

# Older Adults and Computer Usage: Common Activities and Essential Applications

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## ABSTRACT

The global aging population changed the landscape of the information technology industry. Older adults as computer and Internet users are becoming the fastest growing segment in the world today. In this paper, we conducted an interview and contextual inquiry study with computer literate older adults to find out about their computer use, specifically on applications and their motivations behind it. We also describe the challenges they face, and the strategies for solving them. The goal is to highlight the pattern of usage observed in certain applications which was scarcely covered in previous studies, so as to design simplified interfaces for older adults.

## Author Keywords

Older Adults, Human-computer Interaction.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## General Terms

Human Factors.

## INTRODUCTION

The global phenomenon of population ageing can be witnessed by the rising proportion of older adults in the world. In the past 50 years, the number of older adults aged 60 years and above has tripled [13]. The Population Aging and Development published in 2009 by the United Nations (UN) Population Divisions [7] indicated that the number of older persons aged 60 and above is estimated to be 737 million (about 11% of the world population). That is to say, in 2009, one out of every nine individuals in the world is 60 years old and above [14].

Information technology industry that was once dominated by younger users is now evolving due to the aging phenomenon. Older adults are now the fastest growing population of computer buyers and Internet users [1, 5]. As computers and the Internet are starting to be more immersed into older adults' lives, there is increasing relevance in examining the relationship between the use of

computers and older adults.

For computer use, older adults have different needs and concerns as compared to their younger counterparts as a result of aging. Older adults experience age-related physical and cognitive changes such as diminishing vision, hearing loss, psychomotor impairment, reduced attention and memory [4] which determines that older users will have different requirements and performance from younger generations in terms of perception of input information and interaction with computer. With increasing older computer users, it is necessary to have a thorough understanding of these users instead of getting them to use current interfaces which are mostly designed for younger users [6]. Having a clearer idea of older users' computer use, suitable interfaces can be designed for them.

Existing literatures examine these age-related changes by older adults and its implications for computer use. Wagner et. al [11] provide an excellent multi-disciplinary review of the literature that looks at the computer use by older adults from the perspective of Social Cognitive Theory. The most common use for computer seems to be communication and social support, as it facilitates contact with family and friends especially when constrained by geographic boundaries or limited mobility [11]. Broady, Chan and Caputi [2] review literature to compare older and younger adults' attitudes towards computers which is essential besides understanding their needs and concerns.

Past studies [9, 10] have focused on the general use of computers by older adults. Besides the Internet, not much has been discussed about the use of specific applications for activities that they partake in [3]. We are interested in finding out the essential needs of older adults in computer usage, and how such needs are reflected in the type of computing activities carried out as well as the most common computer applications being used.

The computer systems and interfaces today are too complex for average older adults. The majority of the functionalities provided by today's computer are not needed and used. To confirm our hypotheses and to come up with the requirement for a simplified computer interface that addresses the essential needs of older adults, we conducted an interview with 8 users.

## INTERVIEW DESIGN

Our interview aims to examine qualitatively the motivations and practices of computer usage among the elderly, and to

understand the experiences that they have encountered. A total of 8 computer literate participants were recruited for the semi-structured interview (5 male, 3 female, age range 51-73, M: 64.5, SD: 7.89). 5 participants live with their spouses, where 4 of them have at least one child residing with them. 2 participants live alone and 1 participant live with his children.

### **Procedure**

The interviews varied in length from 1 to 2 hours. Besides collecting their demographics, participants were asked questions that covered:

- Experience with learning and using of computers
- Motivations for the activities they do on computers
- Difficulties faced and resolutions

To elucidate the issues raised by the participants, we conducted contextual inquiry where the participants demonstrated the tasks and possible difficulties that they faced on their computers.

### **RESULTS AND ANALYSIS**

Our results showed that the participants have varied personal backgrounds and experiences with computers. In the following sections, we expand on understanding their background and the attitudes they have about computers. We will also discuss about the challenges that they faced.

#### **Educational Background of Participants**

All of the participants have some form of formal education. 6 participants have tertiary education while the remaining 2 participants each have Primary and Secondary education respectively. In terms of occupations, 6 participants have since retired from their former jobs, ranging from educator to labor worker, and nursing officer to engineer. For the 2 participants who are still working, they each hold positions in lecturing and management.

Participants responded that they have about 10 years of experience or more in using computers, where they started learning how to use them for work requirement. Most of them took courses for word processing applications, while the minority picked up the skills from their colleagues, children or by themselves.

#### **Computer usage and ownership**

A common pattern in computer usage can be observed among the participants. The top activity that was performed using computer was checking and sending of emails. Besides that, a few participants would perform online transactions of bill payments and bank statements, as well as searching for information on the Internet such as news. Other activities included writing and preparation of documents using word processing applications, staying in contact with family members and friends, and making online reservations and ticketing. Using computers for entertainment purposes were performed amongst a few participants, where they would play games or watch videos through online streaming sites. Only 1 participant

mentioned that she visits social networking sites using the computer.

The responses are similar to past studies [3, 9, 10, 11] which discuss about the kind of general use that older adults engage in with computers. To understand the interactions that they go through in using computers, we shall look into the type of computer applications that they use.

### **Specific activities**

#### *Information seeking*

**Internet search.** Google search is the search engine used by majority of the participants. They would look up for information or directions for places that they need to go. 1 participant mentioned that he likes to search for language translations. On the contrary, 1 participant uses Google search if she is not able to find any information on her default choice: Yahoo search.

**Browsers.** Participants use a variety of browsers. Those who use Internet Explorer as the primary browser for web access acknowledged it as the “default” application. There were 2 participants who use Google Chrome, as they felt that it is more user friendly in terms of its search feature, and among them, 1 participant would primarily use Internet Explorer unless he needs to do a search of information. There were also 2 participants who use Mozilla Firefox as it is able to support and load a greater variety of websites and media content. Among them, 1 of the participants mentioned Mozilla Firefox is “more stable and better” than Internet Explorer.

**News.** Only 1 participant read the news online, as he finds that there is too much information on newspapers out of habit and convenience. Amongst them, 1 participant responded that he would read some news from Yahoo news, while another said that another source would be from television programs.

#### *Communication*

**Email.** All participants manage their emails through email providers (Gmail: 3, Yahoo mail: 3, Gmail and Yahoo mail: 1, others: 1). Participants gave a variety of responses about their email usage. It is interesting to note that participants use different emails for different purposes, such as for general usage and for work. On the contrary, 1 participant mentioned that she seldom communicated with her friends through emails as she said, “At this age, not many friends are around.” Moreover, she felt that using the cellphone to call or send SMS to family is “better”. Another interesting response was that 1 participant uses Yahoo mail most frequently although she was taught how to use Gmail. The explanation was that she is familiar and comfortable with the structure of Yahoo mail hence, she is reluctant to switch to Gmail.

**Video calls.** 3 participants use Skype for video conferencing with their family and friends when they are overseas, while 1 participant uses both Skype and Windows

Live Messenger but prefers the former. 1 participant however, felt that it was not necessary for video calls as there is no need for regular contact.

**Social networking sites.** Most participants have heard of this term before, and 5 participants have accounts on Facebook. However, they rarely visit the site and if they do so, they would look at pictures of their children, or when they receive notifications via emails. 1 participant mentioned that she is particular about sharing of personal information online as her friends have told her that such information are easily compromised and may be seen by others. Another participant does not know what to write on Facebook. Besides Facebook, 2 participants have heard about other social networking sites such as Twitter and Google+ but they felt that it is not important to use it.

#### *Productivity*

**Microsoft Office.** Microsoft Excel was mentioned as the popular application of use, followed by Microsoft Word. 1 participant mentioned that Excel is good for doing calculations and data compilations, while Word is for typing of letters and printing as the paper orientation is set at A4 by default. However, it is interesting to note 1 participant did the opposite by using Excel to type texts. He also expressed that he was trained in Microsoft Office 2003 and new icons presented in version 2007 look unfamiliar to him. Most participants who use Microsoft Office applications have gone through training which teach them how to use, as required by the companies they are in.

**Online transactions.** 2 participants use the Internet to pay their bills, submit online applications, and make restaurant reservations and bank transactions. However, there are 2 participants who are skeptical about online banking and its safety. Among them, 1 of the participants mentioned that she does not find computers to be useful in e-transactions due to security concern.

**Photo Management.** 3 participants use Picasa to manage and organize their photographs, where 1 participant who uses this mentioned that she seldom does so as she does not like to take pictures. On the other hand, 1 participant uses Flickr to manage his photographs.

#### *Entertainment*

**Video channels.** 4 participants watch videos on YouTube and XinMSN. 1 participant watches Hong Kong drama on azdrama.net, which was introduced to him by his son. 2 participants do not watch videos online where one of them claimed that the video screen is too small and the resolution is not that clear in quality.

**Games.** 3 participants play games using the computers, of which 2 of them play Freecell (a computer card game) offline. 1 participant mentioned that he does not find online games interesting. Whereas for another participant, she plays Solitaire and finds that strategy games train her in her alertness and reaction. Ironically, she does not like playing Mahjong as she felt that the game requires her to think fast.

All participants except one use computers daily with a minimum duration of 1 to 2 hours, up to a maximum of 4 hours. 1 participant mentioned that her duration of use is dependent on the work that she is doing.

In terms of computer ownership, participants each have either a desktop or a laptop/netbook at home, with an exception of 4 participants having both. A variety of responses were collected with regards to their preference of usage between desktops and laptops. For participants who preferred using desktops, they liked it for the bigger screen size and "better view", and the easy accessibility of peripherals such as the keyboard and mouse. As for the other participants who preferred the laptops, they stated portability as the reason where they can "carry and go".

#### **MOTIVATIONS AND RELEVANCE**

2 of the participants mentioned "interesting" as the reason for learning and using of computers, while 3 other participants associated "interesting" with the experiences they got from the activities that they do on the computers. The other reason for motivation includes the presence of computer users around, where 1 participant stated that his son is a computer consultant. In addition, 1 participant mentioned, "There is no harm learning computers." The availability of computing facilities is also one of the reasons for them to learn computers. Moreover, the type of applications that the participants were taught has an effect over their usage, where they would use familiar applications. On the contrary, the prevalence of software and technology may deter elderly to learn computers, where 1 participant felt that aging is affecting his learning.

Most participants felt that learning and using computers has significant relevance to their lives, where computers help to facilitate communication between their family members, and allow them to look for the information that they want online which broadens their knowledge. 1 participant mentioned that he would not know what to do if there are no computers, as he is used to having them in his life.

In short, participants would be motivated to learn or use a certain application if they find that the particular application has specific relevance to their lives, such as staying in contact with their family members, or work purposes.

#### **DISCUSSION AND IMPLICATIONS**

From our interview, we have looked into the understanding of older adults and their computer use in terms of their experience and the relevance.

It can be observed that the older adults engage in computers for general and utilitarian use such as word processing, checking of emails, news and information on the Internet, basic communication activities and entertainment. The types of applications that they use are mostly the default ones assigned by the computer systems, or the popular ones used by many companies and taught in most courses. As such, we are able to witness similarity in their computer usage as well as the types of applications.

As for the challenges that the older adults faced, it can be said that older adults faced certain difficulties when they interact with both hardware and software aspects of the computers. The common concerns with software were unfamiliarity with applications, interfaces and jargons, while the hardware ones were screen size and contrast, and the ease of use with peripherals. It may be worthwhile to note that some of the older adults probably do not realize these problems are due to age-related characteristics. This applies most appropriately to sub-optimal strategies in using computers as observed from contextual inquiry, where 1 participant accessed websites through Google search rather than bookmarks. They also do not see this as a problem that is as prominent as the other challenges discussed. This shows that they may not be consciously aware of the difficulties that they are facing.

From the interview, we derived that changes made to interfaces should be handled carefully as older adults may not adapt effectively. Interface changes to Gmail and Microsoft brought difficulty for some participants in terms of buttons location. Comments such as “old people like to use old things” and “(it is difficult for) old people difficult to take changes” were expressed during the interview.

Emphasis in interface design for certain applications can be placed, so as to facilitate the older adults users, such as, applications for word processing, communication, Internet browsing and video viewing. Designers can come up with recommendations and guidelines for these popular applications that older adults frequently use, so that these guidelines can be discussed and adopted where a common mental model of tasks can be visualized and understood. Designers may also want to explore alternative feedback modalities for interaction (such as *earPod* [14]) to make the computer interface more accessible, or alternatively, tangible objects (such as *Magic Cards* [13]) can be used to minimize learning of new computer interfaces.

Our findings lead to the makings of a basic interface for the common applications that older adults use. An essential interface for the elderly should address the needs in the four categories: *information seeking*, *communication*, *productivity*, and *entertainment*, with a few key applications supported for each category. In particular, a browser with integrated search engines is needed for *information seeking*; email, voice, video, and social networking applications are needed for *communication*; word processing, photo and video authoring and management are needed for *productivity*, and videos and games for *entertainment*. A computer interface with these essential applications can address the majority of user needs of elderly while alleviating many of challenges as presented in this paper.

## CONCLUSION

In our study, we have looked into the understanding of older adults' essential computing needs. We highlighted common usage and attitudinal patterns among the older adults which can have implications on interface design for

this group of users. We suggested an essential computer interface with limited number of key applications for older adults. For further research, we aim to look into the design, implementation, and evaluation of such interfaces.

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