

Mobile Learning Concepts for Older Adults: Results of a Pilot Study with Tablet Computers in France and Germany

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Abstract. This paper sums up the evaluation results of a tablet computer course for older adults. As part of an European research project, the SenApp project, online course modules were developed to teach older adults the first steps on a tablet computer. After the course, a questionnaire was filled in Germany and France ($N = 26$). The evaluation focused on differences in satisfaction with support and course contents and in learning routines between age groups, education level, countries and pre-experience conditions. Main findings suggest that both courses were rated good, but that some support and content aspects were rated less good in France and by lower educated participants, by participants with less pre-experience in e-learning and by older age groups. This suggests that future course concepts should be created more flexible with different learning amounts for different experience levels and that especially support possibilities can be improved for some groups.

Keywords: Older adults · Tablet computer · ICT courses

1 Introduction

The heterogeneous group of older adults is a growing and promising target group for new learning concepts. As life expectancy increases and people stay healthy and fit for longer periods, more and more older adults are looking for useful leisure activities and are willing to learn something new. Nowadays in Western Europe, life expectancy at 60 years of age is 85 years for women and 81 years for men. This an increase of more than ten years for women and eight years for men compared to the life expectancy 100 years ago [1]. This gives more older adults the time to learn something new during retirement. As numbers of further non-occupational education institutions show, more and more older adults engage in further education and many of them in the area of ICT [2].

1.1 Learning in Older Age

As the group of adults older than 60 years of age is very diverse in cognitive, physical and learning abilities, creating learning programs that suit the entire target group is challenging. In general, many abilities decline in older age, e.g. fluid intelligence and

the speed of information processing and reaction times. This means that learning something new might take more time in older age, but is possible [3]. Also hearing and visual performance decline, which are also important senses for learning. This and other health problems can hinder potential participants in travelling to learning institutions. Although these problems are more or less relevant for all older adults, there are many older adults who have no problem with engaging in learning activities and others who have many problems. Pre-experiences with learning influence the perception of learning in general: people who engage in learning activities often, rate learning often as fun, whereas older adults without learning experience think that it is more exhausting than pleasant and are less willing to participate [4]. Also a minimum of self-organization, motivation and autonomy in learning is important for all further education offers for adults. People without many learning experiences in their adult life, often lack skills like self-organization and need a lot of structure and guidance in learning [5]. Also motivation for learning differs between older adults and motives change with age. Whereas competition, social comparison and instrumental motives are important for younger learners, motives like additional social contacts and intrinsic motivation and personal growth increase with age [6, 7]. E-Learning and blended learning concepts can be a solution at least to some of these points. E-Learning includes all forms of electronically learning and teaching; electronic media is used for presentation and/or distribution of learning material and/or is used for communication between learners and teachers [8]. Blended learning combines classical face-to-face learning with the flexible methods of e-learning [9]. These concepts enable many degrees of freedom regarding learning time, speed, material and place but also have possibilities for structure, guidance and communication [10].

1.2 ICT Use in Older Age

However, e-learning and blended learning require a minimum of ICT skills. Before e-learning and blended learning can take place, basic ICT skills are compulsory. This can also be done in a blended or completely online way, as long the new users have support for the first steps and good learning material that guides them step by step. Already since 2004, different e-learning courses for older adults were developed at the University of Erlangen-Nuremberg and its partner institutions and successfully integrated in an e-learning platform [10]. The platform enables learning, practicing and rehearsing in the participants' own speed, is enriched with different multimedia elements, suits to the daily living circumstances of the target group and shows added value for daily activities. Studies found, that these e-learning approaches can be very successful as long as individual support and feedback, communication, individual learning speed and the possibility to repeat everything at home and as often as it is needed, is given [10, 11]. Also age and pre-experience differences can be compensated by online learning approaches and it is therefore possible for different age groups and experience levels to learn in the same learning group [12]. At the moment, e-learning and blended learning approaches for older adults concentrate often on learning ICT skills, but of course, in the future also diverse learning topics are possible.

Of course, ICT users are growing, but many older adults still see themselves as computer novices and have no e-skills so far (e.g. 62 % of population 60 years old and over use a Computer on a regular basis in Germany. Yet, among those who are 70 years old and over, the percentage decreases to 29.4 %) [13]. This means that there are about 70 % of people above seventy years of age and also many younger adults, who might be interested and might profit from ICT learning. In the group of older adults, there are of course many in-group differences: Older women use the internet and ICT in general not as often as older men and also report more fears and negative attitudes against ICT [14]. Also low income, lower formal education and living in rural areas increase the possibility that an older adult is a non-user of online services [15]. The reasons for non-use are different, as a study in Germany has shown [16]: One group of older adults is interested in ICT in general, but gave up learning how to use it. Some report that the effort is too high and that it is too complicated. This was especially true for very old adults with some impairments e.g. sensory impairments with reading the screen, using the mouse or cognitive impairments with memorizing processes. Also frustrations with quite long learning processes and confusions e.g. with changing screens, pop-ups etc. lead to high drop-out rates in other studies [17]. The other group of non-users is not interested to learn how to use ICT, because they see no added value, they are satisfied with the existing mass media or because of time and/or financial constraints. Additionally, a big percentage of this group of non-users in general disapproves the internet and is afraid that it can be like an addiction or it can be dangerous to be online [16]. Although many of the convinced non-users will not be interested in learning how to use ICT, some of the non-users with false beliefs or with problems in their first learning attempts might profit from online or blended learning as this enables them to rehearse more often, use their own device and learn at home. Although, this seems promising, many older adults still feel overwhelmed by the many possibilities a desktop computer or a laptop have and/or have problems using a mouse or a keyboard. For this group, tablet computers can be an alternative.

In general, tablet computers are easy to use with limited technology experience, they have neither mouse nor keyboard but an intuitive touch screen, they are easy to bring to courses or use wherever the user wants and have easy and quick to use applications. First results of a study in Austria in 2012 show high acceptance and satisfaction rates [18]. Based on this findings, a comparison study in 2012 [19] took place in Germany. Two matched groups (n = 18 per group, mean age 71.5 years, range from 63 to 85 years) of older adults got the same training (a blended learning course) and used a tablet computer or a notebook to learn first steps on the internet. Results of this study showed that the perceived competence at the end of the course was similar in both groups, but that the tablet group needed less learning hours per week to reach the same competence. The tablet group also showed a higher commitment to the course and seemed to be more motivated at the end of the course. Nearly all participants found the tablet easy to use and information was very quickly found via different applications. Also the portability of the devices was rated very positively.

1.3 The SenApp Project: Learning with Tablet Computers: Project Description and Research Questions

Based on these positive findings, a project to develop online course material for tablets (android and IOS) to support older adults with learning how to use a tablet computer, started in 2014. This project, SenApp, is funded by the Erasmus plus program of the European Union and has the aim to develop and test course material for tablets in four countries (Germany, France, Romania and Spain). The content of this first mobile learning course for older adults are learning elements about ICT use like the use of e-mail, skype, photos and so on. In total, 12 short learning units were developed. Additionally, all courses offer support and communication possibilities via e-mail, phone and a forum with other participants and tutors, as this was found to be essential for learning success [12]. Also materials to train tutors are developed. The learning platform is created with the open source software ILIAS, version 5.0. In a first interview study in 2014 with 23 potential trainers and participants of these courses [20], it was found that all current older tablet computer users were very satisfied, rate the device as easy to use and very convenient. The trainers and more experienced users all mentioned that rehearsing, patience and explanations of added values are important. Also the reduction of fears play a role for many new users, this is an important topic teachers need to be aware of. To motivate new learners it is important to find suitable contents which are in line with interests and daily activities of the target group. Also good, up to date learning material is important for teachers and learners. Additional material on new topics like security questions, social networks, tablets and smartphones and so on can help to motivate new learners. Based on these findings, the modules of the SenApp course were adapted and additional material was added. Courses were guided by experienced older adult trainers. The course content for this pilot course was developed and tested in 2015 and between November 2015 and January 2016 the first pilot courses took place in all partner countries. Due to some translation delays, the courses in Romania and Spain did not start in November, but in December. Therefore, no data of these countries is available yet and for this paper only the data of the German and the French course is used. The evaluation results of these two pilot courses are described in this paper.

Based on previous findings [19] and our aim to offer a course that suits a very heterogeneous target group, we expect that not many differences will be found regarding satisfaction with the course based on age, education, previous experience and gender groups. As we try to offer courses with high support standards and train the tutors carefully, we also do not expect differences between countries as all should receive the same high standard course. But we expect differences on learning routines (hours of learning, learning methods) between participants with more ICT experience and a higher level of ICT confidence and participants with less experience and confidence.

2 Method

2.1 Participants

All respondents of our questionnaire participated in advance in the SenApp course in Germany or in France (basic pilot course) between beginning of November 2015 and end of January 2016. In total, 40 persons participated in the two courses, 20 persons per country. Course participants enrolled voluntarily. They were contacted via organizations for older adults. The final questionnaire was filled in by 26 persons. The missing persons were partly on holiday or ill during the time the evaluation took place and partly did not finish the course (per country 3 persons did not finish the whole course). Demographic data of the surveyed participants can be found in Table 1.

Table 1. Demographic data of the course participants ($N = 26$)

Country	Age group (M/SD)	Gender (female in %)	Years of formal education (M/SD)
Germany	4.77 (.59)	100 %	14.08 (4.15)
France	5.23 (.92)	85 %	12.85 (2.38)

Participants in both countries did not differ in age, gender and years of education. Age was measured in groups. All people belonged to age group 4, 5 and 6, this means they were between 61 and 69, between 70 and 79 or older than 80 years of age. In total, only two men participated in the courses. Therefore gender differences are not analyzed in this paper.

2.2 Procedure

After completing the last course module, the participants were asked to fill in an online questionnaire on the course platform. This was announced on the front page of the course and they were reminded to do so by their trainers. The questionnaire is divided in different parts. These are displayed in Table 2.

On the first page of the questionnaire, participants were informed that the questionnaire was filled in anonymously, that it was voluntary to fill in, but that it would be very important to the developers and researchers to get feedback. To fill in the questionnaire took approximately 20 min. At the end of the questionnaire, the participants were thanked for their help and had the possibility to leave additional comments.

3 Results

In this paper, only quantitative data will be analyzed. Answers about learning routines, course support and course content will be analyzed by group differences. Therefore t -tests will be used to analyze differences between countries and low and high education groups (group 1 between 6 and 12 years of education, group 2 more than 13 years of education). Age differences were analyzed with ANOVAS and with three age groups.

Table 2. Questionnaire details

Part	Method	Number of questions	Example item
Demographic data	Quantitative	4	How old are you?
Experiences with ICT	Quantitative	4	How confident do you feel when you use the internet?
Satisfaction and expectation	Qualitative	5	Which contents are the most useful one's for you?
Learning routines	Quantitative	5	How do you work through new learning modules?
Course support	Quantitative	13	My questions were answers professionally.
Course content	Quantitative	6	The length of the learning modules was too short for me.
Course platform	Quantitative	6	The layout of the platform suits well to the target group of older adults.
Exercises	Quantitative	5	Did you use the possibilities for exercises?

Also differences between participants with and without e-learning course experiences and people who feel more confident in using ICT and people who feel less confident in using ICT than average were analyzed. Answers about the course platform and exercises and some questions about learning routines were not analyzed, due to the length of this paper. Nearly all samples met requirements for normal distributions. However, based on the small sample size, normal distribution tests are very conservative. As t -tests stay very robust also under these conditions, t -tests were selected based on previous findings of Bortz and Schuster [21].

3.1 Group Differences in Learning Routines

First we analyzed how many hours our participants learn with the course material per week. In general, participants learn between one and 30 h per week ($M = 5.67$, $SD = 7.82$). These differences were found between groups: There was a big difference between countries, in Germany, people worked on average 8.85 ($SD = 9.81$) hours per week with the SenApp course, in France only 2.5 ($SD = 3.07$) hours per week. This might be due to the fact, that French participants needed more assistance, they did not learn much on their own, but usually only with the tutor or with other assistance. No differences in learning hours were found between people with higher and lower education. A difference was found between age groups: Participants of the oldest age group (older than 80 years) learned less hours per week than the other age groups ($F(2,23) = 3.94$, $p = .034$). The level of confidence using ICT and the level of experience with similar courses had no influence on the learning hours per week.

To find more answers about the flexibility our participants want and need, we asked them when they use the SenApp course (at different time slots or always at the same time, e.g. always in the morning) and if they work through the material step by step or prefer other learning methods. Most participants use the SenApp material at very different times, e.g. always when they have some free minutes (61.5 %), 23.1 % use the course material in the evening and the other 15.4 % gave different answers (usually in the morning, at the weekend).

53.8 % go through the material step by step, 19.2 % work through it at random, 11.5 % only use the parts, they are interested in and 15.5 % work first with the parts they are interested in and then they do the other parts. No differences were found between countries, age groups, education groups, experience and ICT confidence.

3.2 Group Differences in Course Support Ratings

In this part, we asked participants to rate different aspects of our support possibilities on a five point Likert scale (1 = “I totally agree”, 5 = “I totally disagree”). It was also possible to answer with “no experience” as some services might not be used by all participants. Descriptive statistics of the questions about support rated on this scale are displayed in Table 3. The answer “no experiences” was excluded from analysis, therefore all questions have slightly different group sizes.

Table 3. Descriptive statistics for aspects of support ($N = 26$)

Question	Germany (M/SD)	France (M/SD)
My questions were answered professionally. ($n = 22$)	1.00 (0.00)	1.25 (0.45)
My questions were NOT answered fast enough. ($n = 21$)	4.67 (0.71)	3.83 (1.12)
My questions were answered friendly. ($n = 23$)	1.00 (0.00)	1.00 (0.00)
I was very satisfied with the support by my tutor. ($n = 23$)*	1.00 (0.00)	1.54 (0.66)
I was NOT satisfied with the support by the technical support team. ($n = 14$)	4.75 (0.50)	4.30 (1.25)
I was very satisfied with the support by the organizational team. ($n = 21$)*	1.00 (0.00)	1.46 (.52)
I was NOT satisfied with the availability of my tutor. ($n = 19$)	4.75 (0.46)	3.64 (1.75)
The support offers were absolutely sufficient for my needs. ($n = 23$)	1.50 (1.27)	2.00 (0.82)
The support offers were NOT very helpful for me. ($n = 21$)	4.75 (0.43)	3.54 (1.16)

*Group differences: $p < .05$

Additionally to differences between the two countries, possible group differences between educational groups, between high and low experience with e-learning courses and between high and low confidence levels in using ICT were analyzed. Also age differences for the three existing age groups were analyzed per question.

Differences were found for question four: in France people were less satisfied with the support of the tutors during the course ($t = -2.56$, $df = 21$, $p = .018$). Additionally people in Germany were more satisfied with the work of the organization team ($t = -2.49$, $df = 19$, $p = .022$) than in France (question six). For the question if the support was sufficient for the needs of the learner (question eight), an education difference was found: the lower education group ($M = 2.33$, $SD = 1.16$) rated the support as less sufficient than the high education group ($M = 1.18$, $SD = 0.41$) ($t = 3.13$, $df = 21$, $p = .005$). Additionally, people with some experience in course participation rated this question more positively ($M = 1.22$, $SD = 0.41$) than people without course experience ($M = 2.14$, $SD = 1.17$) ($t = -2.25$, $df = 21$, $p = .035$). For the last question, a difference was found between people with course experience ($M = 4.78$, $SD = 0.44$) and people with no experience ($M = 3.42$, $SD = 1.68$) ($t = 2.36$, $df = 19$, $p = .029$). People with e-learning experience rated the support as more helpful than persons without experience.

Moreover, participants rated these communication channels as the most useful to them: 34.6 % rated the forum as most helpful for support and questions, 27.9 % email and 42.3 % phone calls. Additionally in the French group, face-to-face meetings were conducted and were rated as very useful. As this was not foreseen in the first place, this aspect was not part of the evaluation. When participants had questions, 73.1 % asked their tutor, 23.1 % someone from their family, 0 % friends, 3.8 % someone else. 50 % said that their tutor helped them with motivational aspects, 50 % with technical questions, 30.8 % with organizational questions; 61.5 % with questions about the content, 15.4 % gave emotional support and 3.8 % that the tutor did not help with any of these aspects.

3.3 Group Differences in Course Content Ratings

Also the content aspects were rated on a five point Likert scale (1 = "I totally agree", 5 = "I totally disagree"). It was again possible to answer with "no experience" as some services might not be used by all participants. Also here, the answer "no experiences" was excluded from analysis; therefore all questions have slightly different group sizes. Descriptive statistics of the questions about the content rated on this scale are displayed in Table 4.

For the questions related to the course content, all questions were again analyzed by group differences between the two countries, educational level, experience with e-learning, confidence on ICT use, and age group. These differences were found: People with more e-learning experience rated the relatedness of the content to daily life examples as better ($M = 4.78$, $SD = 0.44$) than people with no course experiences ($M = 3.46$, $SD = 1.13$) ($t = 2.08$, $df = 21$, $p = .050$). Moreover, for question three, persons of the lower education group rated the amount significantly more often as too big ($M = 2.83$, $SD = 1.12$) compared to the higher education group ($M = 3.91$, $SD = 0.70$) ($t = -2.74$, $df = 21$, $p = .012$). Also the oldest age group rated the amount more often as too big for them ($M = 2.5$, $SD = 0.84$) compared to age group 4 ($M = 3.29$, $SD = 0.95$) and age group 5 ($M = 3.90$, $SD = 0.99$) ($F(2,20) = 4.14$, $p = .031$). In question four only a difference in age groups was found: The youngest

Table 4. Descriptive statistics for aspects of the content ($N = 26$)

Question	Germany (M/SD)	France (M/SD)
I was very satisfied with the up-to-datedness of the content. ($n = 22$)	1.30 (0.68)	1.75 (0.62)
I was NOT satisfied how related the content was to real life. ($n = 23$)	4.17 (0.84)	3.45 (1.13)
The amount of the learning units was too big for me. ($n = 23$)	3.50 (1.09)	3.18 (1.08)
The amount of the learning units was too short for me. ($n = 20$)	3.42 (1.08)	2.88 (1.46)
The theoretical explanations about the learning contents were completely sufficient. ($n = 24$)	2.25 (1.21)	1.75 (0.75)
The videos were very helpful as addition to the learning content. ($n = 23$)	1.27 (0.65)	1.33 (0.65)

age group rated the learning units more often as too short ($M = 2.29$, $SD = 1.11$) than the second oldest group ($M = 3.80$, $SD = 1.03$) ($F(2,17) = 4.10$, $p = .035$). The oldest group did not significantly differ from the other two ($M = 3.33$, $SD = 1.16$). Finally in question five, the theoretical explanations were rated as more sufficient by the group who feels quite or very confident on using ICT ($M = 1.55$, $SD = 0.52$) than by the group with insecure feelings on using ICT ($M = 2.38$, $SD = 1.19$) ($t = 2.16$, $df = 22$, $p = .042$). For the other questions, no group differences were found.

4 Conclusion and Discussion

In order to better understand learning needs of older adults who learn how to use a tablet computer, this paper addresses age, education, pre-experience, and country differences on course satisfaction and learning methods in an online learning course.

Main findings revealed some differences between the courses in Germany and in France. Participants in France learned less hours per week with the material, were less satisfied with the support by the teachers and less content with the organization of the course. Although we did not find differences on age, education and pre-experience between countries, we assume, based on the feedback of the French trainers that the participants were in less good health conditions than the German participants and that many lived in retirement homes. Furthermore, a lot of face-to-face support took place in France as some participants had problems to work with the course on their own. It needs to be further investigated how this can be improved as flexible and self-organized learning is important for the course concept. Also some age differences were found. Older participants used the learning material less often per week and for them the amount of material was too big. The same was true for people in the lower education group. Moreover, people in this group rated the support as less sufficient for them. Participants without experience on e-learning courses rated some aspects also a little more negative than the group with e-learning experience. Furthermore, people with

high confidence on using ICT found the theoretical explanations more sufficient than the group with low confidence. However, the courses were evaluated positively, as many ratings are above average.

Although most of these findings are understandable, we did not expect age, gender and pre-experience differences on course content and support as previous research based on similar courses with desktop computers showed that ratings between groups were similar high [12]. This suggested a very well suited approach to a heterogeneous target group based on multiple degrees of freedom to choose material and support. As we want to create a flexible course about tablet use for all older adults with limited ICT skills, we need to further investigate where these differences come from. It might be due to the fact that learning units are much shorter for the tablet course and less flexible to use, e.g. there are less possibilities to skip parts of the units or use additional material. As communication was very important in other courses which were developed earlier, it might be negative for the tablet users to use a forum on regular basis as some participants seemed to have trouble to write longer text parts with the touch screen.

Several limitations should be noted for this study. Although we found some interesting results, these findings are still preliminary findings. We aim to evaluate all courses in all four countries and compare them carefully to find differences between these courses. As only the German and the French courses were finished before the deadline of this paper, a more detailed analysis with all partner countries will be conducted in spring 2016. Also the small number of participants is a big limitation of this study. For future evaluations, it seems to be useful to additionally ask some health and living condition questions as this might influence skills to use the course.

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