E-NAMOSUPPORT: A WEB-BASED HELPDESK SUPPORT ENVIRONMENT FOR SENIOR CITIZENS

Wei Zhou, Takami Yasuda, Shigeki Yokoi
Graduate School of Information Science, Nagoya University, Japan

Keywords: Helpdesk, Lifelong learning, Frequently Asked Questions, Information Cycle Model.

Abstract: This study aims to track the development of a helpdesk support environment -- E-namoSupport -- to solve digital divide between seniors and other generations. This is one part of the E-namokun project, an information promotion project started in Nagoya city, Japan. E-namoSupport is a helpdesk system that has the following characteristics: (1) unlike general helpdesk systems, which generally only cover one organization, E-namoSupport has been developed through joint government, university, and NPO cooperation; (2) users are senior citizens with little or no PC experience; (3) its aim is not only to solve problems or answer questions, but also helping senior citizens learn more computer knowledge and further their computer skills. In the E-namoSupport environment we have developed four subsystems: a case trace system (CTS); a consultation management system (CMS); an FAQ System (FAQS); and an FAQ analysis system (FAQAS). We propose an information cycle model that efficiently manages information flow in the four subsystems as well as in organizations. We take senior citizens' attributes into account using a set of quizzes that help operators describe enquiry cases and make conversation flow more smoothly. We also design an easy-to-use interface and functions that help users access FAQS. Moreover, we develop E-namoSupport as a learning environment, providing suitable learning contents by analysing users' interests and needs, which helps users to improve their IT abilities of and enjoy life in the information age.

1 INTRODUCTION

Although the availability of personal computers to senior citizens has increased, this availability is lower than for other generations. A recent survey (MPHPT, 2003) 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 15%. This remarkable gap has been a cause for considerable concern. To combat this digital divide, in 2004, the easy-to-use E-namokun project, which aims at bringing more people, especially senior citizens, in touch with the information age by providing simple Internet (Masato, 2005) and email (Kiichirou, 2005) tools, was been started in Nagoya city. The project was developed through joint government, university, and NPO cooperation, which is a national first.

In order to encourage more senior citizens to enjoy the project, several help and support methods have been planned and implemented. Courses on the use of E-namokun software were held at each ward's Lifelong Learning Center; special consultation rooms have been set up in two wards' Lifelong Learning Centers, providing face-to-face consultation for those using computers or the E-namokun software. Furthermore, a call center was set up to provide installation, utilization, and certification support, and other help for E-namokun software users. Such supports are viewed as key processes because the level of user satisfaction has a significant impact on whether they will maintain their interest in using computers.

As the importance of customer support is widely recognized, helpdesk systems are becoming more popular. In this context, we developed an enhanced web-based helpdesk-support environment called E-namoSupport, which has four subsystems including a Case Trace System (CTS) for call center, a Consultation Management System (CMS) for consultation rooms, an FAQ System (FAQS) for users, and an FAQ Analysis System (FAQAS). Together, these provide an integrated and extensible platform that transforms the user service support into

Zhou W., Yasuda T. and Yokoi S. (2006).
E-NAMOSUPPORT: A WEB-BASED HELPDESK SUPPORT ENVIRONMENT FOR SENIOR CITIZENS.
In *Proceedings of WEBIST 2006 - Second International Conference on Web Information Systems and Technologies - Society, e-Business and e-Government / e-Learning*, pages 29-36
DOI: 10.5220/0001239000290036

an effective and efficient service that meets senior citizens' requirements and offers them satisfaction.

The rest of the paper is organized as follows. In section 2 we discuss related work; section 3 describes E-namoSupport features; section 4 describes the architecture and information cycle model; and section 5 shows the four subsystems. In section 6 and 7 we offer some conclusions and discuss both our present and future works.

2 RELATED WORK

Currently there is no hard and fast definition of the term 'help desk,' however its name implies a basic function of being a source of information or action on demand, to aid the caller in carrying out a given task. The Gartner group's definition of the help desk's mission (R.C.Marcella, 1996) is to provide a single point of contact and responsibility for rapid closure of end-user's problems.

With the advent of web technology that can provide dynamic, interactive, platform independent, and distributed services, operators and supporters can access online knowledge databases to track cases and provide answers; users can ask a question and get suitable solutions via any web browser. Web-based help desk systems provide several key functions that organize helpdesk activities into single web-based applications that can be accessed and maintained through a web browser. A number of web-based helpdesk products are popularly used in enterprises. For example, WebHotLine (S Foo, 2002) is designed and developed as an intelligent helpdesk environment in a large multinational corporation with major functions including fault information retrieval, online multilingual translation capability, different operating modes of video-conferencing, and direct intelligent fault diagnosis. NTT Inc (Kuwata, 1998) suggested an automated follow-up service for help desk customers, which identifies customer interests from their queries and automatically sends related Q&A information back to the customers.

In the field of education, some universities create their own help desks based on the FAQ style. For example, the State University of New York (Sandra, 1992) has an automated help desk system to answer student questions. FAQ share systems (Huu Le Van, 2002) aim to optimize the student-teacher interaction and evaluate learning effectiveness. These cases have been used in educational environments.

Currently, there are some commercial FAQs available for senior users, visually handicapped people, and novices, such as IBM and Fujitsu, which adopt easily accessed interfaces that take into consideration the difficulties users face when using computers.

Also, there are several relevant studies that examine the use of help desks. For example, Christine evaluates how shifts in management, organizational structure, incentives, software technologies, and other factors affect the development of help desk systems in a large organization (Christine, 2004).

3 THE FEATURES OF E-NAMOSUPPORT SYSTEM

All of the above mentioned help desk systems have two major goals -- to make the best use of the customer information gathered and to provide the best service quality. Our goals are as the same as these; moreover, because E-namokun project's organizations and users differs from general systems, the E-namoSupport helpdesk support system has some additional features, which are listed below:

(1) Information cycle in multiple organizations.

The E-namokun project was developed through joint government, university, and NPO cooperation, which was a first for Japan. Therefore, unlike general helpdesk systems that assist only one organization, the E-namoSupport system is used by multiple organizations. Our main tasks have been related to how to gather information from different parts and how to retrieve, reuse, and retain information. We proposed an information cycle model that processes information gathering, information publishing and information analysis among these organizations.

(2) Design for senior citizens.

Our users are mainly senior citizens and almost all of them are computer novices. When these users encounter a problem and call the operator, most of them cannot describe the problem in detail. In order to help operators describe enquiry cases correctly and in detail, we designed a set of case items to make conversations between the operator and the user run more smoothly. Further, in consideration of senior citizens' age-related attributes, we designed an easy-to-use interface with enlarged characters, buttons, and pointers, simplifying the operations,

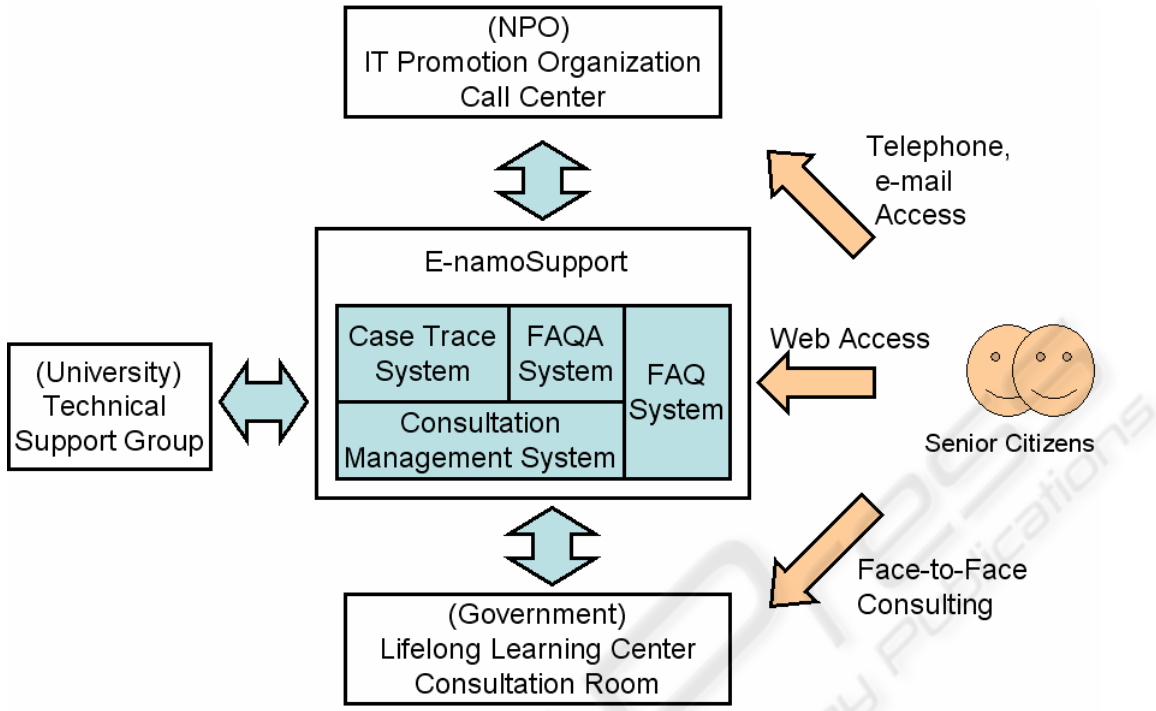

Figure 1: Overview of E-namoSupport Environment.

providing easily understood contents, and avoiding the use of technical terms.

(3) Learning content provisions.

Our aim is not only to answer questions and provide solutions to problems; we also aim to help senior citizens learn more computer knowledge and improve their IT abilities, helping them enjoy their lives in the information age. By analyzing the FAQ accessing status, we can understand senior citizens' learning needs and interests; based on this information, we can provide suitable learning content.

4 OVERVIEW OF THE E-NAMOSUPPORT SYSTEM

4.1 Structure of the E-namoSupport Environment

Before showing our system, we should first describe the duties and relationships of organizations in the E-namoSupport environment. As shown in figure 1, there are three types of organizations: a local government, two universities, and an NPO. Their duties are listed below:

- (Government) Local Lifelong Learning Center:

Local lifelong learning center in Nagoya city sets up special consultation rooms in ward lifelong learning centers to provide face-to-face consulting services for senior citizens. Consultants exchange information with each other, cooperate with the call center to get case solutions if they cannot resolve them alone, and give advice to help the call center create FAQ contents.

- (University) Technical support group:

The technical support group at Nagoya University and Chukyo University takes charge of technical and system support, including E-namoSupport maintenance and solving technical problems coming from the call center.

- (NPO) IT promotion organization:

The IT promotion Agency of the eco-cycle NPO, short for IT promotion organization, establishes the call center to provide support service through telephone and email, 8 hours a day, 5 days a week, as well as developing the FAQ system that users can access anytime via the Web. It manages user personal data, traces enquiry cases, answers and solves problems, asks for technical help from

technical support group, gathers enquiry cases from the consultation rooms, creates the FAQ documents and publishes them, analyzes the FAQ accessing status, and so on.

We developed four subsystems, including the consultation management system (CMS) for consultation rooms, the case trace system (CTS), the FAQ system (FAQS), and the FAQ analysis system (FAQAS) for the call center.

The E-namoSupport environment offers total support to users: telephone and mail support from the call center, face-to-face support from the consultation room and problem solving by the users themselves using the FAQs on the Web.

4.2 Information Cycle Model

We built an integrated information cycle flow that not only covers the organizations but also uses information gathered during the fulfillment of a problem, resolving to improve effectiveness and efficiency. The representation of the subsystems' relationships and the information processes are described in the information cycle model shown in figure 2, which stresses the importance of an interconnected and integrated flow of information.

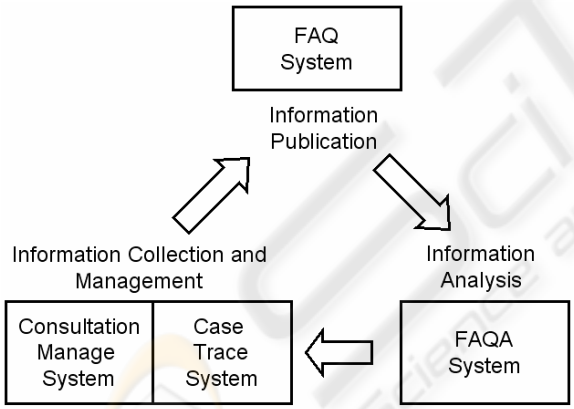

Figure 2: Information Cycle Model.

First, enquiry case information is gathered and managed by CTS and CMS. The call center's operators turn the well-organized case information into FAQs and then publish them. FAQAS monitors and collects users' FAQ access information and analyzes and reports the results. Based on these analysis data, operators adjust the case information, add necessary case, and modify the FAQ contents to meet and reflect users' needs and interests.

5 SYSTEM CONFIGURATIONS

There are 4 subsystems in E-namoSupport environment. In this chapter we describe their functions and characteristics in detail.

5.1 Case Trace System (CTS)

The case trace system (CTS) used by the call center allows operators to input, retrieve, search, and deal with enquiry case information accessed by telephone or email. In order to process cases efficiently, we set five-status marks to each case: new, confirming, answer-waiting, calling back, and closed, as shown in figure 3.

When operators add a new case, the case's status is "new". After they finish dealing with the case, its status is changed to "closed". When the operators are in the process of solving the case, the case's status is "confirming". If the operators cannot answer the case and they dispatch it to the technical support group, the case status is set to "answer-waiting". After they receive an answer from technical support group, the operators then call back to the user. If the user cannot be contacted, the case status is set to "calling back".

Every case is marked as being one of five statuses, so it can be easily located and managed. Each operator can retrieve, trace, and deal with other operators' cases, so that each case can be dealt with in a smooth and timely manner.

Our users are mostly computer novices, who do not know even basic technical terms. When they encounter a problem and call the operator, it is difficult for them to describe the problem in detail; usually they can only say "It does not work", "It turns dark", "A strange window appears" and so on. In order to help operators describe a case correctly and in detail, we designed a set of case items and quizzes to make the conversation between operator and user run smoothly. The relationship between the quizzes and items are shown in table 1. Talking with users while using these quizzes, the operator can easily get useful information then input the case item.

Figure 4 shows the case process interface. The top of the interface is a set of buttons to let operators change the case's status; the bottom of the interface is the log list, which records the change process of the case. The middle of interface shows details of the case.

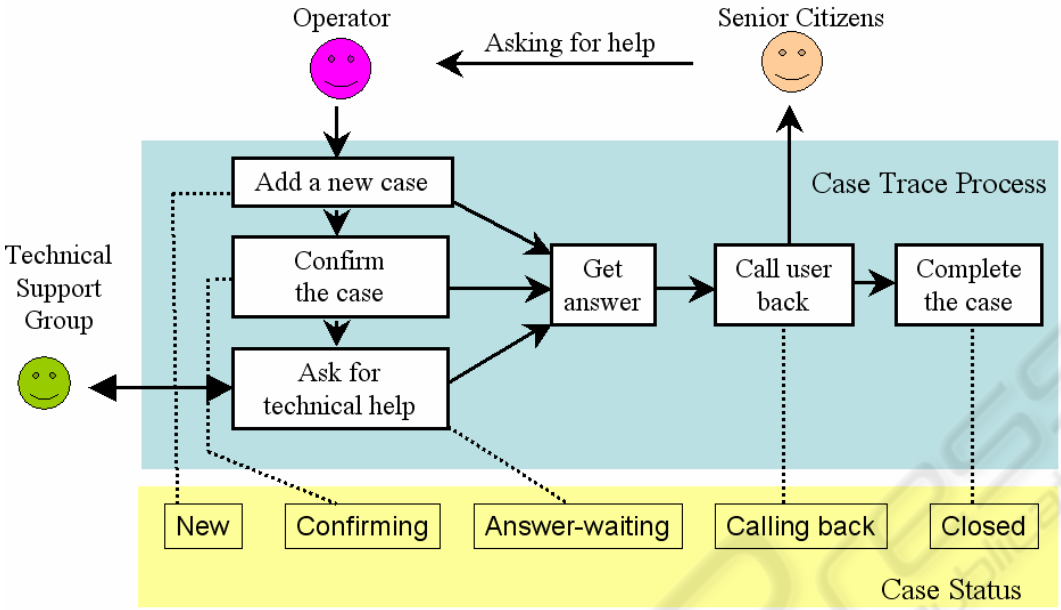

Figure 3: Case Process Flow and Five Statuses.

Table 1: Quizzes and Case Items.

Quizzes	Items
Can you tell me what current interface you are using?	Category, Inquiry Info
Can you move your mouse and see your pointer moving on screen?	Inquiry Info
Is there any error message showing on the screen?	ErrMessage
What did you do after the problem occurred?	ErrMessagedo
Can you tell me PC's maker, software version or other information? If you do not know how to find them, I can tell you…	OSVer, E-namoVer, Hardware, Maker
When do you want us to call you back and what is your contact phone number?	Emergency, UserInfo, Contact Info

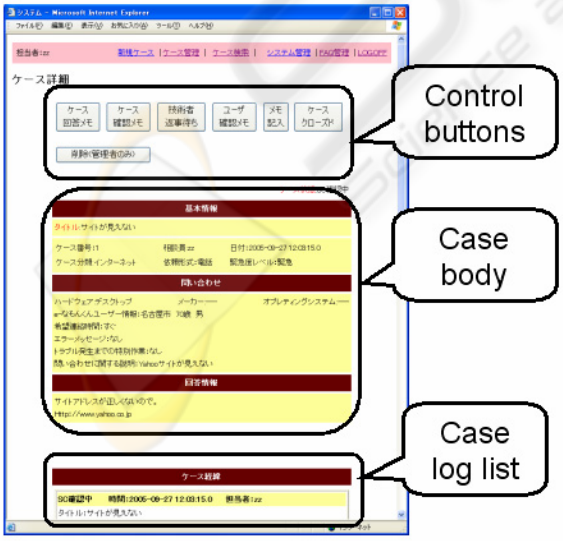

Figure 4: Case Process Interface.

5.2 Consultation Management System (CMS)

Two lifelong learning centers at a ward level have established special consultation rooms to provide a face-to-face consulting service for E-namokun users. Consultants are not full-time staff but rather volunteers who work in their spare time. In order to exchange and utilize consultation case information among the consultants to improve their consulting abilities, we developed the consultation management system (CMS).

Similar to the enquiry case, the consultation case has 4-status marks: new, answer-collecting, commenting, and closed. Through CMS, consultants can exchange their opinions; comment and offer feedback to others, and ask for solutions. The system can enrich consultants' knowledge and strengthen their problem solving skills.

Figure 5: FAQ Interface.

5.3 FAQ System (FAQS)

By providing FAQs on the Web, we aim to train users and improve their problem solving abilities. We developed the FAQ system not only as a support method, but also as a learning platform. We choose suitable learning content that will satisfy user needs. We also designed the interface and functions taking into consideration those physical attributes affected by the aging process.

5.3.1 Learning Content

The FAQs come from cases produced by CTS and CMS. All are "closed" status cases that relate to issues frequently asked about by users. To provide suitable contents, we consider two content select criteria:

(1) Content should satisfy users' interests.

(2) Content should satisfy what users want to learn.

From FAQAS, we can get the statistics and analysis information required to grasp users' interests and needs. Based on these, we adjust the FAQs by adding contents, modifying content categories, and adjusting difficulty levels to provide highly relevant knowledge for users.

5.3.2 Interface and Function Design

Current websites are twice as hard for seniors to use as they are for younger users (Coyne P. K., 2003). In relation to the attributes of the aging process, "eyesight," "precision of movement," and "memory and understanding" typically deteriorate (Coyne P. K., 2003). If we don't consider these attributes when designing guidelines for seniors, they will not use the system. We follow the design guidelines (Mari Fujiwara, 2005) listed below in order to make websites easier to use for seniors:

(1) Visibility improvement

We enlarged the size of the characters, buttons, and pointer, and set the color of character and background to be easily distinguished. Moreover, the color changes when the user clicks a button, so users can confirm the operation immediately.

(2) Operation improvement

To avoid missing an operation, we put more intervals between the buttons, and scroll-movement is replaced by button-click. Complex and multi operations are simplified by a single click. To avoid a situation where the user misses the focus, we don't use pop-up windows.

(3) Consideration of Cognitive Factors

We aimed for a simple interface including only the necessary minimum functions and limited the quantity of buttons to 8, the hierarchy of depth to 4, and the result list to 10. Moreover, the "Topic Path" is always shown on the top of the main body so that the user will not lose their way while browsing. In addition, we replace technical terms for familiar expressions.

To access FAQ easily we define a button named "when in trouble" embedded in the E-namokun software. When the button is clicked, the FAQ site appears. The FAQ interface is shown in figure 5. The left one is the top of the FAQ pages and the right one is the FAQ list result searched by users.

5.4 FAQ Analysis System (FAQAS)

The main aim of FAQAS is to determine senior citizens' information needs:

(1) Identify the types of information which are of most interest to senior citizens.

In the FAQ system, we set a counter when accessing each page, so we can see which content is more popular and which functions are used most frequently. FAQAS analyses this counter data and reports it in a graph or table (see Figure 6).

(2) Investigate the willingness of senior citizens to learn.

In the FAQ system there is a search function by which users can enter words to find information they want. We analyze the inputted words and record each word's frequency. If the inputted word doesn't appear on the result list and the inputted word's frequency exceeds the normal value defined beforehand, FAQAS will notice it and create a users' learning needs report, which can help to find holes in the FAQ content.

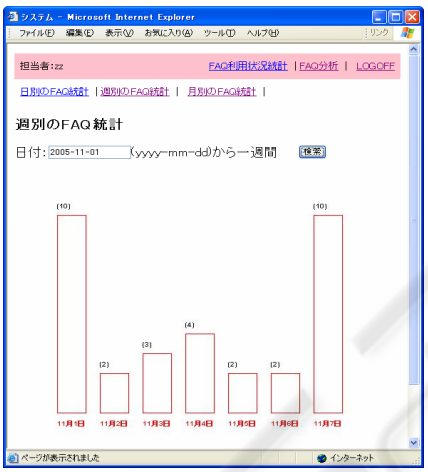

Figure 6: FAQ Access Statistics Interface.

6 CURRENT WORK AND EVALUATION

The E-namoSupport is a part of the E-namokun project, which is an information promotion project to help bridge the digital divide for senior citizens. In order to allow more senior citizens enjoy the project, other than the use of the E-namoSupport environment, other support methods such as short courses, text support, and hardware support, providing recycled PCs for free have been implemented.

E-namokun short courses began running in the local lifelong learning centers of wards in Nagoya city from September 2005 and will be held until March 2006. These courses were publicized to senior citizens throughout Nagoya City through public brochures, and also received coverage in the newspaper and on television. As a result, more than 2,000 seniors applied to join the courses, although the capacity was only 600 places. The teaching scene in the E-namokun course is shown in figure 7. This highlights the level of demand from senior citizens. This also highlights demand and the need to increase the availability of computer education and support for senior citizens.

Figure 7: E-namokun Course Scene.

Figure 8: Scene depicting use of E-namoSupport System by call center operator.

We are now implementing the E-namoSupport system beginning from November 2005. A scene depicting the use of the E-namoSupport system by a call center operator is shown in figure 8. Call center operators are using the CTS for their daily case process work and about 10-20 cases are managed every day. We have obtained operators' comments. They expressed that the system is an effective system to input, retrieve, search, deal with enquiry case information and easily turn the case into FAQ.

We are collecting the evaluation results, which we get in two ways: (1) questionnaires about satisfaction levels related to the interface, function and content provided by call center operators, consultants from the consultation room and end users; (2) FAQAS analysis data, from which we get access frequency, interest levels and learning needs. In the future we plan to improve our system based on the experiment results and extend system functions by increasing the support service's range.

7 CONCLUSIONS

In this paper, we described a helpdesk support environment -- the E-namoSupport -- for computer beginner with a special emphasis on senior citizens. Unlike general helpdesk systems, E-namoSupport proposes an information cycle model, which integrates information among three types of organizations and four subsystems: the case trace system (CTS) for call centers, the consultation management system (CMS) for consultation rooms, the FAQ system (FAQS) for users, and the FAQ analysis system (FAQAS). E-namoSupport considers users with little or no computer experience by using a set of quizzes to help describe enquiry cases. Seniors' attributes were taken into consideration when designing the easy-to-use interface and functions. Moreover, E-namoSupport is not only a support environment but also a learning environment that provides suitable learning contents by analyzing users' interests and needs.

ACKNOWLEDGEMENTS

We thank Li Yi, who has a lot of practical experience in working as helpdesk operator in a large international enterprise and who gives us useful advice in the design of the E-namoSupport system.

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

This research was partially funded by Nagoya Urban Industries Promotion Corporation Joint Research, and Grants-in-Aid for Scientific Research -- 21st century COE program "Intellectual integration (IMI) of the voice images for the social information base" of the Ministry of Education, Culture, Sports, Science and Technology, Japan.

REFERENCES

MPHPT Survey (Ministry of Public Management, Home Affairs, Posts and Telecommunications, Japan) Communications usage trend survey. (2003). Retrieved August 10, 2005, from http://www.soumu.go.jp/s-news/2004/pdf/040414_1_a.pdf.

Masato Goto, Mamoru Endo, Takami Yasuda, and Shigeki Yokoi. (2005). Web Search System and Learning Environment for Senior Citizens. *Digital Learning, CSDMS India*, Vol.1 No.1, pp24-26.

Kiichirou Sasaki, Yurie Iribe, Masato Goto, Mamoru Endo, Takami Yasuda, and Shigeki Yokoi. (2005). Simple Web Mail System That Makes the Best Use of the Senior Citizens Social Experience. *The 9th International Conference*, *KES 2005, Melbourne, Australia*, pp.1274-1280.

R.C. Marcella and I. Middleton. (1996). Key factors in help desk success. *BLR+DD Report* No.6247, from British Library.

S. Foo, S. C. Hui, and P. C. Leong. (2002). Web-based intelligent helpdesk-support environment. *International Journal of Systems Science*, 33 (6), pp 389-402.

Kuwata Yoshitaka, Yatsu Masashi, and Koizumi Nobuo. (1998). An Automated Follow-up Service for Technical Support Help Desks. *IPSJ technical reports*, Vol.1998, No.080, pp 43-48.

Sandra L. Peters. (1992). Setting up and automating a help desk: the first year of operation. *ACM SIGUCCS*, pp 187-191.

Huu Le Van and Andrea Trentini. (2002). FAQshare: a frequently asked questions voting system as a collaboration and evaluation tool in teaching activities. *SEKE 2002*, pp557-560.

IBM Accessibility Center, Retrieved August 18, 2005, from https://www-06.ibm.com/jp/accessibility/main.

Fujitsu, Rakuraku product support.
Retrieved August 18, 2005, from http://www.personal.fujitsu.com/products/support.

Christine A. Halverson, Thomas Erickson, and Mark S. Ackerman.(Nov.2004). Behind the help desk: evolution of a knowledge management system in a large organization. *CSCW'04*, pp304-313.

Coyne P. K. and Nielsen J. (2003). Web Usability for Senior Citizens: Design Guidelines Based on Usability Studies with People Age 65 and Older. *Nielsen Norman Group Report*.

Mari Fujiwara, Takami Yasuda, and Shigeki Yokoi. (2005). Usability Design of Introductory Web Browsing System for Senior. *Master's thesis, Nagoya university, Japan*.