

Supporting Senior Citizens to Learn IT Skills

Shigeki Yokoi
Nagoya University, Japan
E-mail: yokoi@is.nagoya-u.ac.jp

Wei Zhou
Nagoya University, Japan
E-mail: zhou@nagoya-u.jp

ABSTRACT

Digital divide owing to age has become a major concern around the world, even in developed country, Japan. To combat the digital divide, a project named “e-namokun” aiming to help senior citizens use the Internet was started in Nagoya, Japan, which was a national first joint project run through government, universities, and NPO (Not-for-Profit Organization) cooperation. In the project, nearly 2000 senior citizens have taken course of the software we developed. In relation with this project, we have been developing useful tools to support senior IT beginners. In the paper, we introduce the outline of the project and explain developed tools for senior citizens.

Keywords: Senior Citizen, IT Beginners, IT Promotion

INTRODUCTION

In Japan, the number of people aged 65 and above currently accounts for 21.5% of the overall population (The 2008 white paper on ageing society in Japan). The growth of this aging population is expected to rise by 2015, and the ratio of people over 65 will be more than 1/4. On the other hand, use of the Internet has become an everyday activity, and much useful information for senior citizens, such as welfare information, crisis-management information, is offered by the Web. However, although the availability of personal computers to senior citizens has increased, this availability is lower than for other generations. A survey revealed that in Japan, over 90% of those aged

between 13 to 39 years use the Internet, the percentage of use by those aged over 65 years old is extremely low, at less than 20% in 2005. Although the number of senior citizens who have a strong desire to use computers is increasing yearly, many of them could not gain enough skill for using PC or the Internet, due to difficult characters to learn, complex operations for use, and few supporters in case of meeting some troubles in operating, and so on.

It is very important in Japan that seniors could continue their social participation or social contribution, living independently. We think that supporting seniors to get skill in PC or Internet is very important for the purpose.

A PROJECT OF USING WEB SOFTWARE FOR SENIOR IT BEGINNERS AND EDUCATION IN LIFELONG LEARNING CENTERS

Overview of the project

In 2004, we started a project of information promotion project for seniors with Nagoya City, which was named the “e-namokun*” project. In contrast to other famous Internet promotion projects for senior citizens in Japan, such as E-senior net (<http://www.e-seniornet.com/>) and Senior Net Club (<http://www.zundanet.co.jp/seniornetclub/>), the project aims to develop a total support and learning environment for helping senior citizens use the Internet. After analyzed obstacles for senior citizens to use PC (Table1), several support methods have been planned and implemented through this project, such as user-friendly e-namokun Internet tools, a rental computer service, easy-to-understand curriculums, NPO support center, e-learning and e-community systems. Such solutions are viewed as key processes because a convenient support and learning environment can have a significant impact on whether users will maintain their interest in using computers and the Internet.

The project is a joint government (Lifelong learning department of Nagoya city), universities (Nagoya University and Chukyo University), and NPO cooperation (IT Eco-cycle Initiative), which is a first for Japan. These team cooperation structures are shown in Figure1. In this project each member has their own task and they belong to each committee, such as promotion committee, diffusion committee, and technical committee. Each committee member has meeting and discuss each topics once a month.

Table1: Obstacles for senior citizens to use PC and solutions of e-namokun

Obstacles for senior citizens to use PC	Solutions of e-namokun
Age-related attributes (eyesight, movement, etc.)	Easy-to-used Internet tools Easy-to-understand courses
PC's price is too high	Recycle PC rental service
No purpose to use PC	Learning community
Dissatisfaction with place of study environment	E-Learning system
Dissatisfaction with the existed support methods	NPO support center Total support platform Remote IT support

* e-namokun: is the name of software we developed. It was named from the dialect in Nagoya city which means “nice tool”.

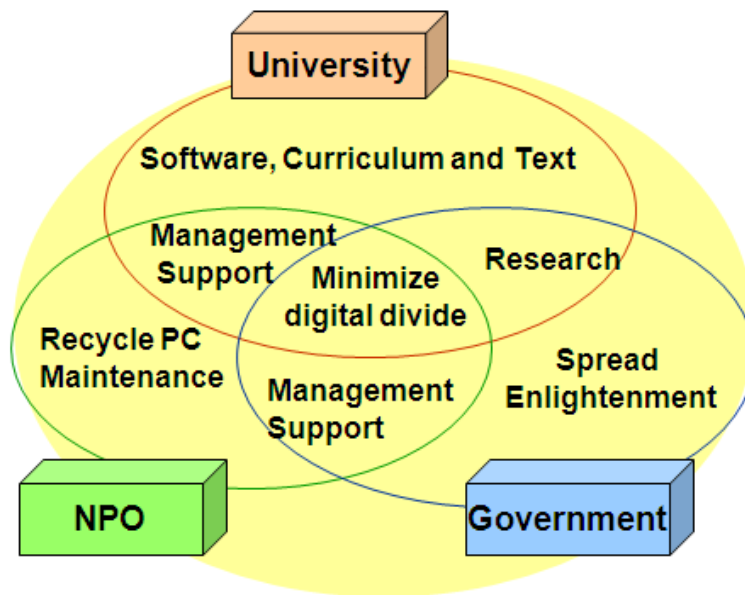


Figure1: Organization structure

Software development

Current Internet tools and websites are very hard for seniors to use. So a set of simple, user-friendly Internet tools named e-namokun software (Sasaki et al., 2005; Iribe et al., 2005; Goto et al., 2006) for senior beginners was developed. The e-namokun software enables access to the Internet and email features solely through using the mouse without having to use the keyboard. The developed software include: directory web

search system, web mail system, software keyboard system and mouse practice software. The interface designs are shown in Figure 2.



Figure2: Interfaces of e-namokun software

(Authentication, e-mail, categorized web search, and software keyboard for Japanese character input, respectively)

1. The user interface design

According to ISO9241, usability means “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use”. We obeyed the usability design policy, as well as according to Nielsen’s usability definition, which has five main aspects of usability: learnability, efficiency, memorability, errors and satisfaction. Next, we offered three design policy areas taking these three aging characteristics into consideration: visibility improvement, operational improvement and consideration of the cognitive correlates, which are:

(1) Visibility improvement

To improve visual interface, character sizes, buttons, and the expanded cursors are designed to easy to understand. Although changing the color of character and background is often enough, moreover, we made the color of the button change when the cursor passes over it, which incorporates visual feedback into this operation.

(2) Operational improvement

We made complex operations and functions easier to operate. To avoid mis-operations, we put more intervals between buttons, and enabled scrolling and character extension operations in a single click. We created a single window to avoid complex operations such as return and window movement.

(3) Consideration of cognitive correlates

This aims toward a simple interface. We reduce operations to only the minimum necessary functions, and limit the function buttons to eight. Function buttons are Internet top, back one page, character size (big), character size (small), favorite, search, help, and close. The depth hierarchy is three, and the width is nine including the favorite, in light of magic number 7 ± 2 . Moreover, the “topic path” appears so that users will not lose their way while browsing. In addition, we replace technical terms with familiar expressions.

2. Experiment and achievement

For those who wish to use the e-namokun software, courses on software use have been held at 16 local Lifelong Learning Centers in Nagoya city wards since October, 2005. Software and training materials have been available for purchase for 500 yen since January 2006. The e-namokun course throughout Nagoya City by a PR brochure was publicized, and the project also received coverage in the newspapers and on the televisions. During 2006-2008, about 2000 seniors have received the education course in lifelong learning centers in Nagoya. This highlights the level of demand from senior citizens for this kind of learning environment (Figure 3). Most of the participants of the course in lifelong learning center are over 60 (94%). According to the sampling study of e-namokun users, about 75% users are satisfied with this software and the rest feels this software has not enough functions. Only about 5% participants answer difficulty of learning. From these results e-namokun system has a good reputation from internet beginner senior citizens.



Figure3: Learning course at lifelong learning center

Development of new version software: e-namokun browser

Through three years of education and software providing, it has been evaluated its usefulness. However, because it is a web based tool, the user registration and maintenance of server (mail service, authentication service, etc.) is becoming difficult for local government because of the heavy cost. Now, we are developing a revised version of the “e-namokun” software. The merits of the new version are as follows:

1. It doesn't require server computers.
2. Authentication of users is not needed.
3. User registration is not necessary.
4. It can be used everywhere in Japan (in the world) by downloading from some certain web sites.
5. Through the use of about three years, the reliability of the software was verified.

This new version has web browsing function without e-mail function only. Instead, users can use commercial web mail service through the new e-namokun browser. The new version is being developing and it will be opened from 2009.

DEVELOPMENT OF KEYBOARD LABELS AND LEARNING COURSE FOR SENIOR BEGINNERS

Many senior users can learn “e-namokun” software mentioned above which provides a good tool for senior IT beginners. However, after they mastered the e-namokun software, they wanted to learn keyboard input for more fast operation of their PC. The ordinary keyboard composed of keys on which small characters arranged and it is very difficult to learn key positions especially for senior users. So we developed a set

of seals to paste on key tops. They are used to display single emphasized character on each key top depending on the frequency of characters. In addition, we developed keyboard labels for functional keys to denote each function directly. We developed two kinds of seals: Japanese Roman and Hiragana (a Japanese character input method) (Yamauchi et al., 2007).

Seal for Japanese Roman

Basically, frequently used letters are emphasized by marking or coloring. “A I U E O” are the vowels of the Roman for Japanese sound and most frequently used characters. They are emphasized by the “○” marking. “S T N H M Y R W” are characters to represent resonant sounds in Japanese Roman. They are frequently used after the vowels. These characters are emphasized by blue colors. “G Z D B” and “P” are characters for dullness sound and represented by green colors “N” and “Y “ are used for special sound in Roman and emphasized with mark. Seals for function keys are also designed. The function keys are especially difficult to learn for seniors so we designed Japanese character seal to show the functions directly in Kanji (Chinese characters used in Japan).

- “上段・SHIFT” is for displaying Shift key to show input of upper characters.
- “変換・空白” is to show the key for conversion and space.
- “前文字削除” is to denote BACKSPACE key to show deleting the forehead character.
- “確定改行” is to denote the function of “Enter key” to represent confirmation or line break.



Figure4: The keyboard seal for Japanese Roman



Figure 5: Key top characters to denote functional keys

Seal for Japanese Hiragana

We also developed a seal to display Japanese Hiragana characters as shown in Figure 6. This is for elder people who have not learned alphabet characters or Japanese Roman. The seals for function keys are also used in this case.

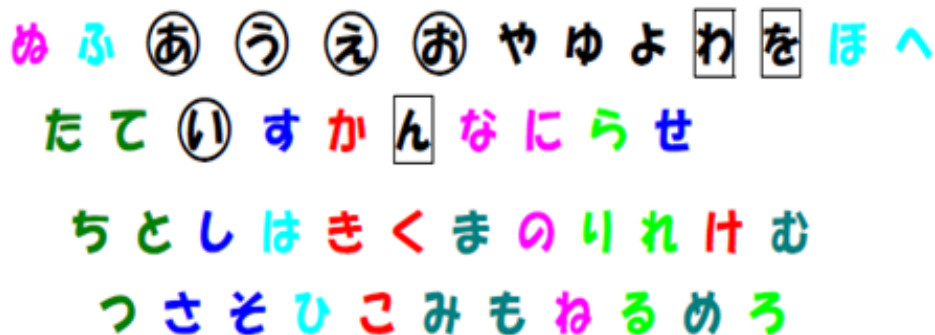


Figure 6: The keyboard seal for Japanese Hiragana characters

Proposal of an introductory course of IT learning for senior beginners

We developed the e-namokun software and keyboard seal. Based on these new support tools for seniors, we proposed a fundamental learning course for senior beginners. The course consists of 6 elementary steps, and each step is given 1 hour learning. Totally 6 hours course is designed, which are listed in Table2.

Table2: Fundamental learning course for senior beginners

1	Mouse operation	Learning of mouse operation based on the learning software
2	Character input	Practice of inputting letters by e-namokun software (or revised version)
3	Web browsing	Web viewing and searching by e-namokun software (or revised version)
4	E-mail	Learning of web mail service (such as Goo mail) through e-namokun software
5	Keyboard operation with seal	Characters input practice with WordPad software by using keyboard seal described above
6	Making a document and printing	Practice of picture drawing with Paint software and built-in it in the document of WordPad

The proposed course includes basic techniques for PC and Internet beginners based on easy used software. The course includes fundamental process of IT learning so that it can enable senior beginners learning elementary IT skill as the first step.

REMOTE IT SUPPORT EXPERIMENT

Many senior novices ask questions and support about PC or software troubles by telephone provided by NPO support center (Zhou et al., 2006, 2007). However, by the telephone support, questions on visual interface or learning of practical operations for software may not be convenient for users. Most novices worried that when talking over the telephone, it may not be possible to clearly describe the problems they encountered, so that it becomes more difficult for operators in the telephone support center to understand what users mean. Therefore, we think that besides existing support methods (telephone) that the support center provided, a “remote IT support” method may be more efficiently and useful for novices, which not only solve users IT problem quickly, but also improve senior citizens’ Internet literacy and their ability through completely solving process. We named the remote IT support as e-RemoSupp (Figure 7)

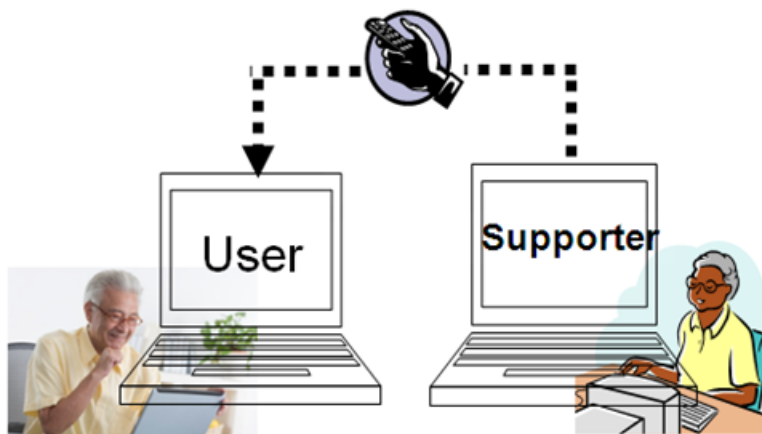


Figure 7: Image of e-RemoSupp

e-RemoSupp's features

The e-RemoSupp we have proposed has the following features:

1. In cooperation with IT volunteers and NPO groups

The e-namokun project focuses on working in cooperation with NPO IT groups who are playing an important role in local communities. Our research and social activities get a lot of valuable advice and direct supports from IT volunteer groups. In the e-RemoSupp experiment, Aichikyu club, which has nearly 30 IT volunteers (all of them are retired senior citizens) give us more supports and cooperation.

2. Using existed remote control software

There are many software tools specialized in remote access and control, file transfer, instant connectivity and communication. By using existed remote control software tools, volunteers can access to senior user's home PC virtually anywhere then do instruct and support work. There are many kinds of software so we must select suitable products and solutions for them. We discussed with volunteers about their support demands then decided the software selection principles: (1) easy to use, (2) having necessary functions, and (3) low usage fees. Based on these selection principles, 4 types of solution were decided (Table3).

Table 3: Classification and example tools

Classification	Example tools
Type1:Multi function type	Laplink, RemoteCall
Type2:Simple function type	LogMeIn, VNC tool
Type3: Communication type	MSN with remote assistant, Skype with VNC tool
Type4:Remote instructing type	MSN, Skype

Experiment results and conclusion

The remote IT support experiment started from December 2007 to March 2008 and 6 IT volunteers have participated in the experiment. They exchange information and report the experiment process by mailing list and lecture meeting. During the period, 132 pieces of e-mail have been transferred to sharing their activity information and 5 lecture meeting (about 2-3 hours for each meeting) have been done. Participants are from 60 to 80 years old, 3 of them have rich IT teaching experiences, others have not higher computer skills. During the experiment, they were divided into 3 fixed groups, provided support and received support peer to peer. They used the remote software tools listed above in their homes, where ADSL and NTT fiber are mainly used to connect to the Internet. They get private IP address from their Internet providers. In order to give them a better experiment environment, we provided 6 sets of device, including a recycle computer (Mobile computer, Windows 2000, service pack 4, hard disk: 20G), a sound and microphone set, and a web live camera.

During and after the experiment period, we collected participants' usage experiences and their attitudes to the experiment. All of them agreed that remote support method is a very important and necessary method to support senior, especially novices, to solve the problems and questions in computer usage and learning process. Meanwhile, participants give us many advices about how to effectively use the services. We have discussed essential issues: functions, cost, usability, Internet environment, security and reliability, and quality of support to direct how to implement the remote IT support successfully by NPO group and volunteer level in social IT promotion activity (Zhou & Yokoi, 2008).

WEB BASED LEARNING SYSTEM FOR SENIOR CITIZENS

Due to the rapid expansion of the Internet, the style of senior citizens' learning has changed from the traditional face-to-face classroom to blended learning that mixes both traditional and online learning methods, such as web based learning. But e-learning for

senior citizens is different from one implemented in universities and companies, where learners can be subjective while having clear objectives. Since IT learning of senior citizens is not compulsory, learners might not always have clear objectives. It is important to help learners easily choose and join learning activities and promote their IT learning motivation, so besides of learning function, community function is another important element among learners and teachers. In the e-namokun project, an experimental system of web based learning for senior citizens is being developed which aims to:

1. Provide an efficient teaching/learning environment,
2. Share teaching materials and experience among teachers from different NPOs, and
3. Promote communication among senior learners to keep their learning motivation.

Moreover, unlike company and university which have more funds to buy commercial e-learning systems, for NPO organization low cost is necessary. So the system is built by using open source: Moodle, an open source software package for producing Internet-based courses. It is a world-wide ongoing development project designed to support a social constructionist framework of education. The developed web based learning system named “e-citizen-school” (Figure 8), which has the following features:

1. E-learning contents for senior citizens

E-learning contents which fit senior citizens interests are investigated and selected. Teachers from NPO groups who have much IT teaching experiences are also interviewed on how to provide interesting course for learners.

2. Promoting communication among senior citizens

There are many community sites in Japan for senior citizens, but not many for learning purpose. The system provides many learning and communication activities such as: chat, discussion by forum function, collaboration and group work by wiki, question/answer by questionnaire and quiz functions and so on.

E-citizen-school is developing and the study is ongoing. We are preparing a course named “Introduction of useful free soft”. After the completion of the course finished, some experiments will be done to determine which elements are necessary to promote their learning motivation and learning effect.

The screenshot shows the interface of the 'e-citizen-school' website. At the top, there is a blue header with the site name 'e-市民学園' and the date '2009/03/06'. Below the header, there are several sections:

- Login Section:** Includes fields for 'ユーザ名' (username) with 'admin' and 'パスワード' (password) with '*****', and a 'ログイン' button. Below it, there are links for '新しいアカウントを作成する' and 'パスワードを忘れました?'.
- Main News Section:** Titled 'サイトニュース', it contains a post from 2009年02月07日 (Saturday) 19:01 by 前川 征一. The post is about a course starting on February 7th and mentions a problem where reply emails from '管理ユーザ' (management user) are being sent to '迷惑メール' (spam mail) folders. It also includes a 'コースへ' (to course) link and a note about using photos for the course.
- Calendar Section:** A calendar for March 2009, with the 2nd of the month highlighted in red.
- Other Sections:** There are sidebars for 'e-市民学園について' (about the site), 'コースカテゴリ' (course categories), and '関連リンク' (related links).

Figure 8: Interface of “e-citizen-school”

CONCLUSION

In the paper, we report a project named “e-namokun”, which is an information promotion project to help senior citizens with little or no IT experience, to use computers and the Internet. Several support methods, such as use of software, keyboard seal, course, remote IT support, and web based learning, have been planned and implemented. Many significant studies have been done and are ongoing. With the Information technology and application development, some useful system and studies will be discussed and developed in the near future in the project.

ACKNOWLEDGMENT

We would like to thank all people connected to the e-namokun project, especially the City of Nagoya, the Nagoya Urban Industries Promotion Corporation, Aichikyu club, and the IT promotion Agency of the eco-cycle NPO.

REFERENCES

- Iribe Y., Sasaki K., Endo M., Yasuda T., & Yokoi S. (2005). Design of an introductory Web mail system for senior citizens. *Information and Systems in Education*, 4(1), 45-53.
- Goto M., Zhou W., Yasuda T., & Yokoi S. (2006). Directory Web Search System for Senior Beginners: Local Project of Developing an Easy-to-use Web Software for Senior Citizens. *Proceedings of International DSP Invitation Contest*, Taiwan.
- Sasaki K., Iribe Y., Goto M., Endo M., Yasuda T., & Yokoi S. (2005). Simple Web Mail System That Makes the Best Use of the Senior Citizens Social Experience. *Proceedings of the 9th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES2005)*, Australia.
- Yamauchi A., Yasuda T., & Yokoi S. (2007). Proposal and Pilot Study of Introductory Learning Course in Personal Computers for Senior Citizens. *Proceedings of the 2007 TLC conference proceedings*, USA.
- Zhou W., Yasuda T., & Yokoi S. (2006). E-namoSupport: A Web-based helpdesk support environment for senior citizens. *Proceedings of the 2nd International Conference on Web Information Systems and Technologies (WEBIST)*, Portugal.
- Zhou W., Li W., Yasuda T., & Yokoi S. (2007). Supporting senior beginners using the Internet: Implementing a Web-based helpdesk system and a case analysis in an NPO support center. *Proceedings of IADIS International Conference Web Based Communities (WBC2007)*, Spain.
- Zhou W., & Yokoi S. (2008). A Study of Remote IT Support by IT Volunteer Group for Senior Citizens. *Proceedings of the 13th annual conference of The Japan Society for Socio-Information Studies (JSIS)*, Japan.