What Motivates Older Adults to Learn to Use Mobile Phone

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ABSTRACT

In this paper we present a study that employed mixed qualitative methods: longitudinal contextual interviews, semi-structured event-driven diary, and phone interviews at specified intervals, to investigate how older adults learn to use a mobile phone. Trial-and-error was found to be their most preferred method, followed by the manual. We identified several factors that could (de)motivate older adults for learning to use a mobile phone. Older adults who were highly motivated to learn were found to be more successful and more satisfied in their learning outcome.

Author Keywords

Motivation, mobile phone, older adults, learning resources.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Human Factors.

INTRODUCTION

Mobile phones have become pervasive in developed countries. They offer benefits that may be especially valuable to older adults (ages 50+) in terms of maintaining their quality of life, for example, by keeping them connected with loved ones, maintaining contact information, and providing reminders about important events. Despite such potential benefits, older adults, particularly those aged 65+ have been relatively slow to adopt mobile phones and services [Ofcom, Smith].

The low adoption may be due to the learning difficulties encountered by older adults, which in turn can be attributed to several factors, including 1) natural declines in their sensory, perceptual, motor and cognitive abilities [Fisk], 2) problems with devices' user interface (UI) [Kurniawan] and 3) a lack of experience with computers and mobile devices [Fisk]. In addition, people over the age of 60 were found to use mobile phones for very limited purposes only, such as for calling or texting in emergencies [Coates 2001]. Their limited needs for using mobile phones likely resulted in their reduced desire to learn to use more advanced features.

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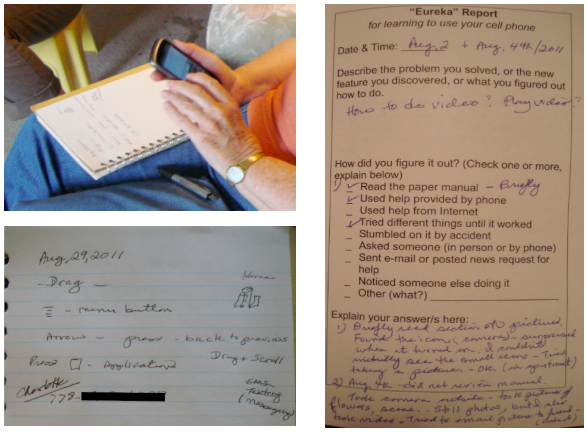

Figure 1. (left) Taking notes while learning to use the Android phone, (right) A learning journal.

Therefore, we conducted a field study using contextual interviews, diary, and phone interviews to explore how older adults learned to use a feature-rich mobile phone in their preferred learning environment such as a home. We also identified several factors that played a role in motivating or de-motivating older adults for learning to use mobile phones. Consequently we offer several recommendations for increasin older adults' motivation for learning to use mobile phone features.

RELATED WORK

Previous studies that examined older adults' learning resources for mobile devices included survey studies focused on information and communications technology (ICT) such as computers and televisions [Selwyn], technologies (but did not specify which) used in the home [Mitzner], and mobile devices [Leung], and a focus group and observation study to examine mobile phone use [Kurniawan 2006]. Findings from these studies have been mixed on which learning methods older adults preferred: a strong preference for trial-and-error and that friends, family and work colleagues were rarely consulted for ICT support (use of manual was not studied) [Selwyn], and the manual was used most [Leung, Mitzner] but only after trial-and-error was unsuccessful [Kurniawan 2006].

Kurniawan (2008) identified usability problems encountered by older adults with mobile phones such as complex interface design and small button size. There was also a number of guidelines for improving the design of training materials to help older adults learn to use computer technology. For example, Fisk et al. (2009) suggested over 30 guidelines, such as "provide a…mechanism… to help

the learner develop cognitive schemas to organize the new knowledge" and "minimize demands on working memory".

While mobile phones were perceived with a positive impact on personal independence [Abascal] and self-image [Oksman], safety and security have been recognized as most important reasons for motivating mobile phone adoption among older people [NTT]. Conci et al. (2009) conducted a survey and identified that perceived usefulness, self-actualization and enjoyment were important driving factors for motivating older adults to use mobile phones. Our study differs by taking an empirical approach to examine how older adults can be motivated to learn to use mobile phones in context. Our participants were given a feature-rich Smartphone to learn, to explore and to use for 7 to 10 days in their own learning environment, which was in most cases their home. Our study design that consisted of longitudinal field visits, phone interviews, and the use of a learning journal allowed us to capture the participants learning experience in detail. Despite having only six participants, our study revealed a positive relationship between older adults' motivation to learn to use mobile phones and their learning outcome.

METHODOLOGY

We conducted a mixed-method field study. Data were collected through note taking during field visits and phone interviews and were analyzed for emergent themes.

Participants. Participants were 6 (2 male) healthy adults aged 50 and above (mean age 65.8), free from cognitive impairment and motor impairment in their hands. All our participants used a "regular" mobile phone except P6 who used a Smartphone for over a year. None of our participants had a data plan. All the participants had college or higher education except one with Grade 10 education. 2 participants lived alone, 3 with a spouse only, and 1 with a spouse and 2 daughters. They were recruited through posters placed in community centers and libraries in an urban city in North America.

Materials. A Smartphone, HTC Google Nexus One with Android 2.1 Éclair platform (hereinafter called the Android phone) [goggle] and all its accompanying accessories in its original factory settings, was used for the study. The phone was equipped with a pre-paid phone plan that included voice calls and text messaging from a local mobile service provider. A data plan was also included if the participant did not have wifi access at home. The goal was to provide a phone with features that could be fully explored by participants if they chose to. A printed copy of the manual (300+ pages) was provided to each participant, together with a list of suggested tasks about features, such as text messaging, email, camera, and internet. A learning journal was also distributed to each participant for recording his/her learning experiences including features explored, resources used, and problems encountered (Fig. 1, right).

Methods. Our study consisted of two field visits (approximately 1.5 hours for the first visit and 45 minutes for the second) conducted 7 to 10 days apart and two phone interviews (each about 15 minutes) between the two visits. The field visits were conducted in a place where our participants normally learned to use new technologies; we met with all our participants in their home except P1 who chose to meet in a local community center.

In the first visit, we asked participants about the resources and methods that they had used for learning to use their own mobile phone and the features that they had explored. We also asked them to demonstrate those features. We then briefly introduced the Android phone, and the touch screen interactions, key icons, physical buttons, and phone accessories. Next, we gave them a list of suggested tasks and a paper manual for the phone. Finally, we explained the learning journal for recording elements of their learning experience. During the phone interviews, we asked participants about the features they had explored and how they had learned to use those features. In the second visit, we asked participants about their learning experiences, using the learning journal as a conversation prop.

FINDINGS

In this section we present findings from our field study that examined the learning resources and methods that the participants used for learning to use the Android phone. Next, we present factors that played a role in motivating or de-motivating our participants' learning.

Learning Resources and Methods

All participants (except P1) used a combination of the following resources for learning to use a mobile phone.

Trial-and-error was the most preferred learning method among our participants, same as that found in [Selwyn et al. 2003]. P6 stated, "*everything is trial-and-error…99% of how I learnt was trial-and-error*". A simple phone design with clear ***in-phone instructions*** was regarded as crucial for learning by trial-and-error. Some participants enjoyed the element of serendipity associated with trial-and-error such that it often led them to stumble upon new discoveries as they were trying things out. For example, P3 was excited to discover by chance the pinching gesture for reducing text size on the screen. ***Paper manual*** was the second most preferred resource for learning. For learning the Android phone, P1 did not use the manual at all while P4 used it extensively. We observed P2 and P4 ***taking notes*** when we showed them the basic features of the Android phone (Fig. 1, left). They expressed that they would refer to these notes when performing the tasks.

Our participants generally did not choose to learn from their ***social circle***. However, we found two participants' contrasting learning experience with their social circle particularly interesting. P2 responded, "*If I ask him [his husband], we will start World War 3*" when we asked her

why she did not ask her tech-savvy husband for help with the Android phone during the study week. On the other hand, P6 enjoyed engaging his wife in collaborative learning, justifying that "*…two brains are better than one*" (P6). The couple would sit together, exchange control of the phone and try things out as a team.

All participants had contacted ***help agents*** at least once for assistance with their own phone, either via phone or by visiting a service provider location. Yet most participants were disappointed with this resource due to long waits and/or inferior quality of services. P2 stated, "*I wouldn't call [them] in a million years!*" Our participants did not consult ***online help*** for using the Android phone although they sometimes used this resource for their own phone.

Factors impacting Older Adults Learning Mobile Phones

We identified several factors that could impact older adults' learning, particularly for (de)motivating participants to learn to use a mobile phone. Specific to the Android phone used in the study, we found participants falling into two groups that exhibited dramatic differences in their desire to learn to use the phone. P3, P4, and P6 displayed a high level of motivation for learning the Android (HM) whereas P1, P2 and P5 showed considerably lower level of motivation for learning (LM). However with the small sample size in our study, we do not intend to classify them into the two concrete groups. We only use these group labels when behaviors were commonly found across all members of the group while individual participants will be stated for isolated behaviors.

Goal setting. Our study design included a list of suggested tasks (only task names without instructions), classified into basic and advanced tasks, for participants to use as a quick reminder of possible features that they could explore. Our findings however indicated that all our participants found this task list very motivating in their learning process. Several participants used the task list as a source of concrete examples of tasks they could attempt to learn. For instance, P5 said he went over the list, decided what he wanted to learn, and then proceeded to the manual to learn them. P2, P4 and P6 also used that list as a guide for what they could accomplish on the phone. P6 said "*I like that [task list]! Things to try…that's excellent! That should come with other phones, because otherwise you just don't know…I mean there's lots of apps here*". We imagine that the absence of such initial goals might have left participants overwhelmed and clueless as to where to start. Therefore providing this initial direction helped increase their motivation for learning.

Perceived needs. Participants' motivation to learn to use a mobile device seemed to be positively related to their perceived needs for using the device. The LM group expressed very limited needs for using their own mobile phone. P1 and P5 used their own phone for calling and storing contacts only. P2's needs were limited to dialing numbers (i.e. not using contact list) and receiving calls. These limited needs seemed to subdue their motivation to learn to use the study phone as exemplified by P2's comment: "*Perhaps if I had a stronger desire or need to use this phone, I would be prepared to go to greater lengths to learn*". Conversely, the HM members used their own phone for more purposes and desired for other features in their phone. For instance, P3 had used her phone to call and text while also using it as an address book, camera, alarm clock, calculator, and measurement converter. P6 had used his phone to check emails in addition to making basic phone calls. Both of them expressed interest for internet access on their mobile phone. Consequently, the HM group was much more enthusiastic in exploring the capabilities of the Android phone.

Exposure to technology. The LM group seemed to be less exposed to technology than the HM group. P2 and P5 both relied on their tech-savvy spouses for technology-related issues around the house, and hence did not have to deal with technological gadgets themselves. In the HM group, P6 was in charge of all the technological devices around the house, and P3 was comfortable with various technologies and explained how 75% of what she managed to learn on the Android was a result of knowledge transference from other devices she had had experience with.

Curiosity towards technology. The HM group seemed to be more curious about technology than the LM group. P3 and P4 were both very curious and motivated to explore features available on the Android phone, particularly P4 as she was considering upgrading her current phone to a Smartphone. Such elevated level of curiosity could also be a result of their stronger perceived needs and higher exposure to technology.

Social influence. We identified both positive and negative influences from the participants' social circle on their motivation to learn to use features on their mobile phone. None of P2's friends did text messaging so she found no reason for her to learn it. Similarly P4 who had used text messaging when she first got her phone had stopped using this feature after realizing that her friends did not use it. The participants expressed that they would be motivated to learn to use other features if they could use them with their friends.

Ease of use. Ease of use is particularly important for participants who preferred learning by trial-and-error. They pointed out that phone applications and features should be readily visible for use, coupled with clear on-screen instructions. Despite the dexterity issues that many older adults face, all participants who did not have prior experience with touch interaction showed significant improvement between the two visits. They appeared to be positively motivated by their own progress although P4 and P5 were frustrated with the virtual keyboard as they found it difficult to achieve precision when touch-typing.

Knowledge of mobile phone and services. Several participants were very conservative when using their mobile phone, mainly because of their lack of knowledge about what services were included in their mobile service plan. As a result, they felt reluctant to explore features for fear of incurring unexpected charges on their phone bill. Another reason behind their conservative use was the fear of breaking or damaging the phone. This echoed the findings in previous studies (e.g., Kurn) that older adults were afraid of damaging the software of their mobile phone while they explored different features. We explicitly encouraged our participants to explore as many features as possible. Therefore, most of our participants expressed being comfortable exploring different features on the Android phone. We suspect that this might have contributed to the trial-and-error learning predominated in our study.

Availability and quality of external help. The use of the manual was the second most preferred learning resource among our participants. The clarity of the manual was reported to impact our participants' motivation to learn. For example, both P2 and P5 found "*a mismatch between what's in the instructions and what's happening on the phone*" (P2). P2 explained that she kept getting "*surprises on the screen*" that did not seem to correspond with the manual descriptions and that discouraged her to explore further. Besides, the 300+ pages of the manual made the participants feel "*daunted*" (P2) and "*overwhelmed*" (P6). Several participants also complained about the abundant use of technical terms and the lack of guiding definitions. For example, "*it is still a great deal of verbiage. Some of which is language I do not understand*" (P2). P4 coined this technical "language" as "*jargonese*" with negative sentiment. Several participants also complained about the complexity of the instructions and the lack of details. However P4 found the manual very useful and she was excited that she could follow along and learn many features that she had never thought of being able to perform.

P4 also shared with us two contrasting experiences she had had with in-store help agents. She was once treated like a "dumb" old lady who could not even perform basic call functions, which made her feel very discouraged. But her second experience had highly motivated her to learn to use a Smartphone as the sales representative was courteous and showed her many advanced features on mobile phones. She pointed out how the attitudes of a service representative could affect her desire to learn to use advanced mobile phone features.

Motivation and Learning Outcome

HM group learned more Android features. The LM group spent relatively less time on the study phone, experimented with fewer features, and did so on a more superficial level. P1 and P2 both used it for only a few phone calls and exchanged a couple of text messages during the study week. P2 only briefly accessed the alarm clock and the camera. In contrast, the HM group ventured further and deeper into the Android features. For instance, P3 experimented with email, camera, music player, picture sharing besides making phone calls and text messages.

HM group felt more satisfied and less frustrated. All three participants in the LM group expressed frustration in their learning experience with the Android phone. "*I feel bad about saying this, but I won't want this phone to waste a percentage of my trash!*" (P1). "*As always, learning a new machine is nerve wrecking and frustrating…I am not one for perseverance*" (P2). "*I want to throw [the phone] to the wall!*" (P5). In contrast, the HM group seemed more patient and pleased with their learning experience, despite the occasional glitches they encountered. All three in this group were very excited about the features that they have learned on the Android phone. P6 said, "*It was fun*". P4 "*loved*" the experience and told us that she would seriously consider a Smartphone for herself.

DISCUSSION AND FUTURE WORK

Our findings clearly indicated that older adults could be motivated to learn to use a mobile phone, at least initially, by providing them with an enumeration of tasks, which they can use as a roadmap for exploring the phone and as the goals to achieve. We recommend presenting the tasks in increasing order of difficulties so that they can attain a sense of accomplishment early on.

Improving the interface design can benefit learning by trial-and-error. Most participants desired for a simple interface with high visibility of applications and features on the screen. To do this, they recommended labeling icons and *"putting everything in one place"* (P1). Features that require only a single step were also strongly preferred. To address older adults' dexterity issues on a touch screen, P5 suggested wearing specialized gloves or finger caps for screen interactions. Also the Android touch interactions such as short touch, long touch, and dragging that have caused considerable confusion and frustration among our participants should also be simplified.

As the manual was a popular learning resource, providing older adults with a manual with clear, yet simple instructions would be useful. In particular, the use of technical jargons should be minimized. A quick reference card that includes instructions about basic functionality was also suggested. This resource could help jumpstart the learning process by building an initial set of skills for mobile phone use.

Online tutorials and classes were also recommended as alternative learning resources. P2, P4 and P6 found online tutorials valuable as they could then learn at their own pace. They also desired group classes but emphasized that the classes had to be tailored for older adults. P6 believed that "*the first Smartphone company to come up with a class, oh it will get full!*"

Finally, future work can build on this study to include more participants to (re)-examine the relationship between motivation levels and learning outcomes, and to investigate how the motivational factors may be manipulated for increasing older adults' motivation to learn to use mobile phones, and more generally mobile devices.

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