ICT IN TEACHING AND DIGITAL INCLUSION – THE PERSPECTIVE OF SELECTED COUNTRIES FROM LATIN AMERICA, CARIBBEAN AND EUROPE

LAS TIC EN LA ENSEÑANZA Y LA INCLUSIÓN DIGITAL: LA PERSPECTIVA DE PAÍSES SELECCIONADOS DE AMÉRICA LATINA, EL CARIBE Y EUROPA

Resumen:
Les estamos dando a los lectores una extraordinaria monografía. Es una publicación cuyo principal objetivo es mostrar los desafíos de la efectiva inclusión de las TIC en los procesos de enseñanza y el fenómeno de la inclusión digital. La publicación fue creada como resultado de una investigación internacional realizada en países como Bolivia, Brasil, República Dominicana, Ecuador, Finlandia, Polonia, Turquía y Uruguay. El libro es único porque a menudo no es posible recopilar datos que nos permitan ver las necesidades y las condiciones educativas en el contexto de una sociedad de la información en desarrollo desde una perspectiva horizontal. Esperamos que el libro resulte particularmente valioso para los educadores de medios, profesionales e investigadores.

SOLOMON SUNDAY OYELERE, ŁUKASZ TOMCZYK

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Solomon Sunday Oyelere & Łukasz Tomczyk (editors)

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Smart Ecosystem for Learning and Inclusion

TABLE OF CONTENTS

INTRODUCTION AND METHODOLOGICAL ASSUMPTIONS

We are giving the readers an extraordinary monograph. It is a publication whose main goal is to show the challenges of effective inclusion of ICT in teaching processes and the phenomenon of digital inclusion. The publication was created as a result of international research conducted in countries such as Bolivia, Brazil, Dominican Republic, Ecuador, Finland, Poland, Turkey and Uruguay. The book is unique because it is not often possible to collect data that allow us to see the needs and educational conditions in the context of a developing information society in a horizontal perspective. We hope that the book will prove to be particularly valuable for media educators, practitioners and comparative researchers.

The research was designed within the international project SELI. The main objective was to investigate the conditions related to ICT-supported learning and teaching and digital inclusion. These goals are primarily diagnostic but they will also enable comparative analyses of the selected European and Latin American countries. In addition, the praxeological dimension allows to present the characteristics of the potential users of an international online platform with courses addressed to the end users of the SELI project. While conducting the research among teachers and students of pedagogical university courses, we answer the following questions:

- What are the respondents' attitudes towards individualisation of learning, qualifications and permanent development of teachers?
- How do they view ICTs in the context of learning, teaching and individual use?
- How do they evaluate the quality of ICT equipment in their workplace or ICTs designed to prepare them to perform their teaching profession?
- How often are different digital technologies used in the school environment and among the students of teaching degrees?
- What is their subjective evaluation of the ICTs used to support learning, teaching and digital inclusion?
- What is the level of interest in new online trainings focused on the development of digital literacy in learning, teaching, development support and digital inclusion?
- How frequently do the respondents use popular e-services?
- How often do the respondents use the Internet for learning purposes?
- How often do members of the digital society use their mobile devices during their typical activities?
- How do respondents evaluate their own basic digital literacy?
- What elements should an ideal online educational platform have?

The research was conducted using the quantitative method of social studies within the opportunities paradigm of media pedagogy (Pyżalski, 2017). The technique used was the diagnostic survey and the tool was an online or printed questionnaire.

The tool was developed in an environment diverse in terms of culture, paradigm and scientific disciplines (at the joint of education and technology). The overall activities were coordinated by the Polish team, members of which combined the expertise in pedagogy and IT. The tool was developed using a multi-level dialogue. The diagnostic survey was designed during February-May 2019. The first stage

involved sharing the initial version of the tool by the leader WP2 SELI, which was then further developed during offline meetings (e.g. in March 2019, in Joensuu, Finland) and several Skype conferences of the research teams who prepared the version subject to two-step validation. The first stage of reliability and accuracy testing was carried out by independent academic professional invited by the representatives of the certain European and Latin American countries. Based on six independent opinions of the external experts, the tool was thoroughly modified (adding and removing items, linguistic corrections). The next step involved a pilot study in the SELI partner countries. Based on the pilot study, more changes were introduced to increase the clarity of the tool and adjust the questionnaire to the research problems and the needs of the international team responsible for implementation of the results to design the platform supporting learning, teaching and digital inclusion. The pilot study allowed to introduce further minor modifications resulting from linguistic conditions, educational models and administrative solutions functioning in the certain countries. The tool development process is presented in the diagram 1.
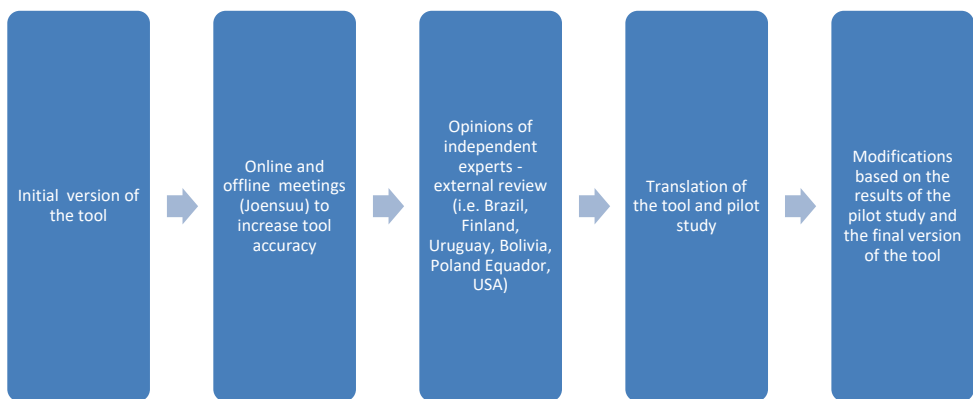
Fig. 1. Process of developing the quantitative research tool

The tool was translated from English version which was the reference for all the countries. Translation in each team was made by a qualified specialist, expert in the areas of education and digital inclusion.

The tool consists of 11 parts (variables) and a module with questions about the sociodemographic features (separate for students and teachers). The diagnostic part related to learning, teaching and digital inclusion included the following modules:

- Inclusion (3 indicators) (Spratt, & Florian, 2014),
- Attitude to new media (13 indicators) (Tomczyk et al., 2017; Zych et al., 2017),
- Technical Infrastructure (7 indicators, description of SELI project),
- ICT as a tool for supporting learning (8 indicators, description of SELI project),
- Perception of the effectiveness of ICT solutions in education (8 indicators, description of SELI project),
- Preferred pedagogical strategies offered in SELI (8 indicators, description of SELI project),
- Use of internet (including social networks and instant messaging apps) (9 indicators) (Eger et al., 2018),
- Usage of internet for learning (5 indicators – original design),

- Usage of mobile devices (5 indicators – original design),
- Perception about the level of ICT skills (5 indicators) (Taubert, 2006; Petuhova et al., 2010)
- and open questions regarding the characteristics of the open e-learning platforms.

In all 10 modules, the relevant Lickert scales were used (see Appendix 1). The sociodemographic part included questions related to: age, gender, ethnicity, marital status, professional status, years of professional experience in education sector, type of school the respondents-teachers work in, location and ownership-status of the school, evaluation of own financial status and educational background.

The tool in English was accepted in its final version by all the participants from 10 countries in Latin America and Europe. The tool was then translated into national languages. The data were collected in accordance with the ethical principles of social studies. All the data were completely anonymous. They were collected in different ways, that is, using printed and online questionnaires. In each country the specific collection method resulted from the organisational conditions of the research process (i.e. access to the respondents, organisation of the school and academic year or previous experiences of the research teams regarding data collection in the area of social sciences).

On behalf of the SELI team

Łukasz Tomczyk

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A STUDY ABOUT ICT USE AND INCLUSION BY PRE-SERVICE TEACHERS IN BOLIVIA

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ABSTRACT

This article is a study on ICT use by pre-service teachers. For the research a sample of 154 students in Cochabamba-Bolivia respond to a survey, the purpose of this research is a diagnose about ICT infrastructure, digital literacy, ICT for learning and effectiveness perception in the pre-service teacher schools. The most important result is the belief of these pre-service teachers in the positive impact of ICT in learning for students, the analysis also states an open attitude to inclusion and changes in the learning process with the help of ICT tools. Nevertheless, they consider face-to-face human interaction more important than ICT aid. The results state access to the technology due to insufficient access to ICT infrastructure in the pre-service schools. Exist a low ICT literacy in the group of pre-service teachers who participated in the survey. There is a lot of work to do in ICT for education and let the pre-service teacher empower with ICT applied to education.

Keywords: ICT, Education, Inclusion, e-learning, Literacy, Bolivia, Pre-service teachers

INTRODUCTION

The survey was realized at two high schools to former young teachers. Geographically located in the suburbs of Cochabamba Department (political region in Bolivia) more precisely at Quillacollo and Sacaba municipal areas.

The population surveyed is between 18-40 years old. The most significant number of students is in the range between 19-25 years.

The generalized social perception in Bolivia and the Cochabamba Department about the people involved and working in the primary education like the teachers

and similar to teachers community, is that they do not belong to high-level education society moreover with a high level of income, however a variety of technological or connectivity fees at the educational centres are resolved with the teachers money.

Generally, from the past years, the schools for teachers are located in suburb zones with a community of students and teachers living in not metropolitan areas, far away from the Cochabamba city. Note the survey has a variety of questions referred to technology or access to a kind of technology by people who live in suburban areas with difficulties to access technology, which could be so expensive, low quality of internet connections, and low mobile connectivity (PRONTIS, 2014).

This study presents a diagnose about ICT infrastructure, digital literacy, ICT for learning and effectiveness perception in education from the pre-service teacher view. The diagnose let us know the conditions and challenges for inclusion in the education process helped with ICT, and how it is evolving in the education environment.

DIAGNOSIS OF ICTS FOR TEACHERS WITHIN THE FRAMEWORK OF THE SELI PROJECT

Sample definition

The sample length is 154 students of different levels of training to belong to a teacher, which throw responses of this sample and its analysis are in the following sections.

There is no public available data of training teacher population, and thus the representativeness of the sample is not discussed.

Application of the Survey

The data collecting was with the printed surveys in June 2019 . Three researchers work on the tabulation. The tabulation was carried out using OCR, to next be validated by the researchers. Surveys not recognized by OCR were tabulated manually.

Characteristics of the participants

The number of women surveyed (74%) than men (26%) of a random sample is noticeably higher, with a strong tendency for the teaching profession to be prominently female, and among those surveyed with almost 78% is between 18 and 20 years old, 13,64% is between 21 and 30 years old; and 4% of people over 30 years old.

The 82% of them declares single status, 14.94% is married and 1.3 is divorced. More than half of the respondents (60%) declare an acceptable financial situation, 9% considers his financial situation bad, and 12.34% considers it good. The majority of the people surveyed are economically dependent on their parents since the study schedules are not very compatible with a work schedule, and at the most compatible employment they could take is of a partial type, having study days very similar to the students of Elementary education to which they intend to teach in their work as future teachers.

Results and analysis

This section presents the data obtained with an analysis of them by the question of the survey. The answers and analysis correspond to Colleges and Schools of the urban sector of the City of Cochabamba.

INCLUSIVE EDUCATION

The concept of inclusion is recent in the educational programs of Bolivia(MINEDU, 2012; Zegada, 2019); in fact, segregation was the most rooted aspect in Bolivian society and still. It is a product of an education differentiated by diverse aspects, such as economy, race, social position and also those derived from a physical / motor or cognitive disadvantage.

The applicants' responses to teachers show a degree of confidence in inclusion as a form of education and social training with a significant percentage (81%). Low percentages may be due to the Non-inclusive education received.

It is important to note that the belief of continuous improvement and the artistic training that a teacher must demonstrate in the thinking of the applicants (92%), this aspect is crucial since it allows to be receptive to the changes that in many ways are influenced for the advent of new technologies.

Confidence and credibility in ones' abilities is another aspect to highlight since the respondents affirm it by 65%.

The positive responses are quite high and denote availability to inclusion and change and receptivity to change.

Table 1. Inclusive Education

	Strongly Disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualisation of learning	12.34	1.95	3.90	36.36	45.45
I think all educators must believe they are qualified/capable of teaching all learners	9.09	10.39	12.99	42.21	23.38
I think all educators must continually develop creative new ways of working with others	5.19	0.65	0.65	24.68	67.53

USE OF DIGITAL TECHNOLOGIES

The results of this part of the survey indicate some essential things: Teachers in training like technology (82%) and trust it for the educational processes they expect to carry out (65%).

There is not much credibility of giving technology exclusivity for educational processes; they believe and trust that humans and human interaction are even more important than technology. That technology is essential for learning or whatever other processes; it is also essential for training teachers and students. Notice they hope to use it in favour, including software, new tools and new means of interaction.

Table 2. Use of Digital Technologies

	Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
I like to use digital technologies	1.95	1.95	12.99	45.45	37.01
Digital technologies have positively changed our lives	3.25	11.04	51.95	25.32	7.79
It is necessary to use digital technologies in the process of learning and teaching	0.65	7.79	23.38	43.51	22.08
Web sites are useful for teaching and learning	1.30	1.95	16.88	54.55	23.38
Digital teaching aids are better than physical teaching aids on improving learning	6.49	27.92	42.21	16.88	5.19
The use of digital technologies by the teacher has a positive impact on student learning	2.60	5.19	30.52	50.00	11.04
The use of digital technologies by the teacher has a positive effect on student motivation	0.65	6.49	28.57	45.45	18.18
The use of digital technologies by the teacher has a positive effect on student involvement	0.65	16.23	44.81	34.42	3.90
The use of digital technologies by the teacher has a positive effect on student satisfaction	1.30	11.69	33.12	42.86	10.39
Students should be prohibited from using cell phones at school	9.74	24.03	35.71	16.23	14.29
Using a new software is easy for me	3.25	24.68	24.68	37.66	8.44
Using a new website is easy for me	1.95	14.29	22.73	44.16	15.58
Using a new electronic device is easy for me	3.25	10.39	30.52	39.61	15.58

TECHNICAL INFRASTRUCTURE

The qualification on the availability of technology is very low, since the availability of the technology supported and installed in schools and colleges or in the training institute from which students demand technological infrastructure and must be taken into account.

The availability percentages of infrastructure are extremely low, with a satisfaction level of less than 10% on all items.

If we take into account that this same group of students has high confidence in technological development and its use in educational processes, it does not come from the use in the institute as users of technology because it is in the condition of students. Trust instead comes from its particular use in a human approach, which they hope to adapt it for the benefit of the education processes they hope to develop.

Table 3. Technical Infrastructure

	There is not (%)	Very poor (%)	Poor (%)	Accept-able (%)	Good (%)	Very good (%)
Quality of WiFi internet connection	54.55	12.99	11.69	14.29	2.60	1.30
Quality of cable internet connection	59.74	7.79	8.44	15.58	4.55	0.65
Quality of computers in common areas	7.14	7.14	23.38	48.70	7.79	1.95
Quality of e-learning platform	27.27	7.79	20.78	28.57	9.74	2.60
Quality of equipment and projec-tors	6.49	3.90	5.19	53.25	24.03	5.19
Quality of smartboard	74.68	2.60	7.14	8.44	3.90	0.65
Quality of E-books / E-textbooks	38.96	0.65	11.04	31.17	14.29	3.25

ICT AS A SUPPORT TOOL FOR LEARNING

The respondents are students to be teachers, so the use of technology is answered from the role of student. In this role usually does not allow to be responsible for the choice of technology used in education processes.

The percentages of use are very low in all questions, with approximately 10% satisfaction of use. The only question with a higher degree of satisfaction is the question of the use of digital games (about 19%) in education. Relating this answers with the ones indicating the low availability of technology, the inclusion of games and their appreciations a bit more positive than the others, possibly due to their use as players on their own devices obtaining a vision of greater use and perception of satisfaction somewhat higher.

Table 4. ICT as a support tool for learning

	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
open learning solution eg. MOOCs, OER	57.14	24.68	9.09	4.55	2.60
flipped learning	40.26	22.08	18.18	5.84	1.95
digital storytelling	38.31	20.78	25.32	9.74	0.65
blockchain technology	82.47	3.90	3.90	0.65	0.00
educational digital games	23.38	22.73	31.17	14.94	3.90
ICT tool for teaching and learning foreign languages	38.31	19.48	29.87	5.84	2.60
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	55.84	14.29	16.23	8.44	1.30
method to support the digitally excluded (eg. elderly, migrant)	60.39	14.29	11.04	5.84	3.25

PERCEPTION OF THE EFFECTIVENESS OF ICT EDUCATION

The answers indicate little knowledge about ICT solutions in education, the most unknown of them is 'blockchain' (77%). Taking away responses about unknown ICT technology, we evidence low credibility or knowledge to the proposed technological solutions.

The simplicity of the technologies or educational approaches maybe because they are scarce used tools in the plans where respondents meet as students with little available technology (results related to sections 3 and 4).

Table 5. Perception of the effectiveness of ICT Education

	I do not know it (%)	Very Poor (%)	Poor (%)	Accept-able (%)	Good (%)	Very Good (%)
open learning solution eg. MOOCs, OER repositories	51.30	11.69	8.44	16.88	6.49	2.60
flipped learning	44.16	12.34	11.04	19.48	5.84	0.65
digital storytelling	38.96	11.04	6.49	25.97	7.79	2.60
blockchain technology	77.92	3.90	5.19	5.84	1.95	0.00
educational digital games	14.94	14.29	12.99	30.52	11.69	6.49
ICT tool for teaching and learning foreign languages	33.77	13.64	10.39	22.08	12.99	3.25
special ICT tools to support teaching and learning for the deaf	44.81	8.44	6.49	21.43	11.69	2.60
method to support the digitally excluded (eg. elderly, migrant)	51.30	10.39	9.09	12.99	11.04	1.95

PREFERENCE OF THE PEDAGOGICAL STRATEGIES OFFERED IN SELI

The expectation of strategies proposed by the SELI project has generated quite positive expectations. There is limited experience in the concepts related to approach education helped by technology, and scarce knowledge is widespread in the topic.

The respondents reflect an interest to learn and use pedagogical strategies with ICT, even without prior knowledge about it (most of the respondents have more or less 60% knowledge about Education with ICT).

Table 6. Preference of the pedagogical strategies offered in SELI

	Unknow (%)	Not interested at all (%)	Not interested (%)	Neutral (%)	Interested (%)	Very interested (%)
open learning solution eg. MOOCs, OER Repositories	20.78	1.30	1.95	14.94	36.36	18.83
flipped learning	19.48	0.00	1.30	21.43	38.31	14.29
digital storytelling	14.94	1.95	1.95	23.38	32.47	20.13
Identifying and preventing cyberbullying	12.99	0.65	1.30	18.18	29.22	31.17
blockchain technology	30.52	0.00	0.65	12.34	29.22	22.08
educational digital games	7.14	0.65	6.49	13.64	35.06	33.12
ICT tool for teaching and learning foreign languages	6.49	0.00	1.95	17.53	34.42	37.01
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	9.09	0.00	1.30	13.64	37.01	35.06
Method to support the digitally excluded (eg. elderly, migrant)	9.09	0.65	1.30	20.13	38.31	27.92
Other (Specify) ….	14.29	0.65	1.95	6.49	10.39	10.39

INTERNET USE

The use of the Internet for different activities of daily use has quite different answers except for those of transactions, e-government and leisure services, for which respondents claim a declining frequency of use (less than 10%). In the rest of the questions, the affirmative answers of use and those that indicate little use, are equitable.

Table 7. Internet use

	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
Publishing messages on Internet	20.78	1.30	1.95	14.94	36.36
Consuming Internet streaming (eg. VOD)	19.48	0.00	1.30	21.43	38.31
Creating video	14.94	1.95	1.95	23.38	32.47
Using a file sharing service	12.99	0.65	1.30	18.18	29.22
Participating as member of a group	30.52	0.00	0.65	12.34	29.22
Accessing online services – e-government	7.14	0.65	6.49	13.64	35.06
Buying/Selling goods	6.49	0.00	1.95	17.53	34.42
Leisure	9.09	0.00	1.30	13.64	37.01
others activities….	9.09	0.65	1.30	20.13	38.31

INTERNET USE FOR LEARNING

The use of Learning Tools and educational technology for their benefit is sporadic and infrequent. The students for teachers do not have a culture using the Internet as a tool. Probably during their training, they learn to use it for information search, which has a good percentage of use (72%), the rest of possible usable uses for its formation have a shallow frequency (just over 10%)

Table 8. Internet use for learning

	Does not apply (%)	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
Study in an obligatory online course in my career or in my postgraduate studies	25.97	27.27	21.43	12.99	10.39	1.30
Searching relevant sources on the Internet to complete online classes for my degree	1.30	2.60	7.14	14.94	36.36	36.36
Taking free e-learning courses (on-line courses - e.g. language, ICT)	5.84	29.22	22.73	18.83	11.04	11.04
Taking paid online courses	13.64	56.49	12.34	9.74	4.55	1.30
Participating in online study groups	6.49	46.10	20.78	11.04	9.74	3.90

USE OF MOBILE DEVICES

The use of direct communication resources, such as those available on mobile devices and telephony, are widely used in surveyed students. Communication services with multimedia content delivery are widely used (about 50%). The use of resources that implies higher training, such as the use of repositories is less known (28%) resources for sharing connectivity is even less (23%), and the use for translations is somewhat higher (36%).

Table 9. Use of mobile devices

	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
Sending/receiving emails	11.04	20.78	17.53	27.27	20.78
Sending/receiving photos	1.30	9.74	14.94	29.22	42.86
Using as a hotspot/internet connection sharing	35.06	22.08	15.58	10.39	12.99
Using cloud data synchronization (eg. dropBox Google Drive)	28.57	19.48	20.13	19.48	8.44
Translation to foreign languages	14.29	18.83	27.27	24.68	11.69

PERCEPTION OF THE LEVEL OF ICT SKILLS

The use of technology for everyday work through the creation of digital documents is not widespread, perhaps because in the condition of students they have not yet had a deep need to demonstrate the creation of digital documents and, less frequently, share them in their digitla form.

The question with less knowledge is about security. There is no culture of security and aspects derived from handling digital documents and sharing them in an environment of multiple access.

Table 10. Perception of the level of ICT skills

	Very low (%)	Low (%)	Medium (%)	High (%)	Very high (%)
Using the text editor (e.g. Word, writer)	2.60	8.44	43.51	36.36	8.44
Using the Spreadsheet (e.g. Excel, Calc)	7.79	24.03	50.00	13.64	3.90
Using the presentation program (e.g. Power Point, impress)	1.30	9.09	40.91	35.71	11.04
Using the graphic program (e.g. Picasa, Gimp)	25.32	33.12	27.27	9.74	3.25
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	10.39	23.38	31.82	22.73	9.09

FEATURES OF THE IDEAL E-LEARNING PLATFORM

Only 91 out of 154 respondents fill out this question. These 91 respondents represent 100% for the analysis of the ideal platform for an online course.

The 10.99% of whom do not know about online course platforms, 21.98% of the answers do not talk about features they would like from the platform, but instead they refer to the need to have internet access for everyone and everywhere; to the proper use of technologies, to the minimum requirements regarding equipment for access to any online course initiative and containing exciting and current topics.

Regarding the characteristics that the platform should have, usability occupies an essential place with 27.48%, and they emphasize that it is easy to use, that has precise and clear slogans, visible and not hidden accesses with images many times of advertising.

Accessibility with 20.88% is another identified criteria; respondents emphasize easy access to the platform, courses and resources containing a concern in this segment of respondents with 13.19%, is the content and qualities that it should have on the platform; an interest is highlighted for them to have social and cultural identity, both in material, bibliography and language; On the other hand, the creativity with which the course is presented is essential.

The platform should provide mechanisms that allow interaction when using it; This feature is mentioned in 10.99% of the surveys. About the user interface, 10.99% consider it should be flashy, intuitive, attractive and tidy.

The platform should, according to 10.99% of respondents, consider the inclusion of videos, music, whiteboards, specialized libraries, which are considered resources that support the courses.

The pre-service teachers consider important, with 8.8% of the surveys, the activities appropriate to the course, both learning and evaluation. The respondents (8.8%) indicate that the access to the platform should be free; and only 6.6% are interested in the security of the platform, which they express in different ways: controlled access, not linked to other technologies and with secure information.

Communication with 5.5% is a characteristic that they identify to keep the actors of the platform informed/communicated; They suggest to include or link with other communication platforms.

The didactics of the courses are mentioned in 5.5% of the surveys, which indicate that teaching didactic material, innovative learning strategies should be used.

The 5.5% of respondents believe that the cost to access online courses should be economical.

For 5.5% of the respondents, the platform must have a flexible course and learning strategic setup. It must take into account the pace of learning for each student.

Inclusion is a feature required by 5.5% of respondents who that the platform should be designed for access to everyone: children, adults, people with disabilities or language impairment not. Speed, according to 5.5% of respondents, is a feature that should be considered. The 4.4% of respondents are interested in the platform's courses being certified, with curricular value and regulated by ministerial resolution.

The evaluation, according to 4.4%, should be digital and presented at different times of the course. The 3.3% believe that the platform should be open, with free access to talks. Availability according to 2.2%, is necessary so that it can be used offline or online. Technical assistance Timely Is important for 1.1% of respondents. The respondents, in a 1.1%, believe it must be reliable and functional

Feature	Percentage (only from 91 answers)	Sample answers (in spanish)
Usability	27,48	"easy to use", "clear user instruction", "clear language", "clear access", "menus with direct access"
Accessibility	20,88	"within our reach", "better access", "easy access for all educational actors", "easy access", "accessible", "easy access at the time of subscribing", "accessible everywhere in the country"
Content	13,19	"appropriate to our social reality", "relevant topics", "creative"
Interaction	10,99	"have interactive assessments", "spaces to answer personalized and not so frequent questions", "have discussion groups"
User Interface	10,99	"super attractive", "not have ads", "intuitive", "organized"
Resources	10,99	"educational videos", "simple to do streaming", "teaching with images", "electric board", "having books", "digital library", "access to specialized libraries"

Feature	Percentage (only from 91 answers)	Sample answers (in spanish)
Activities	8,8	"have tasks online", "innovative practical proposals", "have learning modalities", "learning options", "practical"
Free	8,8	"free", "allow free dissemination of educational material", "free or low cost", "free access"
Security	6,6	"free access", "closed", "a reliable security base", "no password but secure", "do not ask for google account", "safe"
Communication	5,5	"adequate communication to perform work that they request in the online courses", "include platforms and/or communication channels, for example whatsapp, telegram, etc", "allow contact with other participants", "chats"
Didactics	5,5	"innovative strategies to teach complicated things", "have the same result as a normal (physical) course", "look for strategies to have a good learning"
Economically accessible	5,5	"affordable cost", "economic" , "be low cost"
Flexibility	5,5	"that allow to finish the course according to the student's learning rhythm", "have course modalities", "that is progressive", "new tools"
inclusive	5,5	"that is for each type of age", "accessible to all people (adults, children)", "teaching of people with disabilities", "that translates correctly into any language"
Speed	5,5	"fast"
Certification	4,4	"high level courses" , "that have curricular certification", "regulated by ministerial resolution"
Evaluation	4,4	"digital evaluation", "send exercises after the course", "evaluate prior knowledge"
Open	3,3	"more open", "free access", "allowing access to talks"
Availability	2,2	"no connection problems ", "downloadable", "portable"
Technical support	1,1	"permanent contact and help"
Training	1,1	"pre learning of use course "
Confidence	1,1	"a reliable security base"
Functional	1,1	"functional"

CONCLUSIONS AND FINAL DISCUSSION

For the training teachers, the most relevant words featuring an ICT platform for learning are Usability and accessibility. This group is open to inclusion and changes in learning and teaching with ICT aids. They consider face-to-face human interaction more important than ICT aid for learning and teaching, thus showing a sceptic position to ICT tools in the area of education.

This students for teachers think there are satisfaction and positive impact of ICT in learning for students.

At most 14% of the sample is not natural to start using devices and new software, between 23% and 31% not agree nor disagree about it. The students feel uncomfortable starting to use new devices or software. But more than 50% considers having easy to manage new devices and software.

Most of the feeling with technology is probably related to access to technology by the respondents. The university where they study has not or has insufficient ICT infrastructure to offer for teaching and learning process. The most acceptable infrastructures are projectors and computers for almost 50% of the training teachers.

They do not usually use technology to aid their learning process; it is related to their sceptical position for positive effects of ICT in education. In their answers for the effectiveness of ICT in education, they demonstrated a low literacy on ICT. They also declare as the most popular tools to be games, storytelling, and foreign languages teaching with a percentage lower than 60.

The main finding is that pre-service teachers have high availability for inclusion and change; they are very receptive to change their minds in education. But there is low credibility or knowledge to the proposed ICT educative solutions together with an average of a mid-skill in ICT. This young and future teachers have a low technology use in education because there is little available technology for them; the Bolivian society main use of technology is for social networking. The pre-service teachers (young students) believe more in games as educational ICT than the other alternatives.

For the SELI platform in Bolivia, the following recommendation will be taken into account: gamification availability, good user experience and accessibility. The SELI platform should provide a mobile-first design to reach young Bolivian students.

Finally is necessary to promote and increase the research spirit in the educational field, the discussion and research from pre-service teachers (guided by teachers) will help to change how technology and education are perceived and used in education in Bolivia.

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A STUDY ABOUT ICT USE AND INCLUSION BY TEACHERS IN BOLIVIA

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ABSTRACT

This article is a study on ICT use in education by teachers. For the research a sample of 137 teachers in Cochabamba-Bolivia respond to a survey, the purpose of this research is a diagnose about ICT infrastructure, digital literacy, ICT for learning and effectiveness perception in education. The results state the interest of teacher for usability and accessibility in the user interface and content. A low ICT literacy-focused in user experience and useful content for learning is another result of the survey analysis. It also shows the perception of teachers about inclusiveness with ICT and education as a necessary duty. There is also work to do in the topics of e-learning, blended learning, ICT tools to support teaching and learning for the deaf, a method to support the digitally excluded. In Bolivia still, a lot of work to improve ICT in education, and it is related to the grade of penetration of ICT in society.

INTRODUCTION

Bolivia is in the process of inclusion in digital, in (Agencia de Gobierno Electrónico y Tecnologías de Información y Comunicación, 2018) and (Tomczyk et al., 2019) the provision of computers to students and teachers from 2011 to 2018 is indicated; Coverage reached 72.3% of teachers and reaching 4.39% of students have access to a computer in schools. To this endowment of computers is added the endowment of technological floors (Computer centres and a server, with all the installation of electrical energy, and data network that technically incorporates access to the internet). Consider that according to the study (Agencia de Gobierno Electrónico y Tecnologías de Información y Comunicación, 2018) in Bolivia for 2012 (last Population Census) 23.63% of households accessed a computer, and 9.57% had access to the internet.

   The data from Instituto (Nacional de Estadística, 2018), one of the latest publications on ICT data, shows the following results in terms of Internet access: In urban areas,

33.1% of households have access to a computer, against only 6.4% of homes in rural areas, and 20% of households in urban areas access the internet, against only 4.2% of households in rural areas. It also shows that 69.9% of people use a mobile phone, most of them, not have a smart device.

Also, according to the calls in (Programa de Formación complementaria para Maestros y Maestras en ejercicio, 2019) and (Ministerio de Educación, Bolivia, 2018), you can see the efforts of the Bolivian government to train teachers in ICT.

According to (Agencia de Gobierno Electrónico y Tecnologías de Información y Comunicación, 2018), only 5% of the population that uses the internet in Bolivia makes use of online courses. From this 5% of users who access online courses, most are in the range of 24 to 54 years old represents 54% of users attending online courses. The student population between 14 to 23 years old, represents 22% of users attending online courses, they show less access to these types of courses.

Due to the penetration of the Internet in Bolivian homes and the data on access to online courses by the population, the low experience of ICT in education can be assumed.

The text presents a diagnose about ICT infrastructure, digital literacy, ICT for learning and effectiveness perception in education from Bolivian teacher perspective; The diagnose let us know the conditions and challenges for inclusion in the education process helped with ICT, and how it is evolving in the education environment.

DIAGNOSIS OF ICT FOR TEACHERS WITHIN THE FRAMEWORK OF THE SELI PROJECT

Sample definition

The population of teachers in Cochabamba is 31,345 (Instituto Nacional de Estadística, INE, 2017, June 6). It has achieved a sample of 137 professors from urban area colleges. With this sample there is a margin of error 8.35%, with a confidence level of 95%. Note that 79.4% of teachers work in the urban area (national level), so the diagnosis made does not provide information on the rural area.

In this sample, there is observed a non-balanced number of teachers between the rural and urban groups. The same observation deserves the number between fiscal and private schools group.

Application of the Survey

The first attempt to collect data was with the electronic survey by google forms. The teachers did not respond to an electronic survey invitation by email nor official social network call. The final attempt was through printed surveys. The final sample has teachers from urban schools, three private, two public, and one school by agreement(Fe y Alegria project). The rural schools are not part of this sample due to their dispersion in the countryside. The collecting date was done in june 2019.

The school by agreement works on the education of people with physical and cognitive disadvantages. The teachers from private educational units respond better by filling out the surveys. Many teachers from public schools, and the one by agreement

did not agree to conduct the survey, on the contrary, in the private units, the entire teaching staff completed the survey.

Three researchers work on the tabulation. The tabulation was carried out using OCR, to next be validated by the researchers. Surveys not recognized by OCR were tabulated by hand.

Characteristics of the participants

From the survey applied to the sample of teachers, the following data regards to demographic characteristics:

1. The average age in the teachers is 46 years, with a median of 44 years. The age range varies from 22 to 68 years with a standard deviation of 10.86.
2. Regarding gender, 65.7% of teachers are women, 33.6% are men, and 0.7% did not answer the question.
3. Regarding nationality, 97.8% indicate that they are Bolivian, 1.5% indicate they are immigrants, and 0.7% did not respond with Regarding nationality. Note that several teachers have responded as immigrants to the nation-to-country migratory movement.
4. 39% of respondents work in public schools, 12% work in convention schools, 70% work in private schools, and 6% did not indicate the type of school where they work. Consider that teachers generally work in two schools, one public and the other private; This observation is qualitatively based on the informal meeting.
5. Regarding the level of instruction in which they teach: 8% of the teachers work at the level of primary education, 42% in primary school, 62% in secondary school, 6% in universities, and 4% responded in another type of level. The last one corresponds to the technical level as clarifications from respondents.
6. Regarding its economic situation, 72% considers it acceptable, 18% considers it proper, 3% indicates that it is excellent, 5% indicates a lousy situation and 1% did not respond.
7. In terms of teacher training: 78% graduated from a school for teacher training, 12% have completed master's degrees, 8% have completed a specialization cour-se, the rest did not answer.

Results and analysis

This section presents the data obtained with an analysis of them by the question of the survey. The answers and analysis correspond to Colleges and Schools of the urban sector of the city of Cochabamba.

INCLUSIVE EDUCATION

Most of the teachers surveyed, 89%, consider diversity important, as an essential aspect in human development. They are also aware that teaching involves continuous work in the creative development of work approaches with other people. 70.8% of teachers responded that all educators must believe they are qualified / capable of teaching all

learners; There is a 19% group that disagrees. 96% believe that all educators must continually develop creative new ways of working with others. Most respondents believe in continuous training or the development of strategies for working with others as necessary. Some of them consider diversity as necessary, and a few ones believe everyone is capable of being involved in inclusiveness.

The last question links training in terms of diversity and inclusiveness. It produces a lower percentage for positive responses about the capacity to teach everybody. The question would ask about considering the need to favour diversity, and not think universal that teachers can be involved in it; this is a point to study further.

Table 1. Inclusive Education

	Strongly Disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualisation of learning	3.65	1.46	4.38	40.88	48.18
I think all educators must believe they are qualified/capable of teaching all learners	5.84	13.14	10.22	45.26	25.55
I think all educators must continually develop creative new ways of working with other	2.19	0.73	1.46	30.66	64.96

USE OF DIGITAL TECHNOLOGIES

From the total of teachers surveyed, only 89% say they like to use technology. Only 62% believe that digital technologies have produced positive changes in life, whereas 9% disagree on it. The percentage of teachers undefined about it is 26%. Only 32% agree that teaching with digital support is better than physical education. 86% recognize the usefulness of websites for teaching-learning and 80% agree that it has a motivational impact on the student. This percentage falls as soon as the utility is considered, but also the positive use. When asked about the positive impact on learning 72% agree, and as for the positive involvement of the student with the use of technology, only 44% agree, this criterion deserves to be studied to understand the reason for it.

Concerning prohibiting students from using the cell phone, it is accepted by 37% of the teachers, while 37% prefer not to give their opinion on the subject. Only 25% believe that cell phone use should not be prohibited.

As for using new software, websites and electronic devices; the fourth part of the respondents is unopinionated. The 43% consider having the facility to use new software, 52.6% facility of using new websites, and 53% facility of using new electronic devices.

Table 2. Use of Digital Technologies

	Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
I like to use digital technologies	2.92	2.19	5.84	52.55	35.77
Digital technologies have positively changed our lives	1.46	8.76	25.55	46.72	15.33
It is necessary to use digital technologies in the process of learning and teaching	1.46	4.38	14.60	54.01	24.82
Web sites are useful for teaching and learning	0.73	2.92	8.76	59.12	27.01
Digital teaching aids are better than physical teaching aids on improving learning	2.92	21.17	40.15	24.82	9.49
The use of digital technologies by the teacher has a positive impact on student learning	1.46	5.11	20.44	56.20	16.06
The use of digital technologies by the teacher has a positive effect on student motivation	0.73	2.19	16.06	62.77	17.52
The use of digital technologies by the teacher has a positive effect on student involvement	0.73	13.14	40.88	35.77	8.76
The use of digital technologies by the teacher has a positive effect on student satisfaction	0.73	7.30	29.93	51.82	9.49
Students should be prohibited from using cell phones at school	6.57	18.25	37.23	24.82	12.41
Using a new software is easy for me	2.92	13.14	25.55	43.07	13.14
Using a new website is easy for me	2.19	6.57	22.63	52.55	14.60
Using a new electronic device is easy for me	2.19	6.57	23.36	53.28	13.14

TECHNICAL INFRASTRUCTURE

The most common equipment for teachers in her educational unit is the data display. Almost half of the respondents consider this equipment in good or very good quality. Only 68% of teachers have access to computers in common areas, and 19% consider it reasonable to excellent quality, 34% consider it acceptable. The Wi-Fi connection in the unit is available for 70% of teachers, and they consider it proper to excellent quality 17% and acceptable 31%. Learning platforms are not accessible for 47%, those who

do agree to consider the quality between acceptable and useful. The cable internet connection is also not accessible to 53% of teachers.

The researchers supposed it, the schools do not have sufficient infrastructure for the use of ICT in learning, and there is a more significant flaw in software than in hardware. It should also be considered that the majority of respondents were from private institutions; a comparison between private and public institutions would provide more data to analyze.

Table 3. Technical Infrastructure

	There is not (%)	Very poor (%)	Poor (%)	Accept- able (%)	Good (%)	Very good (%)
Quality of WiFi internet connec- tion	29.93	8.76	13.14	30.66	10.95	5.84
Quality of cable internet connection	53.28	1.46	9.49	18.25	8.76	3.65
Quality of computers in common areas	32.12	2.92	8.76	34.31	18.98	1.46
Quality of e-learning platform	46.72	2.19	3.65	24.82	11.68	4.38
Quality of equipment and projectors	5.84	3.65	5.84	36.50	35.04	11.68
Quality of smartboard	82.48	0.73	0.73	10.22	2.92	0.73
Quality of E-books / E-textbooks	71.53	0.73	2.19	15.33	7.30	2.19

ICT AS A SUPPORT TOOL FOR LEARNING

ICT, as a support tool for learning, is not used by the majority of teachers surveyed. The most used tools were: educational digital games and storytelling. The former was rarely or sometimes used by 44% of respondents and frequently at very frequently by 10%, and the second was rarely used frequently by 50% of respondents. All others were used for less than 40% support for people with disabilities was used only by 14%.

Blockchain is an unknown technology by teachers, 86% of them never use it. Surprisingly some of them affirm use blockchain: 11% of them used it rarely or ever, and 0.7% indicates a frequent use. Local researchers believe it is a distortion. The blockchain technology is almost unknown in the Bolivian educational field, and by the degree of ICT penetration in Bolivia it is very unlikely they have used it, even in those low percentages.

The most commonly used ICT as a frequent support tool are: storytelling, open learning solutions, flipped learning, ICT tool for teaching and learning foreign languages, educational digital games with frequently used percentages between 4% and 9%.

Table 4. ICT as a support tool for learning

	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
open learning solution eg. MOOCs, OER	51.82	10.22	26.28	8.03	1.46
flipped learning	54.74	13.14	20.44	5.11	1.46
digital storytelling	43.80	21.17	23.36	9.49	0.73
blockchain technology	86.13	3.65	6.57	0.73	0.00
educational digital games	41.61	21.17	28.47	4.38	2.92
ICT tool for teaching and learning foreign languages	51.09	16.79	22.63	5.84	0.73
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	84.67	5.11	5.84	0.73	1.46
method to support the digitally excluded (eg. elderly, migrant)	75.91	8.76	11.68	1.46	0.00

PERCEPTION OF THE EFFECTIVENESS OF ICT EDUCATION

Since many of the respondents never used most of the ICT tools, they will not be able to have a correct perception of their effectiveness. Discounting the percentage of respondents who do not know the tool, the comparison between the different tools provides us with the following data.

Respondents consider special ICT tools to support teaching and learning for the deaf, as the most effective in education; the next to be useful is ICT to support the digitally excluded. Storytelling, flipped learning and open learning solution, eg. MOOCs, OER repositories, are considered of acceptable effectiveness, and those considered weak to inferior effectiveness are primarily educational digital games and then blockchain.

Table 5. Perception of the effectiveness of ICT Education

	I do not know it (%)	Very Poor (%)	Poor (%)	Accept-able (%)	Good (%)	Very Good (%)
open learning solution eg. MOOCs, OER repositories	48.91	7.30	5.84	20.44	13.14	2.92
flipped learning	54.01	5.84	8.03	17.52	8.76	0.73
digital storytelling	41.61	6.57	9.49	24.82	13.14	1.46
blockchain technology	68.61	5.84	5.11	8.76	4.38	0.73
educational digital games	28.47	8.76	11.68	24.82	18.98	3.65
ICT tool for teaching and learning foreign languages	40.15	8.76	9.49	19.71	13.87	5.11
special ICT tools to support teaching and learning for the deaf	64.96	3.65	4.38	10.22	11.68	1.46
method to support the digitally excluded (eg. elderly, migrant)	63.50	4.38	3.65	12.41	11.68	1.46

PREFERENCE OF THE PEDAGOGICAL STRATEGIES OFFERED IN SELI

Approximately 60% to 70% of the respondents are interested and very interested in several of the pedagogical strategies offered in the SELI project. The interested ones range from 35% to 52%, and the very interested vary from 10% to 22%, those not interested or less interested are percentages below 10%.

The technologies that arouse most interest are the same mentioned earlier as the best known and most efficient: educational digital games (70%), open learning solution, eg. MOOCs, OER Repositories (64%), digital storytelling (63%), flipped learning (61%), ICT tool for teaching and learning foreign languages (61%). The ones that less interest are: Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people (41%), followed by identifying and preventing cyberbullying (48%). It is striking that there is more interest in blockchain(a less known technology and considered less effective) than ICT to support the disadvantaged people and cyberbullying prevention.

Neutrals and those who do not know is a representative, which depending on a positive experience, might be more interested in the strategies listed, should be considered.

Table 6. Preference of the pedagogical strategies offered in SELI

	Unknow (%)	Not interested at all (%)	Not interested (%)	Neutral (%)	Interested (%)	Very interested (%)
open learning solution eg. MOOCs, OER Repositories	18.98	0.00	0.73	15.33	47.45	16.06
flipped learning	21.17	0.00	1.46	12.41	51.09	10.95
digital storytelling	15.33	0.00	1.46	18.25	49.64	13.14
identifying and preventing cyberbullying	16.79	0.73	3.65	17.52	40.88	16.79
blockchain technology	27.74	0.00	2.92	16.06	35.77	14.60
educational digital games	9.49	0.00	3.65	13.14	48.18	22.63
ICT tool for teaching and learning foreign languages	13.87	0.00	5.11	17.52	43.07	17.52
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	15.33	0.00	7.30	24.82	35.04	10.95
Method to support the dig-itally excluded (eg. elderly, migrant)	16.79	0.00	3.65	26.28	37.23	12.41
Other (Specify) ….	13.87	0.00	1.46	7.30	6.57	5.11

INTERNET USE

The primary use of the internet is related to social connection. The respondents who frequently use it have the following answers: social group (55%), streaming (55%), sharing (51%), posting messages with text and multimedia (50%). Notice Accessing online services - e-government has 20%, create multimedia has 20%, and e-commerce with only 11%.

The respondents who use internet rarely/sometimes have the following percentages: social group (32%), consuming Internet streaming (39%), sharing (36%), posting messages, text and multimedia material (41%), accessing online services - e-government (36%), create videos (44%) and commerce (26%). In this group, the percentage of creating videos and publishing rises compared to frequent use group. Each publication or video is created and shared by many, so we can assume the use of the Internet is inside a social group where the creation and publishing take place. It would be worth asking about the type of information they consume and their sources.

The use of the Internet for leisure has relatively low percentages: frequent usage (29%) and rarely/sometimes (46%). The activities like reading and dissemination of messages, texts and multimedia; should be considered a kind of leisure. Notice the teachers did not consider them as such.

The culture of using these services for formal purposes is not entrenched in Bolivian society. The services offered by the public administration are still incipient, as seen in the responses about internet commerce (sometimes used to frequently by 28%) and use of e-government services (40%).

Table 7. Internet use

	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
Publishing messages on Internet	9.49	15.33	25.55	21.90	27.74
Consuming Internet streaming (eg. VOD)	6.57	13.14	26.28	29.20	24.82
Creating video	43.07	23.36	20.44	5.84	5.11
Using a file sharing service	12.41	13.87	21.90	25.55	25.55
Participating as member of a group	10.22	11.68	20.44	31.39	24.09
Accessing online services – e-govern-ment	43.07	16.79	18.98	10.95	9.49
Buying/Selling goods	60.58	10.95	15.33	5.84	6.57
Leisure	22.63	19.71	25.55	16.79	11.68

INTERNET USE FOR LEARNING

Internet is used as a learning resource, frequently or very frequently, searching for relevant sources on the Internet to complete online classes for my degree (78%) Less frequently for Taking free e-learning courses (online courses - e.g. language, ICT) (31%) and study in an obligatory online course in my career or in my postgraduate studies (20%). There is a tendency that the use is scarce; they never or rarely use it for paid courses (59%), for participation in study groups (59%), and even for free courses (43%).

Table 8. Internet use for learning

	Does not apply (%)	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
Study in an obligatory online course in my career or in my post-graduate studies	20.44	19.71	18.25	21.17	12.41	7.30
Searching relevant sources on the Internet to complete online classes for my degree	0.73	1.46	0.00	18.25	38.69	38.69
Taking free e-learning courses (on-line courses - e.g. language, ICT)	7.30	18.25	24.82	17.52	18.25	13.14
Taking paid online courses	17.52	46.72	12.41	17.52	2.19	2.92
Participating in online study groups	8.76	35.04	24.09	24.09	2.19	5.11

USE OF MOBILE DEVICES

Sending/receiving photos and emails by the mobile are the most frequent use for teachers. This use occurs frequently and very frequently by 71% of teachers. While more sophisticated activities such as sharing internet connection and synchronization of data in the cloud are activities that less than 36% do in their daily lives. It is striking that 37% of the teachers never did this kind of activity with their mobile device; this may be due to a low extent in digital literacy. Translation activities are rarely used with smartphones, but 30% do them sometimes.

Mobile devices, such as tablets and personal phones, are the most preferred in the surveyed community. A more advanced use that requires the installation and handling of more sophisticated applications is not yet exploited.

Table 9. Use of mobile devices

	Never (%)	Rarely (%)	Some-times (%)	Frequently (%)	Very Frequently (%)
Sending/receiving emails	1.46	8.76	17.52	30.66	41.61
Sending/receiving photos	3.65	4.38	21.17	32.12	38.69
Using as a hotspot/internet connection sharing	36.50	16.79	19.71	10.22	15.33
Using cloud data synchronization (eg. dropBox Google Drive)	35.77	10.95	20.44	20.44	11.68
Translation to foreign languages	24.09	18.25	29.93	16.06	9.49

PERCEPTION OF THE LEVEL OF ICT SKILLS

Teachers indicate that they have excellent skills in the use of office software. Half of them indicate high or very high dexterity using the text editor, 43% using presentation programs. One-third of them have high skills in managing spreadsheets, and 27% declares knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting).

Half of the teachers indicate average skill level in spreadsheet management, 40% using the text editor, 39% knowledge about the dangers of the digital world, and 37% using the presentation program.

In graphic program management, 54% report having a low to a deficient level and 29.2% declared having a medium level in graphic program management skills.

Table 10. Perception of the level of ICT skills

	Very low (%)	Low (%)	Medium (%)	High (%)	Very high (%)
Using the text editor (e.g. Word, writer)	3.65	5.84	39.42	33.58	16.06
Using the Spreadsheet (e.g. Excel, Calc)	5.11	12.41	50.36	21.90	8.76
Using the presentation program (e.g. Power Point, impress)	4.38	13.14	37.23	28.47	13.87
Using the graphic program (e.g. Picasa, Gimp)	19.71	34.31	29.20	9.49	4.38
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	13.87	18.98	38.69	17.52	8.76

FEATURES OF THE IDEAL E-LEARNING PLATFORM

Only 65 of the 137 respondents have provided data to understand the ideal characteristics of the ideal platform. The percentages calculated in the answers are about these 65 entries identified.

Taking into account that the answers provided correspond to a level accorded to the concerns/requirements of the respondents, obtaining, in sum, a quality of ´importance´ or ´priority´ of the mentioned aspects, the following can be indicated: The highest percentages They indicate the following characteristics: Usability, Accessibility, User Interface, Interaction, Content, Activities, Speed, and Flexibility. From this list, the first two Usability (40.23%) and Accessibility (33.34%), are the most relevant, the rest of those mentioned above are in the range between 14-9%.

There are named characteristics that have a frequency lower than 9% such as flexibility, availability, have communication tools, be didactic, access to resources, existing training for their use, have evaluation activities, be free and / or of economic access, count With safety mechanism, have certification, be compatible, be reliable, be inclusive. All of them are related to education-oriented platforms and should be considered since the inclusion feature is desirable according to the perspectives of the SELI project.

Table 11. Features of the ideal e-learning platform

Feature	Percentage (only from 65 answers)	Sample answers (in spanish)
Usability	40,23	"Easy to use", "of course", "to have simple tools", "to highlight the applicability clearly", "easy to understand", "friendly interface", "concrete", "same language", "good navigation for that delivery of work is easier "," useful "," simple "," simple "," good audio "," understandable "
Accessibility	33,34	"Easy access", "accessible"
User Interface	13,80	"Specify", "not boring", "attractive", "clear content", "concrete", "clear and precise instructions", "legibility", "striking aesthetics", "without excess accessories", "organized eyelashes"
Interaction	12,65	"Dynamic", "interactive", "participatory", "interactive", "intuitive interaction", "periodic notifications before the lesson to keep course students updated"
Content	11,50	"Updated information", "Spanish language", "intuitive contents and gradual progress organization", "design the course scenario"
Activities	10,35	"More practical than theoretical", "you can create online courses in a combined e-learning platform for active learning and have unlimited virtual resources", "examples and exercises", "practical", "facilitate different forms of learning", "support for presentation of work at different times"
Speed	9,20	"When using multiple users don't be slow", "good speed", "fast"
Flexibility	8,05	"Group people according to knowledge for better service", "with restrictions, so that they are not distracted in other things", "flexible in the organization of modules / blocks", "edition of several courses at once", "reuse of materials" , "Connections to other pages"
availability	5,75	"Mutual availability", "operation on windows and android", "viable access in the classroom", "off-line mode", "on-line mode", "being able to work from a mobile device"
Communication	5,75	"Varied communication tools", "message editing options", "instant messaging services", "dynamic chats with immediate notifications"
Didactics	5,75	"Useful content to teach", "didactic", "teaching / learning strategies", "didactic", "methodology and creative and recreational practices that allow basic knowledge to be exploited"
Resources	5,75	"That has a dossier of technical language", "support for graphics," support for mind maps "," teaching resources "," online resources "," updated and reliable digital resources "," access to digital library "
Platform Training	4,60	"Have information of basic knowledge that one must have in technology", "properly train users", "driving tutorial", "first learn the use of it"

Feature	Percentage (only from 65 answers)	Sample answers (in spanish)
Grading or Evaluation	4,60	"That has questionnaires", "evaluation resources", "that contemplates the evaluations", "learning result"
Free	4,60	"free"
Security	4,60	"Avoid entry to unknown persons", "secure access", "secure", "security in access to the information provided"
Technical support	2,30	"Support from an administrator", "online support to solve problems"
Economic	2,30	"economic"
Functional	2,30	"To highlight the functions clearly", "operational"
Certification	1,15	"There must be a guarantee that the title they give is valid at the continental or local level"
Compatibility	1,15	"compatible"
Confidence	1,15	"reliability"
Inclusive	1,15	"Appropriate topics for each grade"

CONCLUSIONS AND FINAL DISCUSSION

The present study gives initial results useful for comparative analyses with countries of de region; these results will help to understand the environment and needs to face up to the SELI platform. But the study does not allow a generalization due to data collected dimensions.

The four keywords of greater use and relevance put in the survey are usability, accessibility, user interface and content. Significant words that must be taken into account to satisfy an essential group of people. It should be mentioned a low ICT literacy due to the high percentages of low ICT literacy by the respondents in Bolivia. This low ICT literacy focuses on characteristics with user experience and useful content for learning. These four characteristics frequently appear in documents of SELI project.

Blockchain is not well known in the social and educational field, even in the computer field it is widely unknown. The benefits, advantages or opportunities presented by this technology are still unknown.

Something notable is the accessibility aspects since some respondents work with students with physical and cognitive disadvantages (The case of the Fe y Alegría convention school). This issue is notorious once the educational programs are increasingly venturing into a diversity education and of enormous scope among the population that suffers from accessibility problems.

There has been a good reception of the respondents to answer the questions of the survey, having an almost perfect percentage of valid answers (answers with value to be taken into account). There has been a good intention to support, and it can be considered they have not tried to influence the results, either positively or negatively intentionally. It has been noted in some topics such as Blockchain, revealing low literacy in ICT for education. In the case of Blockchain, they indicate having used this feature, but the majority ignores or has a few experiences with pedagogical strategies using ICT. It reveals a need to show expertise in the area by a small percentage of respondents.

The teachers respond as ´users´ of educational services with technology. They consider the use of technology a necessity and have an interest in learning the use of new tools. It evidences the feasibility to expect that shortly they will become designers or providers of educational ideas with technology.

It is necessary to study further and solve some problems exposed by the results of this survey, such as:

- Not all those who consider the technology useful, necessary and motivating, consider that getting the student involved and the overall impact of its use is positive. It would be worth exploring further the basis of this discrepancy
- In general, Bolivian society does not use the Internet and electronic devices for learning or education purposes. Teachers do not differ from that

Access to quality technical infrastructure is insufficient, but there are even more flaws in the installation of programs and tools and their use. The Bolivian society is in the accessibility to technology stage with high penetration of mobile phones (Tomczyk, 2019); in this sense, teachers are using mobile phones to access mainly social media.

The vision regarding disabilities and inclusiveness deserves further study. A vast majority of teachers consider it necessary but do not believe all teachers should be able to face it. A minority of teachers are interested in learning ICT tools for this purpose.

All of it led us to think about the difficulties at the level of conceptions by the teacher about education using ICT. Is a need to evaluate it before getting involved in ICT.

The teachers, part of the study, answers coincide in the following findings: insufficient ICT infrastructure for education, low-mid ICT literacy for education, inclusion is a crucial feature in education. The teachers agree that ICT help is valuable for learning in regular and special education. A good advantage is the teachers high interest in ICT for education; they are willing to involve it in their practice.

The findings in this document suggest to improve and support the efforts to gain accessibility to the internet in Bolivia, use the widespread mobile technology in the country for accessing educative ICT platforms and tools, change the teachers' use of technology for social communication into ICT tools usage.

For SELI platform in Bolivia the following recommendation will be taken into account: good user experience and accessibility, offer inclusive features for content in the platform, mobile-first design because Bolivian teachers accest to the Internet is mainly by mobile phone.

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ICT IN EDUCATION AND INCLUSION:
THE TEACHERS' POINT OF VIEW
IN THE BRAZILIAN CONTEXT

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ABSTRACT

In Brazil there has been a growing interest in understanding how teachers are using information technology (ICT) in the school environment. In this context, the discussion of what digital skills would be necessary for teachers to insert ICT in their teaching practices has been highlighted. This chapter presents the results of 104 randomly selected teachers in the field of pedagogy who answered an online questionnaire on inclusion, technology in the teaching-learning process. In general, it can be said that the teachers who participated in this research recognize the importance and value of the organization of teaching with ICT. They point out precisely the need to improve infrastructure, limiting their knowledge of the use of ICT and the application of technology in learning contexts while punctuating the use of technology as a tool that adds value in teaching practice and demonstrates much interest and availability to learn and deepen knowledge on the subject.

Keywords: *Education, Inclusion, Accessibility, ICT*

INTRODUCTION

In Brazil there has been a growing interest in understanding how teachers are using information technology (ICT) in the school environment. In this context, the discussion of what digital skills would be necessary for teachers to insert ICT in their teaching practices has been highlighted. Many studies and educational public policies address

the theme in the national and international scenario. In Brazil, educational policies have recognized the role and space that technology occupies in the way of rethinking the teaching and learning process. Studies have reinforced the importance of teachers appropriating communication and pedagogical potentialities through the development of ICT skills. Because they will have opportunities to offer diverse learning situations both in relation to new knowledge and new learning environments that are better suited to the current challenges facing the school. The Brazilian path is anchored in international practices, in this sense to analyze educational practices with ICT in the national scenario from international indicators provides guiding references for school practice and formulation of national public policies. The objectives and discussions proposed by the SELI project, provide relevant contributions and reflections on the same theme, but with different perspectives and realities according to the different countries involved. This diversity has been very rich and encouraging in the search for strategies and actions that help improve the quality of world education.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The study was conducted in Brazil by 4 SELI research university professors during the months of August and September 2019. Data collection took place at random from e-mail and social networking invitations to education people. Participants were invited to complete the electronic form (google questionnaire) and also encouraged to share the invitation with colleagues who met the inclusion criteria for the survey. As already mentioned in the introductory chapter,the tool was developed in an environment diverse in terms of culture, paradigm and scientific disciplines (at the joint of education and technology).In all 10 modules, the relevant Lickert scales were used. The sociodemographic part included questions related to: age, gender, ethnicity, marital status, professional status, years of professional experience in education sector, type of school the respondents-teachers work in, location and ownership-status of the school, evaluation of own financial status and educational background.The data were collected in accordance with the ethical principles of social studies. In total there were 104 teachers respondents, as shown in figure 1, being 59.61% women and 40.39% men. Only 5 participants were immigrants, 75.96% of respondents were teachers, 16.35% were managers and 7.69% teaching assistants. 31.74% of the participants declare themselves married, 32.70% single, 20.19% divorced, 9.61% in stable union and 5.76% widowed. Regarding the workplace, 43.14% of the participants worked in public schools, 48.04% in private schools and 8.82% in public and private schools. These schools were located in central urban areas (66.67%), peripheral urban areas (29.41%) and rural areas (3.92%). Regarding the financial situation, most participants considered it acceptable (43.27%) and good (40.39%). Only 4.80% considered their financial situation very good, 9.61% bad and 1.93% very bad. Most teachers had a bachelor's degree in education (36.54%) and specialization (25.97%). 14.43% had master's degree, 17.30% doctorate and 5.76% had completed high school.
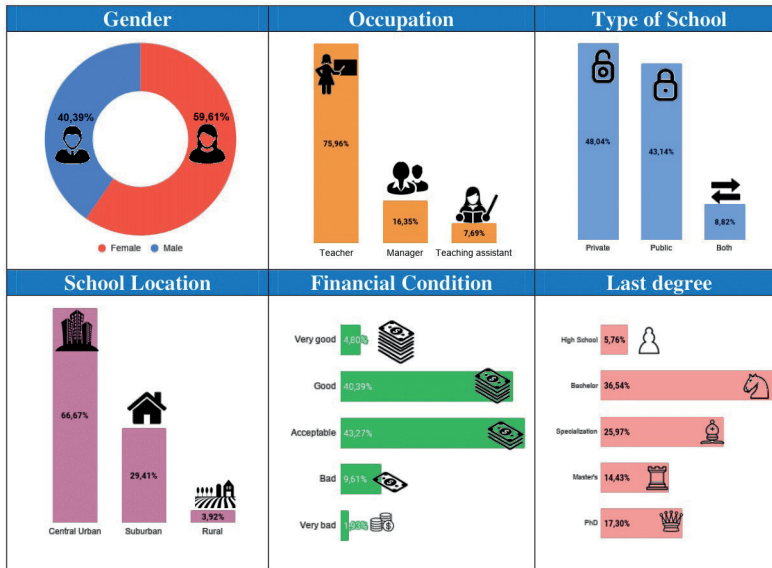
Figure 1. Characterization of study participants

RESULTS

The results reinforce the inclusive policy adopted by Brazilian education and underscores the importance of technology focused on education in order to achieve the greatest challenge of Brazilian education, to offer quality education for all. In this perspective, the data presented in table 1 show how much teachers believe that education should be inclusive, based on diversity and that teaching practice plays a fundamental role in this process.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualization of learning	3.85	4,80	1,92	32.70	56.73
I think all educators must believe they are qualified/capable of teaching all learners	6.73	15.38	5.77	30.77	41.35
I think all educators must continually develop creative new ways of working with others	1.92	0	3.85	30.77	63.46

Overall, most teachers show positive attitudes toward new media. They believe the impact on their lives was positive and value their use in the teaching-learning process. They just did not agree with the statement that digital resources are better than physical teaching aids on improving learning. Another point of major disagreement was the ban on the use of mobile telephones in the school environment. The teachers consulted have no difficulty dealing with new software, websites and electronic devices, although they strongly disagree with this as presented in table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	0	1.92	2.88	47.12	48.08
Digital technologies have positively changed our lives	0	7.69	9.62	53.85	28.84
It is necessary to use digital technologies in the process of learning and teaching	0	5.77	9.61	50	34.62
Web sites are useful for teaching and learning	0	1.92	10.58	62.50	25
Digital teaching aids are better than physical teaching aids on improving learning	2.88	27.89	31.73	15.38	22.12
The use of digital technologies by the teacher has a positive impact on student learning	0	3.85	11.54	55.77	28.84
The use of digital technologies by the teacher has a positive effect on student motivation	0	3.85	12.50	53.85	29.80
The use of digital technologies by the teacher has a positive effect on student involvement	0	5.77	12.50	50.96	30.77
The use of digital technologies by the teacher has a positive effect on student satisfaction	1.92	3.85	15.38	47.12	31.73
Students should be prohibited from using cell phones at school	9.62	26.92	20.19	20.19	23.08
Using a new software is easy for me	3.85	15.38	18.27	42.30	20.20
Using a new website is easy for me	1.92	9.62	7.69	61.54	19.23
Using a new electronic device is easy for me	1.92	10.58	20.19	48.08	19.23

The teachers' evaluation regarding the offered infrastructure did not have the highest score in any of the proposed items. The quality of both WiFi and cable internet connection was considered by most to be acceptable, this was the evaluation of many participants for the computers available in common areas as well. These results are in line with the results obtained from a study conducted in 2017 with 4,000 public school teachers in Brazil (Todos pela Educação, 2017). Regarding e-learning platform, quality of smartboard and quality of ebooks and e-textbooks most participants note that these features are not available at their workplaces. More details in table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	7.69	15.38	8.65	30.78	27.88	9.62
Quality of cable internet connection	6.73	6.73	11.53	29.81	23.08	22.12
Quality of computers in common areas	9.62	13.46	10.58	23.08	26.92	16.34
Quality of e-learning platform	36.54	9.62	2.88	25	21.15	4.81
Quality of equipment and projectors	6.73	10.58	9.62	25	33.65	14.42
Quality of smartboard	73.07	0	5.77	5.77	9.62	5.77
Quality of E-books / E-textbooks	58.66	2.88	1.92	18.27	16.35	1.92

The use of ICT as a tool for supporting learning is not part of the routine of most study participants. As shown in table 4, all tools presented have been evaluated as never used. Only educational digital games had the same proportion of never used and was the most frequently used. This information reinforces the need for research so that it is possible to broaden the understanding of the reasons that favor the use of educational digital games or that makes it difficult for the teacher to use other ICT in the school context.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution eg. MOOCs, OER	27.88	19.23	28.85	20.19	3.85
flipped learning	42.31	17.31	26.92	13.46	0
digital storytelling	49.04	25	15.39	8.65	1.92
blockchain technology	75.96	11.54	7.69	4.81	0
educational digital games	27.88	15.38	24.05	27.88	4.81
ICT tool for teaching and learning foreign languages	48.08	16.35	23.07	12.50	0
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	56.73	11.54	12.50	13.46	5.77
method to support the digitally excluded (eg. elderly, migrant)	65.38	4.81	15.38	13.47	0.96

The vast majority of digital solutions listed in Table 5 are not known to teachers, so it is difficult to assess their effectiveness in the learning and teaching context. Teachers admit that in most cases they cannot assess the effectiveness of the proposed innovative ICT-based solutions. For most participants, open learning solutions are acceptable and consider good the effectiveness of educational games.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	33.65	0.96	7.69	38.47	15.38	3.85
flipped learning	45.19	1.92	3.85	15.38	27.89	5.77
digital storytelling	50	1.92	10.58	14.43	18.27	4.80
blockchain technology	66.35	0	4.81	14.42	14.42	0
educational digital games	24.04	2.88	4.81	24.04	35.58	8.65
ICT tool for teaching and learning foreign languages	43.27	0	0.96	29.81	22.11	3.85
special ICT tools to support teaching and learning for the deaf	44.23	2.88	0.96	19.23	28.85	3.85
method to support the digitally excluded (eg. elderly, migrant)	49.04	7.69	0	15.38	24.04	3.85

Although participants reported very little knowledge about the strategies offered by the SELI project, they expressed interest in learning about them. The tools that aroused the most interest were educational digital games and methods to support the digitally excluded. Table 6 presents the detailed data of teachers' responses about their interest in the strategies offered by the SELI project.

Table 6. Preferred pedagogical strategies offered in SELI

	Unknow	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	6.73	0	7.69	10.58	51.92	23.08
flipped learning	4.81	0	5.77	12.50	47.11	29.81
digital storytelling	4.81	0	5.77	14.42	50	25
identifying and preventing cyberbullying	5.77	0	2.88	11.54	46.15	33.66
blockchain technology	26.93	0	7.69	6.73	37.50	21.15
educational digital games	2.88	0	1.92	9.62	49.04	36.54
ICT tool for teaching and learning foreign languages	4.81	1.92	9.62	18.27	37.50	27.88
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	4.81	0	4.81	11.54	44.23	34.61
Method to support the digitally excluded (eg. elderly, migrant)	5.77	0	9.62	8.65	37.50	38.46

Teachers use the Internet more often to: participate as a member of a group (92.30%) post messages (67.30%), consuming internet streaming (65.37%), using a file sharing service (62.5%)%), leisure (61.54%). A quarter of respondents report never having used the internet to make a video or to shop. According to the results obtained it is not possible to identify a usage profile related to your professional profile. The detailed distribution of responses is presented in Table 7.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	3.85	13.47	15.38	20.19	47.11
Consuming Internet streaming (eg. VOD)	14.43	13.46	6.74	23.07	42.30
Creating video	25.96	14.42	22.12	17.31	20.19
Using a file sharing service	9.61	10.58	17.31	27.88	34.62
Participating as member of a group	3.85	0	3.85	34.61	57.69
Accessing online services	0.96	11.54	32.69	18.27	36.54
Accessing e-government	0.96	11.54	32.69	18.27	36.54
Buying/Selling goods	23.08	13.47	27.88	26.92	8.65
Leisure	5.77	7.69	25	26.92	34.62

According to the results presented in table 8, the tool used for data collection does not allow to state that the research participants use the internet for their learning on a regular basis, only the research by relevant subjects for the formation was pointed as being an activity frequently performed by the majority of the participants. On the other hand, participation in study groups and paid online courses were pointed out as never done or rarely done by most teachers.

Table 8. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my post-graduate studies	4.81	24.04	9.62	18.27	29.80	13.46
Searching relevant sources on the Internet to complete online classes for my degree	0	13.46	3.85	8.65	38.46	35.58
Taking free e-learning courses (on-line courses - e.g. language, ICT)	1.92	24.04	11.54	25.96	20.19	16.35
Taking paid online courses	3.85	41.35	21.15	12.50	12.50	8.65
Participating in online study groups	5.77	46.15	13.46	14.42	11.54	8.66

Teachers make great use of their mobile device to send and receive e-mails (all participants said they have already made such use) and to share photos. In contrast, one third of participants never used their mobile device for sharing internet connection or as a translator for foreign languages. The number of teachers who have never used their mobile device for cloud data synchronization is equivalent to what they do often. The detailed distribution of responses is presented in Table 9.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	0	6.73	5.77	27.88	59.62
Sending/receiving photos	4.81	9.62	15.38	25	45.19
Using as a hotspot/internet connection sharing	33.66	7.69	13.46	22.11	23.08
Using cloud data synchronization (eg. dropBox Google Drive)	18.27	11.54	23.08	20.19	26.92
Translation to foreign languages	20.19	12.50	24.04	24.04	19.23

The importance of using ICT in the Brazilian educational context is already a consensus among scholars. Current studies investigate, for example, the barriers to their implementation. Digital literacy of teachers is a fact to be considered in this analysis. In this study the participants evaluated themselves and the results were that the participants consider that they have a high level of knowledge in text editor use and a medium level of knowledge in spreadsheet, using the presentation program and the Knowledge about the dangers of the digital world. The detailed assessment of respondents' digital literacy is presented in Table 10.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	5.77	5.77	24.04	37.5	26.92
Using the Spreadsheet (e.g. Excel, Calc)	7.69	9.62	48.08	21.15	13.46
Using the presentation program (e.g. Power Point, impress)	8.65	10.58	29.80	23.08	27.89
Using the graphic program (e.g. Picasa, Gimp)	21.15	10.58	41.35	15.38	11.54
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	18.28	12.50	37.50	22.11	9.61

Participants were asked what the key features of the ideal e-learning platform would be for them. This was an open question where the participant could write his answer. 35.6% of participants answered that they did not know, did not want to answer or just filled in with XXXX, the question was mandatory in the digital questionnaire. Based on the answers given by respondents, we can observe that they focus on several main categories: ease of use (intuitive, logical content, personalization, simple language), interactivity (possibility of exchanges with other professionals, forum, chat), content (attractive graphics, multimedia, miscellaneous, digital library), supported and tutorial, free, technically stable, available on different devices, and secure. The categories and examples of quotes from respondents are presented in Table 11.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
Ease of Use	"intuitive, easy to use", "easy to use, readable", "be intuitive and instructional", "simple language", "simple and clear user's instructions"
Interactivity	"forums, virtual discussion groups, monitoring", ""wall" type information sharing", "give input for exchange of ideas and experiences about the content among the participants"
Content	"individual activity folders, Text, videos", "objectivity, clarity, specific and useful information; relevant and without advertisements"

CONCLUSION

The results presented here do not allow generalizing to the Brazilian reality. It is a very small sample compared to the 2.5 million teachers registered by the national educational census conducted by the *Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira - INEP* (National Institute for Educational Studies and Research Anísio Teixeira) for 2017 (INEP, 2018). Even considering only 340,000 in activity, it would still be a much larger universe than this study. The 2018 school census provides important information about the physical structure of schools. The data collected indicate that 63.4% of Brazilian public schools have access to the internet and among private individuals the percentage is 96% in elementary school. In high school the percentages are 93.6% of public schools and 98.7% of private schools (INEP, 2018). This information and the investigated results allow important reflections to be made for the SELI platform design.

In general, it can be said that the teachers who participated in this research recognize the importance and value of the use of ICT in learning. They point out precisely the need to improve infrastructure, limiting their knowledge of the use of ICT and the application of technology in learning contexts while punctuating the use of technology as a tool that adds value in teaching practice and demonstrates much interest and availability to learn and deepen knowledge on the subject. These findings were also found in other studies conducted in the national context. (Echalar, Peixoto, Carvalho, 2016; Schuhmacher Alves Filho, Schuhmacher, 2017 & Todos pela Educação, 2017)

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ICT IN EDUCATION AND INCLUSION: THE STUDENTS' POINT OF VIEW IN THE BRAZILIAN CONTEXT

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ABSTRACT

In Brazil the educational, cultural and social requirements imposed on schools are increasing, the population is growing in diversity, and educational authorities often suggest reforms that pressure teachers to provide appropriate instruction to students. In this scenario teacher education needs to consider updated and constant training, preparing them in a theoretical and practical way, both content and psychological training to support pedagogical decisions. The use of ICTs has been presented as an important way to meet current demands. This chapter presents the results of research on the perception of 107 pedagogy students about inclusion and technology in the teaching-learning process. Students participated by answering an online questionnaire or in person during specific training events. As main results it is possible to highlight the importance that students attribute to inclusion. Students point out many structural problems in the teaching-learning environment and little knowledge of many technological aspects consulted. However, they are very available and interested in increasing knowledge and making use of ICTs. Given the wide diversity of Brazil (social, cultural, economic), much remains to be done to ensure access to quality technology for all people involved in education.

Keywords: *Education, Inclusion, Accessibility, ICT*

INTRODUCTION

Brazil today has different types of assessment to gauge the quality, equity and efficiency of education. The educational, cultural and social requirements imposed on schools are increasing, the population is growing in diversity, and educational authorities often suggest reforms that put pressure on teachers to provide appropriate instruction to students. For this, teachers need an up-to-date and constant training, preparing them in a theoretical and practical way, both content information and psychological training to inform pedagogical decisions. Discussing the educator's formation process from different perspectives is important to identify the advances and obstacles in this process. This way it will be possible to provide more effective tools and resources for education and teaching practice.

Today, information and communication technologies (ICT) have been highlighted as important helpers in the learning process. The great challenge has been to make its use effective in order to meet the interests of trainers and learners considering the great diversity and universalization of education. In this sense, the investigations, discussions and reflections proposed by the SELI project contribute to the possibility of mapping the access, use and appropriation of information and communication technologies (ICT) in several countries, including Brazil.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research was conducted by 04 university professors, members of the SELI Research Project and took place from August to November 2019. Data collection took place in two different ways: randomly, by email and social networking invitations for pedagogy students. Participants were invited to complete the electronic form (google questionnaire) and were also encouraged to share the invitation with colleagues who met the inclusion criteria of the survey. The other form of participation was during training events specific to pedagogy students in two Brazilian cities. In these events students had access to the online form and were invited to fill out the electronic form (google questionnaire) in person. As already mentioned in the introductory chapter, the tool was developed in an environment diverse in terms of culture, paradigm and scientific disciplines (at the joint of education and technology).In all 10 modules, the relevant Lickert scales were used. The sociodemographic part included questions related to: age, gender, ethnicity, marital status, professional status, years of professional experience in education sector, type of school the respondents-teachers work in, location and ownership-status of the school, evaluation of own financial status and educational background.The data were collected in accordance with the ethical principles of social studies. In total, the participation of 106 students was considered, as shown in figure, being 55.67% women, 41.50% men and 2.83% fulfilling the other option. Only 1 participant was an immigrant, 97.17% were students in the Pedagogy area and 2.83% filled the other option. 34.90% of the participants declare themselves married, 42.45% single, 12.27% divorced, 10.38% in stable union. Although students, 8 respondents also worked in the field of education. Of these 8 participants, 6 worked in public schools, 2 in private schools. All schools located in central urban areas. Regarding the financial situation, most participants considered it acceptable (45.29%) and good (28.30%). Only 0.95% considered their financial situation very good, 18.86%

bad and 6.60% very bad. Most of the students (62.63%) were in bachelor education and 31.31% in high school. 6 participants filled out other training possibilities, 1 participant was in specialization and another attending college without specifying, 2 participants had master's degree and 2 other undergraduate degrees.
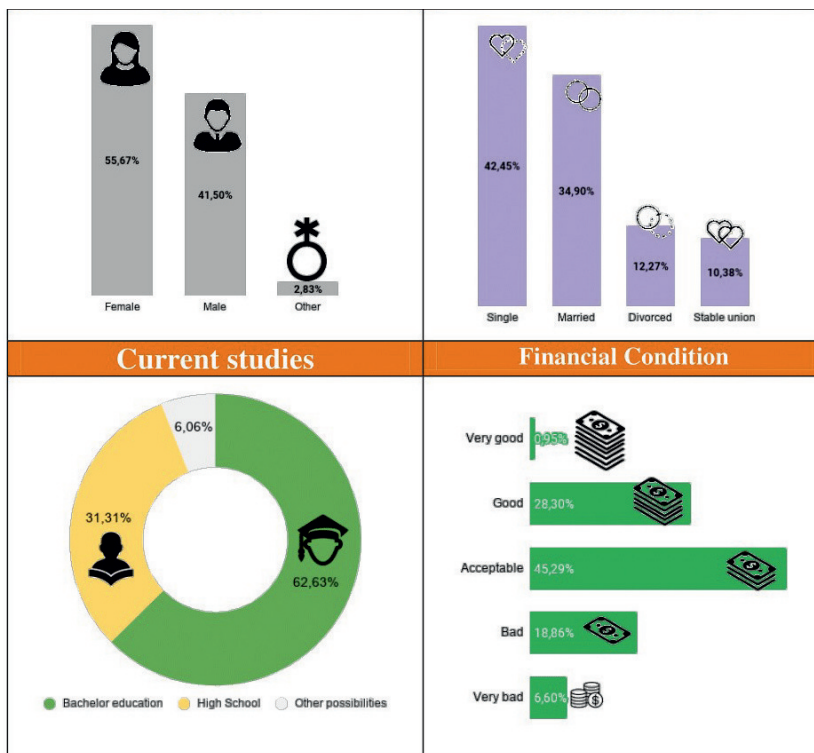
Figure 1. Characterization of study participants regarding gender, marital status, education and financial condition

RESULTS

According to official Brazilian data from *Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira-INEP* (National Institute for Educational Studies and Research Anísio Teixeira), (INEP, 2018), Brazil is one of the countries with the largest dropout in the world. There are many factors that justify this position, among them the lack of interest in the school, the students' learning difficulties and the methodology employed by the teachers value the learning product more than the knowledge acquisition process. Even with this unfavorable scenario, which is difficult to solve in the short term, the results of this study presented in table 1 highlight the importance of inclusive practices in Brazilian education. However 27.35% of respondents believe that all educators must not believe they are qualified / capable of teaching all learners. This information is relevant because these students will be future educators and need to strengthen their education with the universal principles of diversity and inclusion education. As main results it is possible to highlight the importance that students attribute to inclusion. Students point out many structural problems in the teaching-learning environment and little knowledge of many technological aspects consulted. However, they are very available and interested in increasing knowledge and making use of ICTs.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualization of learning	0	1.89	3.77	43.40	50.94
I think all educators must believe they are qualified/capable of teaching all learners	3.77	23.58	6.60	33.97	32.08
I think all educators must continually develop creative new ways of working with others	0	3.77	0	31.13	65.10

Most students positively positioned new technologies. They believe that new technologies impact their lives, they are necessary in the learning process. However, they are contrary to the statement that digital teaching aids are better than phsysical teaching aids on improving learning. Other points of disagreement pointed out by the participants were: use of mobile phones in the school environment, and how they feel able to use new software, websites and electronic devices. Details can be seen in Table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	0	0	5.66	50.94	43.40
Digital technologies have positively changed our lives	0	1.89	23.58	42.45	32.08
It is necessary to use digital technologies in the process of learning and teaching	0	7.54	10.38	54.72	27.36
Web sites are useful for teaching and learning	0	0	6.60	66.98	26.42
Digital teaching aids are better than physical teaching aids on improving learning	0	36.79	43.40	5.66	14.15
The use of digital technologies by the teacher has a positive impact on student learning	0	0	10.37	60.38	29.25
The use of digital technologies by the teacher has a positive effect on student motivation	0	2.83	10.38	63.21	23.58
The use of digital technologies by the teacher has a positive effect on student involvement	0	0	19.81	57.55	22.64
The use of digital technologies by the teacher has a positive effect on student satisfaction	0	4.72	17.92	51.89	25.47
Students should be prohibited from using cell phones at school	3.06	20.51	21	32.78	22.65
Using a new software is easy for me	0	16.04	17.93	45.28	20.75
Using a new website is easy for me	0	12.26	10.38	57.55	19.81
Using a new electronic device is easy for me	0	11.32	17.93	47.17	23.58

Students rated the infrastructure issues offered by school environments in an acceptable and good way. The quality of the computers in the common areas was better rated than the quality of WiFi and cable internet connection. The teachers' evaluation regarding the offered infrastructure did not obtain the highest score in any of the proposed items. It is noteworthy that many students reported not having the resources questioned; 48.11% of respondents do not have smartboard in their school environments as shown in table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	9.44	3.77	12.26	30.19	29.25	15.09
Quality of cable internet connection	13.21	0	9.43	33.96	28.30	15.10
Quality of computers in common areas	8.49	0	10.38	49.06	22.64	9.43
Quality of e-learning platform	20.75	2.83	0	43.40	22.64	10.38
Quality of equipment and projectors	16.03	4.72	1.89	41.51	22.64	13.21
Quality of smartboard	48.11	2.83	0.94	27.36	14.15	6.61
Quality of E-books / E-textbooks	27.36	0	3.77	27.36	29.25	12.26

According to the data collected, the teaching-learning process does not have ICTs as support tools for most participants. As shown in table 4, all tools were marked as non-existent in many school contexts. The tools when available were poorly evaluated. In general it is possible to consider that it is necessary to expand and qualify the use of ICT in the Brazilian school context.

Table 4. ICT as a set of digital aids supporting teaching methods and technics

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution eg. MOOCs, OER	21.70	12.26	23.58	28.31	14.15
flipped learning	42.45	16.03	30.19	4.72	6.61
digital storytelling	39.62	19.81	30.19	10.38	0
blockchain technology	59.43	7.55	17.92	10.38	4.72
educational digital games	15.09	21.69	38.68	20.76	3.78
ICT tool for teaching and learning foreign languages	29.24	18.87	32.08	19.81	0
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	50	18.87	15.09	16.04	0
method to support the digitally excluded (eg. elderly, migrant)	47.17	16.98	27.36	8.49	0

Students' poor contact with ICTs makes it difficult to evaluate them. Table 5 depicts this situation, where most tools are evaluated as unknown. For most participants, open learning solutions are acceptable and consider good the effectiveness of educational games, the use of ICT tools for teaching and learning foreign languages and the use of special ICT tools to support teaching and learning for the deaf. It is noteworthy that although they consider the use of ICTs for the deaf effective, they do not generalize to other inclusion contexts such as the digitally excluded (eg. Elderly, migrant).

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	33.02	0	4.72	31.13	22.64	8.49
flipped learning	37.74	0	0	31.13	19.81	11.32
digital storytelling	47.17	0	1.89	20.75	22.64	7.55
blockchain technology	62.26	0	0	26.42	6.60	4.72
educational digital games	17.92	1.89	7.55	22.64	45.28	4.72
ICT tool for teaching and learning foreign languages	33.01	0	0.94	27.36	32.08	6.61
special ICT tools to support teaching and learning for the deaf	40.57	2.83	0	15.09	33.01	8.50
method to support the digitally excluded (eg. elderly, migrant)	51.89	0	0	23.58	15.10	9.43

The role of ICTs in the teaching-learning process is reinforced with the results presented in table 6. Students consulted even without having much knowledge about the strategies offered by the SELI platform are very available and interested in knowing them. Of note is the increased interest in learning to use ICTs as a method to support the digitally excluded (eg. Elderly, migrant).

Table 6. Preferred pedagogical solutions offered in SELI

	Unknow	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	18.86	0	2.83	10.38	33.02	34.91
flipped learning	18.87	0	2.83	11.32	38.68	28.30
digital storytelling	12.26	0	2.83	9.43	46.23	29.25
identifying and preventing cyberbullying	16.98	5.66	0	5.66	37.74	33.96
blockchain technology	29.25	5.66	0	8.49	35.85	20.75
educational digital games	9.43	0	3.77	4.72	47.17	34.91
ICT tool for teaching and learning foreign languages	11.32	2.83	0	7.55	43.40	34.90
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	6.60	2.83	0	9.43	42.46	38.68
Method to support the digitally excluded (eg. elderly, migrant)	7.55	0	0	10.38	49.06	33.01

Brazilian students consulted use the internet very often. According to the data presented in table 7 the highest frequency of use occurs to participate as a member of a group (45.28%). It is important to highlight that when considering the answers given to e frequent and very frequent in a grouped way, there is great use of the internet by students for publishing messages on internet (70.75%), using a file sharing served (69.81%) and consuming internet streaming (52.83%). It is important to note that there are a significant number of students who have never, or very rarely used the Internet for the purposes investigated by this study.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	0.94	13.21	15.10	34.90	35.85
Consuming Internet streaming (eg. VOD)	13.21	11.32	22.64	23.58	29.25
Creating video	23.58	20.75	22.64	13.21	19.82
Using a file sharing service	2.83	11.32	16.04	36.79	33.02
Participating as member of a group	0.94	12.26	14.16	27.36	45.28
Accessing online services	9.43	10.38	22.64	40.57	16.98
Accessing e-government	9.43	10.38	22.64	40.57	16.98
Buying/Selling goods	11.32	19.81	29.25	25.47	14.15
Leisure	4.72	19.81	23.58	23.58	28.31

According to the results presented in table 8, it is possible to consider that the students' use of the internet for learning is restricted to what is proposed as mandatory for their training or to research relevant sources for their training. Internet use for student learning is absent or underused.

Table 8. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	1.89	10.38	2.83	16.04	31.13	37.73
Searching relevant sources on the Internet to complete online classes for my degree	3.77	0	0	7.55	34.90	53.78
Taking free e-learning courses (on-line courses - e.g. language, ICT)	1.89	12.26	8.49	41,50	16.04	19.82
Taking paid online courses	2.83	31.13	20.75	26.42	6.60	12.27
Participating in online study groups	5.66	41.51	12.26	22.64	7.55	10.38

The good use of mobile devices made by students and presented in table 9 reinforces the importance of expanding the possibilities of use for educational contexts. However, there are still a significant number of students who have never made use of the mobile

device for the aspects consulted, or who do so in an unusual way. This aspect should be further investigated in order to strengthen and expand the use of technology in the educational context.

Table. 9 Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	1.89	3.77	7.55	30.19	56.60
Sending/receiving photos	4.72	4.72	11.32	24.53	54.71
Using as a hotspot/internet connection sharing	17.92	10.38	26.42	22.64	22.64
Using cloud data synchronization (eg. dropBox Google Drive)	8.49	4.72	30.19	22.64	33.96
Translation to foreign languages	11.32	0.94	30.19	29.25	28.30

As previously stated, the Brazilian educational context considers the high dropout rate as a challenge to be overcome. In this context, broadening the understanding of the use of ICTs becomes fundamental so that its use can be expanded and improved since the use of ICTs has been considered an important tool for reducing school dropout in Brazil. In the present study participants were asked to assess their own perception of their level of ICT skills. The detailed assessment of respondents' digital literacy is presented in Table 10. Overall, students rated themselves with medium and low ICT skills.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	6.60	5.66	45.28	27.37	15.09
Using the Spreadsheet (e.g. Excel, Calc)	10.38	28.30	33.02	17.92	10.38
Using the presentation program (e.g. Power Point, impress)	7.55	18.87	41.51	19.81	12.26
Using the graphic program (e.g. Picasa, Gimp)	24.53	30.19	29.25	7.54	8.49
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	11.32	11.32	50.0	20.76	6.60

At the end of the questionnaire all participating students were asked to report on the key features of the ideal e-learning platform for them. This was a mandatory question with the possibility of open answer. The participant should write his answer. Most

participants (62,26%) answered that they did not know, did not want to answer or filled with dashes, random letters, because it is a mandatory question in the digital questionnaire. The categories and examples of quotes from respondents are presented in Table 11. The most frequent characteristics in the participants' reports were related to ease of access, quality of the material provided by the platform, security and the possibility of interaction through chats, forums or study groups.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
Availability	"accurate tools with easy understanding", "easy platform access", "fast and effective", " instant online support", " safety and practicality", " objective, clear and easily accessible", "quality student care"
Interactivity	"availability of quizzes and open chat for questions", "multiple content presentation features", "forum resources and group formation", " attractive that has interesting content", " easy platform navigation"
Content	"clarity of content", "custom learning trails", "enough material available"

CONCLUSION

In order to face the complexity of the problems of education in Brazil, it is necessary to create in the country adequate conditions for the development of research in education and to make the results of this research widely disseminated and known and thus incorporated into government policies. Considering the importance that new technologies achieve today, it is essential that information about their use and knowledge be incorporated into the discussion and elaboration of educational policies in Brazil. The SELI project proposal is an initiative that goes in this direction. The basic proposal of the project considers the use of ICTs towards the inclusive teaching-learning process. This process is very challenging mainly because the practice needs to be meaningful to the student, meets the requirements of the school, and all participants in the process: managers, teachers and students. Many authors have conducted studies in order to broaden the understanding of the relationship between the use of technological resources to pedagogical practice in the Brazilian reality. (Lucena, 2016; Zuni, Zuni, 2018 and Santos, Bortolozzi and Macuch, 2019). Vieira and Cruz conducted a study on the use of ICTs in youth and adult education and concluded that the use of technology in the classroom has been restricted to just one more available resource, very superficially. The authors believe that technology needs to be integrated with the reality and daily life of the students involved in the process. (Vieira & Cruz, 2019).

Given the wide diversity of Brazil (social, cultural, economic), much remains to be done to ensure access to quality technology for all people involved in education. What is important is that educators and scholars in the field of education are encouraged to stimulate discussions and investigations. Only in this way will it be possible to have evidence-based information that provides the necessary public policies for the Brazilian population, to guarantee the right of quality education for all.

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THE ROLE OF THE DOMINICAN TEACHER IN THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

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ABSTRACT

Currently, the Dominican Republic is undergoing a digital transformation in education, which is why the Ministry of Education has promoted the use of technology, fostering a series of programs and plans for literacy, awareness and the inclusion of information and communication technologies as a cross-cutting theme in education, for the transfer of content to audiences with diverse physical, psychological, cultural and economic characteristics, which demonstrates the adaptability of technology to this context, Among the most relevant data, the teachers showed to have knowledge of the existence of technological tools for the benefit of education, but also found an uncertainty about the correct adaptability of them, on the other hand, it can be inferred that teachers take into consideration these tools for the development of their academic activities and are constantly seeking to innovate their learning environments, it is important to emphasize that the data collected will contribute to the development of the Smart ecosystem for learning and inclusion.

Keywords: *ICT, education, innovation, Adaptability*

INTRODUCTION

Currently, the great advances and technological changes that Dominican society is undergoing have a direct impact on higher education institutions, which, in order to respond to technological demands, have included Information and Communication Technologies (ICT) in the teaching and learning process. In this sense, the Dominican Republic is promoting ICT literacy among academics at the various levels of education that exist in the country. For this reason, the adequate development of the SELI Project (Smart Ecosystem for Learning and Inclusion) is of the utmost importance, since basic information was obtained about the culture of use of information and communication technology (ICT), to determine strengths, weaknesses and opportunities to enhance the improvement of teaching and learning processes based on ICTs (Cabero, 2007b). The present study, when analyzing the data collected with research instruments applied to one hundred (102) teachers, shows that the population was made up of citizens of both sexes where 47% were women and 53% men with an average age between 33 years old, mainly of Dominican nationality with 78% and 22% citizens of various nationalities, where the most predominant marital status was single with 51%, married with 42% and having the lowest indicator of Divorced with 7%, the majority of respondents indicate that they have a bachelor's degree with 28%, master with 34% and with a degree of Doctor an 16%. This sample was selected with 80% from public institutions and 20% from private institutions. The data presented above allow us to infer that the found data arise from a universe that guarantees the diversity of information in order to discern the information from the unification of the tacit with the explicit. This collection process was carried out in July 2019, using the survey as technique and as instruments the questionnaire in digital form; the same was distributed through the web, producing the following results:

INCLUSIVE EDUCATION

	Strongly disagree	Desagree	Neither agree nor disagree	Agree	Strongly Agree
a) I think that the diversity of students should be taken into account as an essential aspect of human development in any conceptualization of teaching.	5	1	0	23	71
b) I believe that all teachers should feel able to teach all students effectively, using all available resources, including technological ones.	5	0	1	16	78
c) I think that being a teacher includes continually developing new creative ways of working with other people.	4	0	0	11	85
d) I believe that education is a right for all people, regardless of age, gender, socio-economic status, disability or special educational needs.	5	0	0	5	90

Inclusive Education must be conceived as a process that allows to address and respond to the diversity of the needs of all students through greater participation in learning and reduce exclusion from the educational system, in this regard 71% of respondents indicated that in order to achieve human development through teaching, it is important to consider the diversity of students as a fundamental aspect when planning educational encounters that guarantee the integral formation of all participants; Similarly, 78% emphasized that academics should take into account all the technological tools available to them to establish learning strategies and thus provide a variety of opportunities for the student in the teaching and learning process; Following the same order of ideas, 85% of respondents reported that teachers encourage teamwork as a strategy for building collaborative learning where participants can intertwine their tacit and explicit knowledge as a formula for the development of knowledge for effective development in the community and society where each participant lives; Finally, with 90% it is evident that education in the Dominican Republic is a social right that does not exclude any citizen because of gender, sex, color, race, disability or any socio-cultural condition, which demonstrates that education is inclusive based on the development needs of the nation.

USE OF DIGITAL TECHNOLOGIES

	Strongly disagree	Desa-gree	Neither agree nor disagree	Agree	Strongly Agree
a) I like to use digital technology.	0	5	2	31	62
b) Digital technology has positively changed our lives.	0	4	16	39	41
c) In the teaching-learning process it is necessary to use digital technology.	0	0	17	27	56
d) I know several websites and computer programs that are useful for teaching and learning.	0	0	30	40	50
e) Supporting digital teaching is better than traditional (face-to-face) teaching to improve learning.	0	8	24	29	39
f) The teacher's use of digital technology has a positive impact on students' learning outcomes.	0	0	17	33	50
g) The teacher's use of digital technology has positive effects on student motivation.	0	0	10	40	50
h) The teacher's use of digital technology has a positive effect on the degree of commitment of the student.	0	5	19	36	45

	Strongly disagree	Desa-gree	Neither agree nor disagree	Agree	Strongly Agree
i) The teacher's use of digital technology has a positive effect on student satisfaction.	0	0	15	40	45
j) Students should not be prohibited from using cell phones at school.	0	6	35	29	30
k) It is easy for me to start using new software.	0	0	20	44	36
l) It is easy for me to start using new websites.	0	0	15	35	50
m) It is easy for me to start using new electronic devices.	0	0	11	39	50

With regard to the indicators pointed in the table, it is important to emphasize that education plays an important role in the development of the country's society, which is evidenced by the incorporation of extremely important technological tools to provide a more complete and effective education, integrating the new information and communication technology to support and expand curricular objectives, stimulating students to better understand the development of learning, but it is important to emphasize that these resources cannot be used separately but must be part of the daily activities carried out in classrooms.

In this order of ideas, the study demonstrates that the country's educational institutions are adapting to these changes in an attempt to improve education, developing and applying resources as instructional means to contribute to the advancement of an integral education for students, where they have a leading role in the teaching and learning process, since the teacher supported by these technological tools will become a facilitator who will guide and advice the development of programmatic content, achieving that the students acquire significant competences, all this is reflected in the surveys that are their first items 62% indicate to use the digital technology, 41% emphasize that the digital technologies have favored positively in the Dominican education, 56% express that it is necessary to include the technologies in the process of teaching and learning, 50% rely on Web environments for the development of academic content to enhance the teaching and learning process, 39% expressed the need to transform traditional education through the inclusion of digital technology and thus be able to respond to the demand of the current student community, 50% emphasize that the results of the teaching and learning process where digital technology is used are positive for students, In the same way, they motivate students in a significant way, since they are actively involved in the process, which was evidenced by 45%. Likewise, it can be noted that when digital technologies are used in educational environments, satisfaction is guaranteed, which is demonstrated by 30%; and commitment to students, which produced 36%, and finally, 50% of respondents report that they adapt easily to the digital technologies that are implemented in the development of the contents planned by teachers.

TECHNICAL INFRASTRUCTURE

	Doesn't exist	Very bad	Bad	Accept-able	Good	Very good
a) Quality of the Internet connection by WiFi.	2	12	14	37	21	14
b) Quality of the Internet connection by cable.	10	4	8	35	25	18
c) Quality of the computers for use in common areas.	4	5	12	33	25	21
d) Quality of the learning platform (on the Internet).	9	1	6	29	32	23
e) Quality of equipment and projectors (data display).	1	2	2	31	33	33
f) Quality of interactive electronic boards.	41	5	4	15	19	16
g) Quality of books and texts in digital format.	11	2	4	31	24	28

It is important to emphasize that educational institutions that wish to implement technologies as educational support must have an acceptable technology infrastructure that provides the minimum conditions necessary for the institutional community to access technological resources and services; in relation to this point the majority of respondents are satisfied with the Internet service that the institution involved in the study has, In the same way, they express that they have tangible technological resources for operation in the common areas of the institution. In this same order of ideas, they point out that it is a pleasure to be able to count on technological equipment that contributes to the teaching and learning process, since they are the complement of the diverse digital bibliography that the institution has, which demonstrates the commitment for the quality of Dominican education.

ICTS AS TOOLS TO SUPPORT LEARNING

	Never	Rarely	Some-times	Often	Very often
a) Open learning platform e.g.: MOOC (Free Internet Course).	24	15	26	14	21
b) Inverted classroom.	22	19	23	15	21
c) Digital narration.	16	18	31	20	15
d) Blockchain technology.	47	19	24	4	6
e) Educational electronic games.	17	9	35	18	22
f) ICT tools for teaching and learning foreign languages.	34	9	21	13	24
g) Specialized ICT tools for teaching the deaf.	77	8	5	1	9
h) Policies to increase the access of all people to ICT resources in support of learning.	31	16	17	17	19

Educational communities that wish to venture into education supported by technological tools must first carry out a process of digital literacy on the technologies that will be implemented in the teaching process; in the present study it is evident that ICT tools for the teaching of foreign languages and for the hearing impaired are unknown, similarly, there are no known policies that guarantee technological resources to the educational community, however it was determined that the strategies most used in the teaching process of the involved respondents are educational electronic games and free teaching platforms available on the web, on the other hand digital narration is also frequently used as a means of learning, (Marques, 2007a).

PERCEPTION OF THE EFFECTIVENESS OF ICT IN EDUCATION

	I don't know	Very low	Low	Accept-able	Good	Very Good
a) Open learning platform e.g.: MOOC (Free and Massive Internet Course).	27	1	6	19	19	28
b) Inverted classroom.	20	6	7	17	22	28
c) Digital narration.	16	6	8	23	22	26
d) Blockchain technology.	39	6	15	14	11	15
e) Educational electronic games.	10	7	9	18	19	37
f) ICT tools for teaching and learning foreign languages.	22	5	4	17	21	31
g) Specialized ICT tools for teaching the deaf.	50	7	9	3	13	18
h) Methods to support those excluded from the digital society (e.g. elderly, migrants).	43	5	5	10	13	24

In relation to this aspect, it is important to highlight that the majority of respondents show little expertise in the solutions developed within the SELI project, there is evidence of interest in participating in online courses on the web, as well as the interest in using the inverted classroom model to offer ICT tools to participants in educational environments; on the other hand, it is perceived that educational electronic games often benefit since they are easily and positively adapted to students, it is for this reason that SELI proposes the development of educational strategies based on ICTs, taking into consideration the functional and non-functional requirements of the educational community where the described methodology is to be implemented (Cabero, 2007a).

PREFERENCE OF PEDAGOGICAL STRATEGIES OFFERED AT SELI

	Not interested in any way	Not interested	Neutral	Interested	Very interested
a) Open learning platform e.g.: MOOC (Free and Massive Internet Course).	27	1	6	19	19
b) Inverted classroom.	20	6	7	17	22
c) Digital narration.	16	6	8	23	22
d) Identification and prevention of cyberbullying.	39	6	15	14	11
e) Blockchain technology.	10	7	9	18	19
f) Educational electronic games.	22	5	4	17	21
g) ICT tools for teaching and learning foreign languages.	50	7	9	3	13
h) Specialized ICT tools for teaching the deaf.	43	5	5	10	13
i) Methods to support those excluded from the digital society (e.g. elderly, migrants).	27	1	6	19	19

Others (specify) ….

It is important to point out that the pedagogical strategies proposed in the SELI project correspond to the preference of teachers when planning the academic content to be developed in teaching environments, since it is evident that academics use the Internet as a source of information search and platform that contribute to the cognitive development of students; they understand that including the diverse tools offered by technologies, they can enhance pedagogical practices and offer equal opportunities to students, since it allows the adaptability of needs, which guarantees a more personalized attention to achieve learning objectives, achieving the standardization of educational quality that has a positive and significant impact on Dominican society (Cabero, 2007b).

INTERNET USE (INCLUDES SOCIAL NETWORKS AND MESSAGING APPLICATIONS)

	Never	Rarely	Some-times	Often	Very often
a) Publish messages on the Internet.	1	4	13	22	60
b) Consuming internet streaming (e.g. watching videos).	8	0	14	21	57
c) Create videos.	12	17	29	11	32
d) Use a file to share and exchange files.	2	8	11	21	58
e) Participate as a member of a group.	2	6	11	17	64
f) Accessing online services (e.g. e-government).	10	5	22	20	43
g) Purchase/sale of goods.	30	16	21	15	19
h) Leisure.	8	8	17	22	45

The study shows that the majority of respondents frequently use the Internet through various asynchronous and synchronous tools to establish communication, share explicit and tacit experiences, as well as use web services to share resources, access government services, make purchases, participate in virtual communities; in the same way they use Internet resources to create and share audiovisual material, all of this allows us to discern that the population surveyed has knowledge of the benefits and opportunities that good management of technologies can contribute to the quality of education and in turn have a positive impact on society (Cabero, 2007b).

USE OF THE INTERNET FOR LEARNING

	Does not apply	Never	Rarely	Some-times	Often	Very often
a) Study in a mandatory online course in my career.	1	4	13	22	60	1
b) Search for resources on the Internet that are useful for my learning activities.	8	0	14	21	57	8
c) Access free online learning courses (e.g. learning a language, technology,...).	12	17	29	11	32	12
d) Access to paid online courses.	2	8	11	21	58	2
e) Participate in online study groups.	2	6	11	17	64	2

Internet has brought a series of benefits that directly impact several areas of society, mainly education involving the knowledge society with teaching and learning processes, (Gallardo, 2010); it is for this reason that when analyzing the responses of respondents, it can be determined that 48% of those who participated, frequently have taken online training related to their careers, experiencing the benefits of distance education, 81% explore the resources offered by the Internet to link some of them with learning activities, on the other hand 50% express that they have participated in online learning courses free of charge and 25% indicate that they have not participated in distance learning that charges tuition and finally 37% express that they participate in online study groups to strengthen their knowledge and experience virtual collaborative learning experiences.

USE OF MOBILE DEVICES

	Never	Rarely	Some-times	Often	Very often
a) Send/receive e-mail.	0	3	3	16	78
b) Send/receive photos.	0	1	6	15	77
c) Use hotspot to share internet connection through your device.	9	11	15	23	43
d) Use data synchronization in the cloud (e.g. dropBox Google Drive).	5	5	9	20	62
e) Translation to/from other languages.	4	9	14	23	50

The previous table shows that the respondents, in the study work, frequently use mobile devices as a communication tool to share audiovisual and multimedia material, in the same way they use it to share Internet connection in work groups and thus be able to synchronize data in the different storage platforms, and file sharing, in the same way they use tools for the handling of foreign languages as support for the treatment of information in different languages; it is possible to strengthen the learning process of all those involved and also allows to discern that they have significant skills in the handling of mobile devices and at the same time the capacity to involve them in education.

PERCEPTION OF THE LEVEL OF ICT SKILLS

	Very low	Low	Medium	High	Very high
a) Use of word processors (Word, writer).	1	1	14	28	56
b) Use of spreadsheets (Excel, Calc).	1	11	37	13	38
c) Use of presentation programs (Power Point, impress).	0	5	14	21	60
d) Use of graphics and design programs (Picasa, Gimp).	6	25	30	17	22
e) Knowledge about the dangers of the digital world (cyberbullying, internet addic-tion, sexting).	5	4	27	30	34
f) Use of resources and tools available on the web, in support of diverse dynamics.	2	5	23	23	47

This section is aimed at determining the level of technological literacy that those involved in the study work have, where it is evident a high use of office automation tools among respondents, however, they have basic knowledge of graphic design programs for image processing, video editing and graphic composition work; on the other hand it is important to reinforce and raise awareness among those involved, information about the dangers that are present in the digital world, to avoid that they become victims and have the necessary caution when they are as Internet users. Finally, it is demonstrated that the respondents have a high level on the management of resources and web tools to adapt them to various areas of knowledge where their daily and professional lives develop.

IDEAL PLATFORM FOR ONLINE COURSES

Respondents in relation to this question determine that the ideal platform for online courses should meet the following indicators:

Indicator	Concept definition
Easy access for the user.	Accessibility of the contents by navigating the sections of the platform.
Interactive Contents.	Processing of information in various formats, such as multimedia, audio, audio-visual, hypertext among others.
Dynamism with the user.	Possibility that the user can create products in the platform and be able to publish contents.
Possessing iconog-raphy.	Meaning of the icons for the user to familiarize easily with the platform.
Modeling instructional design.	It is the guide for the design of the contents in the platform in a pedagogical way appropriate to the modality of study.
Communication channels .	Clearly define the communication channels asynchronous and synchronous with what the platform will have.
User History.	It is to record the interactions that a user has performed on the platform and thus be able to measure the performance of it.

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THE ROLE OF THE DOMINICAN STUDENT IN THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

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ABSTRACT

The impact of Information and Communication Technologies on Dominican society in recent years has transformed the social, cultural and educational reality of the country, where students are no longer just receivers of information, but now demand information for the construction of meaningful knowledge, which shows that educational environments are transfigured by the needs of the educational population and by world technological advances. To contribute to this process, the following research explored the technique of a survey of 102 education students from various provinces of the country to explore the expertise they have in technological tools and the data were collected through in a survey, where it was obtained in a relevant way that the majority know and manipulate technological tools, but they do not always use them for the educational environment, if not for recreational purposes. From this collection of information, it is desired to develop the smart ecosystem for learning and inclusion, and thus be able to convert with the educational process of an integral model of learning where the adaptability of academic content allows the inclusion of the diversity of the student body, to break the barriers of discrimination and educational exclusion.

Keywords: *ICT, Education, innovation, Adaptability*

INTRODUCTION

 Progress in the use of new information and communication technologies in Dominican Republic has advanced significantly in the last years. According to ONE 67.6 percent of the population will or has access to the Internet, 40.1 uses computers and 85.8 have access to the use of mobile phones (ENHOGAR, 2018). However, with respect to the others Latin American countries we are below average in terms of fixed broadband access and mobile broadband (ECLAC, 2017). In the specific case of inclusion of vulnerable groups, the convention for the rights of people with disabilities notes that the use of new technologies by people with disabilities is a fundamental element for sustainable development of the region of the Caribbean (A. Bleeker, 2019). Is for this reason that Dominican government has made considerable efforts to launch the project Digital Republic. In the same it is stablished as one of the fundamental axes, the articulation and promotion of inclusive strategies to integrate information and communication technologies into the Dominican education system, (Digital Republic, 2019).

Trough the study presented hereunder it is intended to raise information about the levels of knowledge among students of education and their performance in the use of new technologies.

CHARACTERISTICS OF THE SAMPLE AND RESEARCH PROCEDURE

For the development of this research, four (4) higher education institutions were chosen in a non-random way: Universidad Pedro Henríquez Ureña (UNPHU), Universidad Abierta para Adultos (UAPA), Universidad del Instituto Cultural Dominico Americano (UNICDA) and Instituto Superior de Formación Docente Salomé Ureña (ISFODOSU). On May 31, the letter of request to apply the instrument in ISFODOSU was sent, and in June the application of the instrument began. It was applied in a face-to-face and non face-to-face manner. All questionnaires were answered digitally, through a google form. The data collection work concluded in August with the UAPA. The data collected with the research instruments applied to one hundred (102) students show that the population was made up of citizens of both sexes where 49% were women and 51% men with an average age between 26 years of age, mainly Dominican nationality with 92% and 9% citizens of various nationalities, where the most predominant civil status was single with 85%, married with 14% and having the lowest indicator of Divorced with 1%. 100% of respondents with university students, the sample selected was made up of 88% of public institutions and 12% private, the data presented above allow inferring that the data found arise from a universe that ensures the diversity of information to discern the information from the unification of the tacit with the explicit, this collection process was conducted in July 2019, using as a technique the survey and as instruments the questionnaire in digital form, the same was distributed via web, the same produced the following results:

INCLUSIVE EDUCATION

	Strongly disagree	In disagree-ment	Neither agree nor disagree	Agree	Strongly agree
a) I think that student diversity should be taken into account as an essential aspect of human development throughout all education conceptualization.	3	1	2	33	61
b) I believe that all teachers should feel able to teach effectively to all students, using all available resources, including technological.	3	1	2	22	73
c) I think that being a teacher includes continually developing new creative ways of working with other people	2	1	0	19	78
d) I believe that the education is a right for all people, regardless of age, sex, socio economic condition, disability or special educational needs	1	2	0	12	85

Inclusive Education should be conceived as a process of addressing and responding to the diverse needs of all students through an increased participation in learning and reduce exclusion of the educational system, with regards to this, 61% of respondents indicated that to achieve human development through education is important to consider diversity of students as a fundamental aspect when planning educational meetings to ensure the integral training of all participants; Similarly, 73% underlined that in class sessions it must be taken into consideration all available technological tools to establish learning strategies and so provide many opportunities for the process of teaching and learning; Following this same line of thought, 78% of respondents reported that teachers encourage teamwork as strategy of construction of collaborative learning in which the participant can interleave its tacit and explicit knowledge for the development of effective knowledge within the community and the society where each of the participants live; finally with an 85% it was evidenced that education in Republic Dominican is a social entitlement that does not exclude any citizen because of its gender, sex, color, race, disability or socio-cultural condition, which shows that education is inclusive based on the nation development needs.

USE OF DIGITAL TECHNOLOGIES

	Strongly disagree	In disagreement	Neither agree nor disagree	Agree	Strongly agree
a) I like to use digital technology	0	0	6	22	72
b) Digital technology has changed our lives in a positive way	0	4	18	36	46
c) In the teaching-learning process is necessary to use digital technology	0	0	9	39	52
d) I know several websites and softwares that are useful to teach and learn	0	0	4	38	43
e) Support to education with digital technology is better than traditional education (face to face) to improve learning	0	0	10	33	57
f) The use, by the teacher, of digital technology has a positive impact on learning outcomes of students	0	0	5	55	45
g) The use, by the teacher, of digital technology has a positive impact on the motivation of the student	0	0	12	40	50
h) The use, by the teacher, of digital technology has a positive impact on the degree of commitment of the student	0	5	19	49	39
i) The use, by the teacher, of digital technology has a positive impact on the degree of satisfaction of the student	0	0	9	51	40
j) There should not be prohibited to students the use of cell phones in school	0	6	34	33	33
k) It is easy for me to start using new software	0	0	10	50	39
l) It is easy for me to start using new websites	0	0	10	45	45
m) For me it is easy to start using new electronic devices	0	0	10	56	34

With respect to the indicators indicated in the table, it is important to emphasize that education plays a relevant role in the development of society, which is evidenced in the incorporation of technological tools to provide a more complete and effective education. In this way, new information and communication technologies are integrated to support and expand curricular objectives, stimulating students to

better understand the development of learning, but it must be emphasized that these resources cannot be used separately but must be part of the daily activities carried out in classrooms.

In this sense, the study shows that the country's educational institutions are adapting to these changes in search of a better education, developing and applying resources as means of instruction to contribute to the advancement of a comprehensive education for students. The teacher supported by these technological tools will become a facilitator who will guide and direct the development of the programmatic contents, achieving that the students acquire significant competences. This information is supported by 72% of responses that indicate that they like using digital technology; 46% emphasize that digital technologies have positively favored Dominican education; 49% express that it is necessary to include technologies in the teaching and learning process; 70% rely on Web environments for the development of academic content to enhance the teaching and learning process; 40% expressed that it is necessary to transform traditional education through the inclusion of digital technology and thus be able to respond to the demand of the current student community; 57% emphasize that the results of the teaching and learning process where digital technologies are used are positive for students; 55% are significantly motivated to be actively involved in the process, which was evidenced by 49%; likewise, 50% of the students surveyed responded strongly agree that the use of digital technologies in educational environments guarantees student satisfaction, and 39% assumed that the degree of commitment increases when the teacher uses digital technology; Finally, 50% of respondents reported that they easily adapt to the digital technologies that are implemented in the development of the contents planned by teachers.

TECHNICAL INFRASTRUCTURE

	Don't have	Very bad	Bad	Accept-able	Good	Very good
a) Quality of internet connection by WIFI	10	12	6	37	21	14
b) Quality of internet connection by cable	10	8	4	35	25	18
c) Quality of computers for the use in common areas	4	8	9	33	25	21
d) Quality of the learning platform (online)	9	1	6	29	32	23
e) Quality of equipment and projectors (data display)	1	2	1	29	34	33
f) Quality of electronic interactive blackboards	41	7	2	15	19	16
g) Quality of books and texts in digital format	11	2	2	33	24	28

It is important to emphasize that educational institutions that wish to implement technologies as educational support must have an acceptable technology infrastructure that provides the minimum conditions necessary for the institutional community to access technological resources and services, in relation to this point the respondents, for the most part, are satisfied with the Internet service available to the institution involved in the study, In the same way, they express that they have tangible technological resources for operation in the common areas of the institution. In this same order of ideas, they point out that it is a pleasure to have technological equipment that contributes to the teaching and learning process, since they are the complement of the diverse digital bibliography that the institution has, which demonstrates the commitment to the quality of Dominican education.

ICT AS A SUPPORT TOOL FOR LEARNING

	Never	Rarely	Some-times	Often	Very often
a) Open learning platform eg: MOOC (Free internet course)	14	15	29	24	18
b) Inverted classroom	15	12	32	28	13
c) Storytelling by digital means	13	22	29	24	12
d) Blockchain Technology	38	21	22	16	3
e) Educational Electronic games	9	6	37	23	25
f) ICT tools for foreign language teaching and learning	13	13	23	31	20
g) ICT specialized tools to teach deaf people	62	14	10	10	4
h) Policies to enhance access of all people to the resources of ICT to support learning	17	18	22	30	13

In the present study, it was stated that ICT tools for the teaching of foreign languages and for the hearing impaired are unknown, as are the policies that guarantee technological resources to the educational community. However, it was determined that the strategies most used in the teaching process of the respondents involved are educational electronic games and free teaching platforms available on the web. It is also shown that digital storytelling is often used as a me for learning (Marques, 2010).

PERCEPTION OF THE EFFECTIVENESS OF ICT IN EDUCATION

	Don't know	Very low	Low	Accept-able	Good	Very good
a) Open learning platform eg MOOC (Free and massive online course)	14	6	8	27	31	14
b) Inverted classroom	15	6	9	20	23	26
c) Storytelling o by digital means	13	9	10	24	26	19
d) Blockchain technology	32	2	15	24	16	11
e) Educational electronic games	5	4	7	25	22	37
f) ICT tools for foreign language teaching and learning	10	3	10	22	26	29
g) ICT specialized tools for deaf teaching	32	7	8	23	12	18
h) Methods to support those ex-cluded from the digital society (eg elders, migrants)	22	7	7	22	18	24

In relation to this aspect, it is important to highlight that most of the participants show little expertise in the solutions developed within the Smart Ecosystem For Learning and Inclusion (SELI) project, there is evidence of interest in participating in online courses on the web, as well as an inclination to use the inverted classroom model to offer ICT tools to participants in educational environments. On the other hand, it is perceived that educational electronic games often benefit, since they are easily adapted and positive to students. They understand that learning foreign languages would be more pleasant and effective for hearing impaired people through ICT tools, since they offer dynamism to the formative encounters. For this reason, the SELI project proposes the development of educational strategies based on ICTs, taking into consideration the functional and non-functional requirements of the educational community where the described methodology is to be implemented (Cabero, 2007b).

PREFERENCE OF PEDAGOGICAL STRATEGIES OFFERED IN SELI

	Not interested in any way	Not interested	Neutral	Interested	Very interested
a) Open learning platform eg. MOOC (Free and massive online course)	1	3	13	50	33
b) Inverted classroom	1	1	19	39	40
c) Storytelling by digital means	0	2	21	42	36
d) Identification and prevention of the cyberbullying	4	3	16	39	38
e) Blockchain Technologies	4	4	19	38	35
f) Educational electronic games	3	1	13	37	46
g) ICT tools for foreign language learning and teaching	50	7	9	3	44
h) specialized ICT tools for deaf teaching	3	5	17	33	42
i) Methods to support those excluded from the digital society (eg. elders, migrants)	2	4	13	40	41

Other (specify) …

According to the data presented in the previous table, the pedagogical strategies proposed in the SELI project correspond to the preference of teachers when planning the academic content to be developed in teaching environments. It is reflected that academics use the Internet as a source of information search and as a platform for students' cognitive development. They understand that including the various tools offered by technologies can enhance pedagogical practices and provide equal opportunities to students, since it allows for the adaptability of needs and contributes to a more personalized attention in order to achieve learning objectives. This standardizes the quality of education so that it has a positive and significant impact on society. (Cabero, 2007b).

INTERNET USE (INCLUDING SOCIAL NETWORKS AND MESSAGING APPLICATIONS)

	Never	Rarely	Some-times	Often	Very often
a) Post messages on the internet	1	9	11	27	52
b) Consume internet streaming (eg watch videos)	3	5	17	26	49
c) Create videos	11	18	25	22	24
d) Use a service to share and exchange files	1	5	10	27	57
e) Participate as a member of a group	2	3	11	26	58
f) Access to online services (eg electronic government)	8	14	24	21	33
g) Purchase / sale of goods	25	26	20	14	15
h) Leisure	8	11	16	22	43

The study shows that the majority of respondents frequently use the Internet through various asynchronous and synchronous tools to establish communication, share explicit and tacit experiences, likewise use web services to share resources, access government services, make purchases, participate in virtual communities, as well as use Internet resources to create and share audiovisual material. It can be discerned that the population surveyed has knowledge of the benefits and opportunities that good management of technologies can give to the quality of education and in turn have a positive impact on society (Cabero, 2007a).

INTERNET USE FOR LEARNING

	Does not apply	Never	Rarely	Some-times	Often	Very often
a) Studying in an online course mandatory in my career	1	5	4	14	30	46
b) Search for resources on the internet that are useful for my learning activities	0	0	2	3	26	70
c) Access to free online learning courses (eg.: learning a language, technology,)	6	0	5	18	21	50
d) Access to paid courses	17	19	9	12	21	22
e) Participate in online study groups	4	5	7	15	30	40

Internet has brought a series of benefits that directly impact several areas of society, mainly education involving the knowledge society with teaching and learning processes, (Gallardo, 2010), it is for this reason that when analyzing the responses of respondents can be determined that 46% of those who participated frequently have taken online training related to their careers, experiencing the benefits of distance education, 70% explore the resources offered by the internet to link some of them with learning activities, on the other hand 50% express that they have participated in online learning courses free of charge and 22% indicated that they have not participated in distance learning that charges tuition and finally 40% express that they participate in online study groups to strengthen their knowledge and experience virtual collaborative learning experiences.

USE OF MOBILE DEVICES

	Never	Rarely	Some-times	Often	Very often
a) Send/receive electronic mail	0	1	2	24	73
b) Send/receive photos	0	3	7	21	60
c) Use hotspots to share connection via your device	4	10	16	29	41
d) Use synchronization of data in the cloud (eg. Dropbox, Google Drive)	2	4	5	25	64
e) Translation to/from other languages	2	5	10	33	50

The table above shows that respondents at work frequently implement mobile devices as a communication tool to share audiovisual and multimedia material, in the same way they use it to share internet connection in work groups and thus be able to synchronize data in the various storage platforms, in the same way they use tools for the handling of foreign languages to support the processing of information in different languages.

PERCEPTION OF THE LEVEL OF ICT SKILLS

	Very low	Low	Medium	High	Very high
a) Use of word processors (Word, writer)	1	1	15	27	56
b) Use of calculation sheets (Excel, Calc)	2	6	30	26	35
c) Use of presentation programs (Power Point, Impress)	1	0	13	30	56
d) Use of graphics and design programs (Picasa, Gimp)	8	12	25	29	26
e) Knowledge about the dangers of the digital world (cyberbullying, addiction to Internet, sexting)	3	3	26	30	37
f) Use of resources and tools available on the web, in support to various dynamics	0	4	15	34	46

This section is aimed at determining the level of technological literacy possessed by those involved in the study work, which demonstrates a high use of office tools among respondents, however, have basic knowledge of graphic design programs for image processing, video editing and graphic composition work, on the other hand it is important to reinforce and raise awareness among those involved, information about the dangers that are present in the digital world, to avoid that they become victims and have the necessary caution when they are as Internet users. Finally, it is reflected that respondents have a high level of resource management and web tools to adapt to the various areas of their work and professional life.

IDEAL PLATFORM FOR ONLINE COURSES

Respondents in relation to this question determine that the ideal platform for online courses should meet the following indicators:

Indicator	Conceptual Definition
Easy access to the user	Accessibility of content by the navigation into the platform sections.
Interactive Contents	Treatment of information in various formats, such as multimedia, audio, audiovisual, hypertext , among others.
Dynamism with the user	Possibility that the user can create products on the platform and to publish content.
Own iconography	Meaning of the icons for the user to easily familiarize with the platform.
Modeling instructional design	It is the guide for the design of content on the platform, appropriate to the study model.
Communication channels	Clearly define the asynchronous and synchronous communication channels that the platform will have.
User History	It is to record the interactions that a user has made on the platform and thus be able to measure the performance of it.

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PRE-SERVICE TEACHERS' SELF-REPORTED DIGITAL COMPETENCIES AND ATTITUDES TOWARDS ICT USE AND INCLUSION

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ABSTRACT

This chapter reports the results of a survey on the use of ICTs by pre-service teachers in different colleges in Ecuador. The research aimed at knowing about pre-service teachers´ beliefs and experiences regarding the use of technology and inclusion in education. The total number of respondents were 116. The survey inquired aspects such as inclusion, attitudes towards the use of technology, effectiveness of ICTs in education. This preliminary descriptive study found that the application of technology brings positive effects on education and that it constitutes a great opportunity for inclusion in education. However, there is still a lot to do in regard to connectivity and the way teachers perceive the use of cellphones during class.

Keywords: *inclusion, ICTs, pre-service teachers, attitudes, internet.*

INTRODUCTION

Two important laws were passed in Ecuador in this past decade. One is the 10-year education plan known as *Plan Decenal de Educación*, which aims to provide universal education and to increase the population attending high school, among other aspects (Ministerio de Educación y Cultura, 2009). The other law is the organic law of Intercultural Education, which states that inclusive education is mandatory. Thus, this law calls all schools to find the right means to admit students with special needs. (Ministerio de Educación y Cultura, 2011)

The aspects encouraged by these laws represent a challenge to higher education and teachers in general as they prescribe the provision of computers, laboratories, software and virtual environment, training on virtual education and appropriate methodologies to enhance the process of learning among all students. A simple browse to the Ministry of Education web page demonstrates how important is the training and knowledge teachers need on virtual learning and inclusive education due to the numerous workshops offered in these fields. Additionally, if a teacher pursues his tenure, he needs to demonstrate a wide range of course in these fields.

According to Estrada, Febles, Passilaigye, Ortega and León (2015), ICTs offer a great chance to expand the education coverage. However, this great opportunity requires accomplishing other aspects such as teacher preparation because the use of technology in education does not happen spontaneously. This does not mean, however, that a teacher does not need to have wide knowledge on the conditions in which the learning process is developed. Therefore, teachers need to be aware of the new roles that this new social context demand and how important their role is in the decisions regarding any model of pedagogy adapted to the learning process of their students.

To Torres Arosemana (2004) pre-service teachers and those studying pedagogy need to know how students learn, and how the virtual environment can affect their learning. Knowing if a student has access to internet is not the only aspect that should be considered in virtual learning. Teachers need to plan the integration of ICTs through a cultural view without affecting the background students have. They also need to be aware of appropriate strategies when including ICTs in their teaching processes.

Zwierewicz, Motta and Pantoja (2005) consider that planning for diversity and special learning needs demands the provision of adequate pedagogical and technical conditions in a way that teachers develop a kind of skill in these conditions, so that they can spot areas where teachers can enhance the learning process and areas where students can work independently. Thus, future teachers need to develop these abilities while they are still in their preparation process.

Having these considerations in mind, this study aims at identifying how pre-service teachers view the use of technology, internet and virtual learning can be used in their classes from features such as inclusion, attitudes towards technology, pedagogical strategies, ICT skill level and access among others.

METHODOLOGY

This descriptive study used surveys for data collection, from July 2019 to January 2020. Pre-service teachers who decided to participate responded to a survey online. Items in the survey were ranked with a Likert scale ranging from "strongly agree" to "strongly disagree". Pre-service teachers were asked to self-report their digital competences, attitudes towards ICT inclusion in teaching, and attitudes towards new digital educational solutions for teaching and learning. In the same way, pre-service teachers were asked to rate their knowledge of trending educational solutions such as Blockchain, flipped classroom, and digital storytelling. Answering all the questions in the survey was mandatory for all participants. Teachers were all informed about the purpose of the survey and the meaning of each question. Questions were asked in the native language and later on, they were translated.

SAMPLE

A total of 116 pre-service teachers participated in this study. All respondents were in their last two years of undergraduate programs in the field of education. The population consisted of 97 female participants and 19 male. 113 respondents were Ecuadorian and 3 were foreigners. Three participants had already worked in the teaching field before attending college. Four participants already work in the rural area of the country and eleven work in the urban sector. 3.44% of them have very low

income, while the other respondents varied from poor to high medium social classes in their backgrounds. Their average age was 22 ± 1.5.

RESULTS

Table 1 shows that 28.45% of participants strongly agreed that considering differences of students in class time is important in their learning process. A higher percentage, that is 38,79% of participants, consider that teachers need to be qualified to teach students in different situations. Likewise, they support creativity as a key component when working in class. On the other hand, almost the same amount of pre-service teachers do not think educators should be competent when teaching pupils. In line with these results, they do not agree on continually developing creativity or continuous training to teach.

Table 1. Inclusion

Item	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualization of learning.	29.31	6.90	6.03	29.31	28.45
I think all educators must believe they are qualified / capable of teaching all learners.	32.76	1.72	1.72	25	38.79
I think all educators must believe they are qualified / capable of teaching all learners.	30.17	4.31	2.59	25.86	37.07
I think all educators must continually develop creative new ways of working with others.	30.17	4.31	2.59	25.86	37.07

Although the Ecuadorian constitution posits that education is a right to every Ecuadorian, not all Ecuadorians have access to education. Children with disabilities and people from minority groups are usually left behind. The National Institute of Statistics and Census evidenced that 3.4% of women do not have access to education because of disabilities and 4,3% of men is in the same situation. 39,7% of disabled women do not attend to school or college for many different reasons (Rea & Medina, 2016). Added to this, the fact that schooling may not represent learning to everyone due to the lack on inclusion criteria, something that could be regarded as a hidden statistic because the student is receiving the opportunity to attend school, but is not given a real opportunity to learn. Although the percentage of teachers who answer with strongly agree and agree in Table 1, to the first item, there is still a high percentage of pre-service teachers who do not agree with recognizing differences in students when teaching classes. This means, that training should first aim at digging deep into teacher´s beliefs towards inclusion. In contrast to 37.07% of the population who enjoy using digital technologies, added to the high percentage of pre-service teachers who believe that technology can have a good impact on people's lives and student's

motivation to keep learning, demonstrates that there is promising future in this shift of beliefs of teachers in regard to inclusion.

Another aspect that brings hope to the challenge of granting access to all Ecuadorians to education is that most of pre-service teachers do not have difficulty in using a technological device or a webpage. On the contrary, barely 12.07% of the surveyed pre-service teachers strongly agreed that cell phones should be prohibited in schools, and another group of respondents somewhat think that digital aids can hardly improve the student's learning process. As Rea & Medina (2016) stated, technology, at least until now, is the only possible solution at hand to help teachers customize lessons to reach more students.

Table 2. Attitudes towards technology.

Item	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	22.41	5.17	9.48	37.07	25.86
Digital technologies have positively changed our lives	21.55	6.03	12.07	37.07	23.28
It is necessary to use digital technologies in the process of learning and teaching	22.41	6.03	8.62	34.48	28.45
Websites are useful for teaching and learning	20.69	5.17	11.21	33.62	29.31
Digital teaching aids are better than physical teaching aids on improving learning	18.97	13.79	18.97	29.31	18.97
The use of digital technologies by the teacher has a positive impact on student learning	22.41	4.31	7.76	37.07	28.45
The use of digital technologies by the teacher has a positive effect on student motivation	21.55	6.03	8.62	38.79	25
The use of digital technologies by the teacher has a positive effect on student involvement	21.55	5.17	10.34	36.21	26.72
The use of digital technologies by the teacher has a positive effect on student satisfaction	-	-	-	-	-
Students should be prohibited from using cell phones at school	22.41	25.86	24.14	15.52	12.07
Using a new software is easy for me	15.52	17.24	18.97	31.90	16.38
Using a new website is easy for me	15.52	14.66	16.38	34.48	18.97
Using a new electronic device is easy for me	14.66	14.66	11.21	34.48	25

Many good things have been said about the implementation of ICTs in education. Obviously this is a net generation and students will greatly be motivated if they see their teacher is updated with cutting-edge technology. However, education is a double-side road, on the one hand we have the students´ perceptions and motivation, but on the other we have the teacher, who in the long run makes the decision to

develop the course. Thus, it is of extreme importance to know about their perceptions regarding using ICTs in their teaching practice. As Solano, Cabrera, Ulehlova and Espinoza (2017) declare, in education, every kind of innovation brings drawbacks. According to these authors, one drawback is the lack of connectivity for both teachers and students, and the effort that it takes to teachers to keep learning about how to use technology.

However, Table 3 reflects that 23.28% of respondents consider they have good Wi-Fi connectivity. A high percentage of pre-service teachers believe that the quality of the platform they use in their learning processes in college or the schools where they have carried out their internship programs is good. Nevertheless, other part of the population, recognize that cable connection and computers in common areas of the school or college is poor. Conversely, 25% of the surveyed pre-service teachers do not know about the quality of E-books / E-textbooks.

These results show that teachers need to have some technological knowledge before changing a traditional model to a virtual mode. Some pre-service teachers are still reluctant to allow their students to use their cellphones in class. However, this information is rapidly challenged by the fact that a great percentage of teachers find a positive impact of using technology in class and that a lot of them find it easy to use technology.

Table 3. Technical infrastructure.

Item	I don't know	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of Wi-Fi internet connection	12.07	4.31	9.48	13.79	30.17	23.28	6.9
Quality of cable internet connection	18.97	13.97	3.45	9.48	30.17	17.24	6.90
Quality of computers in common areas	14.66	5.17	5.17	6.90	33.62	28.45	6.03
Quality of e-learning platform	12.93	6.03	6.03	11.21	25	31.90	6.90
Quality of equipment and projectors	9.48	7.76	6.03	5.17	33.62	25	12.93
Quality of smartboard	16.38	26.72	5.17	7.76	20.69	14.66	8.62
Quality of E-books / E-textbooks	25.86	22.41	9.48	12.93	5.17	8.62	15.52

While in the past a good infrastructure for a school was just water, sewer, electricity chairs, and a board, there other needs in a school now that could make a real difference in education. One of them is access to internet in the different areas of the school.

The Ecuadorian constitution in its 347 article states that government should work to eradicate any functional and digital illiteracy and promote the inclusion of ICTs in education. (Asamblea Nacional de la República, 2008). As a result of this constitutional

decree, the Organic Law of Intercultural Education (LOEI as per its Spanish acronym) ratified as obligations the permanent process of education and the eradication of digital illiteracy. The Ministry of Education established the Digital Educational Agenda that started in 2017 and is planned to last until 2021. The objective of this agenda is to change traditional education to a more innovative one by providing internet connectivity to all public educational schools and by moving pedagogical practices to a digital approach while building an infrastructure into a more digital format.

Thus, the information that this table shows, serves to assess how this switch from traditional education to a more digital education is working.

In terms of flipped learning and use of technological strategies, a low percentage of respondents confirmed a very frequent application of online platforms or digital strategies or technologies such as storytelling or blockchain, see Table 4. Other few surveyed pre-service teachers corroborated a very frequent use of digital methods to support students with special needs. Another group of pre-service teachers pointed out they have never used blockchain technology in their lesson plans or practicum. A higher percentage of respondents, however, confirmed a recurrent use of ICT tools when teaching a foreign language or when helping students with special needs.

These finding show that although the law reinforces the permanent use of ICTs in education, there is still a long path to follow. The beginning was set and with a very respectful view on the criteria of inclusion, but the world of ICTs is so ample that there is still much to do.

Table 4. Supporting learning through ICT.

Item	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution	9.48	25	25.86	31.03	8.62
flipped learning	7.8	22.4	21.6	31.9	16.4
digital storytelling	12.9	27.6	22.4	28.4	8.6
blockchain technology	25.9	25.0	18.1	22.4	8.6
educational digital games	15.52	29.31	22.41	22.41	10.34
ICT tool for teaching and learning foreign languages	8.62	24.14	24.14	29.31	13.79
special ICT tools to support teaching and learning disabled people	8.62	28.45	21.55	28.45	12.93
method to support the digitally excluded	12.93	26.72	22.41	26.72	11.21

Table 5 shows the perceptions of the effectiveness of ICT solutions in education. The majority of students (about 36%), report not knowing about open learning solutions, in comparison to acceptable (27.6%) and good knowledge (19%). Similar distributions are present for flipped learning, digital storytelling, and blockchain technology. On other solutions, like educational digital games and learning of foreign languages, higher

values are for acceptable (about 30%) and good (about 23%). However, the number of responders not knowing about these solutions is close (about 20%). Solutions regarding physical and intellectually challenged, and support for the digital excluded reach high values for acceptable, good, and very good effectiveness. Nevertheless, about 20% indicate that they don't know the subject.

There are digital tools that have proved to be effective in education, such as storytelling (Dogan & Robin, 2008) or gamification (Erhel & Jamet, 2013). These benefits vary not only for the class content but for other aspects such as motivation, confidence building, and other digital skills that would greatly contribute to an integral formation of students. Thus, their use should be spread out in the community through proper training. Such training should then consist in getting to know the tool as a student and as a teacher. Only this way pre-service teachers will have a whole view of the tools and will know how to wisely implement them in their classes.

Table 5. Perception of the effectiveness of ICT solutions in education.

Item	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution	36.21	5.17	4.31	27.59	18.97	7.76
flipped learning	29.31	6.90	3.45	28.45	24.14	7.76
digital storytelling	27.59	4.31	4.31	31.03	25.86	6.90
blockchain technology	29.3	8.6	6.9	24.1	18.1	12.9
educational digital games	21.55	3.45	6.03	31.03	22.41	15.52
ICT tool for teaching and learning foreign languages	17.24	3.45	6.90	30.17	26.72	15.52
special ICT tools to support teaching and learning for physically and intellectually challenged	20.69	3.45	3.45	25	29.31	18.10
method to support the digitally excluded	19.83	4.31	6.90	30.17	18.97	19.83

Table 6 shows Teachers' attitudes towards the pedagogical strategies offered by the SELI project. Neutral, Interested, and very interested are the higher values reported by students for all strategies proposed. In all cases, interested obtain the highest values (between 42% and 51%), while neutral and very interested have lower but similar values. These findings concur with the scenario stated by Peñaherrera (2012). In this study, the author reveals that the use of ICTs in education encourage motivation and concentration. However, the lack of knowledge that teachers may have on how to use these tools can turn down not only the model, but the acquisition of the different subject contents. As the study suggests, flipped learning demands a deep change in teachers´ view of education, from a traditional perspective to a constructivist one, so that the student develops a more active role in the learning process through the use of ICTs.

Table 6. Pre-service teachers' attitudes towards the pedagogical strategies offered by the SELI project.

Item	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution	0.86	0.86	30.17	44.83	23.28
flipped learning	0.86	0.86	23.28	48.28	26.72
digital storytelling	1.72	0.86	28.45	50	18.97
identifying and preventing cyberbullying	2.59	0.86	22.41	44.83	29.31
blockchain technology	2.6	-	25.9	46.6	25.0
educational digital games	0.86	0.86	18.97	50	29.31
ICT tool for teaching and learning foreign languages	1.72	0.86	18.10	50.86	28.45
Special ICT tools to support teaching and learning for physically and intellectually disadvantaged people	1.72	0.86	19.83	42.24	35.34
Method to support the digitally excluded	1.7	2.6	16.4	44.0	35.3

Table 7 presents how pre-service teachers use internet when it is not used for learning. More than 50% of students declare using internet for leisure very frequently, and about 22% frequently. Similar values between frequently and very frequently (around 33%) are present for activities like publishing messages, consuming video streams, using file sharing services, and participating in groups. However, other tasks like creating video and accessing online services have a more homogeneous distribution with higher values for sometimes (29.3% and 24.1% respectively). The majority of the respondents (34.5%) declare never using internet for economic activities (e.g. buying or selling goods).

Table 7. Pre-service teachers' use of internet.

Item	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	3.4	12.1	15.5	33.6	35.3
Consuming Internet streaming (e.g. VOD)	2.6	12.1	18.1	34.5	32.8
Creating video	19.0	23.3	29.3	19.8	8.6
Using a file sharing service	6.9	12.1	15.5	34.5	31.0
Participating as a member of a group	5.2	11.2	19.8	30.2	33.6
Accessing online services	15.5	19.0	24.1	23.3	18.1
Buying/Selling goods	34.5	14.7	21.6	15.5	13.8
Leisure	2.6	9.5	15.5	21.6	50.9

Regarding the usage of internet for learning, Table 8 reports that about 50% of respondents access online courses (29.3% frequently and 20.7% very frequently). Students also declare using internet for searching additional information related to their degree (36.2% frequently and 31% very frequently). In one side, participating in online study groups and taking free online courses have a more homogeneous distribution. On the other side, about 28% of respondents declare never taking paid online courses, and 21.6% of them think this kind of courses do not apply to their condition.

Table 8. Usage of internet for learning.

Item	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	10.3	12.9	14.7	12.1	29.3	20.7
Searching relevant sources on the Internet to complete online classes for my degree	1.7	1.7	12.1	17.2	36.2	31.0
Taking free e-learning courses (online courses - e.g. lan-guage, ICT)	8.6	13.8	18.1	15.5	23.3	20.7
Taking paid online courses	21.6	27.6	12.9	12.1	19.0	6.9
Participating in online study groups	13.8	17.2	15.5	17.2	20.7	15.5

Table 9 shows that some activities involving mobile devices are used very frequently (more than 33%). Tasks like: emailing, sending or receiving photos, connecting to an internet hotspot, and translation, report their higher values for frequently and very frequently. Tasks related to cloud data storage and synchronization through mobiles devices obtain lower values (frequently 20.7% and very frequently 33.6%).

Table 9. Usage of mobile devices.

Item	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	0.9	5.2	14.7	31.0	48.3
Sending/receiving photos	3.4	6.9	12.9	33.6	43.1
Using as a hotspot/internet connection sharing	4.3	9.5	19.8	26.7	39.7
Using cloud data synchronization (e.g. dropBox, Google Drive)	11.2	14.7	19.8	20.7	33.6
Translation to foreign languages	5.2	12.1	19.8	26.7	36.2

Table 10 presents Teachers' self-reported ICT skill level related to most frequently required abilities. In almost all cases the highest values are reported for medium and high, and combined account for more than 60% of answers. Word processing, Spreadsheet, presentation, and image edition software share this behavior. On the other side, 27% of respondents declared medium knowledge about dangers of the digital world, in comparison to 25% having high knowledge.

Table 10. Pre-service teachers' self-reported ICT skill level.

Item	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	2.6	5.2	35.3	32.8	24.1
Using the Spreadsheet (e.g. Excel, Calc)	5.2	15.5	35.3	28.4	15.5
Using the presentation program (e.g. Power Point, impress)	1.7	4.3	31.0	38.8	24.1
Using the graphic program (e.g. Picasa, Gimp)	7.8	16.4	37.9	26.7	11.2
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	12.9	13.8	27.6	25.0	20.7

IDEAL E-LEARNING PLATFORM

About the ideal features an e-learning platform should have, most respondents state it must be easy to use. This means the use of intuitive interfaces. The next group of demanded features is related to the use and availability of materials and Interactivity. This is related to the use of interactive audiovisual materials, like games, instead of using the platform as a storage of files to organize the course. Not only Synchronous interaction tools like video calling and debates, but also class recorded videos are also required. Some responders also think security and privacy are important features required. Customizable organization of materials in courses, well-designed graphics, and different color palettes' combination is also demanded. Additionally, acceptable performance and speed improves the general overall experience. Free access with zero price/cost and accessibility are listed too. Finally, a call for improving students participation through e-learning platforms could suggest students are claiming for more inclusive materials to those already available on similar platforms.

CONCLUSIONS

Although in Ecuador, the regulations demand teachers to have a wide knowledge about digital devices, pre-service students mostly agree on the support of the learning process through ICT's. However, their perception of the effectiveness presents some uncertainty. They believe ICT support the process but do not know to which extent they are effective. In this context, all responders are interested in pedagogical strategies offered by SELI project. This chapter uses a qualitative methodology through descriptive data in order to know the reality of the country in topics related to the SELI project and perceptions of pre-service teachers towards ICT use and the project.

Pre-service teachers could be considered internet natives, and consume many services for leisure, from personal computer or mobile device. Even though, being a producer of content is not a very popular option. In the same way, the use of monetary values for commerce is not well-developed in the country and could require further analysis. There could be a relationship between this aversion to electronic commerce and the low number of people willing to pay for an online course. However, public and free services are popular among responders, and their ICT skill level are considered medium to very high. For this reason, they ask for more intuitive interfaces and more interactive materials.

There is still work to be done to integrate the students' expectations in the development of the platform, so that it turns attractive to the future teachers while helps them to meet their students' needs in terms of inclusion. This work opens the analysis to future quantitative studies that would allow to assess the real impact of ICT in education.

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TEACHERS' SELF-REPORTED DIGITAL COMPETENCIES AND ATTITUDES TOWARDS ICT USE AND INCLUSION

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ABSTRACT

In the context of the SELI project, the purpose of this chapter was to gain a better understanding about teachers' attitudes, perceptions and use of Information and Telecommunication Technologies (ICTs). Ecuadorian teachers supported the use of technology in education and in inclusion. Moreover, this preliminary descriptive study found that most of the teachers considered themselves as very skilled and knowledgeable about ICTs. Teachers are also very interested in learning about currently trending digital educational solutions that could further develop teaching and learning in the country.

Keywords: teachers usage of ICT, self-efficacy, attitudes, Ecuador

INTRODUCTION

In 2007, the Ministry of Education of Ecuador (MINEDUC) developed the Ten Year Education Plan (MINEDUC, 2007). This plan offers teachers opportunities for professional development and ICT support in order to improve the teaching and learning process in public schools (MINEDUC 2007; MINEDUC, 2016). Increment in teacher professional competences was directly linked to teacher ICT preparation. This is why the Ten Year Plan included opportunities to further develop pedagogical practices with digital and innovative approaches to refresh current teaching-learning practices for both pre-service and in-service teachers.

The Plan's main objective was to develop specific guidelines for teacher training at the national level, to guarantee progressive improvement in the quality of education, in the teaching-learning processes, and in the teaching profession in general. In order to allow teachers to gain ICT competencies and foster their inclusion in their own class planning and teaching, teachers were offered training on ICT skills and ICT implementation in innovative teaching strategies (MINEDUC, 2018; Salinas, Nussbaum, Herrera, Solarte & Aldunate, 2017).

Research shows that in Ecuador, teachers' use of ICT as tools for education and inclusion varies depending on level of schooling. Valdivieso and Gonzáles (2016), for example, found that digital competences among elementary school teachers are low. Nevertheless, there is evidence of a trend towards curricular integration of ICT, especially in teachers who are younger than 30 years old and for those teachers who have graduated from endorsed pedagogical teaching institutes. Teachers were not very skilled in using Web 2.0 Tools such as online software programs to teach curriculum content, store data, create/edit video, and edit photos.

On the other hand, Salinas et al. (2017) found that high school teachers consider themselves skilled in the use of ICT. A high proportion of teachers described themselves as being able to use several ICT tools for; however, they did not consider themselves able to integrate these skills into the curriculum. The authors attributed these phenomena to the positive correlation existing between ICT training and teachers' self-efficacy. The authors concluded that teachers ICT adoption aligned with the ways in which the public policy emphasized and supported its use and implementation; nonetheless, training by itself might be insufficient to increase the integration of ICT into the curriculum. Teachers who had no proper training on the use of technology and its implementation to improve teaching performance, almost never relied on the use of ICTs for instruction (Murga, Quinde & Niama, 2018). Expanding upon these results, Legris, Ingham and Collerette (2003) suggested that professional development opportunities may not be enough to ensure teachers' use of ICT, since the adoption and usage of ICT depends on the level of acceptance users may have. This suggests that the more teachers feel comfortable with ICTs, the more likely they are to use them for instruction.

Furthermore, Ramírez, Sabaté and Llinàs (2016) evaluated technology adoption and predicted the level of acceptance and use of an e-learning system among college teachers in Ecuador. Their results indicated that perceived ease of use and perceived usefulness directly affected teachers' intentions of using e-learning systems. Enjoyment and social influence had a direct effect on how useful teachers perceived the use of e-learning systems. In the same way, when teachers enjoyed and felt self-sufficient using a computer, they perceived e-learning systems as being easy to use.

In sum, among Ecuadorian teachers, teachers' perceptions of self-efficacy using ICT and training are closely related. In the same way, there is a close relationship between teachers' perceptions of ICT contributions to teaching and learning and level of adoption of ICT for instruction. Additionally, the level of adoption of ICT for instruction depends on the amount and quality of training teachers have been exposed to and teachers' acceptance of ICT. Little is still known about Ecuadorian teachers' ICT competencies and usage. Therefore, the purposes of this study were: first, to expand previous research and help closing the gap in the literature regarding Ecuadorian teachers' self-reported perceptions of their digital competences, their attitudes towards ICT inclusion in teaching and learning practices, and training requirements on innovative digital solutions for teaching. Second, in line with the Smart Ecosystem for Learning and Inclusion (SELI) project's objectives, this study aimed to assess teachers' knowledge of and attitudes towards digital educational environments and trending pedagogical solutions, offered by the SELI's platform.

METHODOLOGY

This descriptive study used surveys for data collection. Participation in the survey was voluntary. Teachers who decided to participate responded to the survey online, from July to October 2019. Teachers were asked to self-report their digital competences, attitudes towards ICT inclusion in teaching, and attitudes towards new digital educational solutions for teaching and learning. In the same way, teachers were asked to rate their knowledge of trending educational solutions such as Blockchain, flipped classroom, and digital storytelling. Items in the survey were ranked with a Likert scale ranging from "strongly agree" to "strongly disagree".

SAMPLE

The participants of this study were 129 active teachers working at the primary, secondary, and college level, nationwide. 71 (55%) females and 57 (44.2%) males answered the survey. 126 Ecuadorians and 3 foreigners; 10 (7.8%) from rural and 119 (92.2%) from urban institutions. The average time working in their positions was 12.55 years (SD = 7.99), with a range from minimum 1 year on the job up to 33 years of service. The average age was 42.27 (SD = 9.82). The youngest teacher was 24 years old and the oldest was 66 years old. In terms of education, 22 (17.9%) of the responders held doctorate degrees. 46 (34.8%) had bachelor degrees, 59 (45.7%) had master's degrees, and 2 (1.6%) had a high school diploma. Lastly, 4.7% (6) teachers described their financial situation as very good; 43.4% (56) as good; and 40.3% (52) classified it as acceptable. For 10.1% (13) the financial situation was bad and for 1.6% (2) was very bad.

RESULTS

In line with one of the main objectives of the SELI project, teachers were asked to rate the extent to which they either agreed or disagreed with statements related to inclusion. Table 1 shows these results. The majority of educators considered that learners' differences must be accounted for as a crucial aspect when conceptualizing learning. Approximately, over half of the educators in the sample considered important taking into account students' individual differences in the conceptualization of learning. In the same way, most of them (60%) believed that self-confidence in their teaching skills and continuous professional development is crucial for creative teaching and learning. These preliminary results suggest that in addition to ICT training, professional development opportunities focused on inclusion should be provided, so teachers feel more comfortable working with all students.

Table 1. Inclusion

Item	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think students' differences must be accounted for, as an essential aspect of human development in any conceptualization of learning.	4.7	4.6	5.5	35.2	50.0
I think all educators must believe they are qualified/ capable of teaching all learners.	4.7	3.1	4.7	26.4	61.2
I think all educators must continually develop creative new ways of working with others.	5.4	3.9	4.7	25.6	60.5

Table 2 presents educators' responses about attitudes towards technology and their perceptions about how technology impacts teaching and learning. In general, educators not only support digital technology, but also include this technology in their courses. In general, the majority of teachers have positive attitudes towards ICT in general. In the same way, they considered ICT to have a positive impact on and are necessary in education. Over 40% of the respondents agreed with the technology being easy to use. Finally, attitudes towards active use of cell phones at schools for learning is less clear. Most of the educators seem indifferent; and for the rest of teachers, opinions on whether cell phones should be allowed or not for teaching are divided.

Table 2. Attitudes towards technology.

Item	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	3.1	2.3	2.3	53.9	38.1
Digital technologies have positively changed our lives	3.1	3.9	8.6	38.8	46.1
It is necessary to use digital technologies in the process of learning and teaching	3.1	2.3	10.9	39.1	44.5
Web sites are useful for teaching and learning	3.1	1.6	3.9	35.7	55.8
Digital teaching aids are better than physical teaching aids on improving learning	2.3	7.8	39.8	32.0	18.0
The use of digital technologies by the teacher has a positive impact on student learning	3.1	2.3	10.1	48.8	35.7

Item	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The use of digital technologies by the teacher has a positive effect on student motivation	3.1	1.6	14.7	43.4	37.2
The use of digital technologies by the teacher has a positive effect on student involvement	3.1	1.6	15.5	47.3	32.6
The use of digital technologies by the teacher has a positive effect on student satisfaction	-	-	-	-	-
Students should be prohibited from using cell phones at school	18.8	24.2	31.3	18.8	7.0
Using a new software is easy for me	3.1	7.8	17.8	44.5	27.3
Using a new website is easy for me	3.1	5.4	11.6	45.0	34.9
Using a new electronic device is easy for me	3.1	6.2	17.1	38.8	34.9

In order to have a more holistic view of the country's context, teachers were asked to talk about technical infrastructure at their current teaching institutions. Table 3 provides insights about perceptions of technical infrastructure. Overall, teachers have good perceptions about wireless and wired internet connections in their workplaces. In terms of computers and other technological artifacts, teachers who had such artifacts seemed satisfied. Around 20% of institutions reported not having e-learning platforms; and in the institutions that had them the quality ranges from "Acceptable" to "Good". Additionally, about 48% of teachers reported not having access to smartboards in their institutions and 20% of them reported not having access to e-books or textbooks. These findings suggest that in addition to professional development opportunities, teachers and educational institutions have to be provided with adequate well functioning technology.

Table 3. Technical infrastructure.

Item	I don't know	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	-	10.0	11.6	12.4	34.9	24.0	9.3
Quality of cable internet connection	9.3	20.0	5.4	7.0	20.9	31.0	10.9
Quality of computers in common areas	5.4	11.6	3.1	16.3	40.3	17.8	5.4
Quality of e-learning platform	9.3	19.0	1.6	6.2	27.9	27.9	12.4
Quality of equipment and projectors	3.1	13.4	5.4	12.4	34.9	25.6	8.54
Quality of smartboard	20.3	47.7	2.3	7.0	13.3	7.8	1.6
Quality of E-books / E-textbooks	10.9	20.2	2.3	6.2	27.1	25.6	7.8

Teachers were asked to rate the frequency with which they had used the ICT teaching techniques in the last year to support learning. Table 4 presents rates of teachers answers. Most of the teachers (32.6%) reported having used open learning solutions such as Massive Open Online Courses (MOOCs) and Open Educational Resources (OER) sometimes for their own education. These preliminary results study suggest the need for further research studying the use of MOOCs among teachers, across levels of schooling. Furthermore, we suggest the use of open-access learning resources as an easy-access and low-cost option for teacher training.

Regarding usage of trending educational solutions, approximately 40% of teachers reported having used flipped learning classrooms sometimes and over 28% of them have used it frequently. Most of the teachers, however, have never used other solutions such as digital storytelling. In the same way, teachers do not seem to know about application of. In the same way, teachers do not seem to know about application of blockchain technology at their institutions. Similarly, most teachers have never used ICT for neither teaching foreign languages (48.1%) nor for teaching physically disabled people, such as the deaf or blind (55.8%). Finally, the majority of teachers (62%) reported never used ICT to support instruction for digitally excluded people, such as the elderly or migrants. Considering the benefits of these learning solutions, we strongly suggest training in-service and pre-service teachers, especially to try to close the digital literacy gap in the country (Barros & Barros, 2019).

Table 4. Supporting learning through ICT.

Item	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution	17.1	20,2	32.6	17.8	12.4
flipped learning	10.1	12.4	39.5	28.7	9.3
digital storytelling	44.2	18.6	24.0	10.1	3.1
blockchain technology	73.6	13.2	3.9	6.2	3.1
educational digital games	38.0	20.9	26.4	10.1	4.7
ICT tool for teaching and learning foreign languages	48.1	19.4	14.7	11.6	6.2
special ICT tools to support teaching and learning disabled people	55.8	20.2	8.5	11.6	3.9
method to support the digitally excluded	62.0	18.6	7.8	7.8	3.9

Table 5 displays results about how effective teachers consider the options presented in table 4 as ways to improve teaching and learning. 31.8% of teachers said they do not know how effective MOOCs or OER repositories can be for teaching and learning in the Ecuadorian context. Meanwhile, 29.5% considered the use of MOOCs and OERs can be good. Teachers' opinions about ICT solutions such as flipped learning or educational digital games, as means to improve education, were divided. One big proportion of teachers thought these solutions could be beneficial for education while the other part did not even know about them.

With regard to the other technological solutions, most teachers did not know whether digital storytelling (38.8%), blockchain technology (56.6%) or ICT for teaching and learning foreign languages (35.7%) could be beneficial for education. Similarly, teachers did not know if special ICT tools could be used to support teaching and learning for physically and intellectually challenged students. Similarly, they did not know whether or not ICT could be used to support the digitally excluded learners (Barros & Barros, 2019).

Table 5. Perception of the effectiveness of ICT solutions in education.

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution	31.8	-	2.3	17.1	29.5	19.4
flipped learning	28.7	0.8	3.9	19.4	28.7	18.6
digital storytelling	38.8	1.6	3.9	24.0	23.3	8.5
blockchain technology	56.6	3.1	3.1	15.5	9.3	12.4
educational digital games	26.4	0.8	1.6	24.8	26.4	20.2
ICT tool for teaching and learning foreign languages	35.7	2.3	3.9	16.3	20.2	21.7
special ICT tools to support teaching and learning for physically and intellectually challenged	37.2	3.1	2.3	13.2	23.3	20.9
method to support the digitally excluded	36.4	3.1	3.1	15.5	23.3	18.6

The majority of teachers, however, were very interested in learning about all of these ICT solutions and how these can be used to improve teaching and learning. Table 6 shows the percentages by answer.

Table 6. Teachers' attitudes towards the pedagogical strategies offered by the SELI project.

	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution	1.6	1.6	13.2	32.6	51.2
flipped learning	-	3.1	10.9	43,40	51.2
digital storytelling	2.3	4.7	14.7	32.6	45.7
identifying and preventing cyberbullying	1.6	3.9	15.5	27.9	51.2
blockchain technology	3.1	4.7	19.4	31.0	41.9
educational digital games	1.6	3.9	13.2	27.9	53.5
ICT tool for teaching and learning foreign languages	4.7	9.3	14.7	27.9	43.4
Special ICT tools to support teaching and learning for physically and intellectually disadvantaged people	3.1	3.9	15.5	29.5	48.1
Method to support the digitally excluded	3.1	5.4	17.8	31.8	41.9

In addition, to these ICT solutions, teachers were also asked to name other ICT training courses they would be interested in learning more about. Among the most frequently named we found:

- attending training initiatives on teaching and learning methodologies for the "Z" generation;
- Classroom (from Google); GEOGEBRA;
- software for music mixing, such as Sibelius, NoteWorthy Composer, Finale, Encore, or Lilypond).

The survey was also intended to learn more about teachers' internet usage habits. Teachers were asked to rate the frequency with which they use the internet for activities such as posting messages, video streaming, etcetera. Table 7 displays usage rates for each of the activities included. The majority of teachers (49.6%) publish messages very frequently. 41.1% use the internet for video streaming. Over half of the teachers (51.9%) use file sharing services; 45% of them use it for social media, and 39.5% used for leisure related activities. 31.8% stated that never or rarely (22.5%) have used the internet to create videos of their own. These results suggest that more training is needed in order for teachers to feel more comfortable and start using Web 2.0 tools, most of them necessary to take advantage of the currently available teaching tools.

Table 7. Teachers' use of the internet.

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	2.3	7.8	7.8	32.6	49.6
Consuming Internet streaming (eg. VOD)	9.3	9.3	10.1	30.2	41.1
Creating video	31.8	22.5	20.9	15.5	9.3
Using a file sharing service	3.1	7.0	10.9	27.1	51.9
Participating as a member of a group	3.9	7.8	16.3	27.1	45.0
Accessing online services	10.1	7.8	20.2	29.5	32.6
Buying/Selling goods	23.3	19.4	20.9	20.9	15.5
Leisure	6.2	8.5	14.7	31.0	39.5

In regard to teachers' ICT use for learning, we learned that a quarter of them take online courses very frequently (24.8%) or frequently (26.4%). Table 8 shows that more than half of them (54.3%) declare using the internet to look for class materials. There is a tendency among respondents to look for free online courses, since most teachers 35.7% have never paid for accessing online courses. This might indicate the need to offer them accessible or free training courses besides the courses offered as part of their training. Digital learning platforms such as the one offered by SELI project could provide teachers with additional courses not only for professional development but also to improve teaching and learning in the country.

Table 8. Usage of the internet for learning.

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	14.7	14.7	3.9	16.3	26.4	24.8
Searching relevant sources on the Internet to complete online classes for my degree	1.6	-	3.1	7.0	34.1	54.3
Taking free e-learning courses	2.3	17.1	12.4	16.3	23.3	28.7
Taking paid online courses	6.2	35.7	18.6	14.0	13.2	12.4
Participating in online study groups	7.0	25.6	13.2	24.0	14.0	16.3

Learning environments and educational digital trending solutions require teachers and students to be skilled in handling basic ICT skills. Currently, most of these environments are accessed from mobile devices. Thus, teachers are to be skilled users of mobile devices as well. Among these skills we find, for example, sending/receiving email, sharing multimedia artifacts, using data sharing points, etc. Table 9 presents general capabilities of teachers to use ICTs. Teachers reported using these skills very frequently. Over three quarters of our sample use mobile devices very frequently for tasks such as receiving and sending e-mail (76%), sharing photos (65.1%), connecting to hotspots (41.9%). Similar percentages of teachers reported using cloud services for data synchronization and online translation services.

Table 9. Usage of mobile devices.

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	-	1.6	5.4	17.1	76.0
Sending/receiving photos	0.8	6.2	9.3	18.6	65.1
Using as a hotspot/internet connection sharing	7.8	10.1	10.9	29.5	41.9
Using cloud data synchronization	7.0	7.0	16.3	22.5	47.3
Translation to foreign languages	12.4	13.2	15.5	23.3	35.7

Table 10 presents Teachers' ICT self-efficacy. 41.9% of teachers reported being very skilled handling text processors. 36.4% and 31.8% of them consider themselves medium and highly skilled handling spreadsheets, respectively. 39.5% considered themselves as able to use presentations or slideshows software. The majority of teachers reported their skill level as "medium" for activities such as picture editing and manipulation. Finally, as part of a good use of ICTs and digital platforms, it is important to know about digital threats. Thus, we asked teachers about how aware

they were of the dangers of the digital world, for themselves and for their students. Teachers' knowledge varied from low (22.5%) to high (20.9%). This suggests that more training might be needed in order to prevent dangers such as digital cyberbullying, internet addiction, or sexting.

Table 10. Teachers' self-reported ICT skill level.

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	2.3	4.7	16.3	34.9	41.9
Using the Spreadsheet (e.g. Excel, Calc)	1.6	6.2	36.4	31.8	24.0
Using the presentation program (e.g. Power Point, impress)	0.8	3.1	22.5	39.5	34.1
Using the graphic program (e.g. Picasa, Gimp)	14.0	15.5	31.0	23.3	14.0
Knowledge about the dangers of the digital world	14.7	22.5	26.4	20.9	15.5

IDEAL E-LEARNING PLATFORM

According to the teachers who participated in this study, the ideal platform for online teaching and learning, to support ICT inclusion and access should be:
1) user-friendly and intuitive for students and teachers,
2) easy access from different devices, at any time, and hosted in high availability servers. Additionally, an offline functionality could be useful for students with bad or no internet connection.
3) Fast or to provide high Speed for avoiding loading times.
4) Trustful identification of students, teachers, and institutions providing the courses. This could improve the credibility of materials.
5) Not only interactive and multimedia materials to keep students attention, but also didactic objects with a clear learning objective.
6) An open collaboration space for sharing between students and teachers, an environment able to record preferences and checkpoints or milestones of courses.

CONCLUSION

In line with previous research, the results of our study show that teachers considered very important to include students' unique characteristics when conceptualizing learning. In the same way, teachers considered self-efficacy and professional development opportunities are a key element of effective teaching (Murga et al., 2018). Overall teachers' attitudes towards ICT inclusion and use in teaching and learning are positive, and they find the quality of infrastructure acceptable, nevertheless, not all teachers have access to ICT at their institutions. They perceived themselves as skilled users of ICTs in general (Ramírez et al., 2016), although the use of ICT was

not directly linked to currently trending digital educational solutions, they showed a good predisposition to learn about them and willingness to include them into their teaching (Salinas et al., 2017). Additionally, the results provided by this study offer a better insight on the topics that could be included as parts of the professional development opportunities that teachers are being offered in order to improve and further develop pedagogical practices with digital and innovative approaches, such as Digital Storytelling, flipped classroom, or educational digital games. Further research is needed in order to examine current existing relationships between teachers' ICT usage and other confounding factors.

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ICT AND TEACHERS IN FINLAND: A QUANTITATIVE STUDY

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ABSTRACT

This chapter highlights teachers' use of information and communication technology (ICT) to support the teaching and learning process. Although, the study is relevant in exposing the teacher's opinions about the current state of the application of ICT in education but failed to gather a representative sample of teachers in Finland. Only 88 teachers and pre-service teachers responded to the online questionnaire used for data collection. Simple percentage was used in the analysis of the data. The result indicated that most of the teachers agreed that ICT has been relevant in supporting the teaching and learning process and helps both the teachers and students to achieve an improved performance in daily tasks. The teachers opined that the differences of learners must be recognized and supported, so that each learner can achieve full educational potential. In addition, the teachers remarked that all educators must continually develop creative new ways of working with others and ensuring a conducive learning environment.

Keywords: Information and communication technology, teaching and learning, inclusion, Finland

BACKGROUND

Information and communication technologies (ICT) are pervasive in the Finnish society of today. ICT permeates family life, services, education, work, leisure, and other societal organizations. ICTs and applications experience rapid changes, which creates new opportunities for use of the technologies in the society. This trend of rapid changes of ICTs has impact on how the Finnish teachers, students, and decision makers react to the use of ICTs (Vahtivuori-Hänninen & Kynäslahti 2016). Teaching and learning processes across Finland have benefitted from the use of ICT. For example, networks, computer technology, and other ICTs have been installed in Finnish schools and several in-service teacher-training programs have been organized to improve teachers' level of ICT knowledge (Sipila, 2011). Besides, the current Finnish curricula

mandate that ICT is integrated and taught from basic school to higher education levels (Finnish National Board of Education, 2014). However, there are still many challenges in discovering a robust and meaningful instructional use of technology, (Ilomäki, 2008) and the integration of ICT into different courses and teacher education (Valtonen, et al. 2015). Questions linger about how to effectively integrate and digitalize the learning ecosystem to accommodate the needs of modern teachers and learners. Therefore, the mandate of SELI project, which includes developing new pedagogy and methods, new learning environments, and digital training of educators oblige the conduct of this survey. This study is in line with the effort of the Finnish ministry of education and culture and the Finnish National Board of Education, to support the digitalization of the learning environment and improve the teachers' ICT competencies. This research was focused on teachers and pre-service teachers across educational institutions in Finland. The sampled population is not representative of the entire teacher population of Finland, nevertheless the results provide basis for deeper, more extensive studies that would capture the entire teacher population.

METHODOLOGY

Research data was collected through an electronic questionnaire by using Google forms. The link to the questionnaire was sent to teachers and pre-service teachers in several higher education institutions across Finland in a bid to recruit respondents. The study was carried out between June and September 2019. In total, 88 teachers and pre-service teachers responded to the electronic questionnaire.

RESULTS

This section will present the results of the analysis of the data collected in the study. Based on the working hypothesis prescribed some of the reviewers of the diagnostic tool in the SELI research, the analyzed data indicated that the teachers who responded to the questionnaire agree that education should be inclusive in all ramification. Education must account for each learner and the development of the needed skills. Figure 1, 2, 3 shows the perception of the respondents regarding inclusiveness in learning domain.
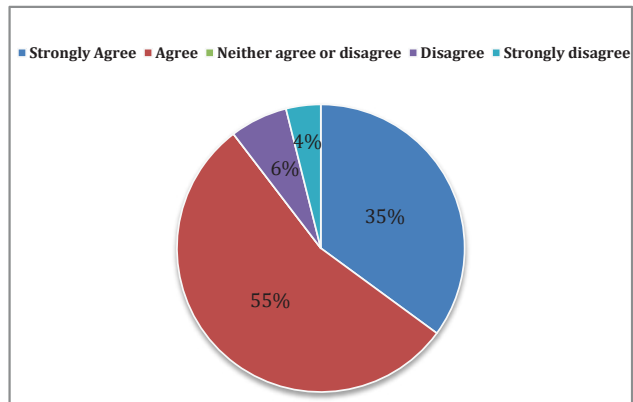
Figure 1. Accounting for the differences of learners

Fig. 1 shows that 90% of respondents agree or strongly agree that differences of students/learners must be accounted for as an essential aspect of human development in any conceptualization of learning. The other 10% respondents opposed or strongly disagree with the assertion.
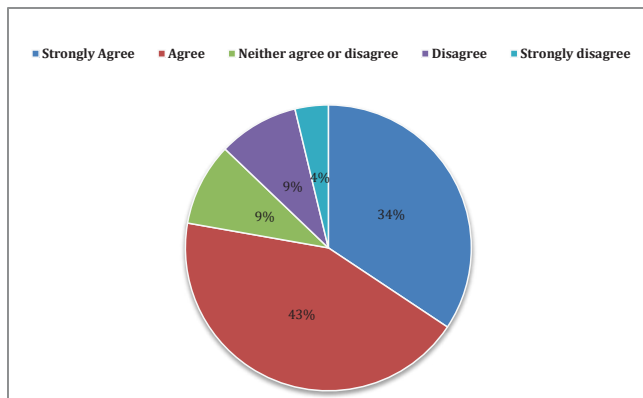
Figure 2. Educators are capable of teaching all learners

Fig. 2. reveals that 77% of the population believes educators must believe in their capability to teach all learners, 11% disagree with the statement while 9% of the respondents neither agree nor disagree with the submission.
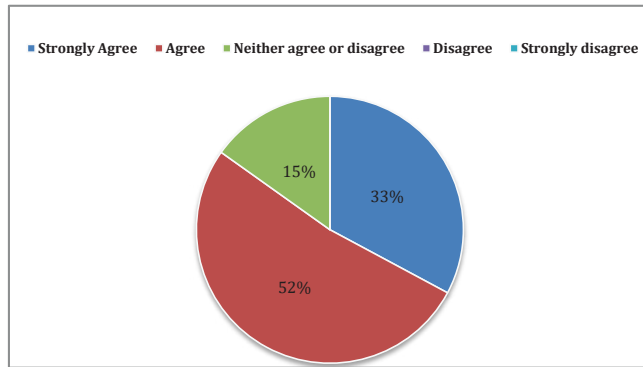
Figure 3. Educators continually develop creative ways of working with others

In Fig. 3. most of the sampled respondents (85%) accepts the fact that all educators must continually develop creative new ways of working with others. None of the teachers oppose the statement while 15% remains neutral.

In summary, Figures 1, 2 and 3, indicated that more than 47% of the respondents agree that the differences of learners must be accounted for as an essential part of human development in the conceptualization of learning. Similarly, 30% of the sampled population strongly agree with this assertion. Only 5% respondents opposed this statement and 3% strongly disagree with the assertion. In addition, 34% of the population believes educators must believe in their capability to teach all learners and 51% of the sampled population accepts the fact that all educators must continually develop creative new ways of working with others.
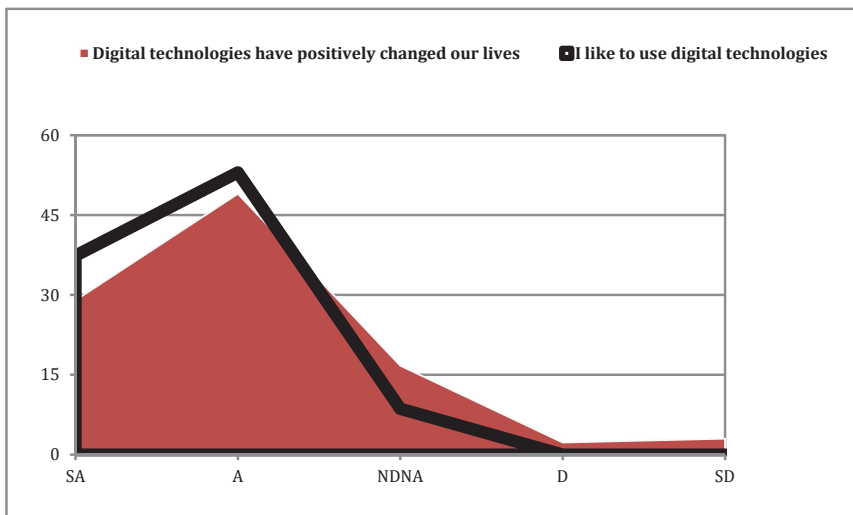
Figure 4. Impact of digital technologies

Fig. 4 shows that that 93.8% of the respondents like to use digital technologies and 82.6% are neutral. Also, 78% believes digital technologies have positively changed their lives while 5.29% do not agree with statement.
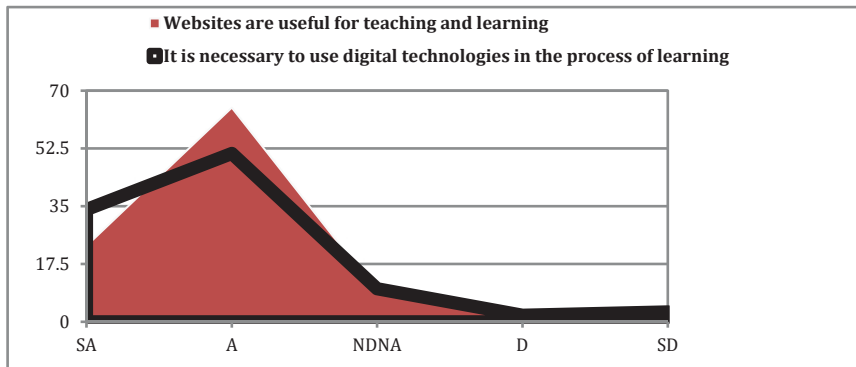
Figure 5. Use of websites and other digital technologies in learning process

Fig. 5 reveals that 87.86% respondents agree or strongly agree that web sites are useful for teaching and learning while 3.04% disagree with the assertion. 85% found it necessary to use digital technologies in the process of learning and teaching while 3% oppose the statement.
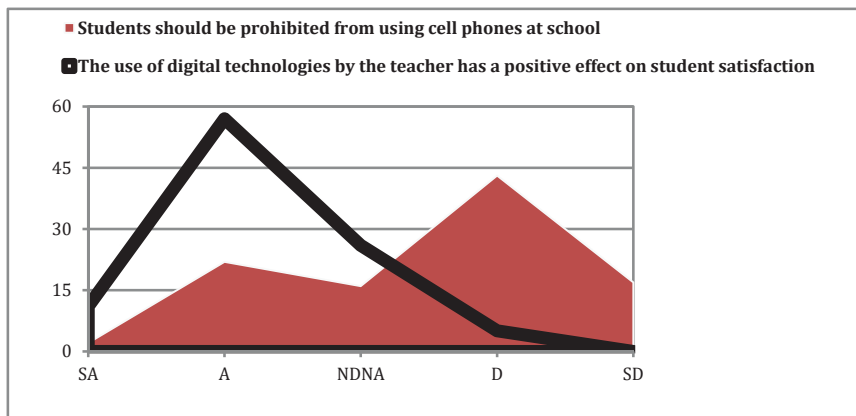
Figure 6. Use of cell phones and other digital technologies in schools

In Fig. 6, only few of the respondents (24%) thinks students should be prohibited from using cell phones at school while 60% agree that cell phones should be allowed at school. 68% of the sampled respondents believes the use of digital technologies by the teacher has a positive effect on student satisfaction while 5% does not agree with the assertion.
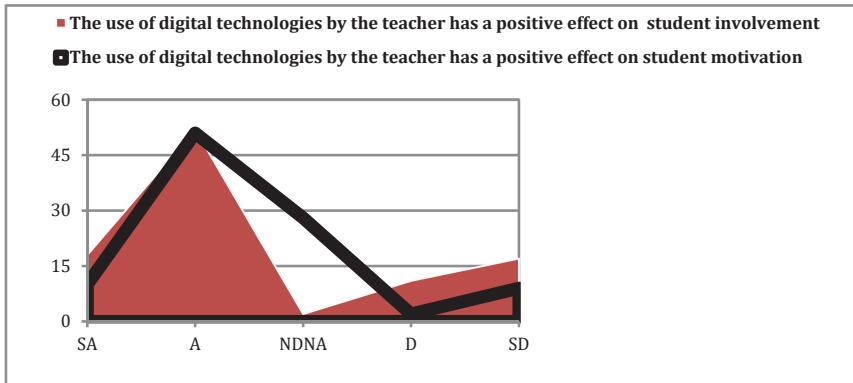
Figure 7. Impact of teacher's use of digital technologies on students

In Fig 7. it is shown that 75% of the respondents agree that the use of digital technologies by the teacher has a positive effect on student involvement and 74% also support that the use of digital technologies by the teacher has a positive effect on student motivation.
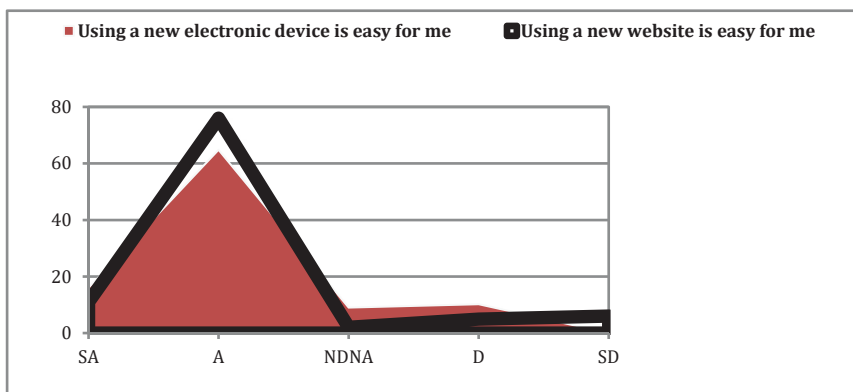
Figure 8. Use of new electronic device and website

Fig. 8 shows that 80% of the respondents agree or strongly agree that using a new electronic device is easy for them while just 10% disagree with the statement. Similarly, 87% found using a new website easy for them and few of the respondents (11%) did not found using a new website easy.
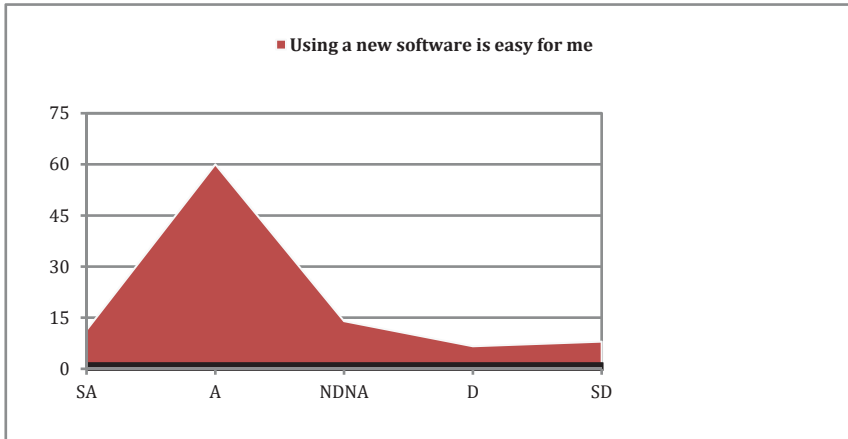
Figure 9. Use of new software

In Fig. 9, almost all the respondents (71%) agree or strongly agree that using a new software is easy for them while about 14% disagree or strongly disagree with the statement.
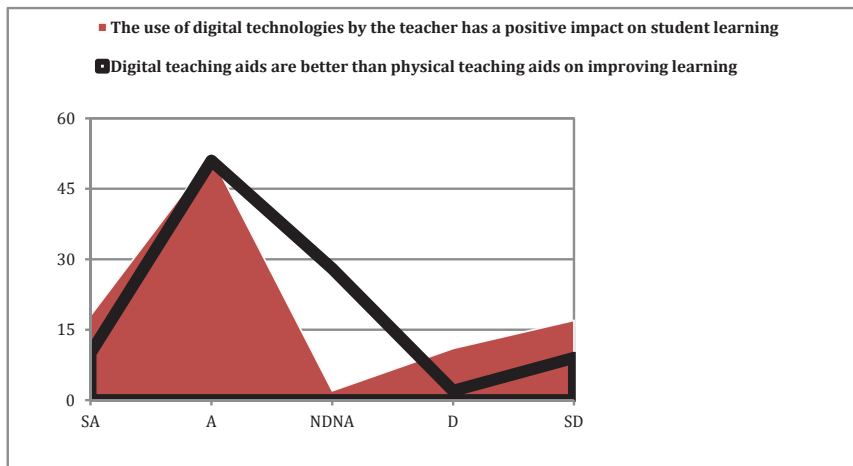
Figure 10. Teacher's use of digital teaching aids

Fig.10 reveals that about 61% of the respondents agree that digital teaching aids are better than physical teaching aids on improving learning while about 28% neither disagree nor agree. Besides, 70% respondents agree the use of digital technologies by the teacher has a positive impact on student learning while 28% disagree or strongly disagree with the assertion.

The positive attitude of teachers towards the acceptance of new media for teaching and learning and their belief in the positive impact technology can make in the classroom cannot be over emphasized. As indicated in Figures 4 - 10, Majority of the respondents are of the view that new media improves learner performance, learner motivation and attitude towards learning. Even though a greater number of the teachers in Finland have difficulty in using new software and accessing information on new websites, a few of them agree to the point that students should be prohibited from using cellphones in schools (2% strongly agree and 21.93% agree).

Multiple studies have shown the negative side of the modern technology use in the schools: evidence have shown that extensive use of mobile devices decrease the concentration ability of the users. That is, the concentration ability of the students. However, while the negative side effects of the modern-day technology have to be taken in the consideration while bringing the technology into schools, the teachers in general are in favor of this.

Table 1. Technical Infrastructure

	Not applicable (%)	Very poor (%)	Poor (%)	Acceptable (%)	Good (%)	Very good (%)
Quality of Wi-Fi internet connection	3.25	0.00	2.00	17.75	43.00	34.00
Quality of cable internet connection	2.00	0.00	3.00	13.33	48.00	33.67
Quality of computers in common areas	2.04	0.00	2.00	22.96	42.00	30.00
Quality of e-learning platform	1.92	0.00	5.08	29.83	32.00	31.17
Quality of equipment and projectors	7.00	0.00	5.05	26.95	36.00	28.00
Quality of smartboard	7.00	0.00	5.00	30.44	27.56	31.00
Quality of E-books / E-textbooks	7.06	0.00	4.94	20.00	33.00	35.00

The quality of technical infrastructure is brought to the fore as portrayed in the table 1. Overwhelming majority attest to the availability of quality infrastructure such as Wi-Fi connection, cable internet connection, quality computers in common areas, quality e-learning platforms, projectors, smartboards and e-textbooks. This could be attributed to the technological advancement of Finland as a nation.

Table 2. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution e.g. MOOCs, OER	10.69	10.00	25.31	47.00	7.00
flipped learning	16.00	22.33	34.67	21.95	5.05
digital storytelling	20.32	35.00	26.00	18.58	0.00
blockchain technology	74.22	10.0	3.00	11.88	1.00
educational digital games	14.00	33.23	24.77	23.00	5.00
ICT tool for teaching and learning foreign languages	9.00	20.66	38.00	30.34	2.00
special ICT tools to support teaching and learning for the deaf or blind or physically decapacitated people	52.08	5.92	28.00	11.00	3.00
method to support the digitally excluded (e.g. elderly, migrant)	42.00	24.00	15.94	18.06	0.00

The response for the various ICT tools for learning is very interesting, as a greater number of teachers (47%) make use of open learning solutions, the majority of teachers rarely use flipped learning (35%). Blockchain technology receives minimal attention as only 12% of respondents frequently use the technology, an overwhelming 74% of the respondents never use the blockchain technology. ICT as a support tool for teaching and learning also receives an average attention as 30% of the teachers frequently use it but a few of these respondents use ICT to support physically depreciated people. Only 11% frequently use ICT to support teaching and learning of such people as against 52% of respondents who never use it. Only 18% of the teachers use ICT to support the digitally excluded people as against 42% who never use it.

Table 3. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution e.g. MOOCs, OER repositories	7.00	6.00	5.00	40.00	34.82	7.18
flipped learning	17.00	2.86	6.04	35.18	33.82	5.00
digital storytelling	18.33	3.67	10	45.00	24.00	0.00
blockchain technology	54.91	7.00	1.00	15.09	17.00	5.00
educational digital games	8.00	3.35	4.65	33.00	40.00	1.00
ICT tool for teaching and learning foreign languages	8.59	1.00	2.41	41.00	35.92	12.08
special ICT tools to support teaching and learning for the deaf	24.00	3.00	8.00	16.89	40.11	8.00
method to support the digitally excluded (e.g. elderly, migrant)	24.00	2.07	2.00	34.93	26.00	11.00

As reflected in table 3, the perception of teachers about the effectiveness of ICT solutions in education is very encouraging, with the exception of blockchain technology receiving 55% of I do not know it, and the rest have a greater number of responses as either good or acceptable.

Table 4. Preferred pedagogical strategies offered in SELI

	I do not know it	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution e.g. MOOCs, OER Repositories	5.45	1.00	2.00	25.00	50.55	16.00
flipped learning	5.22	2.00	2.00	14.00	53.78	23.00
digital storytelling	2.00	2.48	9.00	20.00	43.52	23.00
identifying and preventing cyberbullying	0.00	3.00	7.00	25.33	24.00	40.67
blockchain technology	55.00	7.31	1.00	14.69	17.00	5.00
educational digital games	1.00	2.00	1.57	22.00	44.43	28.00
ICT tool for teaching and learning foreign languages	1.00	9.32	16.00	11.68	52.00	10.00
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	2.00	15.97	10.00	13.00	50.03	8.00
Method to support the digitally excluded (e.g. elderly, migrant)	2.09	17.00	10,00	15.91	50.00	5.00

Though, respondent had very poor knowledge about SELI project solutions, the respondents show interest in potential courses, which will be published on the platform. Teachers had no interest in the methodology of digital inclusion as they think it belongs to different crop of educators (adult educators, trainers). Teachers in Finland have particular interest in educational games, cyberbullying prevention, digital storytelling and learning foreign languages. In most cases, the solutions presented within SELI are consistent with the needs and self-development focus of the teachers. This is depicted by table 4 above.

Table 5. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	2.00	12.56	41.00	32.44	12.00
Consuming Internet streaming (e.g. VOD)	1.00	14.00	44.00	31.77	9.23
Creating video	5.00	40.00	32.82	20.18	2.00
Using a file sharing service	2.00	2.00	42.00	33.00	21.00
Participating as member of a group	4.69	14.00	42.31	35.00	4.00
Accessing online services	0.00	9.88	39.00	41.00	10.12
Accessing e-government	0.00	10.59	23.41	49.00	17.00
Buying/Selling goods	0.00	11.00	23.00	49.20	16.80
Leisure	0.00	9.05	27.00	47.95	16.00

other activities

The frequency of internet access and usage by teachers is mostly centered on publishing messages, sharing files, participating in online group discussions, accessing online services, e-government services, buying and selling online or enjoying leisure time. Very few of the respondents use the internet to videos as depicted in table 5.

Table 6. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	0.00	2.12	15.88	35.00	33.00	14.00
Searching relevant sources on the Internet to complete online classes for my degree	0.00	5.00	10.00	35.77	33.00	17.23
Taking free e-learning courses (online courses - e.g. language, ICT)	0.00	2..00	9.33	62.67	22.00	4.00
Taking paid online courses	0.00	30.23	23.77	25.00	14.00	7.00
Participating in online study groups	0.00	5.00	13.66	42.00	34.34	4.00

Teachers' use of the internet for learning seems not to be fascinating. Majority of teachers sometimes use the internet for learning. With a majority of teachers (30%) who had never taken paid online courses, only 22% of teachers take free online courses to upgrade their knowledge and pedagogical skills but for participating in online group discussions, the trend is a little bit different as 35% of the respondents frequently use the internet to participate in group discussions as shown in table 6.
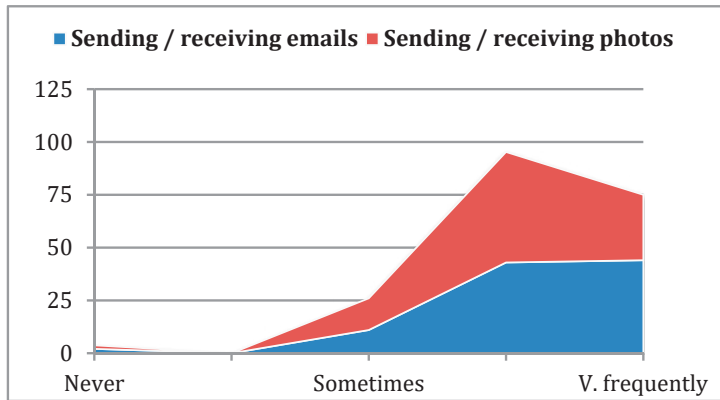
Figure 11. Frequency of sending/receiving emails and photos

Fig.11 shows that about 87% very frequently send or receive emails among the respondents while 3% never send or receive emails. About 83% also frequently send or receive photos and 2% never send or receive photos.
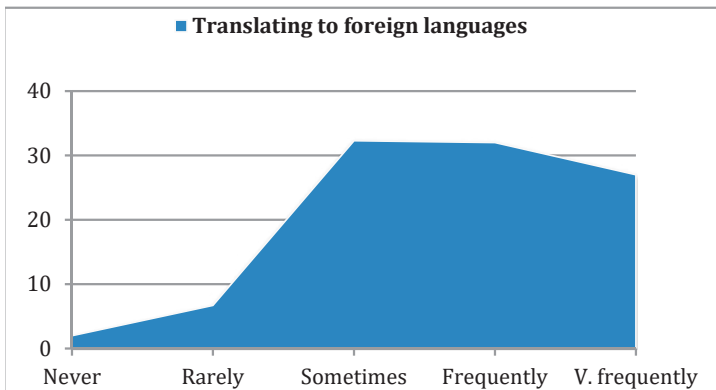
Figure 12. Use of mobile phones for translation to foreign languages

Fig. 12 reveals that 59% of the respondents frequently or very frequently use their mobile phones to translate to foreign languages, followed by 32% who does it sometimes. Around 7% rarely use it for translation while only 2% never used it for that purpose.
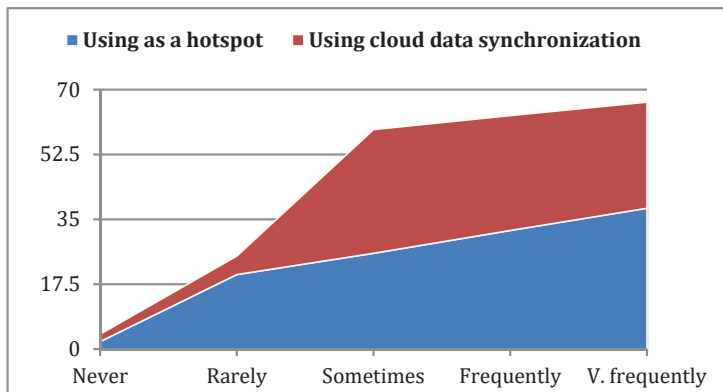
Figure 13. Use of mobile phone for hotspot and data synchronization

Fig. 13 shows that 70% of the respondents use hotspot frequently and about 26% use it sometimes. Similarly, 60% use cloud data synchronization frequently and very frequently and sometime used accounts for 33% while only 2% never used it.

Most teachers use mobile devices such as smartphones and tablets to purposely send and receive emails. Based on the table above, only 2% of teachers never used their mobile device to send or receive emails. It is motivating to realize that the majority of teachers use their mobile phones to perform activities such as sharing Internet access through a hotspot, very frequently or frequently, data synchronization in the cloud and translation to foreign languages. This brings to bear the high level of knowledge and skills that most Finland teachers have in the application of mobile devices in their daily lives as portrayed.

PERCEPTION ABOUT THE LEVEL OF ICT SKILLS
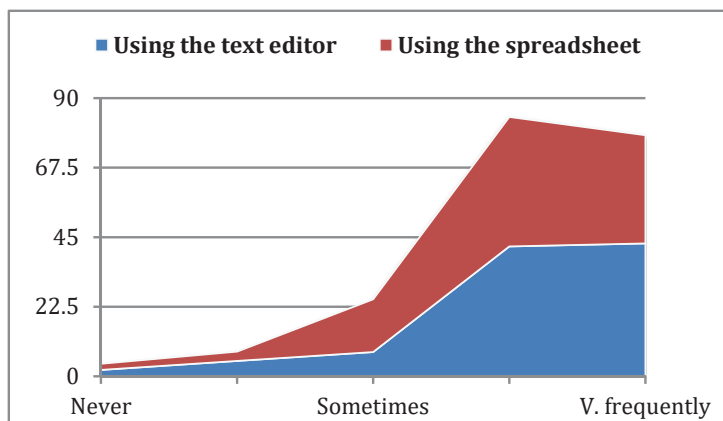
Figure 14. Use of text editor and spreadsheet

Fig. 14 shows that 85% of the respondents submit that they have high or very high knowledge in the use text editor while about 2% have a very low knowledge about it. Similarly, 77% also have high level of skills in the use of spreadsheet.
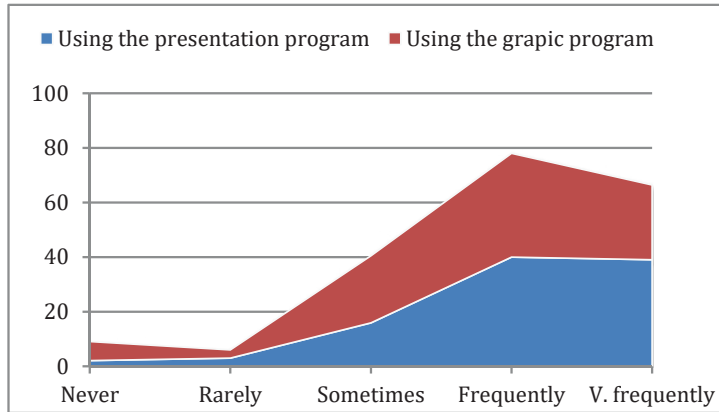
Figure 15. Use of presentation and graphic programs

In Fig. 15, it is shown that 79% of the respondents have high level of skills in using the presentation program and about 67% also assert that their skills in the use of graphic program is at high level.
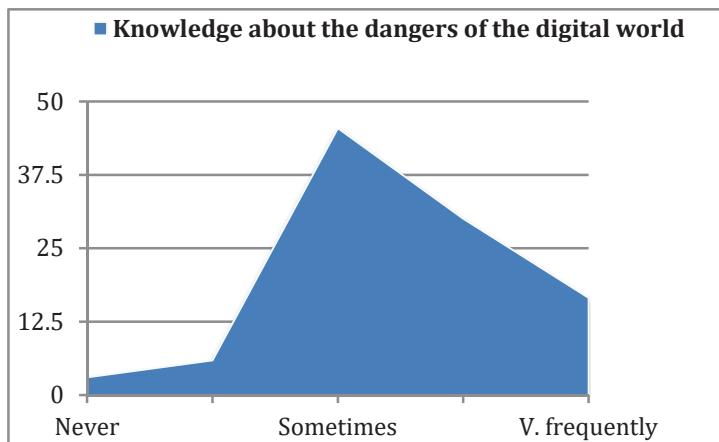
Figure 16. Knowledge about the dangers of the digital world

Fig. 16 shows that about 47% of the respondents have high or very high Knowledge about the dangers of the digital world such cyberbullying, Internet addiction and sexting. This is followed closely by respondents (45%) that have fair or medium knowledge about it. Only about 8% does have low or very low knowledge about the digital world danger among the respondents.

Knowledge about the application of text editors, graphic programs, presentation software and *spreadsheet* amongst the respondents is very encouraging. As illustrated in the figures, the vast majority of teachers have either high or very high knowledge in the above applications. With 45% of the respondent having a fair/medium knowledge about the dangers of the digital world.

Table 7. Features of the ideal e-learning platform

Category	Exemplary answers
User-friendliness	Interactive and informative
Content	Supports all kinds of material, exercises and quizzes. Offers automatic grading, self-evaluation and peer review. Easy to use with all devices.
Visual	Neat and easy to use user-interface
Non-standard	Simplicity and Clarity
Availability	Easy to access, simple instructions, and ability to go forward and backward
Needs	learning analytics, group feature, student/teacher side, communication, eBook, instant notification
Reliability, relevance	communication, engagement, security, privacy

DISCUSSION AND CONCLUSION

Generally, teachers in Finland rely on, use and enhance their teaching through ICT based solutions. Whether the solution is mobile device, laptop computer, software or cloud-based solution, the teachers find the artefacts of digital age useful and encourage the students to use and harvest the power of such solutions. Of course, in Finland, Internet connectivity, availability of ICT solutions such as tablet computers in schools and spread of educational software is quite well adopted into the everyday teaching activities. The raise of innovative solutions for education such as VR, AR and AI is yet to be seen but we argue that very few teachers actually oppose the use of innovative technologies.

The teachers in Finland in general do not educate themselves through paid or free online courses but according to the answers of the teachers, the know-to-how level is high even without the additional self-education. The teachers find technology as a tool to support the learning and teaching and not as absolute value.

The use of mobile devices is well spread among the teachers. Very few teachers actually never use mobile devices to send or receive emails, share Internet connection when no Wi-Fi or cable connection is not available and so further. The teachers use their mobile devices whether they are owned by the teachers or provided by the schools to search for information online or for instant messaging.

Of course, one should be aware that as an industrial country, availability of high-speed mobile Internet connection is widely spread and usually operates well even in the rural areas of the country.

We conclude that in general, the teachers in Finland use hardware and software very often to support the teaching and even encourage the students to use software and hardware when it actually supports the learning of the students.

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ICT AND TEACHERS IN POLAND – PILOT STUDY

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ABSTRACT

The article outlines the ways of using ICT by teachers. The research was conducted on an unrepresentative sample of 106 teachers in Poland. These are pilot studies on the ways of using ICT in education, teachers' needs, school equipment, styles of using new media by the teaching staff. The article also shows the needs of teachers in the context of e-learning and blended learning.

Keywords: media education, digital literacy, inclusion, learning, Poland, teachers, e-learning

INTRODUCTION

In Poland, more and more often analyses are undertaken of the use of ICT in learning and teaching. The issue of digital inclusion is also present in the subject matter literature, mainly in the area of adult education (andragogy), social gerontology and media pedagogy. Both issues are often associated with wider contexts of the level of digital literacy among teachers and technical equipment (saturation with IT devices). The ongoing debate on the modernisation of the education system is impossible without both of these key resources: people and equipment. The analyses performed within the SELI project are not only consistent with the state policy (implemented by the Ministry of National Education and the Ministry of Science and Higher Education) but also fit the wider framework of strategic transformations implemented by the European Union Given the character of the project, it is worth to point out that despite the huge distance between the countries involved in the SELI activities, the analysis of digital literacy and co-existing conditions serves on primary goal: increase of the quality of formal, informal and non-formal educational activities. The research results presented below refer to the group of teachers, supporting staff and managers of educational units. The sample is not representative, however the results provide grounds for further, more advanced analyses (like development of studies into representative samples) and implementation activities within SELI.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research in Poland was conducted by a team of three media pedagogy experts who have a degree in pedagogy and adequate methodological experience (all the team members have PhD in educational sciences). The study was carried out in the first half of June 2019 in Poland, using different methods of data collection: on printed

and electronic forms (dedicated to teachers) and electronic (Google questionnaires) addressed to the students of pedagogical degrees. The teachers who participated in the survey had been recruited on the territory of Poland in a non-random manner by dr Anna Mróz from the Pedagogical University of Cracow.

There were 106 teachers-respondents. The average age of the respondents was 37.84, median=37 with std. Dev= 10.07, min=21 max=69. There were 84% of women and 16% of men. All the respondents hold Polish citizenship. 61.3% declared to be married, 23.6% were singles, 5.7% divorced and 9.4% lived in a free relationship. Of the respondents, 90.6% are active teachers, 4.7% are school directors and 4.7% are the representatives of other, related professions (like school counsellor or assistant teacher). The average professional experience in the group was 12.05 with std. Dev=8.84, median=10, min=0.3, max=40. Half of the respondents worked in primary schools (50%) whereas 17.9% in high schools, 14.2% in kindergartens and 14.2% in technical or vocational schools. The remaining 11.6% represented other types of educational units like: social welfare centres (trainers), universities or post-secondary schools. The locations of the represented schools were as follows: 59.4% cities, 27,4% villages, 13,2% sub-urban regions. The vast majority of the teachers worked in state-owned schools 85.5%, only 14.2% in the private sector. The vast majority of the teachers – 94.3% held master's degree, 4.7% have completed the first cycle education – licencjat, whereas 0.9% have doctor's degree. Their financial situation is diverse: 45.3% evaluate it as acceptable, 32.1% as good, 17.0% as bad, 3.8% as very good and 1.9% as very bad.

RESULTS

According to the working hypothesis posed by one of the reviewers of the SELI diagnostic tool, the data collected enable the conclusion that teachers in the sample agree that education should be inclusive in the first place. Educational activities of trainers and teachers should first of all focus on personal development and searching for new, alternative forms and methods of teaching and organisation of work. However, the respondents point out that they are not omnipotent, therefore not all teachers can teach all the groups (more than 1/3 declared that explicitly). The distribution of answers regarding inclusiveness is presented in Table 1.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualisation of learning	7.55	1.89	2.83	45.28	42.45
I think all educators must believe they are qualified/capable of teaching all learners	3.77	30.19	12.26	33.96	19.81
I think all educators must continually develop creative new ways of working with others	7.55	1.89	5.66	34.91	50.00

The vast majority of the teachers show positive attitude towards new media. More than 2/3 are satisfied using digital technologies. Over half of them agree that ICT change life in a positive way. Almost 80% declared that using digital technologies is necessary for teaching and learning. Only several percent definitely disagree with the statement that digital technologies decrease motivation and involvement, or disturb learning process. At the same time, the respondents are aware that digital didactic means are not explicitly better that their analogue counterparts. Most teachers say that applying new solutions such as: hardware, software and websites is easy or very easy for them. Despite not being collected in a representative sample, these results reflect diverse attitudes towards the ban on using mobile phones in schools. Paradoxically, the distribution of the results in normal and there are two groups: extremely accepting and not accepting, and the most numerous group without opinion in this regard. The detailed distribution of answers is presented in Table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	3.77	3.77	14.15	63.21	15.09
Digital technologies have positively changed our lives	0.94	12.26	27.36	46.23	13.21
It is necessary to use digital technologies in the process of learning and teaching	0.94	9.43	11.32	57.55	20.75
Web sites are useful for teaching and learning	3.77	5.66	14.15	61.32	15.09
Digital teaching aids are better than physical teaching aids on improving learning	4.72	16.04	53.77	21.70	3.77
The use of digital technologies by the teacher has a positive impact on student learning	0.00	7.55	37.74	48.11	6.60
The use of digital technologies by the teacher has a positive effect on student motivation	0.94	7.55	33.02	50.94	7.55
The use of digital technologies by the teacher has a positive effect on student involvement	0.94	4.72	27.36	58.49	8.49
The use of digital technologies by the teacher has a positive effect on student satisfaction	1.89	4.72	30.19	53.77	9.43
Students should be prohibited from using cell phones at school	11.32	25.47	26.42	25.47	11.32
Using a new software is easy for me	3.77	13.21	28.30	44.34	10.38
Using a new website is easy for me	4.72	2.83	23.58	59.43	9.43
Using a new electronic device is easy for me	4.72	7.55	31.13	48.11	8.49

Attitude towards the new technologies to support learning and teaching is much more positive than the quality of school equipment and the availability of the modern technological solutions. Despite the relatively positive opinion about the Internet connections, access to projectors and interactive boards, evaluation regarding e-learning platforms and e-books are still unsatisfactory. Education supported by both solutions seems to be necessary to improve Polish education system. However, it is interesting that almost one third of the teachers declare they do not use e-books if they have access to free materials prepared within the Ministry project epodreczniki. pl. Depending on the analysed elements of IT infrastructure, more than 1/3 of the respondents evaluate the selected elements as very poor or poor. More information is available in Table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Acceptable	Good	Very good
Quality of WiFi internet connection	6.60	11.32	20.75	33.02	17.92	10.38
Quality of cable internet connection	20.75	8.49	12.26	24.53	20.75	13.21
Quality of computers in common areas	10.38	18.87	20.75	28.30	11.32	10.38
Quality of e-learning platform	23.58	11.32	25.47	16.98	17.92	4.72
Quality of equipment and projectors	3.77	11.32	17.92	22.64	28.30	16.04
Quality of smartboard	10.38	9.43	14.15	24.53	28.30	13.21
Quality of E-books / E-textbooks	31.13	18.87	20.75	13.21	9.43	6.60

The frequency of using the ICTs in the areas proposed in the survey is interesting as teachers very occasionally use almost all of the innovative solutions. Only several dozen percent of the teachers use ICT to learn and teach foreign languages, and they often use online games (including gamification). Definitely less teachers use solutions which promote digital inclusion. This is somehow reasonable as they work with the group called digital natives in the formal education system. Based on the data collected, we can formulate a working hypothesis that SELI project addressed the "white spaces in education", that is, the areas which can be improved in terms of methodology and software. The detailed information about the frequency of using certain applications is presented in Table 4.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequent-ly	Very Frequent-ly
open learning solution eg. MOOCs, OER	64.15	20.75	13.21	0.94	0.94
flipped learning	74.53	16.98	5.66	1.89	0.94
digital storytelling	74.53	14.15	8.49	0.94	1.89
blockchain technology	84.91	14.15	0.94	0.00	0.00
educational digital games	30.19	17.92	30.19	14.15	7.55
ICT tool for teaching and learning foreign languages	37.74	22.64	17.92	15.09	6.60
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	75.47	9.43	7.55	6.60	0.94
method to support the digitally excluded (eg. elderly, migrant)	85.85	7.07	0	7.07	0

The respondents admit that in most cases, they cannot evaluate effectiveness of the proposed ICT-based innovative solutions. According to them, the most effective were educational games and ICT tools which facilitate learning the foreign languages. Both areas are at the same time the most recognized by the respondents. The vast majority of the digital solutions listed in Table 5 are not known to the teachers, therefore, it is difficult to evaluate their effectiveness in the context of learning and teaching.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	75.47	2.83	5.66	5.66	8.49	1.89
flipped learning	72.64	5.66	5.66	6.60	7.55	1.89
digital storytelling	77.36	4.72	4.72	4.72	4.72	3.77
blockchain technology	75.47	4.72	6.60	7.55	3.77	1.89
educational digital games	28.30	9.43	12.26	13.21	24.53	12.26
ICT tool for teaching and learning foreign languages	35.85	4.72	11.32	15.09	23.58	9.43
special ICT tools to support teaching and learning for the deaf	71.70	8.49	4.72	4.72	8.49	1.89
method to support the digitally excluded (eg. elderly, migrant)	79.25	6.60	2.83	1.89	7.55	1.89

Despite, in most cases, very poor knowledge about the solutions developed within the SELI project, the respondents show interest in potential courses which will be published in the platform. Teachers are the least interested in methodology of digital inclusion because these issues are addressed to other group of educators (adult educators, trainers) rather than teachers who represent the formal education sector. It is worth to point out that the teachers were particularly interested in educational games, cyberbullying prevention, digital storytelling and learning foreign languages. In most cases, the solutions presented within SELI are consistent with the needs and self-development focus of the teachers. The detailed data on the teachers' answers regarding their interest in potential courses is presented in Table 6.

Table 6. Preferred pedagogical strategies offered in SELI

	Unknow	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	17.92	1.89	8.49	24.53	44.34	2.83
flipped learning	18.87	3.77	7.55	23.58	43.40	2.83
digital storytelling	16.04	2.83	5.66	19.81	52.83	2.83
identifying and preventing cyberbullying	5.66	2.83	7.55	17.92	59.43	6.60
blockchain technology	16.98	3.77	8.49	25.47	40.57	4.72
educational digital games	1.89	2.83	8.49	21.70	59.43	5.66
ICT tool for teaching and learning foreign languages	6.60	7.55	10.38	20.75	46.23	8.49
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	14.15	7.55	16.04	18.87	37.74	5.66
Method to support the digitally excluded (eg. elderly, migrant)	17.92	10.38	13.21	21.70	33.02	3.77

Teachers use the Internet most often to: spent their free time, shop, gain access to e-services, communicate, post messages online and share files. ICTs are used the least to create video files using the Internet or to gain access to e-government. The frequency of using the online potential is diverse within the sample. It seems that teachers use the Internet similar to an average member of the information society. However, we must emphasise that e-government solutions have not been sufficiently known and used, even though services of this type are developed by the Ministry of Administration and Digitisation. The detailed distribution of answers is presented in Table 7.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	8.49	22.64	22.64	24.53	21.70
Consuming Internet streaming (eg. VOD)	19.81	20.75	25.47	15.09	18.87
Creating video	41.51	23.58	20.75	7.55	6.60
Using a file sharing service	8.49	21.70	22.64	30.19	16.98
Participating as member of a group	18.87	16.04	29.25	17.92	17.92
Accessing online services	16.98	16.98	20.75	23.58	21.70
Accessing e-government	19.81	39.62	19.81	14.15	6.60
Buying/Selling goods	0.94	11.32	24.53	37.74	25.47
Leisure	0.00	4.72	23.58	40.57	31.13
others activities	3.77	8.49	33.96	31.13	22.64

The respondents have occasional experiences with online courses. Only one in five teachers had taken online courses during their post-graduate studies very often or often. The mot often, the respondents used online courses to prepare for their classes (more than 40% have indicated they were doing it often or very often). Very seldom had the teachers taken part in free trainings to improve their key competencies, for example foreign languages or ICT (more than 67% have no such experiences or declared this does not apply to them). The respondents also rarely take part in paid online trainings or discussion groups oriented on joint learning. The ideas of e-learning and blended learning have been still insufficiently developed in terms of practical implementation of distant learning in the reality of Polish schools. Of course, as the data in Table 8 are not representative, this analysis need to be further carried out in the representative samples.

Table 8. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	22.64	21.70	12.26	16.98	16.98	9.43
Searching relevant sources on the Internet to complete online classes for my degree	16.04	13.21	9.43	16.98	25.47	18.87
Taking free e-learning courses (online courses - e.g. language, ICT)	16.04	31.13	13.21	19.81	11.32	8.49
Taking paid online courses	26.42	40.57	11.32	9.43	6.60	5.66
Participating in online study groups	26.42	28.30	23.58	10.38	4.72	6.60

The teachers use mobile devices, like smartphones or tablets, mainly to send and receive online messages (there was not a person in the sample, who had never done this in their life). It is interesting that only half of the respondents perform the most technically advanced activities, like sharing Internet access through a hotspot, very often or often. One in every five respondents does not need to do it or does not know how to do it. As for synchronising personal data stored on their mobile devices with external data clouds, the respondents use this option also infrequently. Mobile devices are used as translators slightly more often. The detailed distribution of answers is presented in Table 9.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	0.00	2.83	5.66	26.42	65.09
Sending/receiving photos	0.00	3.77	12.26	29.25	54.72
Using as a hotspot/internet connection sharing	20.75	6.60	20.75	24.53	27.36
Using cloud data synchronization (eg. dropBox Google Drive)	25.47	13.21	24.53	16.04	20.75
Translation to foreign languages	8.49	18.87	24.53	25.47	22.64

Self-evaluation is one of the forms to measure digital literacy. Even though this research technique is not precise, it enables quick and indicative diagnosis of the level of skills and knowledge. The respondents evaluate themselves as the most literate in the area of text editors and multimedia presentations. This results most likely from the fact that they use these applications often. The teachers declare their skills and knowledge regarding graphic software are the lowest. Awareness of the e-threats was evaluated as average. The detailed evaluation of the respondents'' digital literacy is presented in Table 10.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	1.89	1.89	10.38	49.06	36.79
Using the Spreadsheet (e.g. Excel, Calc)	2.83	11.32	43.40	32.08	10.38
Using the presentation program (e.g. Power Point, impress)	2.83	5.66	30.19	37.74	23.58
Using the graphic program (e.g. Picasa, Gimp)	21.70	27.36	27.36	14.15	9.43
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	0.94	7.55	31.13	43.40	16.98

When answering the question: What should the ideal online learning and teaching platform look like?, the teachers listed many elements which may be useful not only within the SELI project. Based on the answers given by the respondents, we can notice, they focus on several main categories: user-friendliness (intuitive, logic content, ease of use, simple language), content (up-to-date, relevant, referring to present challenges, diverse in terms of methods and forms, interactive, logically connected resources), visual (attractive graphics, multimedia, diverse), non-standard (interactive, visible in search engines, creating groups of different users), availability (free of charge, technically stable, available on different devices), needs (adopted specifically to the challenges of the education system). The last category may result from some previous negative experiences, but it is worth to point out that teachers will gladly use platforms which provide reliable, proven content and where the authors provide reliable references. The categories and examples of respondents' quotes are presented in Table 11.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
User-friendliness	"intuitive, easy to use", "easy to use, readable", "logically ordered resources", "grouped resources, simple language", "simple and clear user's instructions"
Content	"it should have interesting materials", "diverse", "resources should be divided according to logically identified content", relevant topics, e.g. psychological help, counselling, changes in the education system, practical courses which can be used working with children", "covering latest issues – up-to-date", "providing specific methodological solutions", "it should contain videos, tests, exercises", "with educational games, support groups for teachers, legal advice, online training database", "with good practices, forum to exchange experiences for teachers of different subjects", "updated", "it should have much information useful for teachers. Grouped into sections", "With clear instructions for teachers and students, and many exercises at different difficulty level"
Visual	"Visually friendly", "with interesting instructional videos", "diverse – no monotony"
Non-standard	"modern", "indexed in Google", "providing the opportunity to exchange experiences", "enabling collaboration between teacher's and students' mobile devices", "best offering different levels of difficulty and adopted to different age and social groups", "where you can ask any question of needed, and find the answer"
Availability	"completely free for the teachers", "generally available", "available on different devices", "working without interruptions, smoothly"
Needs	"adapted to the need of its users", "specific examples teachers could use", "It should offer software to help with work with children with special educational needs", "It should offer free software to facilitate teachers' work"
Reliability, relevance	"names of authors, references, reliability"

DISCUSSION AND RESUME

The research presented herein do not allow to generalise based on the data collected, however, they provide initial results which will help to outline the context for the SELI platform. Several facts are important. First, the aspect of inclusion is important for the respondents but they are aware it is impossible to "be inclusive" universally. Their answers fit the Polish principles of special pedagogy where the inclusive model has been widely discussed and promoted both in universities and schools (Plichta, 2017; Gajdzica, 2011; Gajdzica, 2013).

In general, the respondents show positive attitude towards the new technologies and the opportunities they provide, as well as the features of the new media which can be used to motivate students, increase their engagement and make classes more attractive (Stošić, & Stošić, 2015). However, this optimistic vision contradicts the rules regarding the use of smartphones in schools. Another dissonance is observable when it comes to the evaluation of school infrastructure. Despite many recent investments, the teachers (approx. 1/3 of the respondents) are still not satisfied with the quality of hardware and Internet access. Perhaps the situation will improve due to the present

government programmes like Active Whiteboard (Aktywna Tablica) or the National Education Network (Ogólnopolska Sieć Edukacyjna, OSE).

The solutions proposed within SELI are not well known among the teachers who thus are not able to evaluate their effectiveness. However, we should add that the majority of the respondents is interested in participating in trainings offered within the SELI project. As for the last, open-ended question (Tab. 11), we have noticed that teachers have many specific expectations regarding the structure of online courses, their quality and implementation (including technical solutions offered by e-platforms). These suggestions are one of the many indications of the technological maturity of the teachers in the area of self-learning.

The research provide an up-to-date view on digital literacy among the teachers and the grounds for designing effective solutions which would consider the needs of educators and the challenges of the Polish digital school in the age of ongoing transformations (Potyrała, 2017; Pyżalski, 2019).

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ICT AND PRE-SERVICE TEACHERS
IN POLAND – PILOT STUDY

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ABSTRACT

The article outlines the ways of using ICT by teachers. The research was conducted on an unrepresentative sample of 150 pre-service teachers in Poland. The research was carried out on students of pedagogical faculties in the largest Polish university of pedagogy. These are pilot studies on the ways of using ICT in education, students needs, university equipment, styles of using new media by the the young generation of future teachers.

Keywords: *media education, digital literacy, inclusion, learning, Poland, pre-service teachers, e-learning*

INTRODUCTION

Education of students in teaching faculties has become one of the priorities in Polish academic education system. This is demonstrated by the re-orientation of the curricula addressed to pre-service teachers or re-organisation of the curricula for pre-service teachers specialising in early and preschool education (§ 8 par. 1 point 9 and § 48 of the Regulation of the Minister of Science and Higher Education of 27 September 2018 on studies – Journal of Laws, item 1861, as amended). According to the representatives of two Ministries, namely, the Ministry of Science and Higher Education and the Ministry of National Education, the issue of quality of vocational training for future teachers is one of the key determinants of the functioning of Polish schools. And this postulate has been put forward for years (Śliwerski, 2009). Every official teacher education curricula includes courses preparing to use ICT (usually media in education and information technology). Of course, academic courses are constantly updated to address changes in technology and suggest new opportunities to use digital media to support learning and teaching (Wnęk-Gozdek, 2015; Morbitzer, 2019). Modern school needs modern ICT-based solutions (Stošić, 2015; Smyrnova-Trybulska et al., 2016; Kędzierska, Potyrała, 2015). This chapter focuses on presenting the level of digital literacy among Polish pre-service teachers and the conditions behind a constructive use of ICT for learning and teaching.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research was conducted among students of pedagogical studies, who have been preparing to become teachers, studying in the biggest state Pedagogical University in Poland. A diagnostic survey was conducted in the first half of June 2019 by qualified persons who have wide experience in quantitative studies (Anna Mróz, PhD. and Joanna Wnęk-Gozdek, PhD.). The survey was performed using Google Forms. The sample was 150 respondents, 90% of which were women (N=135) and 10% men (N=15). The average age of the respondents was 24.44 years, with Std. Dev=5.67 and median=23, minimum value=18 and maximum value=48. As for origin, 96% declared to be Polish whereas 4% said they were immigrants (mainly from Ukraine). The marital status of the respondents was as follows: 54.67% – single, 22.00% – in relationship, 23.33% – married. The students evaluated their financial status as: very bad – 2.00%, bad – 10.00%, acceptable – 54.67%, good – 28.00%, very good – 5.33%. Due to the non-ransom sampling, the research do not enable generalisation of the results to the whole population of the Pedagogical University of Cracow or students in all Polish universities which offer programmes for teachers.

RESULTS

The students strongly agree that education should be inclusive. At the same time, they are sceptical towards the lifelong learning process in the context of seeking new, creative solutions. The vast majority also thinks that education should focus on personal development. Despite rather limited professional experience in different formal and informal education institutions, the students are divided in their opinions about the ability to be a universal teacher in all social and age groups. The detailed overview of the answers is presented in Table 1.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualisation of learning	8.67	4.67	4.00	50.00	32.67
I think all educators must believe they are qualified/capable of teaching all learners	11.33	22.67	20.67	34.00	11.33
I think all educators must continually develop creative new ways of working with others	6.00	1.33	4.67	28.00	60.00

The vast majority of the students like to use digital technologies. It is a problem for only 11% of them. More than half of the respondents say that new technologies have a positive impact on their lives, while 1/3 is not fully convinced.70% of the respondents say that it is necessary to use ICT to support learning and teaching processes. Similar percentage recognise the potential of websites in educational activities. It is interesting

that only one in four students declared that digital didactic resources are definitely better than their analogue equivalents. The pre-service teachers are moderate techno-optimists in this regard. Respondents' opinions about the influence of ICTs on motivation and results are also divided (about half of the students have positive connotations regarding this area). Like in case of experienced teachers, student are not unanimous about the ban on using mobile phones in schools, although the pre-service teachers are more radical in their opinions. The vast majority of the respondents declared that exploring and using new websites, software and digital devices is easy or very easy. Only a dozen or so percent admitted they have problems familiarising themselves with the new ICTs. The detailed distribution of answers regarding students' attitude towards the new media is presented in Table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	5.33	5.33	6.67	50.00	32.67
Digital technologies have positively changed our lives	4.67	8.67	31.33	48.00	7.33
It is necessary to use digital technologies in the process of learning and teaching	2.67	10.67	18.00	56.67	12.00
Web sites are useful for teaching and learning	3.33	7.33	12.00	60.67	16.67
Digital teaching aids are better than physical teaching aids on improving learning	4.67	25.33	44.67	18.00	7.33
The use of digital technologies by the teacher has a positive impact on student learning	5.33	12.00	38.00	37.33	7.33
The use of digital technologies by the teacher has a positive effect on student motivation	4.00	15.33	30.67	42.67	7.33
The use of digital technologies by the teacher has a positive effect on student involvement	4.67	17.33	28.67	38.67	10.67
The use of digital technologies by the teacher has a positive effect on student satisfaction	3.33	11.33	36.00	37.33	12.00
Students should be prohibited from using cell phones at school	17.33	27.33	23.33	21.33	10.67
Using a new software is easy for me	4.00	11.33	21.33	46.00	17.33
Using a new website is easy for me	6.00	7.33	10.00	54.67	22.00
Using a new electronic device is easy for me	6.67	9.33	20.00	42.00	22.00

Students have different opinions about the quality of the technical infrastructure in their university. Access to online textbooks was rated the lowest. The vast majority of students do not use these resources because academic education in the Pedagogical University is based mainly on printed textbooks and, in some cases, printed journals and their digital equivalents (which are not always accessible for free). In most cases, students use free Wi-Fi but 1/3 of them point out the insufficient quality of the connection (breaking connection, failures to connect). Also 1/3 of the students are not satisfied with the quality of the computers in the IT laboratories. This problems needs to be addressed by modernisation of the hardware, as IT laboratories are used not only during the obligatory IT classes (1st year of the first cycle studies), but also for other subjects (media in education, methods of teaching the specific subjects, quantitative and qualitative pedagogical research). The quality of multimedia projectors is evaluated slightly higher, as the projectors are used most often by the lecturers and students during classes and lectures. We should also emphasise that e-learning platforms are only occasionally used by the students and lecturers alike. These are the solutions which require methodical and technical support, especially for the academic staff-teachers. The detailed evaluation of the quality of technical infrastructure in the Pedagogical University by the students is presented in Table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	6.67	20.67	12.67	32.00	20.67	7.33
Quality of cable internet connection	22.67	14.00	16.67	28.00	12.67	6.00
Quality of computers in common areas	8.67	18.00	25.33	34.67	10.67	2.67
Quality of e-learning platform	11.33	11.33	24.67	30.67	18.67	3.33
Quality of equipment and projectors	5.33	8.67	18.67	36.67	22.67	8.00
Quality of smartboard	15.33	12.67	18.00	32.00	18.67	3.33
Quality of E-books / E-textbooks	33.33	14.00	19.33	20.67	11.33	1.33

Even though most of the students are digital natives, that is individuals who grew up in the age dominated by computers and the Internet, they do not have much experience using ICT in teaching and learning. The pre-service teachers use e-learning platforms, educational games and software or online translators only occasionally. As for other innovative solutions, they use them very rarely. Most of the respondents do not have any experience regarding: flipped learning, digital storytelling, blockchain technology, special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people, or methods to support the digitally excluded (e.g.

elderly, migrants). These areas seem to be the white spaces in media education. The detailed distribution of answers is presented in Table 4.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution eg. MOOCs, OER	50.00	24.67	19.33	3.33	2.67
flipped learning	75.33	13.33	8.67	1.33	1.33
digital storytelling	72.00	15.33	8.00	4.00	0.67
blockchain technology	75.33	14.00	6.67	3.33	0.67
educational digital games	39.33	28.67	20.67	8.00	3.33
ICT tool for teaching and learning foreign languages	26.00	25.33	26.00	16.00	6.67
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	72.00	11.33	10.00	5.33	1.33
method to support the digitally excluded (eg. elderly, migrant)	75.33	10.00	12.67	1.33	0.67

The vast majority of the students cannot evaluate the effectiveness of the solutions developed within the SELI project. This is likely the result of their insufficient experience in the above mentioned areas. However, according to the respondents, the most effective method is distant learning (only one in ten students does not accept this form of learning), educational games, ICT-supported translation and language learning or using ICT to support teaching and learning for the deaf or blind. It will be interesting to compare the answers in the same group once the students explore the trainings offered within the SELI or similar projects. The detailed distribution of answers related to the evaluation of effectiveness is presented in Table 5.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	58.67	7.33	4.00	20.00	8.67	1.33
flipped learning	67.33	4.00	6.00	16.67	6.00	0.00
digital storytelling	60.67	4.67	4.67	18.00	11.33	0.67
blockchain technology	64.67	7.33	4.67	14.67	8.67	0.00

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
educational digital games	40.67	4.67	4.00	28.00	20.67	2.00
ICT tool for teaching and learning foreign languages	36.67	5.33	4.00	20.67	25.33	8.00
special ICT tools to support teaching and learning for the deaf	59.33	8.00	3.33	16.67	8.00	4.67
method to support the digitally excluded (eg. elderly, migrant)	62.00	9.33	4.00	14.67	6.00	4.00

Despite very limited knowledge about the effectiveness of the solutions, the vast majority of the students were interested in obtaining new insights and skills. The most popular were the following: foreign languages, educational games and cyberbullying prevention. The least attractive ideas seemed to be: blockchain and work with the digitally excluded (less than 40% of the respondents want to find out more about these areas). For each of the above mentioned categories, only a dozen or so percent declared they were not interested in learning about the listed issues. The detailed data about respondents' interest in certain topics is presented in Table 6.

Table 6. Preferred pedagogical strategies offered in SELI

	Unknow	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	33.33	9.33	8.00	14.00	30.67	4.67
flipped learning	34.00	7.33	8.67	12.00	33.33	4.67
digital storytelling	36.67	5.33	7.33	12.67	33.33	4.67
identifying and preventing cyberbullying	28.67	7.33	7.33	12.00	36.67	8.00
blockchain technology	34.67	8.67	4.67	14.67	32.00	5.33
educational digital games	18.00	9.33	7.33	13.33	44.00	8.00
ICT tool for teaching and learning foreign languages	18.00	7.33	4.67	10.67	47.33	12.00
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	28.00	7.33	10.00	14.67	30.00	10.00
Method to support the digitally excluded (eg. elderly, migrant)	31.33	6.00	9.33	14.00	30.67	8.67

The pre-service teachers are active Internet users. They frequently use SNS, communicators to exchange information. The vast majority of the respondents are consumers of online content, using the VOD technology. Also, the vast majority share files online. Similar percentage take part in discussion groups, buys and sales and facilitate their free time using the Internet. The least explored areas are Internet used to develop video materials and e-government. The answers are presented in Table 7.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	7.33	13.33	25.33	22.00	32.00
Consuming Internet streaming (eg. VOD)	10.00	16.67	23.33	24.67	25.33
Creating video	22.00	31.33	27.33	12.00	7.33
Using a file sharing service	4.67	12.00	23.33	28.67	31.33
Participating as member of a group	10.00	12.67	17.33	28.00	32.00
Accessing online services	3.33	7.33	18.67	26.67	44.00
Accessing e-government	34.67	21.33	27.33	10.67	6.00
Buying/Selling goods	7.33	13.33	23.33	28.00	28.00
Leisure	3.33	8.00	12.67	24.00	52.00
others activities	5.33	7.33	22.67	24.67	40.00

Despite being highly active Internet users, to the extent typical for members of the information society, the pre-service teachers do not look well as for using digital media to learn. Only ¼ of the respondents often or very often were involved in acquiring knowledge needed to continue academic education or professional development. Over 1/3 of the students have no experience in this field. Most often, they use the Internet to prepare for their classes. Students use free courses much more often than paid e-resources. Price has been becoming one of the crucial criteria of participation in e-learning. At the same time, we need to point out that students also hardly ever use online opportunities for shared learning with other users. The detailed characteristics is presented in Table 8.

Table 8. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	24.00	12.67	16.00	20.00	20.00	7.33
Searching relevant sources on the Internet to complete online classes for my degree	16.00	10.00	12.67	16.00	25.33	20.00
Taking free e-learning courses (online courses - e.g. language, ICT)	18.67	22.67	16.00	18.00	18.00	6.67
Taking paid online courses	33.33	34.67	16.67	6.67	6.00	2.67
Participating in online study groups	34.00	29.33	15.33	10.00	7.33	4.00

Young people use new technologies mainly to communicate with one another (sending texts and images). All the survey participant send photos, which is one of the many exemplification of the theory of the iconosphere (Drzewiecki, 2010). Slightly less are mobile devices used as hotspots or to synchronise data. It is also interesting that mobile devices are used as translators (only 9.33% rarely or very rarely use phones or tablets for this purpose). Table 9 presents the percentage distribution of answers related to the usage of mobile devices.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	3.33	2.67	8.67	22.00	63.33
Sending/receiving photos	0.00	7.33	15.33	18.00	59.33
Using as a hotspot/internet connection sharing	5.33	14.67	28.67	14.67	36.67
Using cloud data synchronization (eg. dropBox Google Drive)	10.00	21.33	24.00	14.67	30.00
Translation to foreign languages	3.33	6.00	21.33	32.00	37.33

Self-evaluation of digital literacy in terms of using office packages and e-threats awareness, is very diverse. The students ranked themselves the highest in the area of text editors and presentation software, that is, applications they use most often. Using spreadsheets, graphic software and knowledge about the e-threats was evaluated as lower. The results presented in Table 10 have some methodological shortcomings resulting from self-evaluation, but at the same time they indicate which areas should

be particularly strengthened, for example during designing courses related to information technologies and media in education.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	3.33	3.33	27.33	44.67	21.33
Using the Spreadsheet (e.g. Excel, Calc)	3.33	16.00	46.67	24.67	9.33
Using the presentation program (e.g. Power Point, impress)	2.00	4.67	24.67	48.00	20.67
Using the graphic program (e.g. Picasa, Gimp)	10.00	24.67	38.00	22.00	5.33
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	6.67	10.00	34.67	32.00	16.67

When answering the open-ended question about the features of the ideal e-learning platform, the students pointed out several issues which were grouped into five categories. First one is the aspect of the content, that is online trainings which are extensive, interesting and provide helpful resources. Like teachers, the students also point out the praxeological aspect of the content. For this group, data and authors reliability is important. The respondents also emphasise different innovative aspects of this type of websites, such as: integrating many platforms in one place or advanced options like possibility to edit the content and connection with social networking platforms. Other important feature is ease of operation, which is defined as logical layout of the content, intuitive switching between the content and visual attractiveness. The pre-service teachers emphasise that access to the platform should be simple. The respondents connect accessibility with other features like: stability of operation, lack of errors and multi-lingual character, and understandable content. The detailed list of predictors and examples thereof is presented in Table 11.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
Content	"With much information and easy access" "With lots of materials, it should have content enough to exhaust the subject" "The one where one can easily find any information and which covers a wide range of relevant topics" "Thematically diverse" "Useful" "Offering different examples of use and opportunities to practice the knowledge obtained" "A platform where one can find necessary source texts"; "It also has to be reliable. Administered by competent people" "With the content from reliable sources" "It should contain the most important information and not be overloaded with unnecessary content"
Innovative	"Synchronised with most websites so that there would be one, decent webpage" "With a variety of options" "Linked with Facebook" "Secure" "So that everyone can edit at the same time, and verified by the administrators qualified in the certain field"
Operation	"Easy to use, intuitive, functional, with many interesting options" "First of all easy to use, with intuitive menu, clear division of content, subtle colours" "Easy to access and use. It should have quizzes, graphics, it should be colourful because this way it is easier to remember" "Functional, nice, easy to use"
Interactive	Motivating to action Encouraging to study through images Less text, more images-sound Stimulating reflection It should facilitate quick and effective learning Requiring focus
Availability	"Secure, easy to understand" "Fast" "Easily accessible to everyone, not too complicated" "Easy to use, with many options, available in other languages" "Adapted to different levels of knowledge" "Smooth functioning, no errors"

DISCUSSION AND RESUME

The study was conducted in the biggest Polish university focused mainly on education of teachers. The results have turned out to be interesting, therefore we will continue the research using a similar tool. We can confirm that the idea of inclusion is important for the students, however they also recognise its weaknesses (like the necessity to have specialised education to teach in the certain age group). This might result from the fact that there are clear methodological borders between teaching in schools and adult education (Szarota, 2014; Fabiś, 2006). Most of the students share a positive attitude towards using the ICTs. Techno-optimism (Tomczyk et al., 2015) is very noticeable, which justifies the implementation of the new solutions, according to the TPACK model (Drummond, & Sweeney, 2016; Samarji, 2015). Despite the positive attitude

towards ICT, students point out to the challenges related with technical infrastructure and rate its quality low. Upgrading the technical equipment in the University is now becoming one of the key challenges to improve the quality of academic education. The modern, e-learning-based solutions proposed in the SELI project are not well known to the students in Cracow. This may provide the grounds to introduce new solutions to media in education or information curricula. We should add that, despite their very limited knowledge, the students declared their interest in the issues listed herein. Online education seems to be one of the areas students use the most (Eger, 2005; Eger, 2015). Most of the respondents have some experience in using paid and free on-line courses which are carried in universities or outside of them. The style of using ICT by the respondents is similar to teachers' in two regards (distribution of self-evaluation of digital literacy) and online activity (they are more often audience rather than active creators). However, there is a potential in this group, as they are, in most cases, positive towards technical news. Assuming creating adequate conditions (hardware and adequate methods), students are able to change the Polish formal education. One of the key factors is the relevance of the academic courses and transfer of knowledge (import of the best methods), also within international projects.

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ICT USE OF PHYSICAL EDUCATION TEACHERS IN TURKEY

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ABSTRACT

In Turkey Ministry of National Education eager to follow up on current technological developments in education. In this chapter, we discuss the physical education teachers' use of the information and communications technologies. The preliminary findings of this study showed that Turkish physical education teachers think that individual differences between all stakeholders in instruction should be considered. Also, within the scope of this study we discussed about; Attitude to new media, Technical Infrastructure, ICT as a tool for supporting learning, Perception of the effectiveness of ICT solutions in education, Preferred pedagogical strategies offered in SELI, Use of internet (including social networks and instant messaging apps), Usage of internet for learning, Usage of mobile devices, Perception about the level of ICT skills and Features of the ideal e-learning platform. As a result, Teachers indicate that internet connection quality of schools is poor, common used computers are old and poor quality. In addition to this most of the teachers are in favour using mobile phones in schools. Besides, the Turkish government has the FATIH project(Movement of Enhancing Opportunities and Improving Technology) which is designed to provide every student to reach the best education, the highest quality educational content, equal opportunities by improving the technological infrastructure of schools.

Keywords: ICT, Physical Education Teachers, Turkey, FATIH Project

INTRODUCTION

In Turkey, there has been an intense effort to disseminate technology for promotion of education for a long time. It is seen that the Ministry of National Education emphasizes data-deriven education by using learning analytics within the framework of 2023 vision. In this way, it is aimed to develop learning analytics tool in order to better understand the learning and teaching, provide effective feedback, and implement a performance-based education and learning process. Furthermore, ministry has two main goals which priorities the development of digital skills. These are defined as " Ecosystem establishment for the development of digital content and skills "and "Content Development and Teacher Training for the Development of Digital Skills" (MoNE, 2018). These national objectives for 2023 shows Turkey's eager to follow up current technological developments in education. These interest in technological development also applies changes in physical education. It has become a necessity for physical education teachers to use innovative approaches both to meet the motivational expectations of the students and to facilitate the achievement of teaching goals.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research in Turkey was conducted by a team of three experts who are research assistants in physical education sports teaching department of faculty of sports sciences. The study was carried out in the first half of June 2019 in Turkey, using different methods of data collection: on printed (dedicated to teachers) and electronic forms (Google questionnaires) addressed to physical education and sports teachers. The teachers who participated in the survey had been volunteered to fill questionnaires in the territory of Turkey. There were 87 teachers-respondents. The average age of the respondents was 37.97± 7.5, min 20, max 57. Gender of participants were 55 Men 63.2% and 32 Women 36.8%. 95.5% of participants were turkish and 4.6% immigrant whom 67.8% are married 27 6% single 4.6% divorced. Most of the participants were teachers, 94.3%, only 1.1% defined themselves as school directors and 4.6% educator (instructor). The average professional experience in the group was 12.96± 6.95, min=1, max=28. Most of the teachers work in secondary school (48.3%) whereas 10.3% in primary schools, 34.5% in high schools and 5.7% in university. The remaining 1.1% in sports school.

The locations of the represented schools were as follows: 80.5% cities and 19,5% rural regions.The vast majority of the teachers – 65.5% held bachelor degree, 29.9.% have master degree, whereas 4.6% have PhD. Their financial situation are diverse: 54% evaluate it as acceptable, 29.9% as good, 12.6% as bad, 2.3% as very good and 1.1% as very bad.

RESULTS

According to SELI Project's need analysis study; 62% of the teachers think that individual differences between students/learners should be accounted for as an essential aspect of human development. Because all grades have different learner characteristics. The teachers who include this study have believed a teacher could not be capable/ qualified of all learners, thus teachers should continue their personal development about teaching. Detailed descriptive statistics.The distribution of answers regarding inclusiveness is presented in Table 1.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any con-ceptualisation of learning	8	4.6	-	25.3	62.1
I think all educators must believe they are qualified/capable of teaching all learners	16.1	16.1	31	24.1	12.6
I think all educators must continually develop creative new ways of working with others	6.9	3.4	2.3	25.3	62.1

Another concept is " new media" 3 / 4 of Turkish teachers have stated they use new technologies and they think digital technologies have a positive effect on their lives. The 94.3% teacher thinks new media tools and digital technologies should use in teaching-learning setting. Also, more than 80% of teachers have stated that web sites are useful for teaching and learning and digital technologies have positive effects on teachers and learners' inclusiveness and motivate them. In addition to this 1/3 of teachers thinks that smartphones must have forbidden in school but the inversely same amount of teacher thinks vice versa. While %75 of teachers think using a new website or new electronic device easy for them, only 58% of them thinks using new software is easy. The results show that Turkish teachers have a positive attitude for new media. The distribution of answers regarding new media is presented in Table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	3.4	4.6	3.4	43.7	44.8
Digital technologies have positively changed our lives	4.6	-	24.1	42.5	28.7
It is necessary to use digital technologies in the process of learning and teaching	3.4	1	1.1	46	48.3
Web sites are useful for teaching and learning	3.4	3.4	17.2	40.2	35.6
Digital teaching aids are better than physical teaching aids on improving learning	11.5	23	26.4	25.3	13.8
The use of digital technologies by the teacher has a positive impact on student learning	4.6	1.1	1.1	47.1	46

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The use of digital technologies by the teacher has a positive effect on student motivation	5.7	1.1	4.6	46	42.5
The use of digital technologies by the teacher has a positive effect on student involvement	4.6	2.3	3.4	47.1	42.5
The use of digital technologies by the teacher has a positive effect on student satisfaction	6.9	1.1	4.6	47.1	40.2
Students should be prohibited from using cell phones at school	14.9	17.2	29.9	14.9	23
Using a new software is easy for me	5.7	3.4	32.2	35.6	23
Using a new website is easy for me	4.6	3.4	12.6	40.2	39.1
Using a new electronic device is easy for me	3.4	2.3	14.9	41.4	37.9

Despite the fact that teachers have a positive attitude against new media, technical infrastructure malfunction draw attention. According to Turkish teachers, the technical infrastructure at the teaching-learning setting seem poor or acceptable quality. Half of the teachers indicate that cable or WiFi internet connection quality is poor in schools. Also the computers which are used in common areas are poor or very poor quality. By means of the FATIH project, many schools have met with smart-board and internet connection. The distribution of answers regarding technical infrastructure is presented in Table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	14.9	12.6	23	21.8	21.8	5.7
Quality of cable internet connection	4.6	11.5	14.9	23	32.2	13.8
Quality of computers in common areas	2.3%	17.2	25.3	23	27.6	4.6
Quality of e-learning platform	8	10.3	25.3	33.3	17.2	5.7
Quality of equipment and projectors	8	9.2	18.4	27.6	27.6	9.2
Quality of smartboard	14.9	4.6	4.6	24.1	31	20.7
Quality of E-books / E-textbooks	16.1	10.3	10.3	29.9	26.4	6.9

Another subject in this study is using information communication technologies (ICT). The teachers have stated they never or rarely use flipped learning, digital storytelling, blockchain and digital games for learning. Unfortunately, teachers state they don't know how to use new media or new technologies, study results shows they don't use this kind of tools for enhancing their profession or learning of students. Most of the teachers state that they never use special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people, this result is upsetting and striking. The distribution of answers about ICT as a tool for learning is presented in Table 4.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution eg. MOOCs, OER	36.8	20.7	29.9	10.3	2.3
flipped learning	39.1	24.1	26.4	9.2	1.1
digital storytelling	43.7	17.2	26.4	10.3	2.3
blockchain technology	59.8	14.9	19.5	5.7	-
educational digital games	20.7	19.5	36.8	17.2	5.7
ICT tool for teaching and learning foreign languages	36.8	14.9	24.1	16.1	8
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	44.8	12.6	29.9	8	4.6
method to support the digitally excluded (eg. elderly, migrant)	58.6	12.6	19.5	5.7	3.4

At previous table teachers specify how and how much they use ICT as a tools, in this table they state their perception about the effectiveness of ICT tools in education. The proportion of who don't know open learning solution like MOOCs is 36.8%, flipped learning 42.5%, digital storytelling 29.9, blockchain technology 49.4. Thereby the teachers who don't know the tool don't evaluate the ICT solutions in education enough. 55% of the teachers think ICT is effective for teaching and learning foreign languages. The distribution of the answers about perceptions of the effectiveness of ICT tools is presented in Table 5.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	36.8	11.5	12.6	18.4	18.4	2.3
flipped learning	42.5	9.2	8	18.4	16.1	5.7
digital storytelling	29.9	11.5	9.2	19.5	19.5	10.3
blockchain technology	49.4	6.9	9.2	20.7	12.6	1.1
educational digital games	14.9	13.8	10.3	24.1	21.8	14.9
ICT tool for teaching and learning foreign languages	21.8	11.5	10.3	23	14.9	18.4
special ICT tools to support teach-ing and learning for the deaf	37.9	8	10.3	16.1	16.1	11.5
method to support the digitally excluded (eg. elderly, migrant)	47.1	5.7	8	14.9	17.2	6.9

Within the project SELI, teachers were asked which of the following tools they would like to participate in training related to. The most preferred tools are educational games, identifying and preventing cyberbullying, ICT tool for teaching and learning foreign languages. The distribution of answers about pedagogical strategies is presented in Table 6.

Table 6. Preferred pedagogical strategies offered in SELI

	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	6.9	4.6	25.3	47.1	16.1
flipped learning	5.7	3.4	29.9	40.2	20.7
digital storytelling	3.4	8	21.8	47.1	19.5
identifying and preventing cyberbullying	4.6	4.6	12.6	43.7	34.5
blockchain technology	6.9	6.9	23	43.7	19.5
educational digital games	4.6	4.6	8	43.7	39.1
ICT tool for teaching and learning foreign languages	5.7	5.7	10.3	39.1	39.1
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	5.7	5.7	20.7	41.4	26.4
Method to support the digitally excluded (eg. elderly, migrant)	5.7	10.3	24.1	35.6	24.1

When we look closer to the teachers' aim of using the internet. The most common reasons are accessing online services, shopping and consuming internet streaming and leisure.The results show that teachers use the internet very frequently for social interaction and daily needs. But they don't use the internet for personal, professional or educational development. Detailed results are presented in Table 7.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	2.3	12.6	18.4	26.4	40.2
Consuming Internet streaming (eg. VOD)	1.1	1.1	5.7	37.9	54
Creating video	5.7	17.2	33.3	24.1	19.5
Using a file sharing service	2.3	10.3	14.9	35.6	36.8
Participating as member of a group	2.3	4.6	23	33.3	36.8
Accessing online services	1.1	2.3	12.6	32.2	51.7
Buying/Selling goods	1.1	9.2	19.5	26.4	43.7
Leisure	3.4	3.4	16.1	35.6	41.4

others activities

When we examine the teacher's answers about how much, how often and how they use the internet as a learning tool. One out of the three teachers stated that they participated in compulsory education, obligatory online course for their career. The participation level of the voluntary or paid online courses is lower. Detailed information about teachers' usage of the internet for their development is presented in Table 8.

Table 8. Usage of internet for learning

	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	14.9	26.4	26.4	18.4	13.8
Searching relevant sources on the Internet to complete online classes for my degree	3.4	8	26.4	37.9	24.1
Taking free e-learning courses (online courses - e.g. language, ICT)	9.2	14.9	31	28.7	16.1
Taking paid online courses	27.6	13.8	27.6	20.7	10.3
Participating in online study groups	19.5	21.8	28.7	18.4	11.5

It was found that teachers used mobile devices for the most frequently (90%) for receiving and sending email and photos. After that subsequently cloud data, internet connection sharing, and translation foreign languages. The results show Teachers use mobile devices for basic communication needs and social sharing.Also using cloud technology for private data synchronization is highly preferred by teachers. Tablo 9. shows detailed information about the usage of mobile devices.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	-	-	11.5	28.7	59.8
Sending/receiving photos	-	-	4.6	26.4	69
Using as a hotspot/internet connection sharing	2.3	6.9	23	31	36.8
Using cloud data synchronization (eg. dropBox Google Drive)	9.2	8	21.8	23	37.9
Translation to foreign languages	3.4	11.5	27.6	28.7	28.7

Using ICT tools in teaching-learning setting is important so teacher education programs must teach ICT tools to pre-service teachers to catch up the 21th-century competencies. The teachers should know how to use ICT tools to enhance learners' competencies. Bu other teachers who graduate at least ten years ago have to learn these tools and learn how to use them by themself. In this context, the SELI project has examined experienced teachers' perceptions about using ICT tools. The need analysis showed that the teachers think they have high or very high skills about text editors, medium or high skills for using spreadsheets and high or very high skills about presentation software. Teachers' perception of using photo or video editing programs is medium or low. In addition to this, the perception of skills about the dangers of digital world and cyberbullying is very low. Table 10 gives detailed information about teachers' perceptions.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	1.1	4.6	12.6	46	35.6
Using the Spreadsheet (e.g. Excel, Calc)	2.3	6.9	26.4	34.5	29.9
Using the presentation program (e.g. Power Point, impress)	-	4.6	20.7	35.6	39.1
Using the graphic program (e.g. Picasa, Gimp)	19.5	20.7	23	20.7	16.1
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	11.5	13.8	28.7	26.4	19.5

In the SELI project context, the teachers were asked how the ideal e-learning platform should be. With this question, it is aimed to uncover overlooked factors that are not included in the survey conducted within the scope of SELI. Teachers are the last user and going to use the project materials and evaluate. Thus their comments are important. The comments about ideal e-learning platforms are categorized like; user-friendliness, Content, Visual, Non-standard, Availability, Needs, Reliability, Relevance. Also, It was stated that the e-learning platform should be easy to understand, instructive, safe, simple content, interactive, voluntary, easily accessible and powerful infrastructure, suitable for offline use and suitable for feedback. Table 11. shows detailed information about features of ideal e-learning platform.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
User-friendliness	"without restrictions in terms of time", easy, accessible, able to provide education in all languages", "Clear, easy to use","must be easy to use", "understandable", "reliability", "accuracy", "validity", "applicability", "it should be user-friendly", "easy to use","clear"
Content	"must be educational and instructive", "should be safe, provide a good information flow, should be correct information", "question and answer method can be used", "simple content and easy to use, answer should be given, creative, connection", "content is very good and understandable", "processing of content-related considerations" "making online courses interesting (content contests, etc.)", "Interesting short-term presentations with examples from each are of interest"
Visual	"Both parties can communicate in an interactive way, an appropriate time, the opportunity to access the course later, the possibility of interactive question and answer", "fast, simple interface, lots of visual sharing and up to date"
Non-standard	"short periods of duration.", "it will be more efficient if there is a mutual exchange of ideas" ,"connected to social life", "voluntary based", "don't wrestle with details (real learning takes place by living)", "participation to the course through conference method", "with a lot of options", "spread over a wide period of time" "with a lot of evaluation and feedback and interactive where possible". "participants may have different cultures, experiences and experiences"
Availability	"accessibility and connection quality", "effective expression, easy access, easy information sharing, multiple-choice", "fast access", "understandable application", "easy access to the information you want", "inclusion of everyone and no mutual internet problems", "easy to access, cheap and high quality continuously accessible broadcast" "should be accessible from all kinds of devices (mobile device and computer)", "documents can be downloaded", "can also be viewed offline", "the instructor and the question-answer possibility"
Needs	"It is very important that the course is given to people who need it." "Be at the right time, it is the most important feature required to reach the target audience", "be up-to-date, suitable for quick feedback, meet the needs of the age", there should be a platform where feedback can be taken, where there is interaction, where the trainee is not passive but partly active in the process", "free, interactive and well defined levels to meet needs clearly"
Reliability, relevance	"reliable explanatory understandable","reliable, educational and providing relevant feedback"

DISCUSSION AND RESUME

The current research provides preliminary findings which outlines the need analysis of physical education teachers that will essentially contribute to the SELI platform development. According to most of the participants inclusion is an essential aspect and educators must develop creative new ways of working with differences. However they are not sure that educators must believe they are qualified/capable of teaching all learners. Considering cultural differences among students are increased because of inclusion of Syrian students with the decision of MoNE that has adopted an inclusive education model within the context of multicultural education starting from 2016-2017 academic year (Özcan,2018). It is important teachers are in favour of inclusion however, it is also critical that they don't believe that all of the teachers are not capable of teaching all students.

Half of the teachers indicate that cable or WiFi internet connection quality is poor in schools. Also the computers which are used in common areas are poor or very poor quality. But the Turkish government with Ministry of National Education gives importance to the technical infrastructure and new technologies in schools. And the FATIH project(Movement of Enhancing Opportunities and Improving Technology) designed to provide every student with the best education, the highest quality educational content and equal opportunities) has developed.

Surprisingly, only the teachers 32% of pre-service teachers think smartphones should not be forbidden in schools. This finding is finding is in line with the research finding that most teachers strongly resisted any suggestion that the ban currently in place could be replaced by use of mobile phones for educational purposes (Joyce-Gibbons, A., at al., 2018). This can be because of the risk of disruption to lessons and the possibility of misuse as mentioned by Joyce-Gibbons and others.

As part of the, open-ended question (Tab. 11), teachers shared their expectations which can be categorised under usability, content, accessibility including their quality and implementation.

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STYLES OF USING ICT BY TURKISH PHYSICAL EDUCATION PRE-SERVICE TEACHERS

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ABSTRACT

In this chapter, we discuss the pre-service physical education teachers' styles of using information and communications technologies. Also, within the scope of this study we discuss about; Attitude to new media, Technical Infrastructure, ICT as a tool for supporting learning, Perception of the effectiveness of ICT solutions in education, Preferred pedagogical strategies offered in a transnational project called Smart Ecosystem for Learning and Inclusion(SELI), Use of internet (including social networks and instant messaging apps), Usage of internet for learning, Usage of mobile devices, Perception about the level of ICT skills and Features of the ideal e-learning platform. As a result, Turkish pre-service physical education teachers think individual differences in instruction setting must be accounted. They seem to hesitate about whether all teachers must have enough competence in teaching every student. Although there is a low level of knowledge in ICT. Pre-service physical education teachers can be supported during their university education enhanced with technology. The Higher Education Council of Turkey should consider how to integrate ICT tools in university education. According to this need analysis ICT tools such as learning management systems, social media, digital storytelling can be used in the training of pre-service teachers.

Keywords: ICT, Pre-service teachers, Physical Education, Turkey,

INTRODUCTION

Information and communication technologies (ICT) are experiencing rapid developments. It is seen that individuals use these developments in technology in their homes, workplaces and learning environments. In particular, the use of technology in the learning environment has been found to have many concrete benefits. Some of those; facilitating learning, shortening learning time, reducing costs and addressing individual differences (Chen, 2010; Daşdemir, Cengiz, Uzoğlu & Bozdoğan, 2012; Öçal & Şimşek, 2017).

As part of the FATİH (Movement of Enhancing Opportunities and Improving Technology) project in Turkey, it is aimed to support teachers for using ICT actively in the instruction environment. With this project, classrooms are equipped with technological tools and internet connection. Lessons are taught with tablet computers and interactive whiteboard with teacher guidance (Ayvacı, Bakırcı ve Başak, 2014; Tosuntaş, Karadağ ve Orhan, 2015). It can be said that in a setting where there is a policy which intensively support use of technology in education, pre-service physical education teachers are likely to face technology-equipped learning environments when they will begin their profession. For this reason, it is very important that pre-service physical education teachers are well educated in terms of searching and using information with the help of new technologies and they have positive attitude towards ICT. Effective use of these technologies in the instruction environment can be achieved through technology-equipped teachers (Çakır and Oktay, 2013; Kim, Kim, Lee, Spector and DeMeester, 2013; Özden, Çağıltay and Çağıltay, 2004).

This chapter focuses on presenting the level of digital literacy among Turkish physical education pre-service teachers and the conditions behind a constructive use of ICT for learning and teaching.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research in Turkey was conducted by a team of three experts who are research assistants in physical education sports teaching department of faculty of sports sciences. The study was carried out in the first half of June 2019 in Turkey, using different methods of data collection: on printed (dedicated to teachers) and electronic forms (Google questionnaires) addressed to physical education and sports pre-service teachers. The pre-service teachers who participated in the survey had been volunteered to fill questionnaires in the territory of Turkey.

There were 71 pre-service teachers-respondents. The average age of the respondents was 22.07±3.31. Gender of the participants were 46 Male 64.8%, 25 Female 35.2%. 94.4% of participants were Turkish, 5.6% immigrants. The pre-service teachers evaluated their financial status as: 2.8% very good, 22.5% good, 62.0% acceptable, 5.6% bad, 7% very bad.

RESULTS

80% of pre-service teachers have stated individual differences must be accounted. However pre-service physical education teachers seem to hesitate about all teachers must have enough competence for every student. In addition to this pre-service teachers believe that all teachers must proceed with personal and professional development during the course of life. The answers of pre-service teachers about ınclusion are given Table1.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any con-ceptualisation of learning	4.2	1.4	5.6	28.2	60.6
I think all educators must believe they are qualified/capable of teaching all learners	2.8	8.5	45.1	29.6	14.1
I think all educators must continually develop creative new ways of working with others	2.8	1.4	2.8	29.6	63.4

The need analysis conducted in the scope of SELI project, the attitudes of pre-service teachers about new media were examined and it was found that more than%87 of pre-service teachers like using digital technology. However, 25% of the pre-service teachers hesitate that the new technology have positive impact on their lives. They think the new media tool and digital technologies should be used in the teaching and learning process, even if they are uncertain about the positive effect of these technologies. Approximately more than 61% of the pre-service teachers think new websites are easy to use. In addition to this, 70% of pre-service teachers think that digital technologies will have a positive effect on learners' motivation and attendance. Surprisingly, almost 70% of pre-service teachers think smartphones should be forbidden in schools. Although they think new technologies will be beneficial besides the cell phones should be banned in schools probably they think that the use of mobile phones is likely to be used for social sharing and everyday work rather than instruction. The answers about Pre-service teachers' are given in Table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	1.4	4.2	7	42.3	45.1
Digital technologies have positively changed our lives	1.4	4.2	25.4	45.1	23.9
It is necessary to use digital technologies in the process of learning and teaching	1.4	1.4	7	56.3	33.8
Web sites are useful for teaching and learning	1.4	14.1	29.6	38	16.9
Digital teaching aids are better than physical teaching aids on improving learning	2.8	18.3	56.3	12.7	9.9
The use of digital technologies by the teacher has a positive impact on student learning	-	4.2	18.3	47.9	29.6
The use of digital technologies by the teacher has a positive effect on student motivation	-	7	21.1	50.7	21.1
The use of digital technologies by the teacher has a positive effect on student involvement		5.6	23.9	49.3	21.1
The use of digital technologies by the teacher has a positive effect on student satisfaction		1.4	19.7	56.3	22.5
Students should be prohibited from using cell phones at school	22.5	29.6	19.7	15.5	12.7
Using a new software is easy for me	7	12.7	36.6	21.1	22.5
Using a new website is easy for me	2.8	8.5	26.8	38	23.9
Using a new electronic device is easy for me	1.4	1.4	18.3	45.1	33.8

Most of the answers about technical infrastructure pre-service teachers state that wifi and cable internet are acceptable and good. 70% of pre-service teachers think e-learning platforms are acceptable and good. In summary, pre-service teachers think technical infrastructure is acceptable. Detailed information will be found in Table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	2	7	11.3	39.4	28.2	11.3
Quality of cable internet connection	9.9	8.5	8.5	31	33.8	8.5
Quality of computers in common areas	-	11.3	23.9	32.4	26.8	5.6
Quality of e-learning platform	2.8	8.5	19.7	43.7	21.1	4.2
Quality of equipment and projectors	2.8	5.6	11.3	42.3	31	7
Quality of smartboard	8.5	8.5	14.1	35.2	25.4	8.5
Quality of E-books / E-textbooks	7	7	22.5	38	19.7	5.6

When we examine pre-service teachers' perceptions of information communication technology (ICT) as a tool for supporting learning; it is revealed that 50% of prospective teachers mostly never pursue blockchain technology, open learning solution, flipped learning, special ICT tools for supporting learning. Only educational digital games and digital storytelling are pursued to support learning. Pre-service teachers are relatively young but they usually don't think given new technologies support learning. Remarkably, pre-service teachers who live and are exposed to new media and ICT tools do not use these tools at all. The answers are given in Table 4.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution eg. MOOCs, OER	40.8	18.3	28.2	7	5.6
flipped learning	52.1	15.5	25.4	2.8	4.2
digital storytelling	22.5	25.4	29.6	15.5	7
blockchain technology	50.7	18.3	19.7	8.5	2.8
educational digital games	18.3	22.5	32.4	19.7	7
ICT tool for teaching and learning foreign languages	38	19.7	22.5	12.7	7
special ICT tools to support teaching and learning for the deaf or blind or physically discapacitated people	46.5	11.3	21.1	14.1	7
method to support the digitally excluded (eg. elderly, migrant)	45.1	19.7	21.1	7	7

When we look at the results about what pre-service teachers think about ICT tools whether they are useful and effective in education. Within the SELI project, the study results showed that pre-service teachers don't know much about MOOCs, OER, Flipped learning, blockchain technology. This result is striking because the preservice teachers who live in digital age don't use ICT technologies as a learning or teaching tool. The answers about ICT solutions in education are given in Table 5.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	46.5	7	14.1	19.7	7	5.6
flipped learning	47.9	7	12.7	18.3	8.5	5.6
digital storytelling	25.4	11.3	21.1	16.9	18.3	7
blockchain technology	45.1	8.5	15.5	19.7	4.2	7
educational digital games	21.1	8.5	15.5	26.8	18.3	9.9
ICT tool for teaching and learning foreign languages	29.6	8.5	12.7	18.3	19.7	11.3
special ICT tools to support teaching and learning for the deaf	40.8	9.9	9.9	19.7	11.3	8.5
method to support the digitally excluded (eg. elderly, migrant)	35.2	8.5	21.1	16.9	8.5	9.9

When pre-service teachers were asked which ICT tool they want to learn or prefer to learn. They stated that more than 50% of them don't prefer to learn open learning solutions, more than 50% of them don't prefer flipped learning and 40% of them don't prefer to learn Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people. Also, the most popular answer is digital education games. Detailed information about answer is given in Table 6.

Table 6. Preferred pedagogical strategies offered in SELI

	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	33.8	16.9	21.1	23.9	4.2
flipped learning	29.6	22.5	18.3	29.8	2.8
digital storytelling	14.1	11.3	29.6	28	7
identifying and preventing cyberbullying	19.7	11.3	25.4	35.2	8.5
blockchain technology	26.8	12.7	28.2	22.5	9.9
educational digital games	9.9	11.3	29.6	32.4	16.9
ICT tool for teaching and learning foreign languages	16.9	15.5	23.9	29.6	14.1
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	21.1	19.7	15.5	35.2	8.5
Method to support the digitally excluded (eg. elderly, migrant)	21.1	15.5	25.4	31	7

When the teachers use of internet were examined, generally, they use the internet for publishing messages, consuming internet streaming and file sharing. Pre-service teachers use the internet mostly for their daily needs and social sharing. The answers about the use of the internet are given in Table 7.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	2.8	8.5	26.8	32.4	29.6
Consuming Internet streaming (eg. VOD)	1.4	2.8	9.9	47.9	38
Creating video	4.2	14.1	42.3	23.9	15.5
Using a file sharing service	2.3	1.4	33.8	43.7	18.3
Participating as member of a group	1.4	8.5	35.2	29.6	25.4
Accessing online services	-	2.8	22.5	46.5	28.2
Buying/Selling goods	4.2	4.2	23.9	39.4	28.2
Leisure	-	1.4	11.3	33.8	53.5

others activities

The answers about pre-service teachers' usage of the internet for learning showed that 25% of them never take free e-learning courses, 45% of them never attend paid online courses. Pre-service teachers use the internet mostly searching source and reference for homework. The use of internet is increasing day by day so it is important to evaluate the quality of the time spent on the internet. Table 8. is giving information about how teachers use the internet for learning.

Table 8. Usage of internet for learning

	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	14.1	14.1	43.7	22.5	5.6
Searching relevant sources on the Internet to complete online classes for my degree	7	1.4	38	38	15.5
Taking free e-learning courses (online courses - e.g. language, ICT)	25.4	23.9	23.9	23.9	2.8
Taking paid online courses	45.1	19.7	14.1	18.3	2.8
Participating in online study groups	31	9.9	38	18.3	2.8

The amount of mobile tools and their functions is increasing while technology develops. The pre-service teachers use these tools often. The important thing is how and for what purpose they use these tools. The results in scope of SELI showed that 80% of pre-service teacher use mobile devices for sending/receiving emails and photos. Also, the second most common reason is using mobile devices for translating a foreign language. The preservice teacher's answers about the usage of mobile devices are given in Table 9.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	-	1.4	21.1	36.6	40.8
Sending/receiving photos	1.4	-	18.3	28.2	52.1
Using as a hotspot/internet connection sharing	4.2	9.9	23.9	26.8	35.2
Using cloud data synchronization (eg. dropBox Google Drive)	4.2	14.1	23.9	25.4	32.4
Translation to foreign languages	5.6	7	21.1	35.2	31

The individuals' perceptions and attitudes affect their usage of ICT tools. the pre-service teachers' perceptions about their ICT skills were examined in the scope of the SELI project. According to these results, 29% of the preservice teachers stated that they had medium, 42% high and 13% had very high level of ICT skills. The skill perceptions about using the spreadsheet 29.6% medium, 33.8% high and 12.7 very high. The skill perceptions about the presentation program are 26% medium, 40% high and 23% very high. The preservice teachers will be new teachers in a short span of time so they need to learn and use ICT tools like text editors, spreadsheets and presentation programs. Existingly, the preservice teachers have high-level skills about office programs but they have low-level skills about using graphic programs for photo or video editing or knowledge about dangers in the digital worlds. Detailed information about pre-service teachers' perceptions about the ICT skills is given in Table 10.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	2.8	7	29.6	42.3	18.3
Using the Spreadsheet (e.g. Excel, Calc)	4.2	19.7	29.6	33.8	12.7
Using the presentation program (e.g. Power Point, impress)	1.4	7	26.8	40.8	23.9
Using the graphic program (e.g. Picasa, Gimp)	28.2	26.8	21.1	18.3	5.6
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	14.1	23.9	29.6	16.9	15.5

The comments about ideal e-learning platforms are categorized like; Content, Innovative, Non-standard, Availability, Interactive. Also, It was stated that the e-learning platform should be easy to understand, instructive, safe, simple content, interactive, voluntary, easily accessible and powerful infrastructure, suitable for offline use and suitable for feedback. In addition to this pre-service teachers states information presented in e-learning platform should be expressed in an attractive language, have good video quality, gives necessary feedback, simple, straightforward. Detailed information about ideal e-learning platform is given Table 11.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
Content	The presentation of information from virtual environments is more important than the information given.Therefore, information should be expressed in an attractive language, The presentation of information is valuable, It should be in specific time intervals and be able to evaluate among large masses, equipment strength, good training, simple, understandable, easy to understand, Good video and content quality, tutorial, search engine that can easily access any content, simple, ad-free, visual content clear notes,
Innovation	expression clarity, consistency, sound quality, image quality, fluent, impressive, understandable, simple, easy interface, easy to use, to be able to see content again, to give the necessary feedback correction tips, to deliver the documents related to the subject to be covered in the course,
Non-standart	simple, straightforward, be clear and understandable, it should target a specific group rather then all, be free. easy access to the course. Ability to appeal to a wide audience, a quality theme, to make evaluation at the end of the subject
Interactive	learning should be supported by graphical design and interactive forms and the student should be drawn to information. the platform must be accessible. (mobile tablet pc), it should be attractive,
Availability	continuously accessible broadcast good internet connection easily accessible, effective information sharing must be accessible from mobile devices and computers easy interface, ease of accessibility have an infrastructure that can handle many people

DISCUSSION AND RESUME

The current research provides preliminary findings which outlines the need analysis of pre-service physical education teachers that will essentially contribute to the SELI platform development. Although most of the pre-service physical education teachers have stated individual differences must be accounted. They seem to hesitate about whether all teachers must have enough competence for teaching every student. In addition to this pre-service teachers believe that all teachers must proceed with personal and professional development during the course of life. Attitudes of pre-service physical education teachers about new media were examined and it was found that%87 of pre-service physical education teachers like using digital technologies. However, 25% of the pre-service teachers hesitate that the new technology have positive impact on their lives. They think that the new media tool and digital

technologies should be used in the teaching and learning process, even if they are uncertain about the positive effect of these technologies. Approximately more than 61% of the pre-service teachers think new websites are easy to use. In addition to this, 70% of pre-service teachers think that digital technologies will have a positive effect on learners' motivation and attendance. This findings are inline with the current research interest oninformation communication technologies which are used for different purposes both to facilitate the daily practice of teachers and to increase the motivation of students and to contribute to the achievement of learning objectives. For example, Technology Enhanced Learning and Computer Supported Collaborative Learning have recently been of interest to coordinate the realization of specific learning situations with technology-supported educational environments (Dillenbourg, Jarvela, & Fischer, 2009; Roschelle, Dimitriadis, & Hoppe, 2013). Besides use of new technology has become an integral part of sports practice in terms of monitoring physical effort, correcting posture or developing collective strategies (Papastergiou, 2010; Russell & Newton, 2008). However surprisingly, almost 70% of pre-service teachers think smartphones should be forbidden in schools. Educational digital games, digital storytelling are the most perceived ways of using ICT as a tool for supporting learning. This finding is support researches especially recommend digital storytelling to ensure pre-service teachers have an effective teacher practice course during their undergraduate education (Tatlı, Z., & Bayramoğlu, A. ,2015) and although they were concerned about using educational digital games, they were eager to use these games (Alkan, A., & Mertol, H. ,2019). Although there is a low level of knowledge in ICT. Physical education pre-service teachers can be supported during their university education enhanced with technology. Physical education teachers can be educated about how to use technological tools during university education. ICT such as learning management systems, social media, digital storytelling can be used in the training of pre-service teachers.

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STYLES OF USING ICT
BY URUGUAYAN PRE-SERVICE TEACHERS

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INTRODUCTION

Preservice teacher education in Uruguay is under the direction of the Education Training Council (Consejo de Formación en Educación, CFE) which is part of the Administración Nacional de Educación Pública), ANEP (National Public Education Administration. The CFE is in charge of teacher education and training of school teachers, highschool teachers, teachers at technical schools and social educators. Only Physical Education teachers graduate form the University. Most teaching careers are organized in institutions which do not have a university status, and have been created at different historical times, answering to different political views of how teacher education should be organized.

As for the use of ICT and its integration to teaching, 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. They are requested to answer in terms of strengths and weaknesses they find in the preservice program. The survey revealed that they considered that the strongest and greatest emphasis of their education has been placed on the subject matter (Math, Geography, History, etc.) and on the didactic contents. On the other hand, 77% of public school teachers and 74% for private school teachers claim 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 same holds true for highschool teachers, where 71% in public and 73% in private highschools, consider that their education and training on teaching skills with ICT has been deficient. (INEED, 2015, p.18) In this context, shedding new light on the topic of digital literacy among Uruguayan pre-service teachers, is extremely valuable. This work presents the result of a survey carried out among pre-service teachers in Uruguay, in the context of the SELI project (ERANet17/ ICT-0076 SELI. http://project-seli.herokuapp.com/). It focuses on the level of use of digital tools and on the perceptions about ICT tools for educational inclusion.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research was conducted among students of teacher education and training centers in Uruguay, in the followings centers: Institutos de Formación Docente (Teacher

training Institutes), Centros Regionales de Profesores (Regional Teachers Centers), Instituto de Profesores Artigas (Teachers' Institute Artigas), Magisterio (Centers for elementary school teachers) Institutos de formación en educadores sociales (social educators training centers) and Institutos de formación de maestros técnicos (Institutes for the training of technical teachers) and University of the Republic. 79.31% of responses were provided by students in the North East of the country, the departments of Rivera, Tacuarembó, Cerro Largo and Treinta y Tres. 10.34% of respondents were from the South and 10,35 from the rest the country.

A diagnostic survey was conducted in the second half of June, in July and August, 2019. The survey was performed using Google Forms. The sample was 116 respondents, 78.45% of which were women, and 20.69% men. The average age of the respondents was 27.87 years, with Std. Dev=9.37 and median=25, minimum value=18 and maximum value=61. As for origin, 99,14% declared to be Uruguayan whereas 0,86% said they were immigrants. The marital status of the respondents was as follows: 77.59% – single, 4,31% – divorced, 18,10% – married. Students evaluated their financial status as: 3.45 very bad – 9.48%, bad – 19.83%, acceptable – 67.24%, good – 0%, very good – 0%. Due to the non-ransom sampling, the survey does not enable generalization of the results to the whole population of the Uruguayan Pre-service teachers. Still, data are a relevant insight into the situation of pre-service teachers in Uruguay.

Summarizing, this study as surveyed a sample of a population of teacher trainees, in public teacher education and training centers in Uruguay, both in the capital city and in the interior of the country. The majorty of the respondents were women (almost 80%) in final years of the teaching career, all of them experiencing practice teaching training.

RESULTS

The great majority of students (85.34%) agree or strongly agree that education should be inclusive. 87.07% consider that all educators must continually develop creative and new ways of working with others. This shows a positive attitude towards professional life-long development. Only half of them consider that educators must believe they are qualified to teach all learners. A detailed overview of the answers can be observed in Table 1.

Table 1. Inclusion

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualisation of learning	6.90%	2.59%	5.17%	37.07%	48.28%
I think all educators must believe they are qualified/capable of teaching all learners	10.34%	20.69%	18.97%	26.72%	23.28%
I think all educators must continually develop creative new ways of working with others	7.76%	1.72%	3.45%	22.41%	64.66%

83.62% like to use digital technologies, and that show also in that 68% find it easy to use new electronic devices. More than 74% agree or strongly agree with the fact that it is necessary to use digital technologies in the process of learning and teaching. This is consistent with the fact that only a quarter of respondents would agree or strongly agree with cell phone banning at schools. On the other hand, only around 17% would say that digital teaching tools are better than physical teaching aids. Out of the four variables present in the survey (learning, motivation, involvement and satisfaction) it is motivation the one that 74% consider technologies have a positive effect on.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	4.31%	0,00%	12.07%	56.90%	26.72%
Digital technologies have positively changed our lives	2.59%	7.76%	30.17%	41.38%	18.10%
It is necessary to use digital technologies in the process of learning and teaching	3.45%	6.90%	15.52%	50.00%	24.14%
Web sites are useful for teaching and learning	2.59%	3.45%	19.83%	51.72%	22.41%
Digital teaching aids are better than physical teaching aids on improving learning	13.79%	4.31%	35.34%	10.34%	6.90%
The use of digital technologies by the teacher has a positive impact on student learning	3.45%	12.93%	25.86%	47.41%	19.83%
The use of digital technologies by the teacher has a positive effect on student motivation	2.59%	4.31%	18.97%	61.21%	12.93%
The use of digital technologies by the teacher has a positive effect on student involvement	2.59%	12.93%	38.79%	38.79%	6.90%
The use of digital technologies by the teacher has a positive effect on student satisfaction	3.45%	4.31%	32.46%	52.59%	6.90%
Students should be prohibited from using cell phones at school	10.34%	33.62%	30.17%	12.07%	13.79%
Using a new software is easy for me	5.17%	29.31%	23.28%	31.90%	10.34%
Using a new website is easy for me	1.72%	17.24%	17.24%	44.83%	18.97%
Using a new electronic device is easy for me	3.45%	7.76%	19.83%	49.14%	19.83%

When it comes to evaluating equipment, students rate the highest of all the quality of projectors (88.79 adding up acceptable, good and very good), the quality of e-learning platforms (87.93 for the same evaluations), and the Internet WIFI connection (84.48%). E-learning platforms get the best evaluation meaning the highest percentage for good and very good (44,83%). It is important to notice that students in teacher training and at the university in Uruguay use e-platforms regularly, either as repositories and complementary learning environment that extends the experience of the classroom, or in the context of hybrid programs (moodle or schoology are the ones used). E-books and e-textbook frequencies concentrate on acceptable and good and smartboards get fewer evaluations, since 60.34% declare that they do not have this kind of technology. Out of those who have it, only 12.93% evaluate it as good or very good. Table 3 shows details for technical infrastructure.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WiFi internet connection	1.72%	5.17%	12.07%	52.59%	19.83%	12.07%
Quality of cable internet connection	26.72%	1.72%	7.76%	40.52%	20.69%	7.76%
Quality of computers in common areas	6.03%	4.31%	20.69%	49.14%	13.79%	20.69%
Quality of e-learning platform	2.59%	7.76%	8.62%	43.10%	36.21%	8.62
Quality of equipment and projectors	4.31%	4.31%	8.62%	50.86%	29.31%	8.62%
Quality of smartboard	60.34%	0.86%	3.45%	24.14%	9.48%	3.45%
Quality of E-books / E-textbooks	13.79%	9.48%	6.90%	36.21%	30.17%	6.90%

Even though students have shown a positive attitude towards technology, they do not seem to be familiarized with most of the tools surveyed, which are the focus of the SELI project. Educational digital games seem to be the best known since 46.55% say they use them sometimes (34.48), frequently (6.03%) or very frequently (6.03%). It is also the case for MOOCS, which are sometimes used by 25%, frequently used by 9.48% and very frequently used by 12,07%. The technologies that are the least known are blockchain and special ICT tools to support teaching and learning for the deaf or blind or physically handicapped people. Around 77% have never used them. The detailed distribution can be seen in Table 4.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
open learning solution eg. MOOCs, OER	37.07%	16.38%	25.00%	9.48%	12.07%
flipped learning	42.24%	22.41%	21.55%	9.48%	4.31%
digital storytelling	40.525	18.10%	23.28%	8.62%	9.48%
blockchain technology	77.59%	12.93%	5.17%	3.45%	0.86%
educational digital games	28.45%	25.00%	34.48%	6.03%	6.03%
ICT tool for teaching and learning foreign languages	50.00%	24.14%	15.52%	6.03%	4.31%
special ICT tools to support teaching and learning for the deaf or blind or physically handicapped people	76,72%	13.79%	3.45%	3.45%	2.59%
method to support the digitally excluded (eg. elderly, migrant)	66.38%	16.38%	8.62%	3.45%	5.17%

When asked to evaluate the effectiveness of ICT tools, only digital games are evaluated by 82.76%. 37.07% consider digital games good or very good. Blockchain technology, special ICT tools to support teaching and learning for the deaf and method to support the digitally excluded (eg. elderly, migrant), are also pretty unknown by students. 20.69% evaluate MOOCS as good or very good. All values can be observed in Table 5.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	53,45%	2,59%	5,17%	16,38%	16,38%	6,03%
flipped learning	50,86%	6,03%	4,31%	18,10%	17,24%	3,45%
digital storytelling	43,10%	6,03%	9,48%	22,41%	12,93%	6,03%
blockchain technology	75,86%	3,45%	5,17%	8,62%	4,31%	2,59%
educational digital games	17,24%	6,03%	10,34%	29,31%	22,41%	14,66%
ICT tool for teaching and learning foreign languages	43,97%	5,17%	8,62%	21,55%	12,07%	8,62%
special ICT tools to support teaching and learning for the deaf	66,38%	6,03%	5,17%	6,03%	6,90%	9,48%
method to support the digitally excluded (eg. elderly, migrant)	59,48%	6,03%	7,76%	6,90%	10,34%	9,48%

Even though students seem to know little about most of the technological tools surveyed by SELI, interest in learning about these tools is high or very high for most of the cases. It is particularly noticeable for those tools that aim at inclusion of minorities who suffer some kind of exclusion related to physical disabilities, age or migrant condition. But it is important to point out the all of the tools raise some level of interest for about half of the population surveyed.

Table 6. Preferred pedagogical strategies offered in SELI

	Unknow	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	27,59%	1,72%	2,59%	16,38%	36,21%	15,52%
flipped learning	23,28%	1,72%	4,31%	18,10%	36,21%	16,38%
digital storytelling	17,24%	1,72%	8,62%	19,83%	34,485	18,10%
identifying and preventing cyberbullying	18,10%	1,72%	1,72%	10,34%	39,665	28,45%
blockchain technology	35,34%	1,72%	1,72%	17,24%	25,005	18,97%
educational digital games	10,34%	3,45%	0,86%	14,66%	39,66%	31,03%
ICT tool for teaching and learning foreign languages	13,79%	1,72%	0,00%	16,38%	41,38%	26,72%
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	15,52%	2,59%	0,00%	6,90%	35,34%	39,66%
Method to support the digitally excluded (eg. elderly, migrant)	13,79%	2,59%	1,72%	11,21%	43,10%	27,59%

In general terms, students surveyed are active Internet users. Participating as a member of a group seems to be the most frequently used. 81% use it frequently or very frequently. The second in popularity is using a file sharing service. Third, with identical figures, come publishing messages and consuming Internet streaming. Creating videos seems to be the least commonly used of the surveyed activities.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	6.00%	11.21%	18.10%	22.41%	41.38%
Consuming Internet streaming (eg. VOD)	6.90%	11.21%	18.10%	22.41%	41.38%
Creating video	26.72%	36.21%	18.10%	9.48%	9.48%
Using a file sharing service	0.86%	4.31%	16.38%	26.72%	51.72%
Participating as member of a group	2.59%	4.31%	12.07%	30.17%	50.86%
Accessing online services (e.g. e/govern-ment)	16.38%	18.97%	17.24%	24.14%	23.28%
Buying/Selling goods	26.72%	20.69%	20.69%	15.52%	16.38%
Leisure	6.90%	7.76%	12.07%	19.83%	53.45%
other activities	9.48%	4.31%	14.66%	25.00%	46.55%

When teachers to be are surveyed about their use of the Internet for learning, 92.24% declare using it to search for relevant sources to complete online classes for their degree. The figures are frequently (25%) or very frequently (67,24%). This is logical considering that all teacher training programs have some use of platforms, either as extension of the classroom or in a hybrid course format, and the use of the Internet is encouraged. 50.86% study obligatory classes either frequently or very frequently and 50% participate in online study groups.

Table 8. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my postgraduate studies	0%	25.00%	12.07%	12.07%	18.10%	32.76%
Searching relevant sources on the Internet to complete online classes for my degree	0%	0.86%	0.86%	6.03%	25.00%	67.24%
Taking free e-learning courses (online courses - e.g. language, ICT)	0%	20.69%	18.97%	25.00%	16.38%	18.97%
Taking paid online courses	0%	71.55%	8.62%	6.90%	7.76%	5.17%
Participating in online study groups	0%	16.38%	17.24%	16.38%	25.00%	25.00%

The use of mobile devices is also surveyed among pre-service teachers. Sending and receiving photos and messages are the most frequently used applications. Also, cloud data synchronization seems to be highly used, which is consistent with the previous table that shows a population of students that regularly integrates the use of the Internet in their study activities.

Translation to foreign languages is used by 58%. It could be speculated that it mainly corresponds to translation of resources in English, which is the foreign language that is mostly used in study materials, apart from Spanish, the mother tongue and Portuguese, that generally requires no translation due to its similarity.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	1,72	0,00	8,62	19,83	69,83
Sending/receiving photos	1,72	0,00	7,76	20,69	69,83
Using as a hotspot/internet connection sharing	27,59	12,93	14,66	13,79	31,03
Using cloud data synchronization (eg. drobox Google Drive)	11,21	4,31	11,21	18,97	54,31
Translation to foreign languages	7,76	13,79	19,83	19,83	38,79

Students were asked to evaluate their own level of skill in the use of ICT, students consider themselves most skillful of all I use of word processor. Almost 76% believe their skill is high or very high. Presentation software is also among the best used. Students consider themselves much less skillful in the use of Spreadsheet and graphic design programs. Nearly a 44% declare being high or very high in their knowledge of the dangers of the digital world.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word, writer)	0,00	0,86	23,28	38,79	37,07
Using the Spreadsheet (e.g. Excel, Calc)	13,79	18,10	37,93	14,66	15,52
Using the presentation program (e.g. Power Point, impress)	0,00	3,45	27,59	37,07	31,90
Using the graphic program (e.g. Picasa, Gimp)	14,66	32,76	25,86	18,97	7,76
Knowledge about the dangers of the digital world (e.g. cyberbullying, Internet addiction, sexting)	6,90	22,41	26,72	28,45	15,52

When answering the open-ended question about the features of the ideal e-learning platform, Uruguayan students seem to resort to their vast experience in the use of platforms in their own careers. In terms of operation, they want a platform that is visually clear, friendly to the user, fast and flexible, with clearly visible tools. Access must be "on demand" any place any time, allowing work without being connected to the Internet. Accessibility is also understood in terms of inclusion of all kinds of people. This feature, which was not developed, probably refers to availability to people with physical handicaps. When it comes to content, students referred to the quality of diversity, and of being didactic, meaningful and formative, aiming at ongoing learning. They also referred to the ideal content as varied and considering a diversity of learning styles. They expressed the importance of having guidelines and feedback from the teachers. Also, they referred to formats for the content: video streaming of classes and personal libraries. Interactivity was considered, with the possibility of cloud tram-working, group video conferencing and online games.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
Content	Without mistakes With a personal digital library Trustworthy Contributing to meaningful, formative, ongoing learning. Considering a diversity of learning styles A clear course development, easy to follow Not so structured. With a variety of topics. Should allow for streaming classes Didactic Assignments should be easy to understand. Should allow for lots of feedback from the teacher With guidelines to students on how to use the platform
Innovative	Creative With many options Safe Should have sign language Should correct mistakes With an alarm to notify students of changes. Allowing personalization and customization
Operation	Well organized, visually clear and simple. Agile, easy management and attractive. Intuitive, friendly, dynamic. Should never get stuck With instructions Fast, allowing for a great number of users at the same time Flexible Platform tools should be clearly visible
Interactive	Students should be free to interact with the content With a cloud for teamwork assignments Group video conferencing Should have online games.
Availability	Available any place, any time. Accessible without Internet Easy to access and upload information Accessible in many languages Inclusive to all kinds of people Accessible on demand

DISCUSSION AND SUMMARY

The survey reveals a population of student who is in favour of inclusion and to the use of ICT tools for learning. The relevance of inclusion as an orienting value, is undisputed. This belief goes hand in hand with the idea of the teacher's responsibility not to take qualification for granted when it comes to inclusion, and to keep a professional life-long learning attitude.This is consistent with a context in which progressive public policies in the last 15 years have placed the topic of inclusion on top of the agenda.

When it comes to technology use and students' experiences, answers reveal both a high level of use -83.62%- and comfort. It is evident that technology is already part of their study experience, particularly in that they regularly access and use the Internet for resources and also for entering their online learning platforms, a permanent component of teacher programs. Also, students seem to be pretty active users of their mobiles, both to communicate and to keep connected to their reference groups. This is consistent with the appreciation of technologies as motivating, by 74%.

The surveyed population displays a general positive attitude towards technology use, in a context of high connectivity and regular use of classroom projectors and e-platforms. Respondents are also intensive Internet users, with more than 92% declaring that it is a tool for their learning . On the other hand, skill is mostly present in the use of the most traditional tools, such as word processors, or presentations software, and less in the newest and most innovative digital tools. It is evident that the most innovative pedagogical solutions, that integrate ICT and inclusion, are the least known. This creates a favourable context for the agenda of SELI project, particularly in reference to digital storytelling, flipped learning and special ICT tools to support teaching and learning for physically and intellectually disadvantaged people and for people who are digitally excluded for other reasons, such as the age group they belong to.

To conclude, let us bring forward the reminder from previous studies, that teachers to be, believe their training in ICT use has been deficient (INEED, 2015). This idea is confirmed by the analysis of initial teacher training programs (Cabrera C., Cabrera A., Carámbula S., Pérez A and Pérez, M, 2018). Authors compared syllabi in Initial Teacher Training (ITT) in the years 2005 and 2008 and show a setback between current programs and previous ones in reference to the place assigned to digital technologies. Lack of common criteria in the approach of ICT and teaching, added to the fact that teacher education and training keeps on being fragmented in different institutions, and separate from a university context, could also explain part of the road still to travel in the area of preservice teacher education and ICT, in Uruguay.

This study has been a good beginning, that should be followed by randomized similar surveys, to provide important input for further policies regarding ICT as a tool for learning, teaching and inclusion.

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STYLES OF USING ICT BY URUGUAYAN PRE-SERVICE TEACHERS

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INTRODUCTION

Public policies aiming at bridging the digital divide in Uruguay, established in 2007 have put forward the topic of ICT in all areas. Among those policies, Plan Ceibal ("Conectividad Educativa de Informática Básica para el Aprendizaje en Línea", Educational Connectivity/Basic Computing for Online Learning) with the objective of inclusion and equal opportunities for the purpose supporting Uruguayan educational policies with technology, has placed education and technology in the center of the educational debate. Studies carried out in the context of the SELI project, (ERANet17/ICT-0076 SELI. http://project-seli.herokuapp.com/), provide an opportunity for exploring the topic of learning and inclusion with ICT in Uruguay, within the framework of an international perspective. This article presents results of a survey carried out in Uruguay, among higher education teachers in the context of university and teacher training programs. It allows for an initial diagnosis on the attitudes towards inclusion, digital competencies, general accessibility and use of information and communication technologies (ICT). The sample is not representative, but it provides valuable initial information to orient further studies.

SAMPLE CHARACTERISTICS AND RESEARCH PROCEDURE

The research in Uruguay was carried out by a team of education and technology researchers, with a degree in education and in sociology, and adequate methodological experience. The survey was carried out in June 2019, among teachers of public higher education institutions: University of the Republic (UDELAR) and teacher education and training centers[1].

The method for data collection was through electronic questionnaires (google questionnaires) in a non-random manner, using a snowball collection technique. There were 107 teachers-respondents. Participants were recruited mainly in two areas

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[1] In reference to teaching careers, the University of the Republic, the largest university with 77% of university students of the country (MEC, 2017), does not offer graduate programs and degrees which enable teachers to find a position as school or high school teachers. Teacher education and training, in Uruguay, is the responsibility of the Consejo de Formación en Educación (Education training Council).

of the Uruguayan territory: the south of the country: Montevideo, Canelones and Maldonado with 44% of the respondents, and the Northeast area (39% of the cases) in Artigas, Rivera, Cerro Largo, Tacuarembó. 17% of the respondents belong in the rest of the country.

The average age of the participants was 46.41, median= 47, with desv std=10.01. There were 73.83% of women and 25.23 % of men and 0.93% others. The 89,72% were Uruguayans and 10,28 immigrants. As for marital status, 54.21% were married, 14.95% were divorced, 28.04 single, and 2.8% were widow or widower. In terms year of professional experience, the average for the group was 17.5 with std. Dev 11.03, min=0, max=43. About their positions, 93,45% were teachers, el 2,8% directors and 4% had other positions related to the teaching profession. 39,25% were university teachers and 26,17 worked in teacher education and training institutions. 34% also worked in secondary level, and 6% in primary education. 42,05 worked in at least two different educational institutions. 90% of teachers worked in urban schools, 2% in rural areas and 12% in sub-urban regions. In reference to their studies: 49.53% have completed their first cycle teacher education and hold a degree, 29.91% hold a Master's degree and 20.56% have a Doctorate degree.

In general terms, respondents were experienced teachers, almost half were multi-employed, mostly females. 10% evaluate their financial situation as very good, 57% evaluate it as acceptable, 37% as good and 3% as bad.

RESULTS

Evidence collected reveals that teachers in the sample are mostly inclined to believe diversity as an essential aspect to be considered in any conceptualization of learning. 70% strongly agree with the idea and 26.17 agree. Consistently, the same percentage believes that educators must continually develop creative new ways of working with others in a context of diversity. The distribution of answers regarding inclusiveness are presented in Table 1.

Table 1. Inclusion

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think differences of students/learners must be accounted for as an essential aspect of human development in any conceptualization of learning	0,00%	0,93%	2,80%	26,17%	70,09%
I think all educators must believe they are qualified/capable of teaching all learners	10,28%	31,78%	15,89%	24,30%	17,76%
I think all educators must continually develop creative new ways of working with others	0,00%	0,00%	3,74%	26,17%	70,09%

In a context in which almost 89% declare to like using digital technologies and 72% agree that technology has changed our lives in positive ways, 72% consider that it is

necessary to use ICT in the teaching and learning process. More than 68% consider that the use of digital technologies by the teacher will have a positive impact both in student motivation and learning. However, only 34% would argue that ICT necessarily increases student commitment, but more than half would agree or strongly agree that it brings about more satisfaction in students. This positive attitude towards technology is clearly expressed when 65.42% of respondents disagree or strongly disagree with the idea that the use of cell phones should be prohibited at school. Details can be read in Table 2.

Table 2. Attitude to new media

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I like to use digital technologies	0%	2.80%	8.41%	32.71%	56.07%
Digital technologies have positively changed our lives	0%	3.74%	24.30%	48.60%	23.36%
It is necessary to use digital technologies in the process of learning and teaching	0%	8.41%	16.82%	40.19%	34.58%
Web sites are useful for teaching and learning	0%	4.67%	16.82%	47.66%	30.84%
Digital teaching aids are better than physical teaching aids on improving learning	11.21%	23.36%	49.53%	11.21%	4.67%
The use of digital technologies by the teacher has a positive impact on student learning	0%	2.80%	27.10%	42.99%	27.10%
The use of digital technologies by the teacher has a positive effect on student motivation	0%	4.67%	27.10%	41.12%	27.10%
The use of digital technologies by the teacher has a positive effect on student involvement	1.87%	14.02%	49.53%	20.56%	14.02%
The use of digital technologies by the teacher has a positive effect on student satisfaction	0%	7.48%	37.38%	37.38%	17.76%
Students should be prohibited from using cell phones at school	31.78%	33.64%	22.43%	8.41%	3.74%
Using a new software is easy for me	2.80%	3.74%	18.69%	50.47%	24.30%
Using a new website is easy for me	1.87%	2.81%	14.02%	45.79%	35.51%
Using a new electronic device is easy for me	4.67%	8.41%	19.63%	41.12%	26.17%

In terms of technical infrastructure, the survey reveals that all teachers surveyed have access to the Internet. 81,31 express that this connection is at least acceptable (51.40%), good (30.84%) or very good (8.41%). And a total of 83.17% express that the quality of cable connection is either acceptable (33.64%), good (30.84%) or very good (18.69%). When it comes to equipment, 67.29% seem to have computers that could reach a level of acceptability or beyond. The figure is even better for projectors, where approximately 84% comprise those which are acceptable, good or very good. The best figures correspond to e-learning platforms. 90.66% are grouped in acceptable (30.84%), good (50.47%) or very good (9.35%). The piece of equipment that is used the least is the smartboard, which 74.77% say they do not have. Details can be seen in Table 3.

Table 3. Technical Infrastructure

	There is not	Very poor	Poor	Accept-able	Good	Very good
Quality of WIFI internet connection	0%	7.48%	11.21%	51.40%	21.50%	8.41%
Quality of cable internet connection	8.41%	1.87%	6.54%	33.64%	30.84%	18.69%
Quality of computers in common areas	6.54%	13.08%	13.08%	44.86%	14.95%	7.48%
Quality of e-learning platform	1.87%	1.87%	5.61	30.84%	50.47	9.35%
Quality of equipment and projectors	2.80%	4.67%	8.41%	41.12%	34.58%	8.41%
Quality of smartboard	74.77%	4.67%	6.54%	8.41%	5.61%	0%
Quality of E-books / E-textbooks	25.23%	3.74%	9.35%	32.71%	23.36%	5.61%

The survey proposed, explores teacher use of different technologies as a tool for supporting learning. Frequencies of use are pretty evenly distributed for the use of MOOCS, where a total of approximately 69% have had some regular use. Both flipped learning and digital stories appeared among the most familiar tools. Clearly, blockchain technology, ICT tools to support the digitally excluded and the physically handicapped, are the least used of all the surveyed tools. This is a sign that those tools which SELI has signaled as important for inclusion, are areas that require more work to become part of teachers' repertoire.

Table 4. ICT as a tool for supporting learning

	Never	Rarely	Some-times	Frequently	Very Frequently
Open learning solution eg. MOOCs, OER	20.56%	10.28%	21.50%	23.36%	24.30%
flipped learning	37.38%	18.69%	19.63%	18.69%	5.61%
digital storytelling	38.32%	14.95%	25.23%	16.82%	4.67%
blockchain technology	76.64%	13.08%	6.54%	3.74	0%
educational digital games	37.78%	27.10%	17.76%	7.48%	10.28%
ICT tool for teaching and learning foreign languages	55.14%	15.89%	12.15%	11,021%	5.61%
special ICT tools to support teaching and learning for the deaf or blind or physically handicapped people	74.77%	7.48%	8.41%	5.61%	3.74%
method to support the digitally excluded (eg. elderly, migrant)	71.03%	10.28%	9.35%	6.54%	2.80%

When asked about their perception of effectiveness of the different technological solutions, respondents mostly answer that the do not know the tool so as to evaluate it. Particularly blockchain solutions are unknown by almost 80% of teachers who answered. The tools evaluated as most effective are MOOCS, digital games and tools to teach foreign languages. See details below in Table 5.

Table 5. Perception of the effectiveness of ICT solutions in education

	I do not know it	Very Poor	Poor	Accept-able	Good	Very Good
open learning solution eg. MOOCs, OER repositories	21.50%	5.61%	5.61%	14.95%	34.58%	17.76%
flipped learning	36.45%	5.61%	6.54%	12.15%	20.56%	18.69%
digital storytelling	39.25%	3.74%	5.61%	14.95%	27.10%	9.36%
blockchain technology	76.64%	0.93%	5.61%	6.54%	7.48%	2.80%
educational digital games	27.10%	7.48%	8.41%	15.89%	28.04%	13.08%
ICT tool for teaching and learning foreign languages	40.19%	4.67%	1.87%	14.02%	27.10%	12.15%
special ICT tools to support teaching and learning for the deaf	60.75%	5.61%	1.87%	11.21%	11.21%	9.35%
method to support the digitally excluded (eg. elderly, migrant)	59.81%	5.61%	0.93%	13.08%	10.28%	10.28%

Teachers show some degree of interest in or high interest in all of the tools addressed by the SELI project. Interest is particularly high in flipped learning, 67,29% are interested or very interested. In digital games 63,55% are interested or very interested and in digital storytelling 60,75% for the same categories. They seem to be the least interested in tools for teaching and learning a foreign language. It can be speculated that this is due to the fact that language learning in Uruguay is not perceived as a barrier, due to the fact that most immigrants are also Spanish speakers, and English, which is the most widely taught foreign language, is the subject of English teachers, which is a subgroup within the whole group of teaching professionals. All the data collected in this topic can be read in Table 6.

Table 6. Preferred pedagogical strategies offered in SELI

	Un-known	Not interested at all	Not interested	Neutral	Interested	Very interested
open learning solution eg. MOOCs, OER Repositories	7.48%	2.80%	11.21%	19.63%	37.38%	21.50%
flipped learning	11.21%	0.93%	6.54%	14.02%	39.25%	28.04%
digital storytelling	13.08%	0.93%	9.35%	15.89%	42.99%	17.76%
identifying and preventing cyber-bullying	11.21%	0.93%	15.89%	12.15%	35.51%	24.30%
blockchain technology	28.04%	0.93%	4.67%	14.02%	30.84%	21.50%
educational digital games	9.35%	2.80%	6.54%	17.76%	34.58%	28.97%
ICT tool for teaching and learning foreign languages	14.08%	5.61%	17.26%	25.23%	22.43%	14.95%
Special ICT tools to support teaching and learning for the deaf for physically and intellectually disadvantaged people	17.76%	3.74%	17.76%	14.95%	22.43%	23.36%
Method to support the digitally excluded (eg. elderly, migrant)	17.46%	1.87%	14.95%	18.69%	26.17%	20.56%

The following table shows how surveyed teachers use the Internet. The data collected reveals that respondents are very active in the Internet, particularly publishing messages (83.18% do it frequently or very frequently), using file sharing services (87.85 % do it frequently or very frequently) and participating as members of a group (88.89% frequently or very frequently). Also, leisure activities (almost 78% for frequently and very frequently) and assessing online services and e-government (71.04%) are high in frequency. The least common activity is creating videos. But in general, these answers reveal a high level of involvement in the Internet.

Table 7. Use of internet (including social networks and instant messaging apps)

	Never	Rarely	Some-times	Frequently	Very Frequently
Publishing messages on Internet	5.61%	3.74%	7.48%	15.89%	67.29%
Consuming Internet streaming (eg. VOD)	16.82%	7.48%	14.95%	12.02%	46.73%
Creating video	28.04%	19.63%	23.36%	17.76%	11.21%
Using a file sharing service	1.87%	0.93%	9.36%	20.56%	67.29%
Participating as member of a group	1.87%	2.80%	6.54%	24.40%	64.49%
Accessing online services such as e-government	5.61%	4.67%	18.69%	28.97%	42.07%
Buying/Selling goods	14.02%	14.02%	19.63%	28.97%	23.36%
Leisure	7.48%	4.67%	10.28%	22.43%	55.14%
other activities	10.28%	4.67%	13.08%	31.78%	40.19%

Questions referring to the use of Internet for learning (Table 8), show interesting results. 77.57% of respondents, very frequently search for sources of information in the Internet, to complete online classes for their degree. Almost 15% do it frequently and 9.35 do it sometimes. This totals a 98% of surveyed teachers who make use of Internet resources in their studies. Also, almost 60% have studied an obligatory course in their postgraduate studies, online. Considering that 50.47% have declared having obtained a postgraduate degree and knowing that there are not many postgraduate study programs offered in education, in state-owned universities or teacher education centers, teachers seem to be resorting to online courses distant from their homes and probably abroad, as a chance to get postgraduate degrees. It seems that the Internet, by providing both resources and opportunities to attend online postgraduate courses, plays a crucial role in teacher development in Uruguay. Considering that this is not a representative sample, it would be interesting to carry out further studies that test this hypothesis.

Table 8. Usage of internet for learning

	Does not apply	Never	Rarely	Some-times	Frequently	Very Frequently
Study in an obligatory online course in my career or in my post-graduate studies	0%	19.63%	4.67%	15.89%	13.08%	46.73%
Searching relevant sources on the Internet to complete online classes for my degree	0%	0.93%	0.93%	5.61%	14.95%	77.57%
Taking free e-learning courses (on-line courses - e.g. language, ICT)	0%	12.15%	16.82%	13.08%	17.76%	40.19%
Taking paid online courses	0%	51.40%	14.02%	7.48%	10.28%	16.82%
Participating in online study groups	0%	29.91%	14.95%	9.35%	18.69%	27.10%

As for the use of mobile devices, such as smartphones or tablets, respondents reveal a very high level of use, particularly for sending and receiving messages and photos. In both cases, frequent and very frequent users are around 95% (94.39% for sending photos and 96,26% for sending are receiving emails). Also, the use of cloud data synchronization is significantly high. Almost 80% declare using it frequently or very frequently. When asked about using hotspot/internet connection sharing, approximately 25% declare that they never or rarely do it.

Table 9. Usage of mobile devices

	Never	Rarely	Some-times	Frequently	Very Frequently
Sending/receiving emails	0%	0.93%	2.80%	5.61%	90.65%
Sending/receiving photos	0%	1.87%	3.74%	11.21%	83.18%
Using as a hotspot/internet connection sharing	17.76%	7.48%	22.43%	13.08%	39.25%
Using cloud data synchronization (eg. dropBox Google Drive)	0.93%	5.61%	14.02%	14.95%	64.49%
Translation to foreign languages	12.15%	6.54%	21.50%	26.17%	33.64%

When asked about their own skills in the use of ICT, respondents considered themselves skillful in the use of word processor and software for presentations. The figures were 86,91% for high or very high level of skill for the former, and 77,57% for the latter. The third skills that respondents considered themselves skillful at, was the use of spreadsheet, with a 66.36% of high or very high-level responses.

Table 10. Perception about the level of ICT skills

	Very low	Low	Medium	High	Very high
Using the text editor (e.g. Word. writer)	0.93%	0%	12.15%	33.64%	53.27%
Using the Spreadsheet (e.g. Excel. Calc)	3.74%	3.74%	26.17%	34.58%	31.78%
Using the presentation program (e.g. Power Point. impress)	0%	0%	22.43%	30.84%	46.73%
Using the graphic program (e.g. Picasa. Gimp)	14.02%	28.97%	28.97%	20.56%	7.48%
Knowledge about the dangers of the digital world (e.g. cyberbullying. Internet addiction. sexting)	9.35%	15.89%	28.97%	27.1%	18.69%

The questionnaire included the question about which features the ideal e/learning platform should be like. Teachers listed many features that have been systematized in Table 11 in different categories related to user/friendliness, content, visual and audio display, nonstandard features, availability, needs and reliability. User friendliness, a term used by 42% of respondents, is understood in terms of being simple, clearly organized, organic, allowing easy navigation and an intuitive interaction. These traits are associated to a clear and attractive graphic display.

In terms of content, teachers refer to the need to share resources with other colleagues, and to having content that adapt to different learning styles. Also, this relates to the idea of content being expressed in a friendly language. As for the non/standard features named, many refer to the notion of flexibility. The term was addressed in multiple meanings, mainly to refer to the possibility of including multimodal resources, to adding modules, also allowing interoperation with other platforms and other sites in the web. Flexibility also meant that it should run in different devices, including mobile.

When teachers referred to needs, they named the possibility of having synchronic communication with students. They also referred to certain connections between the platform and the institutions. This means, for example, that the platform would be able to provide official certification. It would also be designed according shared agreements among the institution, students and teachers. Reliability was also a need with its own definitions, mainly safety and stability, with good online support.

Table 11. Features of the ideal e-learning platform

Category	Exemplary answers
User-friendliness	Simple. friendly interface. Possibility to personalize Easy navigation between tools and resources Adapting to your needs and teaching objectives With tutorials and feedback Clear language Organic
Content	Allow the teacher to share resources in her own course and with other teachers Considering different learning styles
Visual and audio	Attractive and clear design. Good audio. Good graphic display
Non-standard	Flexible: adaptable to easily adding modules. Open source Able to add external digital tools, outside the platform A version for mobile phones Multi-device
Availability	Accessible With friendly language With easy access
Needs	Allowing synchronic interaction with students. like chatting and video conferencing. Able to provide official certification The result of a consensus among students, authorities and teachers
Reliability	Allowing for human support and contact Safe and stable With good support online when you have problems

CONCLUSIONS

12 years have passed since the beginning of Plan Ceibal. Considering that 2019 is the first year that children who have participated in this plan, have grown and reached higher education, it is now great timing to know if institutions in charge of higher education will provide continuity to learning processes using ICT. One of the questions would be whether teachers in charge, are ready for the challenge.

Even though results cannot be generalized to the whole population of Uruguayan teachers, it can provide valuable exploratory data, that would raise relevant questions for further studies, about teachers, their attitude towards inclusion in education, towards ICT as a tool for inclusion and also, about conceiving the ideal online platform, as an environment for educational processes.

This group of teachers express sensitivity and a positive attitude towards educational inclusion. In fact, almost 97% express agreement or strong agreement

with the statement that differences of learners must be accounted for as an essential aspect of human development, in any conceptualization of learning. This attitude is consistent with a steady display of public policies towards social inclusion, throughout the last fifteen years of the progressive governments in Uruguay.

The second conclusion that can be drawn, is that there is a positive attitude towards the inclusion of ICT in education. In a context in which almost 89% declare to like using digital technologies and 72% agree that technology has changed our lives in positive ways, 72% consider that it is necessary to use ICT in the teaching and learning process. More than 68% consider that the use of digital technologies by the teacher will have a positive impact both in student motivation and learning. Consistently, 63.63% of respondents disagree and 31.78% strongly disagree with the idea that the use of cell phones should be prohibited at school. Details can be read in Table 2.

Connectivity to the Internet is one of the higher points, together with e-platforms. This situation is consistent with a national context of public policies displayed in Uruguay (Plan Universal Hogares, Plan Ceibal) that have been effective in reference to digital inclusion (ITU, 2018), and to the widespread use of platforms both at university and teacher education centers. When it comes to equipment, more recent technology, such as smartboards, are virtually unavailable.

In terms of use of ICT technologies applied to learning, teachers seem to be more familiar with more traditional tools, such as word processors and presentation software, but they are less familiar and therefore less able to evaluate the effectiveness of more recent ICT tools such as special tools to aid inclusion of the physically handicapped or those to support the digitally excluded. Solutions addressed by the SELI project, seem to be among the least known among teachers. At the same time, they show interest in learning about them, particularly those that could be applied to flipped learning, educational digital games and digital storytelling. It can be concluded that, in a national context where there has been a display of inclusive public policies both in education and in digital inclusion, data confirm that the inclusion of the physically disabled, still has a long path to travel in order to improve (Viera, A., Zeballos, Y., 2016).

Replies about uses of the Internet and ICT, also reveal that they have become highly important as a medium or access to professional development, both in terms of access to resources and in terms of postgraduate studies. Considering that postgraduate studies in education are scarce in public institutions, and inaccessible due to territorial exclusion -that is, living far from centers where these studies are offered— digital technologies seem to be facilitating this access to postgraduate studies in education and specialized knowledge in the area.

When it comes to sharing perceptions about how e-learning platforms should be, the richness of ideas reveals a level of familiarity which, in some cases involves very precise notions such as open source, open resources, accessibility, etc. Also, the positive predisposition towards inclusion and the open attitude manifested as interest in certain ICT tools, provide promising grounds to a project such as SELI. In that sense, it is believed that fostering teacher development processes by trying out and testing new platforms and tools, could provide new opportunities for teachers to gain knowledge in the area. (Tomczyk, Ł., Oyelere, S. S., Puentes, A., Sanchez-Castillo, G., Muñoz, D., Simsek, B., ... & Demirhan, G., 2019).

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Many countries across the globe have shown increased attention on the relevance of applying information and communication technology (ICT) in the school settings. The focus has been to understand the kind of ICT skills and competences that are essential to successfully integrate and use ICT in teaching and inclusion process. Hence, this research highlights the perspectives of teachers regarding the integration of ICT in teaching process and addresses the issues related to digital inclusion of teachers.

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