The Usability and Acceptability of Tablet Computers for Older People in Thailand and the United Kingdom

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Abstract. This study investigated the usability and acceptability of tablet computers for older people in Thailand and the United Kingdom. Although some research has shown that older people can use tablet computers easily, other research has found that tablets are difficult to use for them particularly because of problems with the interaction styles. A study with ten participants in Thailand and eight in the UK was conducted, aged from 61 to 81 years old (mean age 67.9 years). Four of the UK participants and six of the Thai participants had used tablet computers before. All participants were able to complete a series of website tasks; however, some encountered problems such as text which was too small and color contrast between text and background that was not sufficiently clear. In addition, when participants zoomed, they tended to lose information and orientation on the webpage. Most participants found tapping, and zooming on the tablet very easy, but some had problems with tapping. This was possibly because their hands are drier than younger people's. In particular, they found tapping on labels on webpages difficult. All participants had positive attitudes towards tablet computers and either enjoy use them or think they would enjoy using them. Some participants felt that tablet computers are easier and more convenient than desktop computers for them to use. Finally, contrary to expectations, participants preferred the concurrent verbal protocol to the retrospective verbal protocol.

Keywords: Usability · Acceptability · Tablet computer · Older people · Concurrent verbal protocol · Retrospective verbal protocol

1 Introduction

The older population worldwide is increasing rapidly and will continue to grow in the next two decades [1]. In Thailand, within the next few years the number of people aged 60 and over will outnumber young people under the age of 15 for the first time in Thai history [2] while older people in the United Kingdom (UK) have outnumbered the number of young people under the age of 16 since 2008 [3]. Older people are increasingly using new technologies as evidenced by their increasing ownership of electronic devices such as smartphone, tablet computers and e-readers [4]. In addition, tablet computers are thought to be useful tool for older people for accessing online

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information and services, as well as communicating with family and friends and to enhance their everyday lives in general [5, 6].

In the UK, the usage of portable devices such as laptop or tablet computers amongst older people has grown, in 2016 43% of 65 to 74 year olds now use a laptop or netbook (20% of those 75 and older), 31% use a tablet computer (15% of those 75 and older) and 83% use a mobile or smartphone (50% of those 75 and older) [7]. Use of the internet is also growing amongst older people. In 2006 only 9% of the population 65 and older used the internet, by 2016 this had increased to 53% [8–10]. Thai older people are now more likely to access the internet via portable devices such as smart phones and tablet computers than via desktop computers [11–13]. Thus it can be seen that portable devices are now becoming more widely used by older people in both the UK and Thailand.

Although some research has shown that older people can use tablet computer very easily, other research has found that tablets are difficult to use for older people, particularly because of problems with interacting with the device (see Sect. 2.2). Moreover, there has been no research on the usability and acceptability of tablets for older people in developing countries such as Thailand, in spite of their increasing use in these countries.

This study also explored the use of concurrent and retrospective verbal protocols with older people. No research could be found which investigated the use of these two popular methods for studying technologies with older people, although a number of studies (e.g. [5, 14]) have used one of the protocols with older participants. It may be that undertaking a concurrent verbal protocol is particularly difficult for older participants, due to the increased cognitive effort of undertaking the task and simultaneously talking about it.

This study investigated the experience and attitudes of older people to using tablet computers in both Thailand and the UK. The research questions investigated in the study are:

1. Are older people able to complete tasks interacting with websites using a tablet computer?
2. What are problems which older people encounter when undertaking tasks interacting with websites on a tablet computer?
3. What are the attitudes of older people to using a tablet computer?
4. What are the differences in performance, problems and attitudes between older people in Thailand and the UK?
5. Is there a difference between older people's preference for concurrent and retrospective protocols?

2 Background

2.1 Definitions of Older People

There are many definitions of the minimum age at which old age begins, from different organizations and countries. According to the World Health Organization [15], the

United Nations (UN) agreed that people who are over 60 years constitute the older population, but there is no UN standard criterion for the minimum age of older people. However, the WHO [15] stated that most developed world countries have accepted an age of 65 years and over as a definition of older person.

Kamollimsakul [16] noted that "healthy life expectancy" (HLE), the average number of years that a person can expect to live in fully health [14], should be considered as a factor for deciding the minimum age of older people, particularly when considering less developed countries, as different countries have different healthy life expectancies. Kamollimsakul investigated appropriate definitions of older people in different countries where the retirement age, life expectancy and HLE vary. For example, in Thailand, retirement is typically at 60 years, life expectancy is 75 years and HLE is 66 years [17]. Whereas in the UK, 65 is the typical retirement age [18], 81 is the life expectancy and 71 is the HLE [19]. We can calculate an appropriate minimum age for old age in two countries which equalizes the HLE in the two countries using the following formula:

$$\text{Minimum age for the second country} = \text{HLE2} - \left(\left(\frac{\text{HLE1} - \text{RA1}}{\text{LE1}}\right) \times \text{LE2}\right)$$

RA1: The minimum age of participants for first country (the UK)
LE1: Life Expectancy in the first country
HLE1: Healthy Life Expectancy in the first country
LE2: Life Expectancy in the second country (Thailand)
HLE2: Healthy Life Expectancy in the second country

The results of this calculation for the minimum age of old age show that the equivalent of a minimum age for older people of 65 years in the UK is equivalent to 60 years in Thailand (see Table 1). Therefore, the minimum of age for older people in our research will be 65 years in the UK and 60 years in Thailand.

Table 1. Minimum age for old age for the UK and Thailand, equalizing for HLE

Country	Healthy life expectancy (years)	Minimum age for old age (years)
The UK	71	65 (set)
Thailand	66	60.44 (calculated)

2.2 The Use of Tablet Computers by Older People

At present, older people are increasing their use of computing devices, not only desktop and laptop computers but also their use of newer technologies such as tablet computers. Nevertheless, there are many arguments both for and against the usefulness, usability and acceptability of tablet computers for older people.

Jayroe and Wolfram [5] compared user interaction with tablets (in this case iPads) and desktop computers for older people in America by interviewing ten American participants aged 67 to 87 years. The study used a think aloud protocol of the

participants talking through the issues they were having. Participants were more comfortable with tablets than desktop computers, but some participants faced issues with the iPad keyboard which did not have a delete button which they were used to. Participants stated that the main advantages of tablets were their portability, efficiency, ease of use and speed.

Werner et al. [14] also conducted an evaluation of the general usability and acceptance of tablet computers (again using an iPad) in Austria by adults aged over 60 years old. They found that some participants misunderstood the tablet interface. For example, participants confused "back" to main screen and "back" within the web browser. In addition, some participants had problems when tapping on the screen for functions such as copy or paste although enlarging and minimizing screen content using the pinch gesture were very easy for all participants as were scrolling and turning pages by swiping with a finger. However, all the older participants stated that in general the tablet was very easy to use and starting an application worked very easily and was faster than on a desktop computer.

Barnard et al. [20] studied technology acceptance and adoption by older people in the UK. In the first of two case studies, they investigated older people's attitudes to tablets for navigation by interviewing them while walking in university of Leeds and using a tablet. They found that most participants believed that new technologies can be learned by older people. In addition, participants stated that size of the tablet may also be an advantage, big enough to see things well when compared with a smartphone and having the keyboard and the screen in one place makes things easier. However, these results were not actually related to the mobile use of a tablet. In a second case study, they investigated the first use of tablets by older people who have little experience of digital technologies. Some participants encountered problems with the tablet, for instance they found the labelling of some controls too small, and they were confused about how to move using the cursor keys. In addition, some participants lacked confidence in using the tablet.

Wright [21] studied issues with tablets for older adults with 52 members of a UK branch of the University of the Third Age. She found that older people easily remembered many finger gestures for the tablet such as swiping, tapping and dragging but their inadvertent touching of the screen could result in typing errors or unexpected page changes. These new users of tablets often focused on a small area of the screen. In addition, these older participants thought that tablets very helpful for internet activities.

Lepicard and Vigouroux [22] compared single-touch and multi-touch interaction for older and younger people in France. Older participants were fastest at moving, slower at rotating and slowest at zoom. The researchers suggested that multi-touch interaction is not recommended for older people, particularly rotate and zoom actions, which is in contrast with the study by Werner et al. [14] discussed above, who found that enlarging and reducing the size of screen content using the pinch gesture was easy for older people.

In summary, research has shown that the attitudes of European and American older adults are more positive than negative toward tablets, but some older adults still have issues with using tablets such as the labels on some on the controls being too small and hard to see or recognize [20], interaction with the touchscreen being difficult [5, 20, 22] and conceptual problems such as confusion about how to move the cursor, confusion

between back to main screen and back within the web browser [14, 20]. In addition, some older adults lack confidence in using a tablet [20] and lack experienced with a non-tactile keyboard [5]. However, older adults generally find that tablets very useful, particularly for things such as internet activities [21]. However, all these studies were conducted with older people in North America Europe, there is no empirical evidence about acceptance and usability of tablet computers older people in countries such as Thailand.

3 Method

3.1 Design

The study was undertaken in both Thailand and the UK. Participants were asked to undertake tasks with two different websites on a tablet computer using verbal protocols and interviewed about their experience with the tablet, with the protocols and their attitudes to tablet computers in general.

Concurrent verbal and retrospective verbal protocols were used in this study as the same as previous studies for testing of usability [5, 14] and both protocols are widely methods for testing the usability testing of interactive systems, although the appropriateness of these techniques for older people has not been investigated to our knowledge. In concurrent verbal protocol (CVP) participants speak out loud what they are thinking while conducting the task and in retrospective verbal protocol (RVP) participants retrospectively verbalize their thoughts about the task while reviewing a recording of performance of the task [23].

Participants completed a questionnaire about demographic information and their use of websites and tablet computers before undertaking tasks on two websites, one website with each protocol. Participants were asked to rate the severity of any problems they encountered while they were undertaking the tasks (a Likert rating item was used, 5 = very severe problem to 1 = very minor problem). After completing the tasks, participants were interviewed about the tasks, their attitudes toward using tablet computers and their preference for the CVP and RVP methods.

3.2 Participants

Eighteen older participants took part in the study, eight participants in the UK and ten in Thailand. In the UK, there were four men and four women, their ages ranged from 65 to 81 years, with a mean age of 71.75 years. Four of the UK participants were still working and four were retired.

In Thailand, there were three men and seven women, their ages ranged from 61 to 71 years, with a mean age of 64.9 years. Three of the Thai participants were still working and seven were retired.

To thank them for their participation, the UK participants were offered a gift voucher valued at £25 and 500 Baht for Thai participants.

3.3 Equipment and Materials

The study was conducted using a mini tablet computer (iPad mini) running iOS 9.2.1. The sessions were recorded using QuickTime on a separate Apple machine running OS X EI Capitan using an iPhone earpod with microphone.

Materials in the study were:

The initial questionnaire which consisted of three parts: (1) the use of websites (2) the use of tablet computers and (3) personal data. Questions included how often participants use computers and the web, how they learnt to use tablet computers and the web, their self-report of their expertise and experience with the web and tablets and information about age, gender, and occupation.

The websites and tasks used in the study were chosen based on older adults' common activities when accessing the internet. The most common internet activities for the 65 and over age group are sending emails, finding information about goods and services and reading or downloading online news or magazines [8, 10]. Therefore, the tasks used in this study related to finding information about goods and services.

Two websites were chosen for the study in Thailand and two for the UK, one an e-commerce website (to cover goods) and one a travel website (to cover services). For the UK study, websites from the USA were chosen, so that participants would be unlikely to have used them. For the Thai study, this strategy was not possible. Both websites used were from Thailand and the contents of the websites presented in Thai. However, none of Thai participants had used either of Thai websites before.

For each website, there were two tasks:

1. Hipmunk.com (for UK study)
   - Find the cheapest direct non-stop flight for two adults from Heathrow Airport London (UK) to Bangkok Airport (Thailand) leaving on 28 August 2016 and returning on 1 October 2016
   - Find the cheapest, five star rated hotel in Paris, France for a room for two people for two nights from 25 August 2016
2. Walgreens.com (for UK study)
   - Find the cheapest yoga mat in an aqua color
   - Find the cheapest, five star rated baby safety gates
3. Traveloka.com (for Thai study)
   - Find the cheapest, four star rated hotel in Osaka, Japan for one room for two people two nights from 10 October 2016
   - Find the cheapest direct non-stop flight for two adults from Suvarnabhumi-Bangkok Airport, Thailand to Melbourne Airport (Australia), leaving on 20 October 2016 and returning on 10 December
4. Watsons.co.th (for Thai study)
   - Find the cheapest hair straightener
   - Find the cheapest, five-star anti-wrinkle skincare cream.

A problem severity rating sheet was provided to participants for use during the tasks. A Likert rating item was used, 5 = very severe problem to 1 = very minor problem.

A post-study interview schedule which consisted of three parts: (1) their experience with the websites and the tablet computer; (2) their preference for the CVP and RVP methods and (3) their use and attitudes towards tablet computers.

3.4 Procedure

The study took place in a quiet room. The researcher explained the aim of the study and the tasks and participants were asked to read and sign an informed consent form. Participants then completed the initial questionnaire. If needed, the researcher then showed the participant the basics of using a tablet computer. The researcher then gave a demonstration of how to perform the first type of verbal protocol, performing a short protocol herself. The participants then practiced the protocol themselves, doing one or two tasks, until they felt comfortable. Then they were given the first website and undertook the two tasks. The procedure was then repeated for the other website.

During the CVP condition participants performed the task and thought out loud at the same time whereas during the RVP condition participants were asked to perform the task in silence, then they reviewed the task by viewing video of the task talked the researcher through the task.

After completing the tasks, participants were interviewed about the websites and tasks, their attitudes towards using tablet computers and also their preference for the CVP and RVP methods. At the end of session, participants were debriefed and encouraged to ask questions about the study. They were thanked for their participation and offered a gift voucher.

4 Results

4.1 Use of the Web by Thai and UK Participants

Table 2 summarizes the devices that the participants use to access the web for both Thai and UK participants, as well as all participants together. Overall, 61.1% (11 out of 18) participants have accessed the web using smartphone, followed by 50.0% (9) who

Table 2. Devices used in accessing the web used by Thai and UK participants (% and number of participants)

Devices	Thai participants (N = 10)	UK participants (N = 8)	All participants (N = 18)
Smartphone	60.0% (6)	62.5% (5)	61.1% (11)
Desktop computer	40.0% (4)	62.5% (5)	50.0% (9)
Tablet computer	40.0% (4)	50.0% (4)	44.4% (8)
Laptop computer	20.0% (2)	62.5% (5)	38.9% (7)

have used a desktop computer, and 44.4% (8) who have used a tablet computer and 38.9% (7) who have used a laptop computer.

The smartphone is the most popular device for participants use to access the web in Thailand (used by 60.0% of participants, 6 out of 10), while the desktop computer, laptop computer and smartphone are the most popular devices for participants to access the web in the UK (all were reported by 62.5% of participants, 5 out of 8). However, the tablet is the second most popular device for accessing the web for Thai participants. 40.0% of Thai participants use a tablet for accessing the web (two Thai participants only used a tablet for teaching and social network applications but not to access the web are not included in these figures) while two participants use a laptop computer. Although the tablet is the least popular device for accessing the web in the UK, 50% of the UK participants use one for accessing the web.

Participants in the UK have been using the web for on average 15.5 years (SD: 6.4) while participants in Thailand have been using it for on average 4.5 years (SD: 4.6). An independent samples t-test shows that this difference was significant ($t\ (16) = 4.23$, $p < 0.05$). Participants in the UK use the web in a typical week on average 8.31 h (SD: 5.6) whereas participants in Thailand use it for on average 6.83 h (SD: 6.9). An independent sample t-test failed to show that this difference was significant ($t\ (16) = 0.49$, n.s.).

In addition, participants were asked to rate their level of experience and expertise in using the web on a scale from 1 = "Not at all" to 7 = "Extensive". The results show that self-reported level of experience and expertise of using the web for Thai participants (mean: 2.40 and 2.30, respectively) were lower than those for the UK participants (mean: 5.00 and 4.88, respectively). Independent sample t-tests revealed that there was a significant difference between the UK and Thai participants in self-reported level of experience of using the web ($t\ (16) = 4.85$, $p < 0.05$) and there also was a significant difference in self-reported expertise in using the web ($t\ (16) = 4.74$, $p < 0.05$).

4.2 Use of Tablet Computers

Ten participants (55.5% from all participants (N = 18)), four UK participants (50%, 4 out of 8) and six Thai participants (60%, 6 out of 10) had used a tablet before.

For those participants who had used a tablet, the most common method for learning to use a tablet was from family members (60.0%, 6 out of 10). Some participants learnt by themselves (30.0%, 3), or learnt from colleagues (20%, 2) or had taken a course (20.0%, 2), while only 10.0% of participants learnt from their friends or by reading a guide (see Table 3).

50.0% of the UK participants and 66.7% of Thai participants learnt how to use the tablet from their family members. 50.0% of UK participants learnt by themselves while only 16.7% of Thai participants learnt by themselves. A few Thai participants learnt by taking a course (33.3%) or from colleagues (33.3%) whereas no the UK participant learnt by either of these methods. Only 25.0% participants in the UK learnt from their friends but no participants learnt by that method in Thailand. In contrast, no participants in the UK learnt by reading a guide but 16.0% of participants in Thailand learnt by that method.

Table 3. Means of learning to use a tablet computer for Thai and UK participants (% and number of participants)

Learning to use the tablet	Thai participants (N = 6)	UK participants (N = 4)	All participants (N = 10)
With a family member	66.7% (4)	50.0% (2)	60.0% (6)
By themselves	16.7% (1)	50.0% (2)	30.0% (3)
Took a course	33.3% (2)	0.0% (0)	20.0% (2)
With a colleagues	33.3% (2)	0.0% (0)	20.0% (2)
With a friend	0.0% (0)	25.0% (1)	10.0% (1)
By reading a guide	16.7% (1)	0.0% (0)	10.0% (1)

The UK participants have been using a tablet for on average 4.25 years (SD: 2.63) whereas Thai participants have been using one for on average 1.95 years (SD: 1.57). However, an independent samples t-test did not show this difference to be significant ($t(8) = 1.76$, n.s.). The UK participants use a tablet for on average 4.00 h (SD: 1.41) in a typical week while Thai participants use one for on average 6.88 h (SD: 5.15) in a typical week. Again, an independent samples t-test did not show that this difference was significant ($t(6.07) = -1.30$, n.s.).

4.3 Experience with the Websites and the Tablet Computer

Participants were asked to rate the severity of the problems they encountered while undertaking the tasks, but some participants found this very difficult during CVP (it clearly distracted them from the task), so we did not insist that they made the ratings. Table 4 summarizes the problems which were mentioned by participants and observed when they used it.

Participants found 13 problems related to text presentation. Four of the UK and all ten Thai participants had problems with text presentation. In addition, some participants forgot to zoom out when the texts were too small and they found that zooming out made them lose information and orientation. One Thai participant said that they should not have to zoom out for reading and the website should be in larger text. In addition, one of the UK and one Thai participant said that the website did not show information clearly enough. Four Thai and one of the UK participants found that the color contrast between text and background was not sufficient. Finally, two Thai participants said that the meaning of some words on the websites was not clear to them and one of the UK participants found that one of the text boxes was too small for typing into.

Nine problems related to misunderstandings were encountered. Two of the UK participants found that some controls were not clear and four Thai participants found that it was not clear where an area should be tapped (e.g. on a label, text or picture) and it was not clear in which category a product would be searched for. However only one Thai participant said that a photo of the product on the website was not clear. In addition, two Thai participants misunderstood some signs on the website and one was confused as to how to move the cursor.

Table 4. Problems encountered during the tasks

Major category	Specific problem	UK	Thai
Text presentation	The button was too small	2	–
	The text on the menu bar was too small	–	5
	Text on the label was too small	–	2
	Text on the webpage was too small	1	7
	Webpage did not show information clearly	1	1
	Meaning of some words on the webpage were not clear and did not make sense	–	2
	Text box was too small for typing into	1	–
	Color of tab which was chosen from a menu was not sufficiently different in color from the other tabs	1	1
	Color of star rating on the product did not contrast sufficiently with the background. They should be red	–	1
	Text and background colors did not contrast well enough	–	1
	Icons were too small	–	2
	Submenu should have different color from main menu	–	1
	Search button for the flight search did not look like a button	–	2
Misunderstanding	It was not clear how to use the control for ranking the price of the hotel	2	–
	The page had two areas which scrolled separately, this was confusing in itself and unclear how to scroll each area	1	–
	Symbols which represent passengers were not clear	–	1
	It was not clear where I should tap (the label, picture, some text or check box)	–	4
	Not clear what category from the menu to search in for a particular product	–	4
	The photo of the product was not clear enough	–	1
	It was not clear how to use the calendar	2	2
	The sign for non-stop flight was not clear	1	–
	Confused as to how to move the cursor	–	1
Feedbacks and controls	I did not know that the website was loading	2	–
	Unclear how to recover from errors when the website is highly interactive	1	–
	I had to fill in all information again when I pressed back button in the browser	1	–
	The initial or previous text in the textbox did not clear when a new search was initiated	1	3
	The total price of the hotel was not given and I had to calculate by myself	–	1
Tapping and zooming in and out with the tablet	Could not see the whole information of the webpage when zooming out	3	3
	The tablet was too responsive, easy to activate things without meaning	1	2
	The button did not work when tapped	1	2
	The calendar on the web was not responsive when tapped	2	–
	Interaction was “weird” and not responsive when tapping on the text box	1	–
Size of the tablet	Size of the tablet was too small which made it easy to make an error	1	–

Five problems about feedback and controls were encountered. Two of the UK participants found that there was no the feedback that the website was still working or searching for something for them. Moreover, one the UK participants found that it was not clear how to return to a previous state when a mistake had been made. Three Thai

participants found that the initial or previous words in a text box were not cleared when a new search was initiated, while two the UK participants faced with this problem. One Thai participant found that total price of the hotel was not summarized for him when he searched for two nights' accommodation.

Five problems related to tapping and zooming in and out were found. Seven of the UK participants had some problems with tapping and zooming in and out while five Thai participants encountered this type of problem. For example, when they tapped on controls but they did not work, probably because their hands are drier than younger people's and some of them tapped using their nails rather than their finger pads, not realizing this will not work. Moreover, three of the UK and three Thai participants found that they could not see the all information on the webpage when they zoomed out for reading. Two Thai and one of the UK participants said that tablet was too responsive for them, they activated functions when they did not mean to by touching the screen accidently. In addition, one UK participant stated that the tablet was too small.

Some of participants misunderstood that some text is interactive and some is not, so were not clear where they should tap and where there was no point in doing so. In addition, the symbols on some controls were not clear, for example the pictures which represent adult, children and infant passengers on travel websites. Moreover, some menus on the websites were not clear about what category from the menu to search in for a particular product.

Texts and some buttons on the website were too small for some participants. However, when participants zoomed in to make the text or button larger, that made them lose some of the information on the webpage and become disoriented. In addition, the website did not show information clearly, this included text and background colors that did not have sufficient contrast. In addition, the feedback when the website was loading was not clear for participants. Moreover, there was no information when participants got lost. For example, when participants tapped in the wrong place and wanted to go back, they were not clear how to do that. In addition, the initial words into text boxes were not clear when participants tapped on the text box for a new search.

4.4 Attitudes of Older Adults to Using the Tablet Computer

All the UK participants were able to complete the tasks and in the post-study interviews said that in general the tablet was easy to use and that they enjoyed using it. They said that gestures such as scrolling down and up, zooming in and out were easy to carry out, although two participants complained that zooming out made them lose some information on the webpage. Two participants had problems with tapping because their hands were quite dry. One participant said that the keyboard was small for her so she found it difficult to type easily. And one participant did not like the "spinner" feature used on one of the websites.

Nevertheless, all participants in the UK reported that they found that the tablet is easier and faster than a desktop computer. Three participants, who had never used a tablet before, said that they were tempted by the tablet after the study although one said that he was not tempted because he was planning to get a smartphone very soon. These results indicate that the UK older participants had positive attitudes toward using the tablet.

All the Thai participants were able to complete the tasks. Some participants stated that using the tablet is similar to using a desktop computer and they are able to transfer some knowledge from using a desktop computer to using the tablet. However, one participant complained that the screen and keyboard on the tablet was too small for her. One participant, who had never used a tablet before, said that if he used the tablet for approximately one month, he thought he would be able to work with it very well. Another participant said that after the study she would try to use a tablet because it was very tempting. Finally, one participant said that using a tablet would be very useful for her because she can study a map on the tablet while travelling and it also would give her something fun to do when she has time to fill, such as when waiting for someone. These results indicated that Thai participants also have positive attitudes toward using tablet computers.

Overall, the results show that All the UK and Thai participants have positive attitudes for using tablet computers. Some of the participants stated that they thought a tablet is easier, faster and also more convenience than a desktop computer. In addition, they mentioned that a keyboard on the tablet screen is easy to use for them but one participant felt that tablet keyboard is too small and some participants found it difficult to type very well on it. Overall, participants said that tablet is useful for older people and they enjoyed using it. However, as already mentioned, some participants still had some problems when doing the tasks on the tablet, such as buttons and text that were too small and poor contrast between text and background. One participant stated that these problems made him become quite frustrated.

4.5 Preference for CVP or RVP

Participants were asked which of the two protocols they preferred. Overall, twelve (66.7%, 12 out of 18) participants preferred CVP and six (33.3%, 6) participants

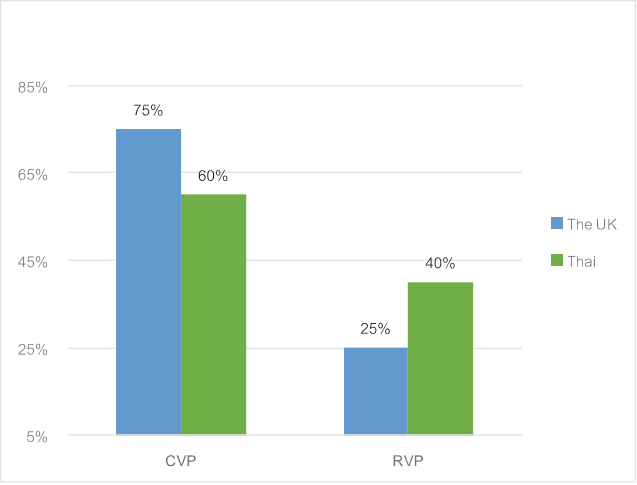

Fig. 1. Preference of UK and Thai participants for CVP and RVP

preferred RVP. Five (75%, 5 out of 8) UK participants preferred CVP and two preferred RVP (25%, 2), while six Thai participants preferred CVP (60%, 6 out of 10) and four preferred RVP (40%, 4 out of 10) (See Fig. 1). A chi-square test was used to investigate the differences in preferences for the CVP and RVP and between Thai and UK participants, there was no significant difference ($\chi^2 = 0.502$, df = 1, n.s.).

5 Discussion

This study investigated the usability and acceptability of tablet computers for older people in Thailand and the UK. All participants, both those who were novices with tablets and those who have some experience with the tablet before, were able to complete the tasks. However, some of participants misunderstood some controls on the websites. For example, they confused which texts are interactive and which are not. In addition, some participants found that feedbacks on the website were not clear such as loading feedback. Moreover, they enjoy to use it and they also stated that the tablet is easier, faster and more convenient than desktop computer. Similarly to some research [5, 14, 20] found that tablets is easier to use than desktop computers or personal computers.

With regard to interaction with the tablet, some of the participants have some problems with tapping. When they tapped on some controls, the controls did not work probably because their hands are drier than younger people's. Sometimes participants made a tap that was too long so other functions on the tablet appeared, such as copy or select all. These results are similar to those of Jayroe and Wolfram [5] who found that older people's fingers were less stable than younger people's and thus typing was not easy for them. Werner et al. [14] also found that some of their participants had problems when tapping on the screen; as with our participants, their tap was too long.

In addition, some of the participants found that zooming out made them lost some information on the webpages and they also found that zooming in too much and that made them confused how to do when the special functions were appeared. However, the majority of participants tapped and zoomed in and out without any difficulties. Furthermore, participants felt that tablets would be useful for older people. Some of participants have already been using a tablet to read news, search for information online and to listen to music. Therefore, the results show that the tablet is relatively easy to use for older people and that they have positive attitudes toward using the tablet.

6 Conclusions

This study focused on older people's attitudes to and use of tablet computers in Thailand and the UK. Overall, participants were able to complete the tasks but had still some issues such as text that was too small and a lack of clear feedback. In addition, some interactions with the tablet were somewhat problematic, such as holding a tap for too long on the same screen position. However, participants felt that using the tablet was not difficult and they thought that the tablet is very useful and convenient.

Two different think out loud protocols were used as one of the methods for eliciting information in this study. Two thirds of participants preferred CVP to RVP. This was quite surprising, as CVP increases the cognitive load on the participant, as they have to undertake the task and talk about it at the same time. However, several participants said that they often "talk themselves through" tasks with technology, as they are unfamiliar with how to do them, so undertaking the CVP was quite natural. Future research will explore in more detail finding problems with the think out loud protocols and readability of the tablet computer for older people.

The study has several limitations. The sample size is small, in particular it was difficult to recruit older participants in Thailand. Older Thai people were nervous about undertaking a study of new technology. In addition, there was a limited number of websites in Thai to be able to choose websites that participant had not used before. However, this turned out not to be an issue, as none of the participants had used the websites used in the study.

This study has investigated the use of tablet computers by older people in Thailand and the UK, highlighting some of the problems they typically encounter. It also investigated their attitudes towards using tablet computers. Older people in both Thailand and the UK have positive attitudes toward tablet computers and are interested in using them.

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