Smart Ecosystem for Learning and Inclusion

December 2020

D6.1

List of pilot tests scheduled and participants

PREPARED BY:
Özgür Yaşar Akyar

Deliverable D6.1.

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Universidad del Azuay (UDA) & University of the Armed Forces-(ESPE), Ecuador

Universidad de la República, Uruguay (UdelaR)

Federico Henríquez y Carvajal University, Dominican Republic (UFHEC)

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EXECUTIVE SUMMARY

This deliverable is the report of the planned pilot tests with participants from different partner countries. This report aims to provide information about the country specific background of SELI project initiatives, preliminary findings of initiatives regarding strengths, weaknesses, opportunities and threads as well as future plans for pilot tests with SELI learning platform in different contexts of using SELI platform in education with learners. Capacity building and pilot tests plans were provided as part of this report considering unexpected circumstances brought by Covid-19 pandemics. Partners planned to integrate the SELI Learning platform in their educational context in various ways.

1. Introduction

Many reasons are responsible for the inadequate inclusion of people with disabilities across several countries, including inadequate funding, legislation, poor policy implementation, discrimination, and many others. Inclusive education is a basic right that everyone has access to education and is not excluded (UNESCO, 1994; Haug, 2017). It can be said that inclusive education is about changing the attitude, behavior, teaching methods, education program and environment to meet the needs of all disadvantaged persons. In fact, "inclusion" can be identified as a dynamic process that is part of a wider strategy for promoting an inclusive society that is constantly evolving and based on local cultures and contexts (McConkey, 2014). In view of the global challenge of making education inclusive, Smart Ecosystem for Learning and Inclusion (SELI) project aimed at providing support for addressing the different context of inclusive education in some European, Latin America and Caribbean countries. For example, the SELI project addresses the aspect of inclusive education by implementing new learning tools, methods, strategies and other pedagogical solutions to support the education of the elderly, physically challenged persons, migrants, rural dwellers, and the unemployed youths. In addition, SELI project foresees teacher education as an important dimension of promoting inclusive education. Therefore one of the focus of the SELI consortium is to support teachers to promote inclusive education in their respective community.

This report aims to provide information about country specific background literature of SELI project initiatives and future plans for pilot tests with SELI learning platform in partner countries.

2. International Cases of Inclusion context

2.1 Digital divide in Bolivia

Author: Vladimir Abel Costas Jáuregui

The Universal Human Rights recognizes the Right to Education, and emphasizes the education must be Inclusive; otherwise, it would be the privilege of the included and harm to the excluded. Inclusion implies reaching all those who suffer any marginality (Cabero, J., Ruiz-Palmero, J., 2018). Digital inclusion must bring high-speed internet access, information technologies, and digital literacy in ways that improve development, opportunities and living conditions for each person and communities. The digital divide is one manifestation of the socioeconomic gap and historical inequities at the global and regional level; implies that a segment of the population cannot access or use ICT efficiently. (Cabero, J., Ruiz-Palmero, J.,2018)

Bolivia has inequality between low income against higher-income, and also relates to the urban/rural area influencing a digital gap. According to INE (2018), the prevailing ICT technologies in Bolivia are television (82.7%), and radio (47.8%); the survey in Bolivian homes in 2015 stands only 14.9% of Internet penetration. (INE, 2018). This gap is worse in rural areas, where Internet connectivity is five times lower than urban zones (UNESCO, 2017). Similar findings from INE (2018) stands 33.1% of households in urban areas have access to a computer,

against only 6.4% of households in rural areas; 20% of households in urban areas access the Internet, against only 4.2% of households in rural areas.

The report from ITU (2018) shows a mobile network increment reaching 96% of penetration and Internet access near to 40%. The penetration of mobile telephony in Bolivia let people have access to the Internet. The third part of the internet users in Bolivia are students, accessing the Internet by mobile phone; the students mainly use it for social networks, and nearly 11% of use is for learning purposes. According to the ICT Survey from AGETIC, urban internet users represent 83% against 17% from users living in rural areas. (AGETIC, 2018).

The government efforts to reduce the ICT gap concentrates in the access to the Internet by mobile phones and satellite Internet (satellite Tupak Katari has been orbiting earth since 2013). The satellite solution provides a fast and cost-efficient Internet, at least six thousand new users will be connected in Bolivia thanks to the project. The strategic plan by the government implies the provision of computers to teachers and students together with a complete installation of the electric network, data network infrastructure in schools (PRONTIS, 2014). The "one computer per teacher" and "one computer per students" projects provided computers to 72.3% of the teachers and 4.39% of students from 2012 to 2016 (AGETIC, 2018).

The effort of Bolivia are not only in the access to the Internet, according to Costas (2019) the digital literacy form teachers and students reduction gap is a concern addressed by NGOs -like Minga Digital and Ayni -, Government institutions, and private sector; but all the efforts from NGOs and private sector run in a standalone way, with no support or joint plan from the government. The training from government institutions depends on the Ministry of Education. They organize the studies based on the Curriculum of the Plurinational Education System and address digital literacy for teachers and pre-service teachers.

The data form ITU (2018), AGETIC(2018) and Costas (2019) shows a reduction of the digital divide, but it was insufficient. The new context under COVID-19 pandemic challenges Bolivian teachers and students in unique scenery with virtual learning running in an emergency approach faster than the changes to support it by the education system.

The digital divide has become relevant in Bolivian education because the government suspended classes in schools since March 12, 2020. Classes have continued for the private sector, which represents 10% of the national student enrollment (MINEDU, 2018). Students from rural and peri-urban areas do not access the Internet, due to the absence of the service -especially in rural areas- and due to the lack of devices to access the Internet, they represent between 40% and 60% of college students. According to press releases in El Deber, Los Tiempos, and La Razón; According to the analysis of the Rural Teaching, some areas do not have the minimum conditions of Internet access, such as rural municipalities, regions near the Cordilleras, indigenous peoples and municipalities deep in the Amazon and Chaco. There are reports of rural communities with local initiatives by teachers who seek to respond to the real situation of the students. Examples of local initiatives are: the rural town of Yotau delivering math and language books weekly to each student, and the rural village of Guarayos using local television channels for classes - however 10% of students declare that they do not have a television.

Civil society has raised the alarm about the privatization of education in Bolivia, and the warning is due to the government insistence on using virtual Internet media under an agreement

with Microsoft and Google Classroom to teach classes throughout the national territory. Researchers such as Ixtaso Arias (2020) emphasize the danger of inequality and exclusion in a country where the tasks of inclusion in education and reducing the digital divide are pending; furthermore, it states that virtual education is necessary but not sufficient. Is not enough to sit the child in front of the computer, neglecting the pedagogical, social and motivational aspects.
The exclusion and access to technology and mainly to education supported by ICT is an underlying problem in Latin America; and Bolivia is one of the least developed countries in the inclusion of ICT in all areas of life, as described in (Costas, 2019). The SELI Project deals precisely with digital exclusion and the lack of access to education for groups in society that are disadvantaged for socioeconomic reasons. In the Bolivian case with the influence of the COVID-19 pandemic in 2020, the need to use technology, in peri-urban and rural areas, to help distance education increases. Moreover, the Quechua culture prevails in rural and peri-urban areas with a distinct education orientation. The Quechua prevailing social group uses narration as a collective memory. This collective memory is the history and knowledge that the people acquire and transcend from generation to generation as a mechanism for learning and remembering. The way to include these groups that prevail in rural areas and migrants to cities is through the use of narration in the teaching-learning process, the inclusion of technology through digital narration is one way to achieve an appropriation of technology in a mechanism already used by the Quechua people. The Quechuas already use the narration mechanism in education, and there is a rich experience with learning and stories in the culture; thus the intention is empowering the Quechua actors in the use of technological tools to incorporate the collective memory. Assumption for the initiatives regarding digital storytelling workshops is that interventions will allow not only to tell the stories they heard from their grandparents but also to hear those voices of ancestors again with the accent and richness of the experience and let the youngest to construct narrations (Akyar et al., 2020).

The pandemic in 2020 shows the large gap in accessibility to education in Bolivia, this gap is due to accessibility to the Internet. The new distance education need represents an opportunity to change and enrich the educational model supported by ICT. However, there is also a severe risk of increasing the educational gap if there are no plans about digital inclusion in education, together with a socioeconomic inclusion approach.

SELI platform has built-in inclusive features driven by instructional design metaphors to guide the course construction. These features and metaphors will help the teacher think in the inclusion when he designs the course. In the next step, the teacher will put together the resources guided by the chosen metaphor and inclusion suggestions. The Bolivian school can improve the way teachers build courses thinking in inclusion. The awareness of SELI authoring tools helps to keep design and resources in the road of learning and inclusion. In Costas & Blanco (2020), the authors show the teacher as a change in ICT education with inclusion. The experience of some experts, surveyed in (Costas, Blanco, 2020), believes there is underutilization of ICT tools, and with the awareness of open software like SELI platform will help to curricular changes with inclusion together with ICT. They also think the wide mobile penetration to access the Internet between young citizens in Bolivia helps to start using open platforms like SELI.

2.2 Challenges, current classifications, and impacts of digital disability divide in Finland

Author: Solomon Sunday Oyelere

The concept of digital disability divide highlights the everyday challenges of people with disabilities in their attempts to use information and communication technologies (ICT). The challenges revolve largely around access to ICT services and solutions. A significant number of activities; study, government services, financial and business transactions are carried out using ICT, this requires a fairly knowledge of the use of ICT to navigate. Digital disability divide affects people with disabilities in both developed and developing worlds, therefore, the impacts can be described as universal (Neeraj, Tuikka, Kimppa, & Reima, 2015). However, the impacts vary from the factors that can be easily highlighted to complex factors that are intricate.

From the term "digital disability divide", we can observe that it is a combination of keywords that describes the physical or cognitive status of the individual and the associated features of having access to a computer system or not. Digital disability divide relates to a person with disabilities and the issues surrounding unlimited or unhindered access to ICT ((Neeraj, Tuikka, Kimppa, & Reima, 2015). Most times, the disability status plays a role in the deep of the digital divide. The different disability status makes it hard to have a one size fits all approach to dealing with digital disability divide. Other factors contribute to create a culture of digital exclusion of people with disabilities, these factors include access to a computer system, the cost of acquiring ICT services and solutions, financial circumstances, location of the individual, cultural perception, skills and competency level, personal attitude to the use of ICT including other factors such age, and gender. It has been established that young people are more likely to use and own ICT than the older people, also, men tend to use ICT more than women (though the percentage varies when comparisons are made between women in developed and developing countries) (UNESCO, 2016).

The challenges an individual faces differs from region or country to country (Arteaga, Tomczyk, Barros, Oyelere, 2020). Though the impacts are universal, however, it has been noted that people in developing countries face more challenges due to near-none or inadequate infrastructure to support people with disabilities either in ICT or other social services. Access to ICT is a major factor in disability digital divide, access can be in the form of physical or internet connectivity. Disability is also a factor in considering the challenge of digital disability divide among people with disabilities. Disability status of an individual determines the significance of his or her digital divide. This can be seen in the cases of those visually impaired and those with mobility related disabilities. While those with mobility will have more access to ICT, those with visual impairments are more likely to be impacted by the digital divide (Toivonen, Oyelere, Suhonen, 2020; Eliseo, et al. 2020; Tomczyk, et al. 2020).

Current Classification of digital disability divide

As highlighted above, access remains one of the significant determinants and causes of digital divide. Another significant factor is availability, both access and availability form the base of technological access for people with disabilities. Accessibility is a broad concept in the study of digital disability divide, it provides a template to understudy the users of ICT. There are two classes of users of ICT, the people with disabilities and those without disabilities. To understand the concept of accessibility, factors such as computer access at home, libraries, schools are taken into consideration, in addition, we will also consider internet access at home, libraries and schools by the two classes of users.

The individual with disabilities is more likely not to have either computer access or internet or both at home compared to an individual without any disability. Though some limited access might be provided at schools and libraries, the effect is that outside those places, access to information is available at certain times and places. This means that there exists digital inequality in the way access to information is made available to a person with disability.

Availability of ICT and Internet infrastructure can be used to measure the impact of digital divide among people with disabilities. This aspect is linked to access, the more access an individual has to an ICT service, the more information is available to him or her.

Apart from accessibility and availability, other factors that can be used to classify digital disability divide are the educational level of an individual, his financial status and levels of adoption of ICT. The educational level of an individual can be used to measure usage of ICT, studies have established that more educated people use ICT more than people with low levels of education. This also translates that people with disabilities with low education will likely make less use of ICT.

Impacts of digital disability divide as experienced by an individual in Finland

The impacts of digital disability divide can be observed from how the inability to use ICT services and solutions limits the individual from access to information and knowledge. Since most services either by governments or organized establishments are now digitized, this means that an individual with challenges cannot fully access such services. With the introduction of ICT in education, more educational contents are now available on the internet. An individual with some physical or cognitive challenges will be excluded from having access to those content. Impacts of digital disability divide on people with disabilities can be measured in the activities that they use ICT for when they have access.

Rapid changes in ICT means that people with disabilities will have to learn new technologies and this impacts their adoption of such technologies. This is largely due to the cumbersome nature of some assistive technologies, People with disabilities are more impacted with ICT due to non-supportive web technologies that they find difficult to navigate. Another impact that the cost prevents the acquisition of ICT for home use, that means that they have to depend on some other means to access the internet or have access to the computer system.

Resolving the digital disability divide challenge

To resolve the challenge of digital disability, conscious efforts are to be taken to understand the issues surrounding the challenge. For example, in the context of the Finland team, a course on how to address digital disability divide was implemented to international students and a course about descriptive learning analytics was implemented with pre-service teachers using the SELI digital learning platform. The aim of the first course was to train the international students on the ways to identify disabilities and resolve the problems posed by the challenge to other people. Similarly, the aim of the second course was to train pre-service teachers about the competencies needed to understand the problem of disability divide in the classroom through learning analytics techniques and find ways to support the students.

There is the need to create more awareness about the digital disability divide of people with disabilities among those without disabilities. The awareness will help push the message of inclusion to policy makers. Since it is more of a technological constraint, there is the need to make access to ICT services and solutions available for people with disabilities. This can be done by governments subsidizing the cost of acquiring ICT for people with disabilities. Since assistive technologies have been developed to allow the participation of people with disabilities, the process of developing such technologies should involve the users from the design stage to the finished technology. The cumbersome nature of some assistive technologies has meant that a section of people with disabilities are discouraged from using such technologies. Simple interface, simplistic use should be the hallmark of such assistive technology. The educational curriculum should be improved to incorporate the needs of students with different physical and cognitive challenges through the use of ICT.

2.3 Digital Storytelling integrated Community of practice to enhance physical education teacher education program in Turkey

Authors: Özgür Yaşar Akyar, Emre Bilgin, Gıyasettin Demirhan

There is an increasing attention to ICT integration among university curricula of teacher education programmes with an emphasis on increasing technology knowledge in addition to pedagogy and content knowledge. For example Moodley & Aronstam (2016) intentionally integrated ICTs by providing authentic learning opportunities to final year foundation phase student teachers through the provision of training in the creation of digital stories (DS), collaborating within communities of practice (Lave and Wenger, 1991) and then using their creations in ‘real-world’ classroom contexts.

Digital storytelling can offer learners the opportunity to reflect in a certain context, as they provide reflection on various research and research activities (Sarıtepeci, 2020; Sarıtepeci, 2016; Van Gils, 2005); student-student interaction in the collaborative learning process with active participation (Kaminskienė & Khetsuriani, 2019; Del-Moral-Pérez, Villalustre-Martínez, & Neira-Piñeiro, 2019); increasing motivation of learners (Goldingay, Epstein, & Taylor, 2018; Hung, Hwang and Huang, 2012); gaining 21st century skills such as critical thinking, problem solving, communication skills (Otto, 2018; Schmoelz, 2018).

Recent studies attempted to use digital storytelling in the context of inclusive teacher education. For example architectural design of digital storytelling, detailed process about the facilitation of digital storytelling workshop with physical education teachers (Şimşek & Akyar, 2020) aim to contribute integration of digital storytelling with a purpose to make teacher education more inclusive (Akyar et al., 2020).

Due to the war in Syria, Turkey has faced the largest wave of immigration in its history. Therefore the multicultural situation has been a reality of education in Turkey. There are several projects being carried out for increasing educational opportunities for Syrian children in Turkey. However, it can be said that a significant number of these children have challenges to access education. There may be a number of reasons which have an impact on low level of schooling among Syrian children such as having to work to contribute to family budgets, early marriage among girls and cultural attitudes of families. On the other hand, it is thought that there are problems for accessing education in general such as being unaware of education opportunities, lack of motivation, language problems, poverty, being against mixed education, bureaucratic obstacles (Düzel & Alış, 2018; Taştan & Çelik, 2017).

Based on the context of a multicultural educational environment and considering challenges for pre-service teachers regarding professional development, our focus in Turkey aims at supporting pre-service physical education teachers throughout digital storytelling integrated Community of practices. Our study assumes that allowing pre-service teachers sharing their stories about school experience is a good way of supporting them to establish a theory-practice connection. In this context, in order to connect theory and practice, a professional development program integrated with digital storytelling based on the community of practice (Lave & Wenger, 1991) was planned.

Therefore SELI Learning platform is used in the context of Physical Education and Sports Teaching Program in order to enhance skills of pre-service teachers to design, develop, implement and evaluate courses with support of ICT based solutions at the Faculty of Sports Sciences, Hacettepe University, Turkey. More specifically, Inclusive education topics and SELI learning platform is integrated in school practice and teaching practice courses of Physical Education and Sports Teaching Program.

2.4. ICT and collaborative work as a way to promote inclusion in Ecuador

In Ecuador plots had two versions as two universities were involved from Ecuador.

2.4.1. Adult education in Ecuador

Authors: Gabriel Barros, Sonia Magali Arteaga Sarmiento

One of the target groups in Ecuador is related to the Digital Divide and has implications in Digital Inclusion. The group encompasses adults in working age (18-65), but who are not able to effectively handle digital tools. This group participated in a national experiment trying to provide instruction to let them finish high school studies and finally obtain a high school diploma. However, the studied group presented a high drop rate. In this context, inclusive education in Ecuador.

2.4.2. Teaching Programming as part of Computational Thinking in Ecuador (ESPE)

Authors: Margarita Zambrano, César Villacís

In Ecuador, around September 2016, ministerial agreement No. MINEDUC-ME-2016-00020-A (Ministerio de Educación del Ecuador, 2019) entered into force. This agreement regulates “Basic General Education curricula for the high school, elementary, middle and lower levels; and, the unified general baccalaureate level curriculum, with their respective hourly loads”, establishing a common teaching core where the following subjects are covered: Language and Literature, English, Mathematics, Chemistry, Biology, Physics, History, Philosophy, Education for Citizenship, Physical Education, Cultural and Artistic Education, Entrepreneurship and Management. However, within the proposed curriculum, the absence of subjects related to Computer Science stands out.

Within this context, there is a need to implement software programs that improve traditional educational methods (Fernández, P., et al., 2009), which in the future will strengthen education in the different areas linking knowledge already acquired, and the lack of teaching subjects related to computing and / or technology at the secondary education level reduces the development of logical and critical thinking, making it difficult to learn professional and educational knowledge in the University (Pérez, 2018).

It has been decided within the SELI Project to prepare courses in Computational Thinking Video Game Programming, where the teaching of SCRATCH, RPG Maker and APP Inventor is contemplated to develop programming logic and abstract thinking in first level university and high school students.

2.5 Collaboration on Comprehensive Care for Disability in Dominican Republic

Authors: Darwin Muñoz, Hugo Parada and Cinthia De la Rosa

The Inclusive education involves all students in their diversity, incorporates them in an environment of equality and respect for their rights, and focuses on undertaking significant changes in the education system to respond to the learning needs of each person.

For the implementation of inclusive education to be effective, optimal conditions must be created, such as accessibility in educational centers, transportation and communication, having adapted teaching materials and resources, and that teachers are trained to deal with diversity, as well as the incorporation of Information and Communication Technologies as a channel for the strengthening of the educational process.

It is necessary to separate special education from inclusive education. In the Dominican Republic, early primary education is compulsory in regular schools for children and young people with special educational needs, whether or not associated with disabilities. Although historically, individuals with some or multiple disabilities are restricted to be at home or, at most, to stay in segregated institutions that have been collectively referred to as "special education". This is based on the belief that these people cannot be educated and that they are a problem to the regular education system. There is often a resistance in regular schools to enroll students with disabilities

or, when enrollment does occur, they are not allowed to continue because it is difficult to educate them.

However, in the Dominican Republic, since the central government, has made an effort to promote inclusive education, through specialized agencies, such as the Center for Comprehensive Care for Disability (CAID), which is dedicated to the evaluation, diagnosis, and rehabilitation of children from zero to ten years with Autism Spectrum Disorders (ASD), Cerebral Palsy (CP) and Down Syndrome, to improve their quality of life and that of their family and social network.

The SELI Project partners visited the Center's facilities, demonstrating the inclusion work being done with a sector of the Dominican population. Similarly, the Project leader, Dr. Solomon Oyelere, presented the advances of the project, how the platform supports educational inclusion, and its integration as a resource to enhance the various activities developed at CAID. It is interesting to note that the center has the presence of technology in some of its administrative, educational, and therapeutic processes.

Also, CAID Center has a School Inclusion program that is *"designed to guide families and educational communities in the schooling of children. It seeks to encourage change in attitudes and practices regarding disability and education. More specifically, the program seeks to identify and eliminate barriers in the school context, so that the necessary strategies and support are provided to favor access, participation, and success for all students. This program includes the processes of school accompaniment and support for those who are not in school"* (*Centro de Atención Integral para la Discapacidad*, n.d.).

The SELI learning ecosystem offers the opportunity to prepare teachers, support staff in schools, specialized centers, families, and the general community, to guarantee the right to education of persons with disabilities. The preparation of this group of personnel should include training and education instances, both in the initial training stages, as well as in the specialization and in-service training courses. Training should also be provided for school administrators, educational planners, and policymakers. These professionals must be qualified in the teaching of sign language and Braille, with a deep awareness of the various impairments, and be prepared to use augmentative and alternative communication media and formats, as well as techniques and pedagogical support materials for persons with disabilities.

2.6 Prevention of Cyberbullying in Poland

Authors: Lukasz Tomczyk

Cyberbullying and electronic aggression are among the most visible e-threats. This is a risky behaviour that about 1/3 of young people in Poland have experienced over the past year (Pyżalski et al., 2019). Most often cyberbullying concerns people: weaker than the perpetrator, celebrities, specific groups of people (due to different nationality, religion, sexual orientation, appearance, age, place of residence), an accidental person, close colleagues, other young people from their environment, teachers, former boyfriends and girls. Cyberbullying or electronic aggression can be expressed through: Commenting on an online forum or other website (for example, a social networking site) to ridicule, upset or frighten others; sending various types of digital messages to evoke negative emotions; posting photos, videos, audio recordings of others

in an unpleasant situation; hacking into other people's profiles and accounts; sending out false information from an intercepted or fraudulent account; sending out other people's audiovisual material presenting these people at a disadvantage due to provocation; discrediting other people in open electronic communication, setting up fraudulent websites; lying to other people in cyberspace to cause emotional harm; sending out false advertisements on various portals (e.g., the Internet, the Internet, the Internet, etc.); sending out a message to others to cause negative emotions; sending false advertisements on various portals (e.g. dating), insulting others while playing online games; sending unpleasant information or links to others; sending unpleasant messages to offend or frighten others; revealing private correspondence or other digital material on the Internet; sending intentionally files to damage a computer; intentionally excluding others from a group of friends in cyberspace (Pyżalski, 2012). These are some of the most important forms of cyberbullying. It is also worth emphasizing, as an introduction, that aggression and bullying to two different phenomena. Aggression, as opposed to bullying, may involve people of equal status. There is no place here for a stronger and weaker person. In the second case the perpetrator is fully aware of the weakness of the attacked person. Both forms are aimed at causing harm. Very often both phenomena are mistakenly identified with each other. Despite the different ways of measuring the phenomena, it is one of the most common e-threats, especially for young people.

Therefore, taking into account the negative consequences resulting from cyberbullying, the scale of the phenomenon, the knowledge of teachers and parents on the subject (Zych et al., 2017; Tomczyk & Włoch, 2019; Wnęk-Gozdek et al., 2019), it was decided within the SELI project to prepare courses for professionals, which discuss mechanisms accompanying cyberbullying, as well as ways to counteract it. The need for preventive actions in this area also stems from the intensive development of the information society (Ziemba, 2017) and transformations in the use of digital media by young people, which is reflected in the scale of cyber-bullying (Tomczyk, 2017).

2.7 Lifelong Education through SELI in Brazil

Authors: Maria Amelia Eliseo, Valeria Farinazzo Martins, Cibelle Albuquerque de La Higuera Amato, İsmar Frango Silveira

People are having a longer life around the world. The elderly population is growing year by year. There is an expectation that the elderly population will increase by more than 60% in 15 years, corresponding to about 12% of the world population in 2030 (He, Goodkind and Kowal, 2016). In 2019, there were around 28 million elderly people in Brazil, a number that represents 13% of the country's population. And this percentage tends to double in the coming decades, according to the Population Projection, released in 2018 by IBGE - Brazilian Institute of Geography and Statistics (Brasil, 2019). The positive environmental conditions, healthy lifestyles, preventive health care that assure the aging quality of life and well-being, better education, better access to employment and income are some of the elements that promote longevity (WHO, 2000; Páscoa and Gil, 2019; Brasil, 2019). On the other hand, aging brings some challenges for the elderly such progressive loss of capacity. As people age, the senses

become less intense, causing loss of visual acuity, loss of auditory acuity, cognitive changes and decline in motor skills. The advancement of age does not restrain any capacity of the individual but it is a matter of adapting to the new limitations, mainly of the body (Oliveira, Scortegagna and Oliveira, 2009). With the medical advances and changes in society's behavior the disability rates among older persons are decreasing and the declines or losses are not irreversible yet. Traditional approaches which used to meet the needs of older people are also undergoing change (Grigoryeva, Shubinskiy and Mayorova, 2014). These persons have looked for involvement in community, social and family life avoiding isolation. The elderly need to share their experiences and continue to produce for as long as possible, so that they are prevented from feeling isolated from society and the continuity of their economic productivity is ensured (Pullum and Akyil, 2017).

In order to guarantee the quality of life of the elderly in Brazil, the "National Elderly Policy" was instituted in 1994 and, in 2003, the "Elderly Statute". These documents promote initiatives and establish recommendations for elderly people to be understood and to enjoy a full and healthy, safe and satisfying life, with their families and in the community where they live (Brasil, 2019; Oliveira, Scortegagna and Oliveira, 2009). In this approach, education for the elderly, guaranteed by the "Elderly Statute", is a reality to be considered and increased by different programs, enabling the permanent acquisition of knowledge and a more active participation of this audience in society (Oliveira, Scortegagna and Oliveira, 2009).

Grigoryeva, Vidiasova and Zhuk (2016) pointed out four possibilities to elderly inclusion: communication practice via ICT Information and Communications Technology) and Internet; effective government services provision; online social discussions and democracy processes in electronic forms. ICT can provide the elderly with a more comfortable and economical way of performing everyday and trivial tasks, such as consulting government portals (e-government), accessing banking services (e-banking), shopping (e-shopping), assisted support at home, greater availability for lifelong learning support and rehabilitation through computerized means (Páscoa and Gil, 2019).

In addition, ICT are increasingly present in the daily lives of the elderly, bringing them more independence and changing behaviors such as the way of acting, thinking and communicating (Grigoryeva, Shubinskiy and Mayorova, 2014; Páscoa and Gil, 2019). The ease of communication favors the elderly to integrate better into the community, increasing their network of relationships, especially with family members who are often geographically distant, minimizing this distance.

The percentage of older people using ICT results primarily from the spread of the idea of lifelong learning, the development of educational institutions addressed to seniors and the individual characteristics of seniors. Those activities promote the recognition and maintain them active in a rich space to learn and promote possibilities of interaction and social communication. Education for the elderly has a transformative character, offering possibilities to find a new sense of life, to allow the reassessment of their own characteristics, providing a process of analysis and reflection for these people (Oliveira, Scortegagna and Oliveira, 2009).

Unfortunately, the current digital educational environments were not completely designed and developed to address the needs of the elderly. The computational resources must be thought

and adapted considering some requirements to minimize the difficulties of the elderly (Eliseo et al., 2020). Considering the decline in memorization and logical reasoning the educational system should allow more time to learn, avoid complex screens with a lot of information, provide simpler interactions to use more than one media to present information like texts with familiar words. Regarding decline in visual acuity must avoid contrasts in blue-green bands, use resources to increase and decrease the source, use recorded audio referring to a presented text, choose images that have good contrast, avoid fluorescent colors, use audio description for imaging. About the decline in auditory acuity the system must avoid automatic text-to-speech and prefer audios recorded by human voice, use sounds between 500 and 1000 Hz, use videos with caption. To minimize the motor decline the system must allow interactions with longer and appropriate time, multi-channels of information input such mouse, keyboard, touchscreen and interfaces with few elements and large buttons (Martins at al., 2019; Phiriyapokanon, 2011; Razgan, Al-Khalifa, Al-Shahrani and Al-Ajmi, 2012; Eliseo et al., 2020).

Another concern to adapt learning to the elderly concerns the pedagogical aspects. Especially when it comes to distance education that takes place in an environment in which the teaching and learning process occurs regardless of whether the actors involved are separated temporally or spatially. Among the pedagogical strategies the planning of activities and content must considering the profile of the elderly student, the profile of the tutor, the use of complementary materials, the importance of the usefulness of the content, didactics, types of resources available digital and virtual learning environment, the use of multimodality of representation such visual, auditory, spatial, linguistic, and gestural modes, including principles of Learning Universal Design (Machado and Behar, 2015; Walters, 2010; Eliseo et al. 2020). It's important to prepare the teacher to work with this audience due to the cognitive losses resulting from aging. The teacher needs to be more patient in transmitting the content giving more time for the execution of tasks.

Despite the pedagogical strategies to meet the specific needs of the elderly in their learning process, and the guarantee of education, public policies in Brazil do not support these strategies. The elderly are included in the education of young people and adults according to the national curriculum guidelines (Oliveira, Scortegagna and Oliveira, 2009) which can lead them to a context of discrimination and frustration because this situation not respecting their learning time nor their needs. Some public and private universities in Brazil are including specific projects that aim to educate the elderly in their programs.

With the expansion of university programs aimed at the elderly, it is essential to develop courses that respect the needs and limitations of this audience. Creating digital and accessible materials for the elderly is not trivial for a teacher. In order to facilitate teachers in the production of educational material for the elderly SELI platform guides them to adapt or create the content to make it more accessible from planning to building the course. For the elderly student, the SELI platform can offer a course that facilitates access to content, minimizing its limitations, especially those related to vision and hearing, in addition to allowing the optimization of some resources, such as the ideal time for the development of activities didactic. As a result, students can focus more on the content to be learned, without worrying about the aging limitations when interacting with ICTs during the course.

2.8. Uruguay Context and SELI contributions

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According to Eurostat, the notion of digital divide refers to the distinction between those who have access to the Internet and can make use of quality services through the World Wide Web, and those who are excluded from that possibility. The term also refers to the differences among the groups in terms of their competencies to use Information and Communication Technologies (ICT) efficiently, as far as their levels of digital literacy, access problems, and different shortcomings are concerned. Occasionally it is used to single out the differences between the groups which have access to quality content, and those who do not. A way to measure the digital divide is by considering two dimensions: (1) access to ICT and (2) how these technologies are used.

Availability of technology is not the main problem in Uruguay and a great achievement in terms of overcoming digital exclusion is acknowledged, although there is still room for further improvement, particularly in terms of availability of individual devices beyond the cellular phone. This is consistent with a national context of public policies displayed in Uruguay throughout the last fifteen years. Some of the policies that fostered digital inclusion were Plan Universal Hogares, Plan Ceibal and Plan Ibirapitá. All of them have been effective in reference to digital inclusion (ITU, 2018).

Plan Ceibal ("Conectividad Educativa de Informática Básica para el Aprendizaje en Línea", Educational Connectivity/Basic Computing for Online Learning) is a connectivity plan, implemented in 2007 following the "one laptop per child" model. Every child and teenager who enters the Uruguayan education system (school and high school), receives a computer for personal use with free access to the Internet. This Plan was created with the objective of introducing ICT in public education. Moreover, it provides connectivity to preservice teacher education centers throughout the country. It has also installed video-conferencing devices deploying a nationwide network.

However, Plan Ceibal is not particularly oriented to preservice teacher education. Nonetheless, pre-service students have benefitted from some of Plan Ceibal's initiatives.

A national survey carried out by the National Institute of Educational Evaluation (Instituto nacional de evaluación educativa, INEED) asks teachers about how they evaluate the preservice education and training they have received.

More specifically, they are required to answer in terms of strengths and weaknesses they find in the preservice program. Clearly, school teachers consider that the strongest and greatest emphasis of their education has been placed on the subject matter contents (Math, Geography, History, etc.) and on the didactic contents. On the other hand, the majority consider that the weakest aspects of their education are in the area of educational management of the center, on

teaching disadvantaged children or children with learning disabilities, and on teaching with ICT. The percentage for those teachers who claim that these are the weakest areas are: 77% for public school teachers and 74% for private school teachers. The same holds true for highschool teachers: 71% in public and 73% in private highschools, considering that their education and training on teaching skills with ICT has been deficient. (INEED, 2015, p.18)

This was reinforced by a recent study, a qualitative research carried out on interviews with three very prominent institutions in the Uruguayan educational context, represented by three references, carried out between January and March 2020 by the Uruguayan SELI team (Porta et. al. 2020). Respondents agree in the opinion that the teacher becomes the center of all the implementations that aim at the technology appropriation processes. The teacher's profile, the teacher's background, the teacher's attitude, and the teacher's participation seem to be determinants of success. Therefore, there is a strong emphasis on the relevance of the acquisition of digital technologies by teachers.

To contribute to solving this challenge of technology acquisition, in the context of the Uruguayan SELI team, a course introducing smart ecosystems for learning and inclusion was implemented and offered for teachers using the SELI digital learning platform, and a second advanced graduate course on smart technologies for education was offered by Professor Solomon Oyelere from Finland SELI team, part in face-to-face and part in e-learning mode.

Besides, access to ICT and how these technologies are used, Uruguay has been walking to move from the concept of accessible education to the wider concept of inclusive education during the last years.

Inclusive education means to give all students a fair chance to learn in the same educational institution and develop the skills they need to have an autonomous life. This includes students with disabilities but also anyone that is excluded like immigrants or social or economically disadvantaged. In order to advance in this direction, in March 2017 the "Protocol of Action for the Inclusion of People with Disabilities in Educational Centers" (https://www.impo.com.uy/bases/decretos/72-2017) was approved, which is a reference guide and consultation in relation to good practices and standards of care for people with disability. This protocol promotes the formation of spaces for participation, information, network, orientation, and consultation in the educational center. This protocol is a tool that guides actions to address the issue in educational centers and promotes, among other aspects, the Universal Design for Learning (UDL) for student access to the contents and objectives of the educational proposal; and also as a tool for identifying barriers to learning and participation.

Inside the SELI project, there is ongoing collaborative work showing the benefits that artificial intelligence has on the contribution to UDL by means of mapping multiple means of representation for learning contents according to learner´s disabilities, needs and preferences (Viola et. al. 2020).

In a diverse collaborative environment, inclusion can be defined as treating each individual as an insider and is also allowed/encouraged to maintain uniqueness within the workgroup.

Within the SELI Project, the learning environment is seen as an ecosystem where individual and/or services interactions occur. From a technical perspective, Blockchain is the platform that supports these interactions to occur in a transparent and secure manner. From a social perspective, Blockchain is the environment that allows inclusion while preserving individuality (without intermediaries). Blockchain democratizes education, gives possibilities, voice, and value to each one be it, student or teacher.

Our contribution in this direction is to promote the use of Blockchain by collaborating in the implementation of the SELI Blockchain infrastructure. Present SELI Blockchain has three nodes, one in Ecuador, one in Finland and one in Uruguay.

3.Plan for Future Pilot Tests

This section covers details of planned pilot tests from different countries. Each pilot test includes the following information in a different context.

- Name and details of the courses created in SELI
  - Objectives
  - Course start and end dates
  - Number of the weeks or hours
- Information about participants
  - Number of the participants (Learning analytics feature can be used for this)
  - Type of the end beneficiaries(migrants, elderly, physical disability, ESL)
- Feedback and recommendations for ecosystem refinement and improvement

3.1. Turkey

General objective of pilot tests in Turkey is to support physical education pre-service teachers to provide inclusive educational settings for enhancing active quality living among students. Therefore a program of pilot tests planned specifically for supporting pre-service teachers to increase technology, pedagogical content knowledge and experience. Therefore specific objectives of pilots were planned based on theoretical framework TPACK(Technology, Pedagogy, Content Knowledge) and General Competencies for teaching profession (MoNE, 2017) with a focus on inclusive education. Specific objective of plot tests are identified as below: To support pre-service teachers,

for using information and communication technologies effectively in the teaching and learning process,

for preparing flexible teaching plans by considering the individual differences and sociocultural characteristics of students,

for respecting individual and cultural differences,

for advocate that every student can learn,

for organizing the learning environments by considering the individual differences and students' needs,

for preparing plans in accordance with the curriculum of physical education and sports teaching program,

for organizing the learning environments by catering for learning outcomes of the curriculum.

First pilot testing will be implemented with physical education pre-service teachers who will use the SELI Learning platform between May and June 2020. Second implementation will be held between September and December 2020. Because of Covid-19 pandemics peer teaching among pre-service teachers is considered to be implemented instead of immigrants. On the other hand specific focus will be supporting pre-service teachers about working with cultural diversity in the classroom for promoting inclusive education among immigrants.

Therefore our intervention with preservice teachers will include a community of practices and integration of digital storytelling during the school practice and teaching practice with a focus

on inclusion. Physical education pre-service teachers will be recruited among volunteers and invited to a community of practices consisting of max 8 members for each community of practice in order to ensure quality of practice and in depth data collection for research. During the intervention, students will discuss inclusion related topics in the forum discussion of the SELI platform. These discussions will include the target group related discussions including working with cultural diversity which brought with the high number of refugees, immigrants that had an influence on the Turkish education system. During the course, a handbook for teachers who have foreign students in the classroom by the Ministry of National Education will be shared. Within a community of practice meetings and in the forum discussions of SELI Learning platform several discussions with pre-service teachers will be held such as: Theoretical Foundations of Inclusive Education, What are the prejudices we Encounter? How can we prevent prejudices?, How should I choose Instructional Materials for inclusive education?, How should we evaluate students in Inclusive Education?, What is Inclusive School?, What is Post Traumatic Stress Disorder?, How can we cope working with children who are faced with violence and have violent tendencies in the educational environment?

Based on the intervention with pre-service teachers' feedback and recommendations for ecosystem refinement and improvement for SELI will be shared.

3.2. Poland

The general objective of activities under WP6 in Poland will be to increase the level of digital competence in the field of digital security and elementary components of ICT services. Further steps in the implementation of tasks from the project in Poland will be dictated by several factors independent of the Krakow team of researchers. Firstly, the pandemic situation continues to keep schools, universities and lifelong learning centres closed. Between July and August, higher education is not working due to holidays. During the break, several action options will be developed in order to successfully complete WP6 in Poland. From October 2020 it is planned

- testing the platform among students (education on digital inclusion in an intergenerational environment);
- testing the platform among teachers (prevention of cyberbullying among adolescents).

During the holiday period, preceding action Wp6.2, the two Polish courses will also be translated into English and will undergo professional linguistic revision. The next activities within the framework of Wp6 will be managed by the employees of the Pedagogical University, Prof. Katarzyna Potyrała and Dr. Łukasz Tomczyk with the support of other research workers of the Faculty of Education and Psychology. In the period from October to December, it is planned to set up two communities of practices. Each group will consist of representatives of pedagogical students and teachers. The selection of students and teachers will be based on the following criteria: voluntariness, interest in the issues of digital inclusion of the elderly or counteracting cyberbullying. Each group will consist of 3 to 8 students/teachers. The size of the group will depend on the situation with COVID and external conditions related to the implementation of the platform. Each group will be supervised by the previously mentioned UP employee. The supervisor will act as a tutor, supporting the implementation of educational activities. The SELI

platform will be used during the activities. The SELI platform will serve as a repository for detailed methodologies related to digital inclusion and cyber-bullying prevention. In addition, the platform will also be a kind of experience centre. The participants of the community of practice will place on the platform their own experiences concerning the teaching and teaching of elderly people to use ICT as well as the prevention of cyber-bullying. It is estimated that about 100 people (elderly people, students, teachers) will benefit from WP6 activities. The following didactic forms are planned to be used: individual work, self-education, group work, problem based learning, digital storytelling, work with an Internet platform, online consultation, case study, text work, knowledge testing. However, it is important to be aware that there is a possibility that the indicators may not be achieved due to the COVID19 pandemic.

3.3. Brazil

The general objective of activities under WP6 in Brazil will increase the level of competence in elderly education supported by ICT services. Further steps in the implementation of tasks from the project in Brazil will be dictated by some factors independent of the Brazilian team of researchers. The pandemic situation continues to keep schools, universities and lifelong learning centres closed. In July, higher education is not working due to holidays.
The government expects to return to face-to-face classes in September. But the situation is still uncertain in Brazil, especially when it comes to the elderly, as they are part of the risk group for contagion of COVID 19. But, if the situation allows, the plan is:

- testing among teachers the efficiency of the authoring tool in its new version for creating or adapting teaching material for the elderly with teachers;
- testing the accessibility and feasibility of courses supported by ICTs among elderly students.

The forecast is to conduct tests with teachers who work with elderly in September and with students in October. With the new version of the SELI platform, the teacher will have more targeted support for planning, structuring and building accessible courses. It is necessary to verify whether these new resources offered by the platform meet the expectations and needs of the teacher in creating accessible courses.

On the other hand, it is equally important to check if the courses offered by the SELI tool correspond to the skills and learning preferences and, especially, they help the elderly to overcome their limitations, such as vision, hearing, motor coordination and time for the execution of didactic activities.

3.4. Ecuador

There have been several plans for plotting in Ecuador.

The planning of courses related to Adults education, as mentioned in section 2.4, are “computer use” and English second language. Courses were supposed to be face-to-face but due to problems related to COVID19 this planning was not respected.
First plan was the **computer use** which is a course to teach adults, possibly affected by digital exclusion, to handle a computer and execute the more important functions like word processor,

spreadsheet, presentations (beamer intended), collaboration tools like shared documents and email. The main goal is to provide hands-on instruction to adults having dropout of high school studies. In this case SELI was the platform to hold learning materials like videos and documented step-by-step guides of the use of programs. Duration of the whole program is about 9 months in a program inside Universidad del Azuay providing support for this group to obtain their high school degree. About 20 people in 2 hours sessions. However, the use of the SELI environment was expected for some units in the months of March and April. Feedback and recommendations for ecosystem refinement and improvement were not possible to obtain because of distance education used because of the pandemic. It is quite complicated to teach basic functions used to people not familiar with computers. Especially keyboard use for some functions.

In the field of ESL the SELI platform was used to teach English for a group of 35 students whose age ranged from 19 to 22. Their level of English was intermediate. Before starting classes students took a pre-test to measure the knowledge they had about the content they were supposed to learn in the platform. Students used the platform for one week. For 10 hour, participants used the platform fully without having contact with the teacher. There were two videos entered in the platform, a pre-test, exercises and an explanatory video. Students showed problems with reviewing the test´grades. At the end and by using a short quiz in a different platform, students demonstrated have acquired the knowledge they had to. Students expressed that they liked working with the platform, but that they were reluctant to work on tests there as there was no chance to see their final scores.

Anotherher course is planed in the SELI platform by the professors of the University of the Armed Forces are SCRATCH, APP Inventor and RPG Maker, these courses are part of the Computational Thinking Course and have the objective of developing skills and abilities such as

• Creativity and design
•Problem resolution
•Teamwork
• Development of creativity and critical, logical, lateral, mathematical, spatial and abstract thinking.
• Interest in pursuing technical and engineering careers.

Each of the courses includes 20 hours in virtual face-to-face mode.
The courses will be applied to 18 students of the first level of the Computer Science career, and to 44 students of the Electronics career whose age ranges between 18 and 21 years of age.
The dates on which the pilot project will be applied is August 20 to August 31, 2020.
Practice project on September 05, 2020.

3.5. Bolivia

Bolivia has shown the vulnerability of the education system to the digital divide by moving classrooms from face-to-face to virtual. Schools, colleges and universities have permanently suspended face-to-face classes for 2020 management. Despite the efforts of public school teachers and students, a low number of students have been reached by technology

accessibility issues. The quality of Internet access and the availability of student devices (mostly accessed by low-end cell phones) are part of digital divide problems in Bolivia.

The SELI Project in Bolivia decided to direct its pilot plan to the inclusion of disadvantaged groups in rural and peripheral areas of the city with low access to digital resources, mainly from indigenous peoples whose language is Quechua. This goal of the pilot plan is not feasible, due to COVID-19: closure of schools and its effect of the digital divide, the isolation imposed; On the other hand, the political situation in Bolivia, after the 2019 elections, has prevented action with the rural sectors, due to the exclusion of those sectors promoted by the current government. For the reasons mentioned, Bolivia has decided to change the orientation of the pilot course to health promoters about COVID-19.

The pilot plan's orientation is the prevention and care of patients sick with COVID-19 at home, in the face of the collapse of the Bolivian health system and the distrust generated by the government towards the most disadvantaged sectors of society (including indigenous groups). The plan is training a Physician in the use of the SELI platform and instructional design; after the Physician will carry out training and guidance for the care of the sick COVID-19 at home. For the training, the Physician will use the scientific knowledge collected in the world (much of this still under study), the knowledge and popular knowledge of traditional and ancient medicine use. This course will be taught to people interested in promoting this type of care to support people excluded from the health system and improve the population's chances of survival. The course will include the possibility of participation of people who communicate in Quechua and Spanish.

During the training, we will use educational techniques based on group communication such as Forums to consult and share experiences, Digital Narration to promote experience and self-motivation. The process will incorporate a Community of Practice to collect and share the resolution of medical problems supported by the participants.

The Community of Practice will allow establishing a group with the possibility of using ICT to support the health system with the common practice of doctors, naturists, and the social healing practices known as the "grandmother's prescription" that are recognized with positive effects in the treatment of diseases.

The attempt to train physicians to help during the covid-19 pandemic was not carried out because of political issues before November elections. Finally, the team chose to train two teachers in Computer science area. Both teachers organized a course to introduce the first-semester student as trainers to help their mates in the process of solving problems. The training to teacher takes 12 hours in a virtual face-to-face mode. After that, the course is used to train the students for three weeks.

The training course in problem-solving for students to help mates to follow the subject uses inclusion features from SELI-platform like image descriptions and subtitles to help the students in cognitive reinforcement and for them with low vision or deaf problems. The teachers also include storytelling activity as a feedback tool for the course.

3.6 Dominican Republic

The main objective of the work packages six activities in the Dominican Republic will be to develop the content of the Scrum Model for the development of software in the subject of "system analysis" in the System Engineering career, where 23 students located in the 2nd year of the career will be participating. The piloting will be carried out between July and the first half of August. It should be noted that in view of the global pandemic, the opportunity has arisen to promote distance education and there are students who have basic skills in the use of virtual learning platforms.

In this pilot test of the SELI learning platform, its accessibility, navigation, and distribution of contents will be tested by students. During this process students will be accompanied to develop this thematic unit through the platform, the person in charge of the process will be professor Hugo Parada, the platform will be used as learning resources through the modality of the Flipped Classroom.

Similarly, the smart ecosystem will be used as a means to promote the importance of distance education in the Dominican Republic, and new learning experiences for students in the face of the situation of COVID-19, which will allow them to create educational, employment and social patterns to identify opportunities before adversity.

Finally, at the end of this pilot project, an instrument will be applied for students to assess the process, which will address aspects of interest for the research group of the SELI project.

3.7 Uruguay

The general objective of activities under WP6 in Uruguay will be to increase the level of teachers' digital competence. However, due to the COVID-19 pandemic in Uruguay, teachers' activities have changed drastically in the last months.

The University of the Republic canceled face-to-face classes on March 13, 2020, at the early start of the first academic semester of the year. The courses were arranged almost immediately to be delivered remotely. This implied excessive teachers work and exhausting days in search of the best transformations of the educational proposals for the new modality. This situation made it impossible to realize the pilot courses with the initial schedule that we had foreseen in the SELI Project.

As of August 2020, the outbreak in Uruguay is still ongoing but only at a low level of infections, so some face-to-face activities have begun to be carried out gradually and with careful protocols throughout the country. The University of the Republic decided to hold massive courses in a non-face-to-face mode and to authorize face-to-face courses in exceptional circumstances (well-founded cases of need for presence due to the use of laboratories or special activities) during the second academic semester of 2020.

In this context, a group of 50 teachers has been identified to work on the SELI platform in a voluntary way. Teachers will work on SELI, using the proposed storytelling tool, in order to

register their autoethnography describing their experience of change from face-to-face to remotely teaching during the first academic semester of 2021.

The proposed schedule will begin run during September-November 2020 and will allow evaluations about the SELI platform and on the use of the proposed storytelling tool in December 2020 (Munoz-Baell et al., 2011).

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