Journal of Universal Computer Science, vol. 25, no. 12 (2019), 1625-1643
submitted: 17/5/19, accepted: 31/10/19, appeared: 1/12/19 © J.UCS

Overcoming the Silver Generation Digital Gap

Carlos Vaz de Carvalho
(Instituto Superior de Engenharia do Porto, Porto, Portugal
cmc@isep.ipp.pt)

Pedro Cano, José Maria Roa
(Universidad de Granada, Granada, Spain
{pcano, jorove}@ugr.es)

Anna Wanka, Franz Kolland
(University of Vienna, Vienna, Austria
{anna.wanka,franz.kolland}@univie.ac.at)

Abstract: Being able to effectively use online tools has become a fundamental competence in our Society. Therefore, it is important to tackle the age digital divide as there is a rapidly growing number of elderly people. Like everyone else, older adults (senior citizens or the silver generation) must be equipped with the necessary skills to be able to be connected and integrated in the online world to prevent their social isolation and to foster their inclusion. As a contribution to that effort, a European-wide digital literacy development initiative for senior citizens was setup and this article presents the analysis of the achieved results which shows a very positive perception of the seniors on the developed digital abilities.

Keywords: Active ageing, Lifelong learning, Knowledge society, Adult education, Senior citizens, Silver generation
Categories: H.1.2, H.5.1, H.5.m, J.4, K.4.2

1 Introduction

Global average life expectancy increased 5.5 years between 2000 and 2016, the fastest increase since the 1960s [WHO, 19]. This translates into a steadily increasing share of citizens over the age of 65 years also known as older adults, senior citizens or the silver generation. This generation should maintain a high quality of life which translates as an active and healthy life, with autonomy and independence [Sixsmith, 00] and [Gilhooly, 13]. This has also been pointed out in the Action Plan on Ageing Well in the Information Society [EC, 07]:

- Ageing well at work, by staying active and productive for longer;
- Ageing well in the community, by staying socially active and reducing social isolation;
- Ageing well at home, by enjoying a healthier and higher quality of daily life, with a high degree of independence, autonomy and dignity.

Technology is seen as a potential support factor but the fast pace of the technological revolution, well portrayed in the growth of the use of digital mobile devices and on the ever-growing requirements for a ubiquitous online access, has

actually generated digital divides resulting from age, social, cultural and genre factors:

- "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" [Castells, 04] [Van Dijk, 12].
- "The access to and engagement with ICTs is unequally distributed across society leading to a digital divide" [Korupp, 05].

The concern with the age divide is stated in the United Nations Principles for Older Persons, which reflect the need to build an inclusive society that emphasizes participation, self-fulfilment, independence, care and dignity for all [UN, 16]. The declaration of principles of the World Summit on the Information Society also states their "…desire and commitment to build a people-centred, 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 that "we shall also recognize the special needs of older persons and persons with disabilities" [WSIS, 16].

Clearly, digital technology plays a crucial role for personal and social development so senior citizens cannot afford being excluded from innovations and the positive results generated by the Knowledge Society. By being able to use digital devices, senior citizens are able to live more independently and autonomously [Damant, 17] [Field, 05]. They can also benefit from access to lower-cost goods and services available online [McLean, 04]. According to Davidson and Santorelli, these technologies could also confer the following social, economic, and health-related benefits [Davidson, 08]:

- 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

Unfortunately, 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 digital technologies compared to the general population, due to the lack of skills in using those technologies [Cushman, 06] [Kiel, 05]. A study by Vaportzis also confirms that the ability to deal with digital technology is not frequent in senior citizens [Vaportzis, 17]. For them, not being able to use these technologies results in social isolation and loss of autonomy and, as a consequence, a lower quality of life [AGE, 08]. However, 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 proved eager to take advantage of technology. Therefore, the problem is not the age, but other factors such as motivation, empowerment, availability and cost of the adequate technologies.

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 digital 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 the achieved results with the senior citizens.

2 Silver generation digital skills

A preliminary study was conducted with 31 experts in senior learning from seven European countries (Austria, Portugal, Spain, Slovakia, Czech Republic, Italy and Romania) to assess and characterize the senior citizens' online needs and how they could be satisfied through digital mobile technologies. A semi-structured interview process was setup based on Wittpoth's determination of the influence of gender, age (generation), educational attainment, social status and former occupational position in the participation in senior education [Wittpoth, 09].

In general, experts agreed that the use of mobile devices would greatly benefit the senior citizens as some of the difficulties they faced in everyday life could be better addressed. They also considered that mobile devices could help reduce isolation and social exclusion and they were very useful in emergencies. Experts mentioned that almost all seniors already used mobile phones for general communication purposes but only a few of them would go beyond that and use smartphones for chat and messaging. Some seniors also used desktop or laptop computers as a communication tool with relatives or friends and as an access point to Internet. The use of tablets and smartphones by seniors to access the internet and its services was still residual and depended on the socio-economic context [Kolland, 13].

Most experts shared the opinion that the motivation to use digital mobile devices depended highly on the level of education and professional experience the seniors had during their life. Focusing on the age factor, experts indicated the following typical patterns of use:

- 60 to 70 years old: used cell phones and a few used smartphones; to less extent they used tablets; the use of laptops and e-book readers was relatively widespread among those still professionally active;
- 71 to 80 years old: used the basic functions of cell phones and mainly in cases of emergency; some used laptops.
- +80 years old: only a small number used cell phones; use of laptops was very rare.

Experts also acknowledged the relevance of tablet use for seniors considering that the main difficulties by older learners were connected with age related physical limitations, namely sight, manual coordination and dexterity. Tablets were easier to handle, and they required less technical knowledge compared with standard PCs. However, several potential challenges in the use of tablets by seniors were also mentioned:

- The apps user interfaces on tablets were not as intuitive for older persons as the ones in PCs;
- There were several basic user interface (UI) principles that differ significantly in PCs and laptops that the user needed to understand, like the use of touchscreens;
- Online safety and data security were important issues for seniors and this was especially relevant for tablet users, since most tablets required an e-mail account;
- The screen size of standard tablets might still be a problem for the target group.

Even though country specific differences exist, there were some general conclusions that could be drawn from the collected empirical material. First of all, all experts agreed that tablet usage was perceived to bring various benefits to older adults, including location independent communication, entertainment, acquisition of real time information and news.

Despite this growing demand, tablets were hardly used yet by seniors in any of the participating countries yet. Out of this gap between demand and supply arises the need for initiatives like UISEL to function as lighthouse examples. The reasons that experts claimed to be responsible for the lack of tablet usage among senior citizens related to general barriers to the internet and mobile devices, which was also mentioned by the European Commission [EC, 13].

These barriers comprise on the side of the seniors,

a) differences in technological acceptance and attitudes towards technology, including security issues and lack of confidence and
b) lack of skills and competences, starting from lack of basic comprehension on how tablet computers work;

and on the side of the digital mobile devices

c) lack of usage simplicity in design, structure and in regard to the constant need for updates and
d) cost of acquisition and related services.

Accordingly, experts observed a social stratification of the digital divide in regard to income, education, former occupation and health. The latter is of particular importance, as the use of touch screens, the onscreen size and the general construction of a tablet can become a challenge under certain health conditions. Some of the mentioned barriers, particularly competences and attitudes could be tackled by the UISEL initiative, while others, like cost or tablet design were more difficult to approach.

3 UISEL pedagogical methodology for senior learning

Beyond raising the awareness among persons aged 65+ about the benefits in the use of digital mobile and online technologies, UISEL intended to achieve practical learning on how to better exploit those technologies, considering that the senior's active involvement with technology contributes to the improvement of their health and quality of life [Blažun, 12][Chen, 13][Sum, 08]. The UISEL consortium collected sociological studies, geragogic principles and practical knowledge of experts in the

field of senior education to develop an adequate methodology. This methodology had to consider differences in the access to and participation in learning and ICT use, characteristics of learning processes and didactics for older learners (geragogy) and practical experiences acquired in different cultural and organizational contexts. The pedagogical methodology was therefore designed by taking 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; and 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." [Kolland, 13]. 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 [Davidoff, 06].

3.1 Theoretical pedagogical implications

Five relevant implications for the specification of the UISEL pedagogical model were considered: the target group, the technical prerequisites, the contents and modules, the learning environments and the didactics and schedule.

3.1.1 Target group

Older adults are a highly heterogeneous group, and not all are participating equally in senior education. Participation patterns relate, among others, to social inequalities, cultural differences and the acceptance and usage of new technologies. Relying on the experts' assessment and on the body of sociological literature, older adults most interested in ICT learning are from 50 to 70 years old, at good health and physical functioning (sensory, visual and being able to attend classes) and with a higher socio-economic status (higher income/pension and/or higher education). This group is more likely to participate in organized education and also more likely to have, at least, basic ICT skills. Deviation from any of these criteria demands specific adaptations in the pedagogical concept, particularly the need for more intense work on the basic understanding of the technology.

3.1.2 Technical requirements

Usage problems resulting from the interaction through a touch/gesture interface (swipe, tap, double tap, pinch, etc.) can be overcome by adjusting the apps and tools (i.e. more tapping than double tapping, etc.). Within the training software, font and icon sizes can be adjustable to accommodate other physical limitations. The methodology should cater for different levels of digital ability or other issues. For example, developing competent usage of the touchscreen might take longer among persons with certain health restrictions so the pace should be slower among persons

with little educational experience and e-learning should involve more guidance for them, etc.

3.1.3 Content and modules

Following the principles of geragogy and the recommendation of the interviewed experts, all content in the learning process must be relevant for every day's life practices. Only if content is located within the personal sociocultural space, can it be helpful for vital questions and the related learning outcomes sustainable. Contents should therefore be related to the services that seniors already use more regularly. Another important identified need is an introductory module in which basic understanding of tablets and digital skills is acquired. This includes understanding basic tablet operations, usage of a touch screen, software updating, etc. Other more specific aspects like e-banking, e-health and e-government are not used by the seniors in the participating countries for security issues and the importance of personal interaction for seniors, for example when shopping or doing bank transfers. As such e-security should also be considered for the course.

3.1.4 Teaching and learning

According to geragogical principles, the role of the trainer is to promote self-learning abilities and to be more oriented towards facilitation and motivation. Trainers should commit to the eight didactic geragogical principles [Bubolz, 10]:

1) Association of reflection and action
2) Stimulation of exchange of experiences
3) Thematization of the learning biography
4) Support of self-determination and codetermination
5) Facilitation of social networks and shared identities
6) Involvement with values orientations and images of ageing
7) Embed learning in the life-nexus and the social space
8) Creation of stimulating learning environments

The task of motivation and confidence building is also crucial as seniors often experience negative reactions at the beginning of ICT courses, as some are afraid of not having enough digital skills, others are not familiar with learning in a course setting, many fear privacy and security issues, and some do not perceive the technology as useful for their everyday lives. Trainers, thus, face a lot of initial constraints and it should be their endeavour to relieve these anxieties and remove barriers. Didactics that help in this process in regard to class learning comprise more explanations and communication, simplicity, patience, self-confidence training, individual support, respect for everyone's own pace and involving fun activities. In regard to e-learning, despite being a more autonomous process, a lot of support and guiding is still needed. Class learning is considered to be effective as it fosters social interaction and networking. The importance of peer learning, the class as a social community as well as the learning support of family member are also important aspects to be considered. Learning processes should then make use of these social networks and be embedded into them. Thus, a third component in addition to class learning and autonomous at home learning should be considered: the creation of free

learning spaces in which groups, family members and individuals can repeat learned content with available, but not obligatory, supervision and help.

3.1.5 Schedule specification

The learning model should propose a basic organization of content and modules, concrete enough to offer a structure to both trainers and learners, but also flexible enough to leave enough participative space for co-creation of the learning process. The outline of the pedagogical model, should combine, in a balanced way, training in class and autonomous work at home or in learning spaces. Each session should not exceed 2 hours (or 3 hours if including a break) and include a social moment, like a joint snack or coffee. Classes should take place twice or three times a week at a maximum. Each session should be limited to teaching one function, which should be recalled at the beginning of the next session.

The different content modules should not be consecutive and could be chosen freely except for the basic (introductory) module that is the foundation for all thematic modules. This module should be aimed at establishing a basic common understanding of use principles and increase confidence in the usage of the tablets.

3.2 Considerations for the implementation of UISEL

The previous implications led to specific considerations on the following four aspects: the role of the trainer, the participant profile, the teaching and learning environment and the content and module framework.

3.2.1 Role of the trainer

Trainers should be not so much teachers as facilitators, moderators, motivators and confidence builders on an equal footing. Thus, the self-perception of trainers must be revised and power relations between them and the learning subjects are to be improved so that the relation between trainer and trainee is symmetrical. As the trainer will only be in direct face to face contact with the participants half of the training, the role of trainer as motivator gains importance. The job of an 'e-learning coach' is not only to facilitate learning to learn in class, but also learn to learn with the usage of the internet: how to find information, how to train acquired skills online and where to turn to if one needs help. Moreover, the trainer must be aware that he/she is one node in a social network of learners, comprising both participants, their family members and friends. Trainers shall make use of this social network full of resources, particularly for the phases of autonomous e-learning, in establishing a group identity among participants, supporting peer learning and integrating family members with digital skills into the learning process. Finally, the trainer must be flexible and sensitive to the participants' pace, needs, wishes and constraints. Older adults start from different levels, have different learning biographies, learning styles and resources and face different constraints. A trainer must cater for this heterogeneity of older age and not try to force a fixed schedule. Besides having access to the modules, trainers also had access to: proposed extra activities to be used with the seniors, tips and experts' advice on topics related with seniors' learning strategies (andragogy) or with digital knowledge for training seniors; and exchange of experiences among the trainers.

3.2.2 UISEL learners

The typical UISEL learners were expected to…

- be in the third age (about 50, maximum of 75 years), most likely of the 'household technology generation' (born around 1949 onwards)
- have a higher educational attainment (compared to the average senior)
- have a higher income (compared to the average senior)
- be mobile and relatively healthy

They were expected to have basic ICT skills, i.e. know how to use a computer and a mobile phone even if they never had used a tablet or smartphone. They were also expected to have a continuous learning process (i.e. participation in vocational training and non-occupational adult education). Their physical status was expected not to cause too many problems with the usage of a touchscreen, however (slight) visual impairments could be expected. Even though this characterization described the 'typical' group of participants, deviations were expected to occur which might even demand for changes in the content-wise and didactic proceeding.

3.2.3 Teaching and learning environments

The UISEL pedagogical model suggested a combination of class learning and e-learning. Class learning allows to create a community and benefits from the face-to-face support by the trainer. E-learning, on the other hand, is important for practice and repetition of learning content at one's own pace and preferences. However, e-learning also requires a lot of autonomous learning and self-motivation skills. It is thus more difficult for persons that are not well acquainted with learning, and might be more difficult for older adults that have limited digital skills. The UISEL initiative proposed three ways to adapt to this challenge:

- increase the amount of mobile or e-guidance, for example through videoconference meetings or telephone calls;
- decrease the amount of e-learning in favour of class learning;
- add a third pillar next to class and at home learning, namely learning spaces in which groups, family members and individuals can repeat learned content with available, but not obligatory supervision and help.

The implementation was further supported by two specially designed apps, one was a video-lecture repository for quick access to the contents and the other was as serious game to support the initial learning of how to interact with a tablet.

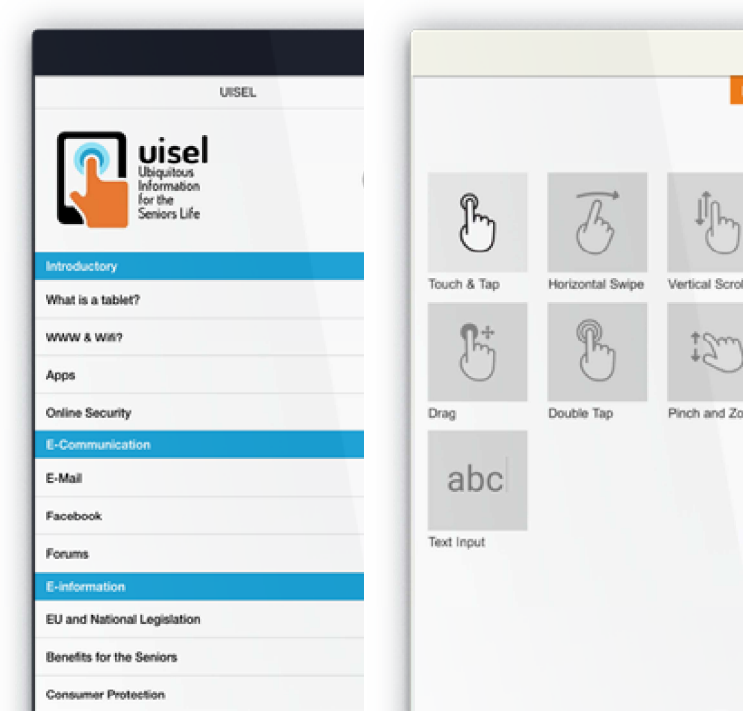

Figure 1: UISEL apps: video-lecture repository and serious game

3.2.4 Content and modules as a flexible framework

The basic framework comprised one introductory module and several thematic modules which could be selected by the trainer according the participants' interests and needs. Each module comprised 16 hours of teaching and learning. In the basic framework, eight hours would take place in class and eight hours by autonomous self-learning/e-learning. The schedule should contain class learning sessions that do not exceed two hours. Classes should take place twice a week and therefore each module should run for 15 days on the basis of 2 classes per week with an interval of at least 2 days. Each module was divided into eight components, comprising a two-hour learning unit each. The different modules themselves were structured in four parts, comprising a four-hour learning unit each (two in class, two e-learning). The module outlines and learning outcomes are shortly portrayed below.

1. Introductory module (16h)

- To understand the basic principles of how a tablet works
- To gain basic competences in the use of tablets
- To have better confidence in their personal ICT skills
- To increase their knowledge on technological security and feel safer about it

2. E-Interaction/e-communication module (16h)
- To create and use e-mail, Facebook, Skype accounts
- To communicate through social media channels / apps / tools
- To share thoughts, pictures and videos with friends
- To look for information (especially for health related issues, managing own financing, travelling, spending leisure time etc.)

3. E-information / e-government module (16h)
- To acquire the needed information about legislation (laws), protection and exercising their rights on EU and national level
- To find options within legal norms on how to solve a consumer problem; how to protect themselves against financial abuse – where and how to seek help
- To acquire information on how to claim their social benefits
- To locate important institutions

4. E-entertainment / media module (16h)
- To develop their personal interests through digital media
- To foster their creativity using free online media tools like image editing
- To use online applications to stimulate mental dexterity
- To enjoy free time and learn with online games

5. E-Health module (16h)
- To know the main activities, events and services related to health issues
- To learn how and where to get information about health websites and condition
- To know how to manage a personal account to have access to the local e-health services: reservation of medical appointments, management of the electronic medical dossier, download and upload health exams/GP's prescriptions
- To take part in blogs or forums related to specific diseases or health issue groups

6. E-banking / e-shopping module (16h)
- To identify the benefits and drawbacks of the electronic economic transactions
- To know the basic functionality offered by financial institution
- To know what is e-commerce and understand the Internet facilities for shopping
- To know and to use the different payment methods

4 Implementation and Results

UISEL was implemented in seven European countries: Austria, Portugal, Spain, Slovakia, Czech Republic, Italy and Romania. The trainers training phase took place in early 2015 and included 78 participants. The seniors' training phase was implemented between May and November 2015 in all seven countries and 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. It was actually very easy to recruit senior participants and form groups for the courses. In Austria, for instance, all the courses were fully

booked and there was a positive environment in the courses, resulting from the seniors' interest. All the users were given a tablet device with Android operating system. The actual brand and model of tablet depended on the national/local market but a common set of requirements (operating system version, memory, screen size, etc.) was defined to ensure a consistent technological platform.

Figure 2: Training in Slovakia and Spain

The evaluation methodology, organized as a case study, aimed at collecting the seniors' and the trainers' feedback in order to get 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.

4.1 Target group characterization

An initial survey was delivered before the training to obtain a general demographic characterization of the UISEL participants. Concerning the age group, 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.

In terms of genre, the majority of participants were women (73%) although this depended heavily on the country: in ES, men represented 45% and, in PT, 38% of the participants were men, while AT, CZ and IT had only 12%, 16% and 19% men participating, respectively.

In relation to the education level, about 40% of seniors had completed the high/secondary school level, 30% had a university/college degree and the remaining had lower qualifications.

Concerning pre-existing health and physical issues, about 35% of the participants (80 out of 233) marked at least one box. The great majority (82%) of these indicated

having problems with their eyesight while 9% declared having difficulty in holding their hands steady, and 8% stated having trouble with picking up small things with their fingers. Therefore, the majority of participants (the ones that did not sign any box in this question) apparently did not suffer from any age related problems although this might not have been entirely true as it was noticed by some trainers that some participants perceived the question to be insensitive so they didn't answer it.

Participants also answered a set of questions about their perceived ICT literacy (Table 1). It is important to note that participants were not required to answer the full set of questions so the total number of answers is not always the same.

	Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)	Mean $\bar{x}$	Variance σ^2
I am generally very curious when it comes to new technologies.	99	103	20	1	3.34	0.43
Handling new technologies is hard for me – I am not very good at that.	40	83	70	20	2.67	0.78
If a problem with a technical device occurs, I solve it by myself.	32	78	87	25	2.52	0.76
If I had more competences regarding new technologies, I would use it more frequently than I do right now.	107	80	22	13	3.26	0.73
I fear to break technical devices when I use them.	28	89	67	39	2.48	0.84
When I'm using technical devices, I have no control over what the device is doing.	15	73	92	42	2.26	0.72

Table 1: Perception on ICT literacy (initial)

The answers revealed a public that was eager and curious about new technologies (90,5%) and would like to use them more frequently (84,2%) but at the moment they didn't felt very confident on their abilities. 58,6% recognized they had a hard time handling new technologies and 60,4 % assumed they had little control over the device operations. Participants were also asked to indicate the digital mobile devices used on a regular basis, i.e., at least once a week (see Figure 1). 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 represented 14% of the ticks and the tablet 12%.

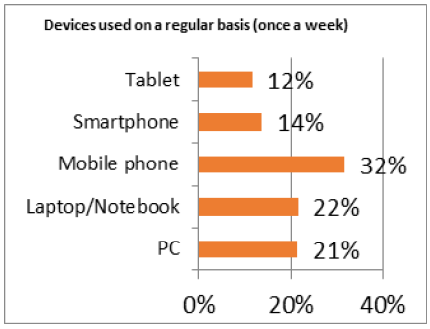

Figure 3: Use of mobile devices

4.2 Assessment of pedagogical content, tools and methodology

As observed by the trainers, 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 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.

In general, participants considered that 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 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 devices. The feedback on the UISEL app (with videos) and game was especially positive. 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 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.

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. Learning at home was often easier if a family member was available to support, and it was also necessary to make sure that the seniors had access to Wi-Fi connection. 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.

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 so they were pleasantly surprised that the course offered a real support in combating isolation and social exclusion. Generally, the acceptance of mobile devices during the courses was quite positive, with many participants planning to use a tablet afterwards.

Figure 4 shows some quantitative results for the particpants feedback on UISEL contents, tools and methodology.

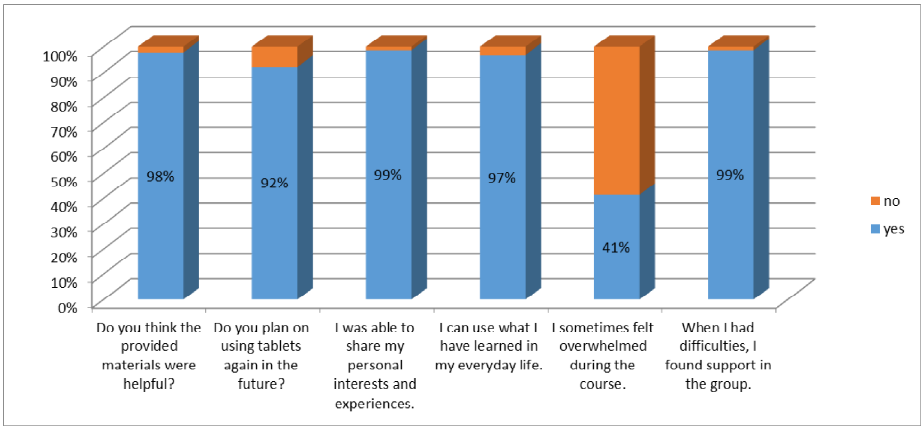

Figure 4: Specific feedback with the UISEL approach

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. Only 41% of participants assumed that "I sometimes felt overwhelmed during the which means that although the general level of the course was challenging for the seniors, they managed to keep their learning in control.

4.3 Improvement in digital literacy

To assess potential improvements on the ICT literacy by the participants, in the end they answered the same questionnaire concerning this topic. The results are shown in Table 2, next.

	Strongly agree	Agree	Disagree	Strongly disagree	Mean $\bar{x}$	Variance σ^2
I am generally very curious when it comes to new technologies.	123	77	18	2	3.47	0.43
Handling new technologies is hard for me – I am not very good at that.	42	96	58	22	2.65	0.84
If a problem with a technical device occurs, I solve it by myself.	25	80	87	28	2.43	0.76
If I had more competences regarding new technologies, I would use it more frequently than I do right now.	111	74	26	11	3.25	0.79
I fear to break technical devices when I use them.	39	80	77	34	2.57	0.85
When I'm using technical devices, I have no control over what the device is doing.	25	54	101	39	2.27	0.81

Table 2: Perception on ICT literacy (final)

The table data compared with the initial survey shows that there was an increase in the curiosity about new technologies (3.47 vs 3.34). The other aspects were equal to the first survey or with minor differencies. We believe this apparent lack of impact was mostly caused by the recent impact of new technologies, tools and devices (the final questionnaire was delivered just after the last session) which was still very present and participants were still a bit anxious about it. However this contradicts to some extent the qualitative data collected which had far more positive results.

4.4 General assessment

One observation done by the trainers was that it was important to have homogeneous groups in class with participants sharing similar competences and experiences. Some of the involved 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.

Seniors also provided extensive qualitative feedback to improve the initiative:

- Duration and content of the introductory module as longer time of learning and repetition are required for seniors to feel autonomous and secure about tablet usage. This is especially relevant for those with no (or limited) previous digital skills. They need time to become familiar with new technology. Also additional technical information would be important as some seniors expressed interest to know more technical details.
- The course should be longer and the sessions should be extended since there was a clear interest in learning about tablet usage and this would strengthen the knowledge and empower the seniors.
- Reinforce online security issues as seniors are a particularly vulnerable group, and emphasis should be placed on the fact that they shouldn't provide personal information in the virtual environment. Also it would be quite important to provide them a wider range of websites and apps that are verified and where there is no danger of getting attacked or fooled.
- The introductory serious game could be more appealing and include the possibility to stop, forward or rewind.
- The references to seniors or older citizens should be carefully written as local cultural habits vary. And what is normal in some countries might be considered offensive in others.
- Attention to seniors' potential physical problems (high screen resolution, high quality touch screen). Consistency concerns between the e-resources used and the ones in the contents (namely same Android version as the e-resources).
- A short version of the introduction module should be integrated in the middle of the course. Revision of the learnt contents, especially important basics in regard to mobile devices, should be repeated in class and with the trainer.
- English vocabulary to describe technical details should be removed. As some participants had problems with English vocabulary, all instructions and words should be in national language.
- In general the videos were considered to be too fast for the target public.
- Include in the App not only the links to the videos, but also all the slides used in class and the step-by-step guides.
- Remake some of the tutorial videos to show how to perform the activities using specific apps instead the web pages of the services using browsers.

Country specific comments addressed the overall quality of the course and contents

- (PT) Most appreciated was the practical approach oriented to daily life issues. Intensive work with tablets was much appreciated. All the contents were considered as very useful but particularly those related with the introduction, on-line payments, health, social media, communications, and games.
- (AT) Contents were deemeed as too difficult by some participants. The e-government module was perceived as not very interesting or useful while the news, google and emails, online security and looking for newspapers online were appreciated.
- (CZ) The most favorite module was e-entertainment/media and especially the photo processing and online games. The other modules and the app were generally appreciated as well.

- (IT) Requests for a longer course, appreciated that there was a connection to individual interests. The majority stressed the importance of the health module, especially the Electronic Medical Dossier. Some participants highlighted the importance of meeting new people and sharing experiences and ideas with pairs.
- (SK) There are mostly positive reactions on the way of teaching and overall on the whole learning process. The only complain was related to the duration of the courses. Most of the topics were relevant, but the module they found especially useful was e-entertainment, with YouTube and browsing through e-magazine and e-articles.
- (ES) Some more advanced participants complained that the diversity of senior previous experience lead to waiting times. Others required an enlarged practice time, which was "... more interesting than the theoretical concepts".

Senior citizens also provided quantitative feedback as seen in Figure 5.

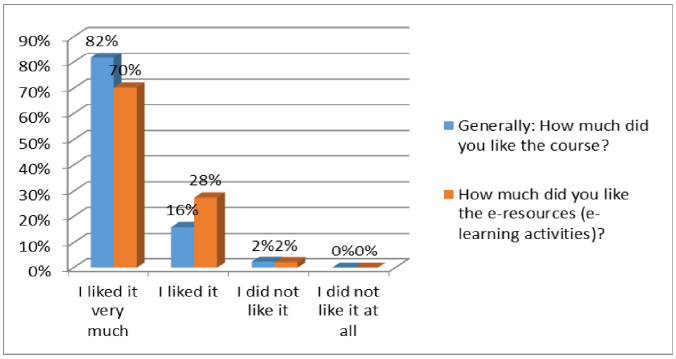

Figure 5: General satisfaction with the UISEL approach

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.

4 Conclusions

The technological evolution brought innumerous positive opportunities for the overall society. Unfortunately, it also potentiated the creation of new forms of exclusion, named as the digital divide. In particular, due to socio-demographic changes there is a rapidly growing number of elderly who have less digital competences and abilities. In a moment where everything is done online from reading newspapers to paying invoices, having the skills to use digital mobile devices and being able to exploit the online means is a necessity for everyone and senior citizens are no exception.

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.

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 own it.

Acknowledgements

Part of this work was funded by the European Commission through the project UISEL (Ref: 539730-LLP-1-2013-1-PT-GRUNDTVIG-GMP).

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