Mobile Technology Adoption Among Older People - An Exploratory Study in the UK

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Abstract. Although there are potential benefits of mobile technology, there are challenges and barriers for older people to adopting them. This exploratory study took place in East London in 2016, UK. It used questionnaire and interview, aiming at understanding how mobile technology is adopted among older people. Older people's adoption of mobile technology has been investigated and concluded from four aspects, i.e. getting, learning, using and adopting mobile technologies.

Keywords: Mobile technology · Technology adoption · Older people

1 Introduction

Aging and the speeding development of technology are two widely reported trends around the world.

Previous research shows that ICT can bring older people social and self-understanding benefits (e.g., increased access to current affairs and health information), interaction benefits (e.g., increased connectivity and social support), or task-orientated goals (e.g., ICT-assisted work, travel, shopping, and financial management) [1].

Although there are many benefits of ICTs, there are challenges and barriers for older people adopting them. The barriers have been reported as: poor visual and motor ability negatively impacting the use of ICT, resistance to change brought about by new technology, potential culture influences, etc. [2].

Mobile technology is a fast growing area of ICT with features of mobility, connectivity and the 'carry principle', referring to technologies that are small and ever present [3].

According to Adult's Media Use and Attitudes Report 2016 from Ofcom [4], there has been a considerable increase in the proportion of adults in the UK who only use devices (e.g. smartphones and tablets) other than a PC/laptop to go online, indicating that these devices are no longer just supplementing PCs/laptops, but are starting to replace them.

Therefore, this study focused on the mobile medium, trying to understand older people's adoption and perceptions of mobile technology.

Technology acceptance has been thoroughly studied with many models and theories, such as the Theory of Reasoned Action (TRA) [5], the Technology Acceptance Model (TAM) [6], and the Theory of Planned Behavior (TPB) [7]. Most of the models consider a workplace setting and are used to predict how new technologies will be received by their potential users.

Since mobile technology is quite new in older people's life, instead of predicting, this study aims to understand how new technology is adopted.

Based on the Innovation Diffusion Theory [8], which explains how an idea, practice or object diffuse and be accepted by people, mobile technology adoption is a long process, getting through the Knowledge stage, Persuasion stage, Decision stage, Implementation stage and Confirmation stage. Therefore, this study investigated older people's adoption of mobile technology from many different aspects, including getting, learning, using and adopting mobile technologies.

Research questions of this study are as follows:

- How do older people get information about mobile technology?
- How do older people learn and use mobile technology?
- Why, or why not, do older people adopt mobile technology?

2   Methods

This study took place in the east part of London (Hackney and Tower Hamlets) in 2016. Questionnaires and interviews were used.

2.1   Participants

Usually, 'older people' are defined as people over 60 years old in accordance with the World Health Organization's convention for the definition of 'ageing' persons [9]. However, we included people between 50 and 60, for the consideration that this group of people are experiencing the evolvement of Internet and have been involved in different technologies to some degree, which may give us some predictive inspiration in future design and research work. We excluded people over 70 in this research, because few of them chose to have unlimited access to Internet or other technology devices.

30 participants took part in this study. They were balanced in gender and employment status, covering different education level and having different living arrangements (Table 1).

2.2   Process

The participants were recruited from a university and two social communities. All of them have signed a consent form, and agreed to take part in this study.

Table 1. Basic information of participants

Characteristics		N	%
Age	50–54	12	(40)
	55–59	6	(20)
	60–64	5	(16.7)
	65–70	7	(23.3)
Gender	Male	17	(56.7)
	Female	13	(43.3)
Living arrangement	Alone	10	(33.3)
	With partner only	6	(20)
	With child only	3	(10)
	With partner and child	7	(23.3)
	With other relative	1	(3.3)
	Other	3	(10)
Education level	Postgraduate or higher degree	11	(36.7)
	1st degree	4	(13.3)
	HND/HNC/Teaching	2	(6.7)
	A-Level	3	(10)
	BTEC/College diploma	7	(23.3)
	Lower degree	3	(10)
Employment status	Retired	7	(23.3)
	Employed part time	5	(16.7)
	Employed full time	9	(30)
	Unemployed	9	(30)

Firstly, each participant was given a printed questionnaire. Since some of the technical terms are unfamiliar with some older people, the questionnaires were done face to face. Each questionnaire took about 15 min to fill in. It was used to understand the general adoption of mobile technology among older people.

Then, each questionnaire was followed by an interview, based on the answers in the questionnaire. It aimed to find out the possible reasons why or why not older people adopt mobile technology.

3   Results

3.1   Information Channels of Mobile Technology

Information channels are important to people's early adoption of a new device or new App. Usually, people need information before making decision of whether to adopt the devices or apps.

From this study, information channels that older people get to know a new mobile device and new Apps are shown in Tables 2 and 3.

Table 2. Information channels of mobile devices

Information channels	N	%
Word of mouth by friends and family	22	73.3
High street stores	7	23.3
TV or Radio	5	16.7
Newspaper or magazines	8	26.7
Social media (such as Facebook and Twitter)	4	13.3
Relevant website	15	50.0
Advertisement in public place (in the underground or on the street)	5	16.7
Other: don't care about this kind of information	2	6.7
Valid N	30	

Table 3. Information channels of mobile apps

Information channels	N	%
Word of mouth by friends and family	12	50.0
App Store or Platform (such as Play Store, Galaxy Apps) in the smartphone or tablet	13	54.2
Newspaper or magazines	3	12.5
Social media (such as Facebook and Twitter)	3	12.5
Relevant website	11	45.8
Advertisement in public place (in the underground or on the street)	3	12.5
I only use the apps existed in my device and never get information about new apps	5	20.8
Valid N	24	

3.2 First Encounter with New Mobile Device or Apps

When facing a new mobile device such as a smartphone or a tablet, the study found that 43.5% participants think they have no difficulty in using a new device or the app 34.8% participants would like to have somebody explain and teach them how to use the new devices or apps.

Different people have different preference in the methods of learning a new function or a new app on mobile devices (especially the smart ones).

The preference of the participants in this study is shown in Table 4. Choices of participants with no mobile devices or only simple cellphones have been excluded in the result, as they have no or little demand for this kind of learning.

3.3 Mobile Technology Adoption Among Older People

Mobile Device Adoption. Among all the 30 participants, all of them have Internet, 14 participants (46.7%) have cellphones (simple mobile phones), 24 participants (80%)

Table 4. Preference of learning a new function or a new app

Methods	N	%
Try it myself	14	58.3
Watching an introduction video	4	16.7
Reading an introduction guide	3	12.5
One to One help from friends or family	7	29.2
One to One help from professionals	6	25.0
Learning within a group of people (like a training course)	3	12.5
Search online	1	4.2
Valid N	24	

have smartphones, 20 participants (66.7%) have personal tablets and 2 participants (6.7%) have smart wristbands.

The participants have rated the frequency of using each item with numbers 1 to 4:

1 = Never
2 = Occasionally
3 = Everyday within 4 h
4 = Everyday more than 4 h

The result is shown in Table 5.

Table 5. Frequency of ICT usage

ICT	Min	Max	Mean	SD
Internet	2	4	3.30	.702
Computer	1	4	2.90	1.029
Cellphone	1	4	1.67	1.028
Smartphone	1	4	2.83	.986
Tablet	1	4	2.20	1.031
Smart wristband	1	4	1.13	.571
Valid N	30			

As shown in the table, the usage of Smartphones has exceeded the usage of Cellphones and nearly the same with computer usage. Only two people in this research have smart wristbands. Both of them were using Fitbit. One got the wristband from her daughter and used it only occasionally, while the other was an IT specialist who used it everyday. Only one participant had never used any kind of mobile devices.

Mobile App Adoption. In total 24 (80%) participants have got a smartphone or tablet, which is capable for installing apps. Among them, 5 (20.8%) participants had never downloaded an app by themselves and rarely used the apps embedded in their smartphone or tablet. 2 (8.3%) participants had never downloaded the apps by themselves but often used the apps embedded in their smartphone or tablet. 17 (70.8%) participants have the experience of downloading some apps by themselves.

The apps they have downloaded include social apps such as whatsapp, twitter and facebook; traffic apps such as citymapper, bus time and national rail; video apps such as BBC Player and Youtube. Some people also download pdf readers to read ebooks or articles on their mobile device and some people could not really remember the names of the apps they had downloaded.

Adoption of Different Operations. People interact with their devices in different ways. Figure 1 shows how frequently the different operations are used.
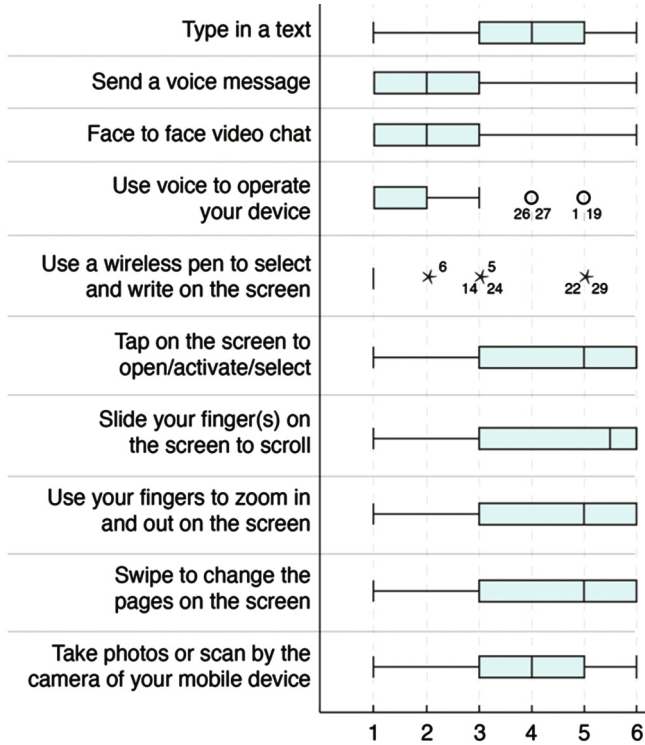

Fig. 1. Frequency of different operations

Frequencies are rated as:

1 = Never;
2 = Less than once a month;
3 = Every month;
4 = Every week;
5 = Everyday (less than 5 times on average);
6 = Everyday (more than 5 times on average).

Adoption of Different Functions. Today's mobile devices are integrating an increasing number of functions. Some people adopt mobile devices only as a mobile

Table 6. Adoption of different functions

Functions	N	%
Making a phone call	24	100.0
SMS, Text messaging	23	95.8
E-mailing	21	87.5
Using face to face video chat (such as Facetime, Skype)	14	58.3
Using social network (such as Facebook, Twitter)	11	45.8
Taking a photo	24	100.0
Filming/taking a video	11	45.8
Watching videos	12	50.0
Listening to music	13	54.2
Playing games	6	25.0
Online shopping (such as eBay Amazon)	6	25.0
Reading News or ebooks	11	45.8
Browsing/surfing website(s)	17	70.8
Mapping, Navigator (such as Google Map)	18	75.0
Online Banking or paying bill	4	16.7
Setting reminders (such as Calendar and alarm)	13	54.2
Sports tracker (count your steps and record your path)	2	8.3
Health monitor (keep a record of your health, such as google fit and healthkit)	4	16.7
Send voice messaging (using messenger, whatsapp or wechat)	7	29.2
Other: Traffic tracker	3	12.5
Valid N	24	

connect with others while other people may regard mobile devices as a small computer. Therefore, to understand people's adoption of mobile technology, their adoption of different functions should be taking into consideration as well. Since many functions are only available on smart mobile devices, only the answers of 24 participants who have smart mobile devices are taken into consideration. Results are shown in Table 6.

3.4 Reasons of Adoption and Non-adoption of Mobile Technology Among Older People

In this study, only one participant had never used a mobile device. He was a teacher who has not retired. He only uses a computer and telephone to get contact with people. The only time he will be out of reach to the people who he may want to contact is the "half hour walk from home to the office." He was satisfied with his lifestyle without mobile devices.

6 participants did not have any smart mobile devices, which could access a larger range of services other than making phone calls. The reasons for not getting this kind of device have been concluded in Table 7.

Table 7. The reasons for not getting a smart mobile device

The reasons for not getting a smart mobile device: (Similar expressions have been calculated as one reason)	N	%
"The cost of using a smartphone/tablet – I do not want to spend a lot of money when using a smartphone/tablet."	4	66.7
"I do not think a smartphone/tablet is useful."	4	66.7
"I want peace and quiet after my working hours"	3	50
"I have other devices such as a laptop or a netbook that can function as well, or better than a smartphone/tablet"	3	50
"A smartphone/tablet is too complicated and difficult to use, and it takes much efforts to learn it."	2	33.3
"I don't know how to use a smartphone/tablet and I don't know what to do when I have difficulties using it."	2	33.3
"Using a smartphone/tablet does not fit with my lifestyle."	2	33.3
"I do not feel comfortable using small screens and tiny keyboards."	1	16.7
"I'm worried about the negative consequences induced by the wrong operations and thus I avoid using new devices."	1	16.7
Valid N	6	

Only 2 of them planed to get a smartphone or tablet, and the reasons have been concluded in Table 8.

Table 8. The reasons for planning to get a smartphone or tablet

The reasons for planning to get a smartphone or tablet (Similar expressions have been calculated as one reason)	N	%
"Most of my friends have used smartphone/tablet, and have convinced me to get one."	2	100
"I want to have a new smartphone/tablet that has more functions such as taking a photograph, filming, and surfing the internet."	2	100
"I travel a lot and the smartphone/tablet will help me on my travels."	2	100
"I will get an upgrade from my provider"	1	50
"They offer apps for the learning apps for languages and composing music"	1	50
"I want to use a smartphone/tablet to keep a better connection with my friends or family"	1	50

Among the 24 participants who had a smart mobile device, 19 participants enjoyed using these devices while 5 of them did not really like using this kind of device. The reasons for not enjoy using smart mobile devices are shown in Table 9.

Table 9. The reasons for not enjoy using smart mobile devices

The reasons for not enjoy using smart mobile devices: (Similar expressions have been calculated as one reason)	N	%
"I don't want my life be taken over by mobile device."	4	80
"I don't want to spent too much time in a virtual world, I'd like to enjoy the real life."	4	80
"Things on mobile devices always change, I'm fed up with learning new figures."	2	40
"Sometimes, I would like to have someone explain and teach me the new functions or apps."	2	40
"Some apps are too complex to use, I can't remember how to use."	1	20

4   Discussion and Conclusion

From how older people get to know a mobile technology to how they use mobile technology, this study investigated mobile technology adoption among older people.

This study shows that more older people are using smartphones instead of simple cellphones. Normally, the fast growing smartphone market will contribute to this.

4.1   How Do Older People Get to Know a Mobile Technology?

Older people get information of mobile devices mainly from the "word of mouth by friends and family" (73.3%) and "relevant website" (50%). They get information of mobile devices mainly from "App Store or Platform (such as Play Store, Galaxy Apps) embedded in the smartphone or tablet" (54.2%). "Word of mouth by friends and family" (50%) and "relevant website" 45.8%) are also very important information sources of mobile apps.

4.2   How Do Older People Learn to Use Mobile Technology?

About 44% participants think they have no difficulty in using a new device or the apps on it. It suggests that older people are getting used to mobile device at a surprising speed, but it could in part because of the limited kind of apps and functions they use.

About 35% participants would like to have somebody explain and teach them how to use the new devices or apps. But 58% participants prefer to learn a new function or apps by "trying it myself". While mobile devices and mobile apps are easier to learn than computers and software, mobile devices have more private information. This is the most fast and safe way of learning a mobile device or mobile apps, especially for those who have confidence in using this kind of things.

This learning method is followed by "One to One help from friends or family" (29.2%) and "One to One help from professionals" (25%), showing that one to one help is the most preferable way for older people to get support on using a new mobile technology.

4.3   How Do Older People Use Mobile Technology?

This study suggests that many older people are already quite familiar with interacting with the touch screen, using "tap", "slide to scroll" and "swipe", even "zoom in and out".

The most popular way for older people to input information is still typing text (Mean = 4.03). Taking photos or scanning by the camera of mobile device (Mean = 3.60) also has an extensive popularity among older users. However, using voice as an input (Mean = 1.73) hasn't been preferred by older people yet.

About 71% of the participants who have got a smartphone or tablet have experience in downloading an app. Although functions like "making phone calls" (100%), "SMS, Text messaging" (95.8%) and "E-mailing" (87.5%) show a great popularity among older people. Functions other than communication, such as "Taking a photo" (100%), "Mapping, Navigator" (75%) and "Browsing/surfing website" (70.8%) have also been used widely among older people. This may suggest that more and more older people begin to explore their smart devices, regarding mobile phone not only as a phone, and try to make full use of it.

4.4   Why, or Why not, Do Older People Adopt Mobile Technology?

The reasons for not getting a smart mobile device can be summarize in 2 points. The most important one is that older people cannot perceive enough usefulness of the device – not useful enough for them to pay an extra cost and not useful enough compared with other devices. The second point is lack of comfort, both physically and mentally, caused by mobile device. These two points are consistent with the "perceived usefulness" and "perceived ease of use" in Davis' Technology Acceptance Model [6].

People adopt devices first and adopt function and apps later. However, from the reasons for planning to get a smartphone or tablet, attractive functions and apps seems to be strong enough to promote the adoption of devices in reverse.

Although most participants are using smart mobile devices, many of them are unhappy with these devices. In order to avoid future abandonment of mobile technology, the reasons for not enjoying using smart mobile devices should be taken into consideration. The reasons come from two parts. On one hand, older people do not like the way that mobile technology interferes their life. On the other hand, they do not want to make much effort to keep up with the changing technology.

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