Technology Enhanced Learning for Senior Citizens

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Abstract. Everything is now done online: reading newspapers, talking to friends and relatives, paying invoices and taxes, setting up doctor appointments, etc. As such, competences related to the use of Information and Communication Technologies (ICT) are fundamental. In particular, as mobile technologies and devices such as smartphones or tablets become more and more pervasive and ubiquitous, it is very important to tackle the digital divide issue. And, in a moment where socio-demographic changes resulted in a rapidly growing number of elderly people, it is fundamental to provide them the skills to be connected and integrated in this world. Otherwise, this will not be just a technological disadvantage, but rather a social disadvantage at a societal scale. This article presents a European-wide initiative that addresses this issue by providing technology enhanced training to this target group and an analysis of the achieved results.

Keywords: Ageing · Lifelong learning · Knowledge society · Senior education
Mobile technology

1 Introduction

Life expectancy and the share of citizens over the age of 65 years have increased in the recent years. Access to information by senior citizens has to be ensured in order to guarantee their full active incorporation in the society. That is stated in the United Nations Principles for Older Persons, which reflect the need to build an inclusive society that emphasizes participation, self-fulfillment, independence, care and dignity for all [1]. The declaration of principles of the World Summit on the Information Society states the "…desire and commitment to build a people-centered, inclusive and development-oriented society, where everyone can create, access, utilize and share information and knowledge, enabling individuals and communities to achieve their full potential in promoting their sustainable development and improving their quality of life" and explicitly mentions "We shall also recognize the special needs of older persons and persons with disabilities" [2].

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The concept of quality of life for older persons is normally related to their ability to maintain an active and healthy life, with autonomy and independence. Remaining independent is recognized as very important to the quality of life [3, 4].

ICT play a crucial role for the personal and social development and senior citizens cannot afford being excluded from ICT innovations and the positive results generated by the Knowledge Society. However, the emergence of the Digital Knowledge Society created new social inequalities:

- "Exclusion from information or knowledge-based society on the basis of age, gender, origin or socio-economic status represents a new form of social exclusion, the so-called digital divide" [5, 6].
- "The access to and engagement with ICTs is unequally distributed across society leading to a digital divide" [7].

Senior citizens are often info-excluded, as mentioned by Cushman, Klecun and Kiel, that report that there is a much larger proportion of seniors not using ICTs compared to the general population, due to the lack of skills in using those technologies [8, 9]. In fact, it is commonly assumed that the elderly will reject any kind of new technology, like computers, Internet and mobile devices, and are implicitly labeled as digital illiterates. But in most studied cases, the key to technology adoption turned out to be access, information, training and the availability of useful applications. When presented with the opportunity, this population always proved eager to take advantage. Therefore, the problem is not the persons, but other factors such as availability, cost, and usefulness.

UISEL (Ubiquitous Information for Senior Citizens Learning) was a European initiative focusing on allowing senior citizens to develop practical knowledge and skills related to the use of the mobile devices for information access, taxes and fiscal obligations, social security issues, banking, emergency situations, medical monitoring and control and, not less important, for leisure and communication. The novelty of the approach related to the pedagogical methodology, to the use of mobile devices with this target group and also to the actual contents addressed. This article presents the adopted learning methodology and achieved results.

2 Senior Citizens' Learning

Beyond raising awareness among persons aged 65+ about the benefits in the use of these technologies, UISEL intended to achieve practical learning on how to better exploit them, considering that the senior's active involvement with technology contributes to the improvement of their health and quality of life [10–12]. Older people, for example, could benefit from access to lower-cost goods and services available online [13]. Or, according to Davidson and Santorelli, these technologies can confer the following social, economic, and health-related benefits [14]:

- Increased connection to family and friends
- Feeling of involvement and relevance to the society

- Access to e-services, such as commerce, personal finances, medication, and employment
- Improved health, wellness, and preventive care
- Benefits to society at large through healthcare savings and senior-related content and services

The pedagogical methodology took in consideration the characteristics of the target audience, namely the fact that they already had years of experience and a wealth of knowledge; they had strongly established values, beliefs, and opinions; they expected to be treated as adults and needed to feel self-directed; they were more interested in straightforward how-to. As such, it relied on the theoretical framework of late life education as proposed by Kolland and Wanka: "Lifelong learning in old age can be defined as personally and socially-motivated experience-based learning. It includes every targeted learning activity that serves to improve skills continuously, abilities and competencies. It can occur both in and outside of organized learning settings. It helps to acquire basic qualifications including digital and practical skills to handle daily tasks better. The objective is self-determination." [15]. It was accomplished through the definition, development and implementation of a two-stage programme:

1. A training phase based on the immersion in mobile contents and a multimedia environment, which requires collaborative efforts from transnational groups of trainees. This stage was for trainers and caretakers that were in direct contact with senior citizens. It took place through a blended learning methodology integrating face-to-face (f2f) sessions and mobile multimedia contents with the support of an e-platform for collaboration and communication
2. The transfer of the mobile technology appropriation to the senior citizens. This was achieved through direct training by the trainers and caretakers with the support of mobile multimedia modules that also had a self-learning model so that senior citizens could recall how to use any of the mobile devices functionalities.

The methodology was also supported by a mobile app that allowed direct access to the contents and a serious game that allowed developing skills and competences related to the handling of mobile devices. The focus, following Davidoff et al., was to put users in control of the technology and using it to take control of their own lives and enhance choice and independence [16].

The following modules were developed: Introduction to the use of mobile devices, E-government (taxes, finances, social security), E-banking, E-health, E-interaction, E-information and media. The selection of the modules resulted from a previous requirements analysis conducted near the target group.

The model was implemented through a combination of f2f sessions animated by trainers, followed by autonomous work. The e-learning component consisted in accessing the provided UISEL app, going through the tutorial videos proposed and performing a list of suggested e-activities.

3 Results and Discussion

UISEL was implemented in seven European countries: Austria, Portugal, Spain, Slovakia, Czech Republic, Italy and Romania. The seniors' training phase was implemented between May and November 2015 in all seven countries. It counted with the active participation of 233 senior citizens and 27 trainers/caretakers. In total 25 actions with different groups of seniors were organized, in 15 different locations and involving 18 organizations. The evaluation methodology, organized as a case study, aimed at collecting the seniors' and the trainers' feedback, assessing the knowledge acquired by the seniors and getting a general overview of the implementation. The evaluation tools and practices proposed included:

- Applying an initial survey to all the seniors registered in the UISEL course;
- Observing and registering the implementation of the course, taking notes and collecting feedback in an informal way;
- Applying an evaluation survey to all seniors at the end of the course to measure the outcomes and level of satisfaction with the training;
- Performing a semi-structured interview with the trainers.

The first set of questions was aimed at facilitating a general demographic characterization of the UISEL participants. 45% of the participants were aged between 65 and 75 years old. The second largest group, representing 30% of the participants, was aged between 55 and 65 years old. 20% were in the range of 75–85 years old, and 4% were born before 1930, i.e., more than 85 years old.

The majority of participants were women (73%) although an analysis per country shows different realities: in ES men represented 45% and in PT 38% of the participants, while AT, CZ and IT had only 12%, 16% and 19% men participants, respectively.

In relation to the education level, about 40% of seniors completed the high/secondary school level, 30% had a university/college degree and the others had lower qualifications. This data shows that a high educational background is not a condition sine qua non to involve seniors in lifelong learning pathways related with ICT.

Concerning pre-existing health and physical issues (see Fig. 1), only about 35% of the participants (80 out of 233) marked at least one box in this question and the great majority (82%) of these recognized having problems with their eyesight. 9% declared having difficulty in holding their hands steady, while 8% stated having trouble with picking up small things with their fingers. In a positive approach, one might conclude that the majority (the ones that did not sign any box in this question) do not suffer from any age related problems. However, this may not be completely true as it was noticed by some trainers that a great majority did not answer because they perceived the question to be insensitive.

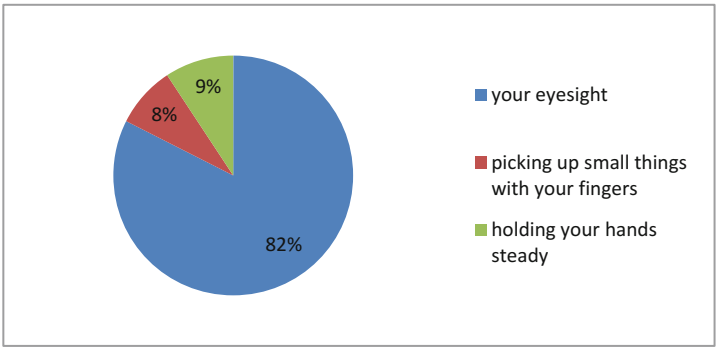

Fig. 1. Health and physical issues

Senior participants answered an initial set of questions in relation to their self-perceived ICT mastery. Their answers are presented in Table 1.

Table 1. Self-perception on ICT mastery

	Initial survey				Final survey			
	Strongly agree	Agree	Disagree	Strongly disagree	Strongly agree	Agree	Disagree	Strongly disagree
I am generally very curious when it comes to new technologies.	99	103	20	1	123	77	18	2
Handling new technologies is hard for me – I am not very good at that.	40	83	70	20	42	96	58	22
If a problem with a technical device occurs, I solve it by myself.	32	78	87	25	25	80	87	28
If I had more competences regarding new technologies, I would use it more frequently than I do right now.	107	80	22	13	111	74	26	11
I fear to break technical devices when I use them.	28	89	67	39	39	80	77	34
When I'm using technical devices, I have no control over what the device is doing.	15	73	92	42	25	54	101	39

UISEL participants were asked to tick the ICT devices used on a regular basis, i.e., at least once a week (see Fig. 2). From the results obtained it was clear that the most used device was the mobile phone (32% of the total number of ticks), followed by the laptop and the PC with 22% and 21%, respectively. The smartphone represents 14% of the ticks and the tablet 12%.

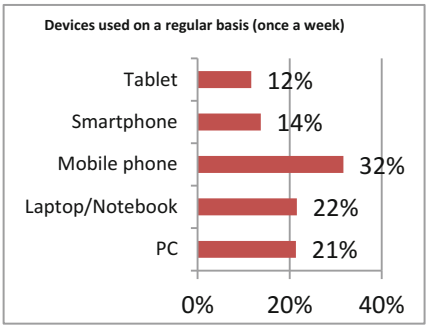

Fig. 2. Use of mobile devices

Seniors' Interest and Acceptance of Mobile Devices

New technologies and mobile devices are an important topic for seniors. It was very easy to recruit senior participants and form groups for the courses. In Austria, each of the courses was fully booked and there was a positive, playful environment in the courses, mainly caused by the seniors' interest but also by the emphasis on group activities and do-it-yourself-activities.

The majority of participants focused on learning how to seek information and how to entertain themselves. Many seniors were happy to be able to communicate with their families and friends who live abroad. In some cases, the motivation driver for the seniors was the will to demonstrate to younger relatives that they were still able to learn new things. The majority considered the tablet a device that better responded to their needs.

UISEL covered a great amount of relevant issues from seniors' daily life, which were adequate to their interests and needs. Seniors were pleasantly surprised that the UISEL course offered a real support in combating isolation and social exclusion. All modules covered their area of interest, which was impressive because they didn't expect it.

Generally, the acceptance of mobile devices during the courses was quite positive, with many participants planning to use a tablet in the future.

Quality of Pedagogical Contents

There was a good combination of materials, all useful and well-structured. Although slides and text guides were commonly used in seniors' training, the use of videos and apps was relatively new and interesting, both from the seniors' and the training organization's perspectives.

The printed contents were perceived to be very helpful and organized but the presentation slides were perceived to be hard to read for senior participants and thus a recommendation to use bigger font sizes and fewer colors.

The feedback on the UISEL app and game was especially positive. The videos and the learning game were used in all courses. Videos were perceived to be helpful for seniors at home as planned in the pedagogical approach, but in a few cases were also used in class. The game was a good instrument to learn first steps on the tablets and was used by all participants during class. In Italy, the UISEL game was considered to be very intuitive and useful for learning touch movement and gain dexterity (even so, some changes are recommended). In Spain, the game seemed too simple for those who already had used tablets, but for those who had never used these devices it was an indispensable tool to learn the basic gestures and skills. Also in Czech Republic the game was considered the most successful resource - being fun for the participants and helping them to feel comfortable with this new technology by understanding the right moves and the way tablets react.

The importance of continuously updating the contents was mentioned. For instance, during the project testing some procedures related to GMAIL functions changed and so the steps showed in the step-by-step guide elaborated months before had to be changed.

Organization of the Course and Pedagogical Approach

The UISEL pedagogical approach was considered appropriate. The combination of learning in class and group repetition was something already practiced generally in senior classes. The inclusion of autonomous learning was a plus that could effectively help the senior remembering some steps that might need further training.

The availability of learning materials in digital format to support autonomous learning was appreciated by the seniors as they had the opportunity to practice on their own. But learning at home is often easier if a family member is available to support, and it is also necessary to make sure that the senior has access to Wi-Fi connection. In class the trainers proposed the videos to support the learning at home, but then it was difficult to verify if it they were effective or not.

In some cases, the e-Learning component was very hard for participants and they did not show particular interest in using the tablets at home autonomously. In other cases, participants were eager to use tablets at home and in free Wi-Fi spaces. Organizations in Austria, in Italy and in the Czech Republic offered weekly learning-meetings in their institutions, where participants could autonomously work with the tablets and use the organization's Wi-Fi. This was perceived to be a good addition to learning in class and self-learning at home. Providing seniors some spare time after or before the class seemed to be more effective and appreciated by them. During the e-learning activities it was important to give trainees the time to repeat the procedure learned in class in an independent way.

In the Spanish group, the availability of learning materials in digital format was quite appreciated by the seniors. They decided to use a local learning platform to offer all students the opportunity to easily access to all materials and that was a very well received. Students were thrilled to use the platform.

It was important to have homogeneous groups in class with participants sharing similar competences and experiences. In this framework, some organizations agreed on

a maximum number of participants per group to be able to work with seniors intensively, while others proposed to have two trainers in class, as seniors need theoretical input on one hand but also one-on-one support while learning. But still due to the different level of users' knowledge and dexterity on ICT tools, trainers had to provide one-to-one support and some users were left waiting for the less skilled participants.

Quantitative Assessment by the Senior Participants

Senior citizens also provided quantitative feedback by answering a set of related questions. Their answers can be seen in Figs. 3 and 4.

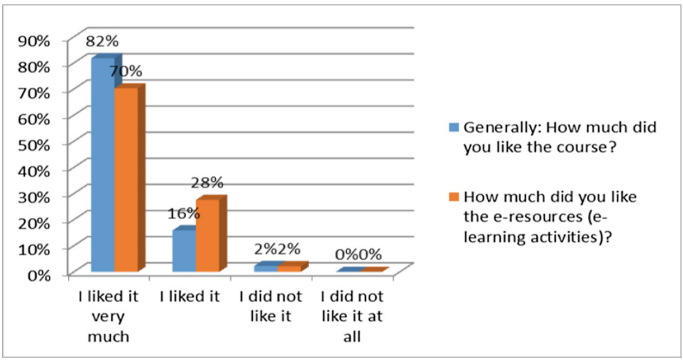

Fig. 3. General satisfaction with the UISEL approach

Overall, when asked if in general terms they liked the course, 98% answered positively (82% liked it very much) and only 2% declared not having liked it. Their feedback on the e-resources (e-learning activities) was quite similar with 98% answering "yes" (70% liked it very much) and only 2% declaring not having liked it.

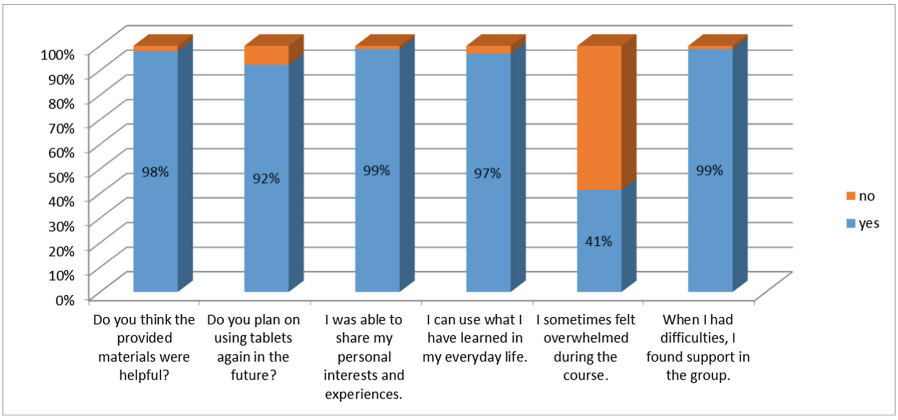

Fig. 4. Specific feedback with the UISEL approach

Practically all the participants answered positively when questioned about the usefulness of the provided materials, the support found in the group, the opportunity to share personal interests and experiences and if they will be able to use what they have learned in their daily lives. 92% answered they plan using tablets again in the future and indeed a few participants have bought their own tablet during the training. The lower rate gathered relates to the question "I sometimes felt overwhelmed during the course" with 41% assuming they did. This means that the general level of the course was challenging for the seniors, which we actually see as a positive aspect because it meant they had to work to achieve success (as most of them did).

4 Conclusions

Socio-demographic changes have resulted in a rapidly growing number of elderly with specific needs and expectations. The need to fully integrate these citizens in the Knowledge and Information Society is a priority. The online information and communication explosion, where everything is digitized from reading online newspapers to paying invoices online, meant that ICT skills are of key importance and a necessity for everyone. However, when it comes to new technologies, like smartphones or tablets, the digital divide becomes even more visible even if the use of mobile devices greatly benefits the seniors as some of the difficulties faced in their everyday life could be better addressed.

The UISEL initiative was designed to tackle these issues through a specific pedagogical approach targeted at this age-group. Its implementation and the research study conducted showed that the courses, the contents and the resources were much appreciated both by senior citizens and trainers and it actually meant positive changes in the participants' attitudes towards new technologies. Besides the development of curiosity regarding new technologies, the level of self-confidence in the use of technologies has been strengthened as the percentage of people who say they don't have control over technical devices declined during the course.

Of course, we understand that there are limitations in the study that can prevent generalizing the conclusions extracted by the achieved results. Namely, the fact that most results are of qualitative nature which could in some degree be influenced by the group nature of most of the data collection tools and even by the observation process itself. Nevertheless, we have seen that all the involved senior participants proved to be particularly thankfulness for the opportunity given. They appreciated the utility of the knowledge acquired and most of them plan to use mobile devices systematically. It was therefore possible to ascertain that using technology is not an age-issue but rather a matter of creating the opportunity to know how to use it.

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