Usage of Mobile Phones amongst Elderly People in Hong Kong

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Abstract—**This study examined the patterns of mobile phone usage and preference of mobile phone functions amongst elderly people in Hong Kong. Two studies were conducted using a mixed-research method. Focus group discussion was conducted to six elderly mobile phone users to investigate their usage patterns and problems of using. Questionnaire survey was administrated to 100 respondents aged 60 and over to understand their preference of mobile phone functions. The study revealed that basic mobile phone functions were considered to be more important for elderly users. The eight features most frequently used by the respondents were calling, address book, alarm, display of date and time, panic button for emergency, incoming call with caller's picture, and camera. The results of this study can facilitate the design of mobile phones for the elderly.**

Index Terms— **Elder users, focus group, mobile phone, survey**

I. Introduction

Mobile phones have become pervasive in recent decades. The mobile phone subscriber penetration rate in Hong Kong was up to 215.8% at the end of April 2012, which mean that on average, each person in Hong Kong owns more than two mobile phones [1]. Mobile phones can benefit the elderly users and support their daily life [2]. The most obvious benefit of using mobile phones is to help the elderly users stay connected with others, such as children, grandchildren, and friends in a convenient and cheap way. Mobile phones also play a crucial role in the "safety-security" domain [3]. Phones with functions like safety alarm and person location enable the elderly to get immediate emergency and health supports by pushing the emergency button. Mobile phones also can be considered as memory aids for compensating aging-related memory decline. The functions of appointment reminder, alarm, and address book can help elders schedule and remember performing daily life activities [2]. Besides, games and audio-visual player functions of mobile phones offer entertaining mental exercises.

However, older adults have reported they experience frustrations when interacting with mobile devices. Older adults may find it harder to learning to use technology than the younger age groups. For example, in the study of Ziefle and Bay [4], they found that older adults (50-65 years old) showed a lower performance than younger adults (20-35 years old) when handing the interface of a mobile phone. Also, the older adults spent more time on task, and took over 40% more unnecessary steps than the younger ones. Ling explained that for older adults who have organized their life without mobile phones, the adoption of the devices is associated with readjustment of their routine way of life [5]. They may not want to change and have anxiety feelings towards unfamiliar technology [6]. Moreover, current mobile industry is mainly targeting at younger age groups who switch phones relatively frequently and admire small devices with multifunction. The requirements and needs of older people are commonly not given sufficient consideration [7]. Since older users do not have the same visual and hearing sensitivity, finger dexterity, and working memory as the younger age groups, they may have problems using mobile phones with small buttons, limited size of the screen and text, and complex functions [3, 6].

Most of mobile phones today include camera, MP3, address book, and more advanced features such as sending and receiving e-mails and video calls. However, it is not known whether these phones meet the needs of elderly users. Mobile phones with fewer functions may not satisfy users' demand, while with too many functions will make the devices more complex and result in redundant learning. The older adults, due to their own physiological and psychosocial characteristics, are different from the younger age groups on the requirements and needs of mobile phone usage. Therefore, it is important to understand and identify the functions that are perceived to be useful by elderly users since suitable functions can increase the usability and reduce the difficulties of operating mobile phones [8]. Moreover, knowing the mobile phone usage by elderly users provides insight on how to improve mobile phone design and functions for older users.

This study aimed at investigating the mobile phones usage by older adults in Hong Kong, with emphasis on their preference for mobile phone functions. The objectives of the present study were: (1) to understand the usage of mobile phones among older Hong Kong people; (2) to identify the functions perceived to be useful for older mobile phone users.

II. METHOD

This study combined qualitative and quantitative method. Focus group discussion and questionnaire survey were used for data collection.

A. Focus Group Discussion

A focus group discussion was conducted by the researchers among a sample of six elderly mobile phone users who were 60 years of age and over. The median age of the participants was 67.5 years. The discussion was to explore the patterns of mobile phone usage by older adults, the benefits they received, and the problems or difficulties they experienced when using mobile phones. The discussion lasted around two hours.

B. Questionnaire Survey on Mobile Phone Functions

Besides the group discussion, this study also conducted a questionnaire survey aiming to find out what mobile functions were perceived to be important for older users. The questionnaire contains 25 mobile phone functions, i.e., Calling, Displaying date and time, Address book, Emergency button, Camera, Alarm, Calculator, Text messaging, Mini games, Calendar, Speed dialing, Contact pictures, Speaker, Touch screen, Bluetooth, Radio, Wi-Fi internet, MP3 ringtones, Torch, Playing MP3 songs, Playing video, Notepad, Global Positioning System, Email, and Sound recording. These 25 functions were selected since they were relatively common across differing phone manufacturers. Participants were asked to pick out the functions which were important for them. They were allowed to choose more than one function. A sample of 100 respondents (53 males and 47 females) participated in this study. All the participants were mobile phone users over 60 years of age.

III. RESULT

A. Focus Group Discussion

Focus group discussion was employed to investigate the perceptions, attitudes and benefits of using mobile phones, as well as the problems of using. Respondents reported that calling was the most-frequently used function, and also the main purpose for purchasing a mobile phone. It was noted that older adults receiving calls more than making calls and family members and friends were their major contacted parties. The respondents indicated that they rarely used extra services of mobile phones, such as listening to music and message texting.

This study examined the benefits or useful features of mobile phones perceived by the elderly users. The eight most frequently mentioned features were calling, address book, alarm, display of date and time, panic button for emergency, incoming call with caller's picture, and camera. Detailed descriptions about each function are shown in Table I.

Participants also identified the problems or difficulties they experienced when using mobile phones. The problems can fall into three aspects. The first aspect was related to the mobile phone layout and interface design. Participants reported that the body of mobile phone was too small to hold. The texts on screen were too small to read. Buttons were tiny and crammed. Ringtones and speaker volumes were low. The backlight time was short. The second aspect was associated with the complexity of function operations. The elderly users may be aware that there are many functions of phones, but they do not know how to use. The menu operation was not easy for them. The elders indicated accidental dialing sometimes happens because of failing to lock the keyboard. Another issue was that there were many buttons on the interface which yields different functions, such that they felt confusing and hard to remember the corresponding functions. In addition, the participants seldom texted messages because they did not know input method and found it is hard to learn. The third aspect of problem was the cost of using the mobile phone device and related services. Elder users seldom use the mobile value added services like call forwarding and polyphonic ringtone because they incur extra charges.

TABLE I
MOST FREQUENTLY MENTIONED MOBILE PHONES FUNCTIONS

Functions	Respondents' descriptions
Calling	It was a direct way to contact people regardless of time and location.
Address book	It was useful because users do not need to carry the heavy paper phone book anymore. However, participants mentioned that they need other people's help for inputting the address and phone numbers for them and teach them how to use.
Alarm	Alarm function was useful since it provides support for older people with cognitive and mental impairments by cueing and reminding them about medical schedules and upcoming appointments.
Display of date and time	It was useful because it can replace a watch.
Calculator	Housewife can make use of it when buying things.
Panic button for emergency	Two respondents aged 70 and above considered it is useful for them because this function allows them to get immediate assistance during emergency situations.
Incoming call with caller's picture	It helped to identify who is calling in, but the participants needed others people to help setting up for them.
Camera	Not often used by the respondents. One of the participants said that his children had taught him how to use this function, and now he often uses the phone to take photos for his baby grandchildren and think it is convenient to use.

B. Questionnaire Survey on Mobile Phone Functions

A questionnaire survey was conducted to explore which mobile phone functions were perceived to be useful for older users. The respondents were asked to select important functions among a given list of 25 mobile functions. It was found that 51% of the respondents identified less than five functions to be important, 38% of them selected six to ten functions, and 11% selected more than 10 functions. The average number of choices was 5.1.

Table II presents the frequencies of responses based on the priorities. It could be seen that participants used a few mobile phones functions frequently such as calling, displaying date and time, address book, emergency button, camera, alarm, calculator, and text messaging. The rest of the functions, such as Playing MP3 songs, Playing video, Notepad, Global Positioning System, Email, and Sound recording were used

very rarely. The result indicated that the basic functions, like calling was more important for elderly mobile phone users.

TABLE II
THE FREQUENCIES OF USE ON MOBILE PHONE FUNCTIONS

Mobile phone functions	Frequency
Calling	97
Displaying date and time	76
Address book	69
Emergency button	45
Camera	31
Alarm	29
Calculator	24
Text messaging	20
Mini games	15
Calendar	15
Speed dialing	12
Contact pictures	11
Speaker	10
Touch screen	10
Bluetooth	8
Radio	8
Wi-Fi internet	6
MP3 ringtones	5
Torch	5
Playing MP3 songs	4
Playing video	4
Notepad	3
Global Positioning System	2
Email	2
Sound recording	1

IV. DISCUSSION

This study used group discussion and questionnaire survey to explore the use of mobile phone by older Hong Kong people. It was found that older people had positive attitudes towards mobile phones since using the device could improve their quality of life and make their living more convenient. The seniors used mobile phones for very limited purposes. They did not engage in a wide range of mobile behaviors, with an average of 5.1 activities. According to the results, calling was the most useful and needed function for elderly users. Most of the respondents reported that their mobile phones were bought by their children for the convenience of communication. The function of calling also increased the feeling of safety and security for the elderly because with the device they can contact others at any place any time [9]. It encourages the elderly to go outside and participate in activities, and also makes them to keep in touch with distant relatives and friends. In this respect, mobile phones provide the opportunities for a more independent and healthier life for seniors.

Calling was at the highest ranking order not only because of its usefulness, but also ease of use. Ease of use has been proved to be a decisive factor of mobile phone usage among elders [9]. Respondents indicated that use mobile phone for calling was easy since the operation involves only a few buttons, thus they were motivated to learn and use. Also, local telecommunication companies have introduced special lower price plans for the aged.

Mobile phones are useful for quick information seeking, such as checking time and looking for telephone numbers. Since older adults usually possess worse working memory, the address book plays a significant role for them to record telephone numbers. Address book is perceived of high usefulness not only because it makes contacting people easier, but also it enables the users to identify incoming or missed calls. Knowing date and time enhances time management for the elderly, and this function is easy to operate since it can be used under the lock state.

Mobile phones are an important tool in emergency situations. The emergency function allows a person to gain access to emergency assistance when he/she needs help or medical service by pressing the alarm button. Previous studies indicated that seeking safety is the most crucial issue for older mobile phone users [2, 5]. However, some older persons indicated they dislike the stigma associated with using such service.

The alarm, camera, and calculator functions of a mobile phone were not quite commonly used by the elderly. The alarm service helps elders by cueing and reminding them about medical schedules and upcoming appointments. However, the operation of this function is much more complicated since the users have to set up the schedule on their phones in advance. Camera function was not commonly used among the respondents. Taking pictures might be easy to operate, but saving photos and accessing the picture albums could be a challenge for elderly people because they have to be familiar with the menu structure.

Text messaging was not frequently used and the result is in accordance with Wang's finding that 84% of the older Chinese mobile phone users cannot edit messages [10]. This phenomenon could be attributed to the low education level among older Hong Kong adults. The precondition to text message is that a user needs to be able to read and write Chinese or English words and to know the input method. The seniors may refuse to learn Chinese or English typing because they think it is unnecessary and they can call instead of text message. Calling was considered to be a more direct way to communicate and costs less. Ling also indicated that "mobile texting is age segmented." It was pointed out that textual isolation among the elderly could be due to the design of the mobile phone, the techniques needed, cohort's life experience, and stereotyping by younger users [5].

Elderly people rarely used advanced mobile phone functions. The frequencies in Wi-Fi, listening to music and video were below ten, which indicates that the seniors did not use mobile phones for entertainment purposes. It is known that use of advanced functions, such as Global Positioning System, email, Wi-Fi internet and notepad requires the users to be familiar and skillful with the manipulation of mobile phones and to learn new skills in a certain extent. Since age-related declines in cognitive abilities, older people might be slower to acquire technological skills than younger adults and some of them even experience anxiety to new technologies [11, 12]. The physical and cognitive barriers might lead to that those advanced functions did not appeal to the majority of older users.

In general, basic mobile phone functions, such as calling, address book, and alarm are of high importance for elder users, but the advanced entertainment function seemed to be not appealing to them. Older adults mainly use mobile phones for communication and information seeking. Those features were considered to be useful because they were easy

to use and less costly. Besides, old adults' children, grand children or other family members would suggest and encourage them to use these functions. They also provide assistances for older users when necessary. Elders rarely use functions beyond making and receiving calls, which is in accordance with finding from previous studies [6, 10].

Older adults were faced with difficulties when using mobile phones because of a lack of consideration of older adults' age-related sensory-perceptual changes in the user interface design. Ageing is always associated with functional loss in vision, hearing, motor control, and working memory, and these changes may interfere with their ability to use mobile phones and impact negatively on the ease of use [12, 13]. For instance, elderly people who have visual deficiencies will have difficulty in reading text on small screen and seeing labels on buttons. A complex function buttons will increase seniors' cognitive load. Besides the unsatisfied interface, the cost of using was another issue because most elders were retired and did not have extra money [14]. The cost of purchasing new technologies and the monthly service fee of maintaining the services (e.g. security alarm) could be financial barriers to some older users [3].

V. CONCLUSION

Mobile phone can provide a number of benefits to older people. However, mobile phones with too many functions that users do not need will make the menu structure more complex and affect the usability negatively. This study investigated the usage of mobile phone and preferences of phone functions by older adults. The study indicated that older adults used few features on their mobile phones and showed little interest in additional mobile phone features beyond communication and information seeking. Basic functions were more preferable than advanced entertainment functions for older mobile phone users. Older adults in Hong Kong are passive mobile phone users because they usually use phones to be contacted (i.e., receiving calls) rather than making calls or text messages. The main benefit of mobile phones for the elderly was to maintain connections with someone emotionally close to them. They also used phones to look for information, such as checking time and date and searching telephone numbers. These results provide a list of features that developers should consider to be included in the phone. Older adults reported frustrations in their interactions with mobile devices, which suggest that current mobile phone systems are not well-designed to accommodate older adults' limitations and capabilities.

To minimize the problems elderly users encounter in using mobile phones, it is necessary to gain a clear understanding of users' needs and to place the elderly users at the center of the design process. Since mobile phones with too many functions make the elderly feel confusing and increase the error rate, focusing on critical functions which are important for elders is a good way to improve the usability of mobile phones. To fit the demands of the elderly, the most critical features need to be reserved while the irrelevant functions should be eliminated during mobile phone design. Features desired by older adults included calling, displaying date and time, address book, emergency button, camera, alarm, and calculator. Also, the layout and interface should be suitable and tailored for older users. An ideal age-friendly design of a device needs to take consideration of perceptual and cognitive abilities, and special needs of the elderly, and involves them during the start of the design process. Mobile phones with easy-to-read buttons with large text, brighter screen, loud volume, and easy-to-operate menu would be ideal for elderly users.

In conclusion, mobile phones including only the useful functions and with the simple operation interface may improve the acceptance of mobile device for older users.

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