarely* and Skype was used *very often* by two participants.
- All participants indicated that Google and Wikipedia are *very easy* or *fairly easy* to use.
- Two participants indicated that Gmail was *difficult* to use whilst the rest indicated it is *easy* to use.
- 85% of participants indicated that SenPortal recognises them *always* or *most of the time*. 15% indicated they were recognised *only sometimes* while nobody indicated that they were *hardly ever* or *never* recognised.

Comments recorded in the logbook also conveyed a positive situation. However, there seemed to be some problems with facial recognition, with the following comments being recorded in the logbook: “Couldn’t get into either computer”, “Computer recognised me at 11:00, 15:00, but not at 17:45”, “Wouldn’t recognise my face”. Furthermore, there were also problems related to the printer, certain actions on Gmail, like forwarding and opening attachments, and closing down/logging off.

With SenPortal, most of the user ID and password problems that were previously prominent seemed to have been resolved, yet facial recognition still remained a problem. Studying relevant literature, it was learnt that lighting can play an important role in this regard. Ruiz-del-Solar and Quinteros (2008) reported that variable illumination is one of the most important problems in facial recognition. Thus, because the computer room has

a window to the north-east, with the sun illuminating the room differently at various times of the day, altered lighting conditions appeared to be the major reason for facial recognition problems. Creating standard lighting conditions in the room and changing the settings on the system solved this very effectively.

DISCUSSION AND CONCLUSION

Information technologies and the Internet offer numerous opportunities to senior citizens to improve their quality of life. Unfortunately, many are not in a position to make use of them, because of cognitive and physical restrictions. Internet-based services, therefore, should be designed in a more user-friendly manner to offset such restrictions, which can also include short-term memory loss. It can be argued that the primary objective of the experimental research project to "develop an environment for senior citizens to effectively utilise some of the Internet-related services, taking the cognitive and physical abilities of elderly people into account" has been met.

From the research results it is apparent that a front-end system like SenPortal is able to successfully address the problem of authentication and easy access to selected Internet services. SenPortal makes it possible for a senior citizen user to access his/her Gmail, Skype or Facebook account with two clicks of a mouse, firstly to confirm identification and secondly to select the service. Based on the needs of the elderly, it is imperative to have an administrator on site and readily available to assist novice users with the various services.

SenPortal made it possible for the participants to be authenticated with minimal activity from their side. By using facial recognition, combined with a user-friendly, front-end system, a group of senior citizens, mostly over 70 years old, have successfully used email, search engines and online social networking. But once logged into a service, like Gmail for example, it was noticed that that the users struggle to type an email message. Thus future plans include making use of voice recognition to assist senior citizens to compose their email messages faster and with less physical activity on the keyboard.

Participants confirmed that the project has added to their quality of life. No transactional services, like electronic banking, online purchases or electronic government services, were made available. Introducing such services would require further experimental design and the creation of a secure environment for senior citizen users.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the following contributing parties: National Research Foundation (NRF) of South Africa for financial assistance and Devon Dawson who participated as research student in Year 1 of the project.

REFERENCES

Benbasat, I., Goldstein, D. & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, pp. 368-386.

eMarketer: Digital Intelligence (2008). Seniors are increasingly active online: Is granny gaming? retrieved 21 March 2010 from http://www.emarketer.com/Article.aspx?R=1006249.

Greengard, S. (2009). Facing an age-old problem. *Communications of the ACM,* 52(9), pp. 20-22.

Melenhorst, A. & Bouwhuis, D. (2004). When do older adults consider the Internet? An exploratory study of benefit perception. *Gerontechnology,* 3(2), pp. 89-101, retrieved from www.gerontechnology.info/Journal/pdf.php?a=186.

Ruiz-del-Solar, J. & Quinteros, J. (2008). Illumination compensation and normalization in eigenspace-based face recognition: A comparative study of different pre-processing approaches. *Pattern Recognition Letters*, 29(14), pp. 1966-1979.

SearchSecurity.com (2010). Definition: single sign-on (SSO), retrieved 6 July, 2010 from http://searchsecurity.techtarget.com/sDefinition/0,,sid14_gci340859,00.html.