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O1 – DIGITAL POLICIES IN SECONDARY EDUCATION IN EUROPE

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This study was conducted within the framework of the ERASMUS + **ANGE** strategic partnership project (Digital anchoring in institutional governance).

This study is the subject of intellectual production **O1 – Digital policies in secondary education in Europe** and was conducted in joint writing by the researcher – partners of :

France – Institut Catholique de Paris
Espagne – Université de Salamanque
Roumanie – Université de Craiova (coordination)

The ANGE project is supported by 9 European organizations :

AECG (Catholic Teaching Association of Gironde) -France
ICP (Catholic Institute of Paris) -France
University of Craiova-Romania
Paul Claudel High School in Hulst, Paris-France
Rakovski High School in Burgas-Bulgaria
University of Salamanca-Spain
Zawm School St. Vith-Belgium
High School Novida Loïmaa-Finland

A CEGEP from Eastern Quebec (La Pocatière), recognized for its quality, excellence and innovation, is a partner of the project for its strong added value in the digital anchoring and governance.

The ANGE project was launched on September 1, 2017 and will end on August 31, 2020 and has two priorities:

1. Promote more open, more innovative education systems more anchored in the digital age
2. Strengthen the profiles of teaching professions by training and developing the professional skills of all actors (school heads, teachers)

This project aims to respond to the encouragement of the creation of networks and communities of practice focused on learning to pave the way for innovation at European level. It builds on the specific skills of each country and institution participating in the project in the digital domain, in order to create a team of European trainers competent in this field and coaching between European institutions.

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INTRODUCTION

This study focuses on "a learning society, which facilitates individual and collective learning (...) and that it is based on research, on the possibilities of digital and opens to innovations from all countries". The core values of a learning society are inclusiveness, trust, sharing and cooperation. They encourage the pooling of everyone's experiences, to enable progress for everyone.

"Encourage experiential learning initiatives in the territories to prototype, document, share and evaluate promising projects for the benefit of all, create digital learning ecosystems, stimulate research for education, reinvent and enrich the training backed by the looking for actors in the learning society, inviting our partners to co-build a Europe and (perhaps) a planet "are global actions to achieve this current and shared goal.

Training and education are essential for the social and economic progress of a country and justify the adjustment of qualifications to the needs of the labour market. In an increasingly global and knowledge-based economy, Europe is demanding well-qualified workers to compete in terms of productivity, quality and innovation.

Education policies are one of the fundamental pillars of society to ensure sustainable and sound growth.

According to Fullan, "we must invest in new practices that integrate pedagogy and technology, pedagogy being the driving force". Create a learning environment where students develop the skills to improve their performance today and contribute to the society they will live in tomorrow. The pedagogical integration of technology is a privileged means of creating such a learning environment.

Improving the skills of workers or future workers boosts productivity with positive effects on production, employment and purchasing power. Training and education also promote the development of active and equal citizenship, personal development and integration and social cohesion.

It is important to identify and manage more efficiently the acquisition and development of skills and qualifications required for citizen participation in the business world in order to avoid gaps and gaps in social immersion. Hence the need for a fundamental harmony between the labour market and the education sector.

Each EU country is responsible for its own education and training systems. The main objectives of EU policy are to support national activity and to help tackle common problems, such as the aging of society, the shortage of skilled workers, technological advances and global competition. The objectives, instruments and cooperation agreements at European level can be found in the Education and Training 2020 Strategic Framework. Beyond a simple public and social policy strategy, Education and Training 2020 is also a "forum exchange of good practice "- with regard to reforms and policies in the field of education and training. The European Union is carrying out a series of country analysis in order to assist member countries in their education and training policies. These analyzes respond to the problems noted at the regional, national and / or European level and identify progress in the implementation of reforms at national level in order to anticipate the necessary investments.

According to this model, the ANGE Project tries to offer exchanges of good learning practices to the partners involved and tools for the development of digital policies based on country-specific analyzes.

Study's structure

The study "Digital Policies in Secondary Education in Europe" has a theoretical and applicative character and is articulated around 2 axes:

- a first part, consisting of three chapters, in which are presented conceptual boundaries on the digital economy, digital skills but also the main texts relating to European policy in the digital domain (in particular, the Education and Training 2020 Strategy). The third chapter of the theoretical part is the result of a secondary data analysis useful for building a "country profile" on digital anchoring for each of the 7 partner countries of the ANGE project: Belgium, Bulgaria, Spain, Finland, France, Quebec (considered an example for its good practices), Romania.

- the second part of the study presents the analysis of the main results in a Trend Questionnaire, which was answered by 191 people (heads of institutions, administrators, digital technicians, teachers) from the seven partner countries. It is composed of two chapters; a first chapter presenting the methodological benchmarks of quantitative research (objectives, methods, tools, calendar of activities, research limits) and a second chapter, presenting the results recorded in the 57 questions of the Trends Questionnaire and their analysis.

The results are presented in the form of general analyzes and bi-varied analyzes correlated to the countries of the respondents and are presented in the form of tables, graphs and interpretations (from a comparative point of view).

Work methodology

This study is the result of a collaboration (joint writing) between the teachers and the students enrolled in Master of three universities: the University of Craiova (Ucv) - Romania (5 students), the Catholic Institute of Paris (ICP) - France (10 students) and the University of Salamanca (US) - Spain (2 students).

In each university, a tutor supported and accompanied the student in his research work, documentation, writing of the text and interpretation of the results.

To carry out the joint writing, a 6-month schedule (December 2017-June 2018) made it possible to define the methodology to be put in place and the scheduling of the necessary work meetings between the students and the tutors of the three countries, in order to divide tasks, exchange information, transfer work practices and documentation. These meetings were conducted via Skype or Zoom conferences. Students also had a collaborative workspace (Etwinning Twinspace) and messaging.

The content of the study has been structured in such a way as to guarantee the active participation of each student in individualized work tasks, which can be integrated into their semester / master thesis project supported in each of their respective universities. Each student was involved in both the theoretical and the application part of this study. To establish country profiles (Chapter 3.2), each of the three institutional partners involved had well-defined tasks :

- students from ICP (France) have established a country profile for France and Belgium; - UC students (Romania) have country profiles for Romania, Bulgaria and Quebec (based on information provided by the partner -Cegep La Pocatière); - USAL students (Spain) built country profiles for Spain and Finland.

Regarding the second part of the study, the working methodology was specific to quantitative research (widely described on pages 138-140) and collaborative between the 3 universities and Cegep du Québec :

Québec	- Finalization of the questionnaire (described in Part II of the study and sent to schools in each country. - Creation of an Excel database for census and unification of the results to the questionnaires in French / English.
Romania	Transposition of results into the SPSS program
France Spain Romania	Analysis and interpretation of questionnaire results by students from 3 universities.
Romania	Collection of information and structure in unitary form for the final version of the study.

Limitation of the study

As with any empirical study, this study may have certain limitations. ANGE is a project that involves only 7 countries; therefore quantitative research could not be constructed on a representative sample but on an exploratory group of 191 respondents and the results obtained can not be extrapolated to a company level and considered as a general trend.

On the other hand, online questionnaires can lead to the emergence of certain limits of a study (higher margin of error, impossibility to control non-responses, difficulties of analysis of open and multiple responses).

Finally, in this project which groups together 7 different countries, it was almost impossible to propose a questionnaire in a classic version using the survey operators. To account for all these parameters and to reduce the possible limits of the study, the data were processed using the SPSS Data Editor (SPSS).

CHAPTER 1
CONCEPTUAL DELIMITATIONS

1.1. Digital economy / European digital policies

The simultaneous development of telecommunications and the use of computers has made possible the explosive growth of the Internet and the creation of certain specific technologies that have essentially influenced social and economic activities at the level of the European Union.

At first, the digital economy was named the new economy or web economy, e-economy, Internet economy, virtual economy through its connectivity dependence on the Internet.

The concept of the "new economy" (the digital economy) focuses in particular on the current transformations of economic activities as a result of the use of digital technologies that ensure the access, processing and storage of information in a digital economy. less expensive and easier way. The new economy is characterized by the intensification of the incorporation of knowledge of new products and services, the growth of the importance of learning and innovation, globalization and sustainable development.

The main components of the digital economy are digital products, consumers, sellers, business infrastructure, intermediaries, maintenance and support services, website creators.

The new economy abides by the principle that "the more people involved, the greater the benefit to each person involved".

The new economy is based on specific objectives :

a) **a) The Digital Agenda (D.A) for Europe,** adopted in 2010, is one of the 7 flagship initiatives of the "Europe 2020" strategy, implemented by the European Commission, which recognizes the driving role of information and communication technologies, and in particular the internet, in endowing Europe of smart, sustainable and inclusive growth. "The overall goal of the Digital Agenda is to deliver sustainable economic and social benefits through a fast, high-speed, digital single market and inoperable applications." The promotion of digital technologies would boost the European economy with two perspectives, that of support for citizens and that of support for European Union companies.

The Digital Agenda defines 7 priority areas of action to tackle the obstacles in exploiting the potential of ICT :

1	Create a digital single market	To allow commercial and cultural content and services to circulate across borders by strengthening the telecommunications market.
2	Increase interoperability	Increase interoperability Enhance the effective interoperability of IT products and services with open standards and platforms.
3	Strengthen internet security and user confidence	Address the development of cybercrime and the problems of respect for fundamental rights and the protection of privacy.
4	Allow fast access to the internet	Adopt broadband for all and facilitate investment in new fast, open and competitive Internet networks.
5	Increase investment in research and innovation	Leverage private investment and better coordinate available resources to create a favorable business innovation environment.
6	Foster culture, skills and digital integration	Address the lack of professional qualifications related to the ICT field and the lack of a digital culture.
7	Using the benefits of ICT for the society of the European Union	Exploit the potential of ICT to contribute to the regulation of societal issues such as climate change and the aging of the population.

The digital agenda sets specific goals :

Broadband : the single European telecommunications market	Guaranteeing everyone access to basic broadband services
	Ensure equal access for all consumers to products and

Unique digital market	services to create the right environment for Europe's innovative, dynamic and safe innovative ecosystems and to ensure that every citizen, business and European government can rely on services online and benefit from the digital revolution (Domains: online shopping, cross-border e-commerce, IMM selling online)
Digital inclusion	Promote the use of the Internet for all, including disadvantaged people and people who have never used the Internet
Public services	Interact online with public authorities and send electronic forms to them

b) Investments in individuals, especially in young people, is a major priority for the European Union (Communication from the European Commission to the European Parliament 940.941 / 2016) whose essential message is that the level of quality of education is decisive for prospects and chances of success in the lives of young people. This initiative is based on "The New Agenda for Skills in Europe".

c) **Education** also plays a fundamental role in the European pillar of social rights.

The strong idea is that only high quality education for all will help Europe to achieve its economic and social goals.Schools play a vital role in lifelong learning and more actions will improve the quality and performance of education.

Important challenges are to be met:

• Bridging gaps in skills development at the level of education.

• Respond to the pace of technological and digital changes that profoundly affect the economies and societies facing our schools.

To meet these challenges, reforms and measures are needed, particularly in three areas :

1. <u>Development of the best schools more favorable to inclusion</u>

In this respect, the European Commission :

- strengthen cooperation between schools by facilitating access to school partnerships and student mobility under the Erasmus + Program;
- contribute to the optimization of digital and intercultural learning through eTwinning promotion;
- Develop an instrument for self-assessment of numerical ability so that EU schools can self-evaluate and reveal maturity of criteria evaluation and to support them in

developing and improving the effective use of technologies for learning in the digital age. Through this tool, schools will be able to report on progress in the availability, use, skills and attitudes of information and communication technologies, and create a database in all areas of the world. participating Member States.

1. Support of teachers and school heads for better quality of teaching-learning

Digital technologies can enhance learning and support innovation in schools. When used appropriately, digital technologies can enrich learning experiences and support development beyond digital skills.

1. Achieving more effective, equitable and efficient governance of education systems

The European Commission will create online communities and resources for teaching staff, including new eTwinning opportunities for future student teachers, online networks for early career teachers and mentors, online courses (including MOOC), exchanges of best practices between providers of initial teacher training courses and a digital skills framework to support teacher self-assessment and development.

Collaborative environments and digital technologies can enhance teacher learning. Traditional workshops and training courses held outside the school still predominate. Innovations in the field of education, such as Collaborative Collaboration Networks, Massive Open Online Courses (MOOCs), and sharing of open educational resources, can complement these methods and can help overcome barriers to participation.

d) Importance of the digital economy

The digital economy presupposes a higher consumption of design work, a high qualification, which creates higher added value, new jobs, virtually unlimited segments of business opportunities and creativity, by the existence certain flexible and interconnected standards that facilitate the need for integration and / or individualization of various consumers.

Thus, we note that the Digital Economy is growing 7 times faster than other economic domains and a significant part of this growth has been stimulated by broadband Internet.

The importance of the digital economy results from specific features :

• The existence of a large number of computers connected to the network

• Operationality of some databases of general interest

• The existence of a strong contingent of computer scientists who implement applications available for use by all individuals

• The will of an investment effort of all the actors of the society

• The depolarization of society through the access of citizens to performance and the acquisition of complete, natural flows at the microeconomic level

e) Structure of the Digital Economy

Four components are identified in the hierarchical structure of the digital economy :

1. Internet infrastructure (telecommunication companies, Internet service providers, those providing support for Internet infrastructure, access to the Internet, and producers of network equipment, computers, suppliers of security products and services) ;
2. The applications of digital economy infrastructure (companies whose products and services allow the optimal use of infrastructure, for the realization of e-business, consulting and service companies that project, build and maintain all types of websites, from the portal to complete e-commerce sites) ;
3. Intermediaries who do not withdraw income directly from transactions, but who earn by advertising, taxes, commissions ;
4. Online transactions (all categories of participants in the chain of supply who perform online transactions). In the context of the digital economy, virtual transactions take place by :

   • Technological innovation in the field of communications

   • Information technology

   • Massive use of the Internet system and complementary systems of the Intranet - Extranet type

   • Dedicated IT services and activities (e-commerce, e-banking, e-government, Internet-shopping, e-education)

   • New forms of work (tele-round trips, virtual office, telecommuting)

   • E-activities (virtual community, tele centers, cybermarketing, tele-education, teleshopping, telemedicine)

   • Online transactions, software-fireware products, generalizable computer program products as concepts specific to IT & C theory and practice

(f) The micro and macroeconomic effects of the new digital economy based on the general principles conducive to its development :

• Conviction (awarness)

• Accessibility

• Availability (availability)

• Existence of the necessary resources (affordability)

• Relevance (appropriatness)

The new economy places the demand, the needs of consumers, who are increasingly involved in the design, production and use of goods and services, from the research and development stage of those in the forefront. this.

The new economy has an interactive and participative character, realizing the interface between supply and demand on a volume surface structured in space and time, much more rigorous.

The role of the consumer increases, especially in the sense that it can become an important source of innovative ideas for the producer or constraint of innovation, in order to maintain or expand the market.

The largest savings are in the electronics industry and the lowest in coal mining, the food industry and health.

ICTs have a complex impact not only on the economy and its efficiency, but on all aspects of social life :

- The capacity to practice democratic rights and civic responsibilities; the Internet offers conditions for a more informed and participatory electorate, with motivated rational behavior;
- The creation of new interactions between the Government and citizens through the computerization of governance (e-governance) and democracy (e-democracy), offering everyone the opportunity to participate in self-governance, instructive and deliberative trials strengthening the foundations of democratic practice ;
- The profound transformation of citizens' behavior from those of the "reactive" type to those of the "proactive" type ; transformation that will develop creativity and innovation ;

- Managerial change through the development of decision-making activity through the optimization of creativity, capacity for innovation, and intellectual training ;
- Teamwork, collaboration and cooperation between employees; key features of the organization of the future;
- The competitiveness of the enterprise that will depend on the ability to move from hierarchical and individual to work to the promotion of collaborative work;
- Individual initiative, solidarity, collaboration and mutual trust at work; determinants of success in the information society;
- Virtual communities transforming groups into learning communities through occasional interactivities, conference forums where interpersonal communication, education and online education can take place ...
- Education and online education (e-training and e-coaching) that can provide education "for all", the immediate dissemination of information, remote coordination, feedback ;
- Digital education with cloud-based technology and tablet use will be common to many schools, and learning via video games and even mobile will be normal ;
- Digital culture ; huge source of knowledge and creativity.

1.2. European projects of digital inclusion in higher education

The development of information and communication technologies (ICTs) is fundamental to Europe's competitiveness in today's increasingly "digital" world economy.

In Europe, more than 80% of young people use the internet for social activities. Mobile access to the internet has increased significantly in recent years.

Yet the use of technology for educational purposes is lagging behind. Not all primary and secondary schools in the EU have broadband connections and not all teachers have the skills and confidence to use digital tools to support their teaching. A recent study showed that in 2015, an estimated 18% of EU primary and secondary schools were not connected to broadband.

EU-wide cooperation, through the exchange of good practices, peer learning and information sharing, has been proven to support the education and training systems of the Member States. members. Common frameworks make it possible to identify effective

solutions, while shared tools such as eTwinning help to increase efficiency and broaden the impact of actions. Innovative practices in the field of education, including digital, exist throughout the Union.

Of those who responded to the public consultation on the Erasmus + program, 68% considered that innovation was extremely important for meeting the needs of the education sector.

Many funds are available to be invested in ICT during the funding period 2014-2020 by European Commission. These investments support the Commission's actions to create a single digital market.

Digital inclusion can be considered in terms of access to computer equipment. There is a strong correlation between the use of digital tools and different economic and social indicators.

Professor Steve Reder of Portland State University has proposed a four-step route to digital inclusion :

• First step: digital access for those who have never used a computer

• Second step: digital taste (users must decide if they want to use a computer and for what purpose)

• Third step: digital preparation ("digital ready")

• Fourth step: digital culture

As examples, several projects carried out in the partner countries of the ANGE project, with funds from the European Commission and on digital inclusion in Europe, some in the social field, others in the field of education.

PARTNER COUNTRIES	
Completion period	
2000-2006	**2007-2013**
BELGIUM	
Area / Theme	
Télécommunications et société de l'information	Inclusion sociale, Emploi et Éducation
Title: High Tech Redeployment in Charleroi The demands that the project encounters are multiple. First, it allows the installation and support of telecommunication applications in companies in the province to strengthen their competitiveness. It then offers them services tailored to their needs	*Title: Training in Computer Animation and Audiovisual Production* *"The Center for Advanced Technologies for Computer Animation, Graphic Design and Printing, which opened in Brussels in June 2012, is synonymous with social inclusion, employment, education and "Michel Boumal, Pedagogical*

and high-level training in telematics and multimedia. It also carries out awareness actions on new technologies. Finally, it is active in the field of research and development, necessary to maintain a leading position in telematics and telecommunications. The university world (the Catholic University of Louvain) has its place in the building of Minerve Telecom, through the Cediti, the Center for Advanced Technologies where are developed various research programs.	*Inspector of the Center for Advanced Technologies, said about this project.* *The center has set up dedicated premises with state-of-the-art training course facilities covering printing, computer animation and audio-visual production. The print job includes digital printing and finishing, including cutting, folding, and stapling. Students have access to offset and digital presses, a plate fitter and a cutting table.*
BULGARIA	
Area / Theme	
	Inclusion sociale, Emploi et Éducation
	Title: Sofia Tech Park creates a unique environment for innovation *The project was to create Bulgaria's first science and technology park, which should host national, regional and international researchers as well as innovative companies to enhance and strengthen the knowledge economy in Bulgaria and the Balkans.* *Sofia Tech Park specializes in information and communication technologies, life sciences and green energy. It should stimulate exchange between academia and business, while supporting start-up companies and innovative ideas, in order to serve as a catalyst for the commercialization of research and to make science and entrepreneurs more competitive in Bulgaria .* *This complements the main objectives of Sofia Tech Park, namely to create and manage a unique environment for innovation and to support the commercialization of new services, products and technologies.* *"Sofia Tech Park will be the missing link in the innovation ecosystem in Bulgaria" (Elitsa Panayotova, Managing Director of Sofia Tech Park).*
SPAIN	
Area / Theme	
Télécommunications et société de l'information	TIC
Title: Andalusia against the digital divide *The goal was to make broadband Internet accessible to all residents, including smaller, more remote communities. On an experimental basis, 25 centers of public access to the Internet are emerging as bridges against the digital divide.*	***itle: Title: Results of cooperation between France, Spain and Portugal on innovative ICT tools to promote personalized medicine*** *The TEMIS project has successfully applied innovative information and communication technologies (ICTs) to the medical sector to reduce the costs of providing health care - including personalized medicine - and thus improve treatment. patients. It has also created a sustainable network of cross-border cooperation in South-West Europe that could be replicated elsewhere.* *The TEMIS project has developed new products that accurately track the daily lifestyle of patients*

	to improve personalized medicine, health care services and medical research. These easy-to-use solutions are relevant for many diseases. *A network of ICT professionals based in Spain (Aragon and Catalonia), France (Midi-Pyrenees) and Portugal (Lisbon) has been set up, and many are showing interest in continuing this collaborative work.*
FINLAND	
Area / Theme	
Télécommunications et société de l'information	Éducation et formation
Title: The project "E-Learning Network for Informal Adult Education" aims to set up a distance education network from adult training centers in the Alliance West Finland (WFA) area. *The creation of an e-learning institute for lifelong learning has been decided, with the following objectives:* *- networking of adult training centers* *- development and implementation of online education* *- deployment of distance learning in cooperation with universities* *- creation of a network bringing together teachers from these centers and sharing experiences* *- development of pedagogy for online education (teacher training)* *- support services for online education (pedagogy and technical services)*	***Title: Entering the digital age - Support Circle for Digital Production Skills Development in South Karelia*** *The project "Support Circle for Digital Production Skills Development in South Karelia" aims to strengthen skills and know-how in digital technology, especially in multimedia, and to network the actors in this field. sector, within and outside South Karelia. The goal is to develop and improve content delivery techniques to enhance the multimedia production capacity of participating groups**.***
FRANCE	
In France, the State offers communities new tools to promote coherent digital development at each territorial level. Network and service coverage data provided by operators and managers will inform this strategic thinking. The following themes will be declined: - economic development - e-administration and e-inclusion - culture, heritage and tourism - orientation, training and digital professions - lessons - smart territories and transport - research and innovation Training is an essential step in the development of both a digital sector and the appropriation of digital tools in all economic sectors. Priorities are defined as part of the Europe 2020 strategy; innovation and research, the digital agenda, support for small and medium-sized enterprises, the low-carbon economy. The Regional Council of Brittany, managing authority, is in charge of the implementation and the good administrative and financial management of the program. The Breton ERDF Operational Program is organized in four	The 2020 strategy focuses on smart, sustainable and inclusive growth, it is based on several guidelines, those of education and training are at the forefront of the staffing qualifications, skills but also the social inclusion. To follow these guidelines, two key themes are highlighted: that of student mobility of teachers and researchers, that of the development of creative cooperation, open to the diversity of actors (political, institutional, economic, social ...). In addition to collaborations between higher education and research institutions, these guidelines encourage the development of mixed partnerships within diverse territories. European higher education and research programs are the opportunity for new links with the economic world, local authorities, and more generally organizations that contribute formally or non-formally to the transmission of knowledge. The French government launched in 2017 its "national strategy of digital inclusion" - Together for an inclusive digital - aiming to help the 13 million French people left on the sidelines by the development of the Internet in the economic and social life. For this, Secretary of State for Digital Mounir Mahjoubi, formally launched working

areas, divided into nine objectives, themselves structured into actions.

The main focus of this study is to develop Brittany's economic performance by supporting research, innovation and businesses, with the aim of: Strengthening the competitiveness of Breton research in the European area and with sub-objectives Support the development of excellence in research infrastructures, Support the integration of Breton research in the European Research Area, Support the development of scientific and technical culture.

In advance, it is proposed to promote the development of digital practices and culture.

groups, composed of elected officials, associative representatives and social organizations. They will be responsible for "identifying and guiding target audiences" - the needs being different in different places -, "structuring networks of places of mediation and training" and finally finding the money.

The fourth working group, transverse, will be mandated to identify the existing digital strategies and make a review, highlighting good practices.

Local actors will have to "build together the most relevant solution" for their territories, with a similar approach, at the departmental level, of diagnosis, choice of the most efficient actors and identification of financing solutions.

ROMANIA

In Romania, infrastructure in schools and the country's economy are key factors in the implementation and subsequently the efficiency of the use of new technologies in education.

As far as teachers are concerned, they certainly find additional resources for the need to use the computer, especially since the preparation of the material needed for the lessons is mainly done at home because of the intensification of didactic and administrative activity in recent years does not provide time or space for lesson preparation at school.

In 2016, Orange Mobile Company launches a project called Digitaliada that it finances from personal funds of 350,000 euros. The goal of the project was to put the students in the gym at their disposal smart tablets with open source applications. They focused on rural school units that had not used any method to master information and computer technologies until now.

Thus, by simply promoting and mastering basic knowledge about using a device with Internet access, students and teachers can take advantage of open-source projects that many large companies launch during of a year. Again, this depends on the funding and level of teacher training in educational institutions.

Other digital implementation projects in Romania include: SEI, Thinkquest (via Oracle), eTwinning (via Comenius), iTeach.

In Romania, one of the most popular virtual platforms is ThinkQuest, a platform created by the Oracle Foundation for Education, which allows for the exchange of ideas and creativity and drives information further afield. developing and improving communication in different languages, teamwork and partnership. For each member to have access to the virtual platform, he must have a protected user account and a personal web page. "ThinkQuest offers opportunities to: create web pages, publish work for other students, create quick courses, send

One of the first programs designed to support and strengthen the teaching process of secondary education through the use of digital technology by the teacher and the student was SEI, it is a very well structured program implemented by the Ministry of Education and Research in 2001. The main objective of this program is to modernize the teaching-learning process using advanced technology.

Another objective of this program is to develop a digital education, as detailed as possible, of the young population. Also ensure the necessary conditions for all students and pre-university teachers, and beyond, to access and benefit from modern teaching / learning tools. Currently, Romanian schools provide students and teachers with the necessary laboratories with computers and all that is needed to effectively manage ICT courses, thus contributing to the improvement of the educational process existing in Romanian schools.

These interactive teaching resources, designed to help the teacher in the teaching process, improve the quality of the learning process among students, and they better understand the information that was explained to them by the teacher. Thus, students are presented not only abstract or static illustrations of the lessons taught by the teacher, but also realistic simulations related to the theme, animations and virtual experiences, but also games, designed to help correct the most information. effectively possible.

Following the realization of this project, it was remarkable at European level, on the basis of the results obtained, that this project was the best choice in terms of education because it is one of the most advanced projects of implication. of computer technology in the learning process. It can also be said that this project is the beginning of one of the most successful and beautiful campaigns for the computerization and

protected messages, create groups of projects, collaborate with other groups or other schools in the world " .	modernization of public education in the world. Another platform in the virtual environment is provided by eTwinning, which is part of the European Commission's Lifelong Learning program, also participates in the Comenius Sector Program and supports the interaction on various topics between European schools thanks to the technologies of the information and communication. In addition, this eTwinning action provides both the support and tools and services needed to help, as much as possible, to initiate short and long-term partnerships in any discipline. Thus, we can say that the main meeting point and workspace of the action is considered as the eTwinning portal, available in 23 languages, already counting about 50 000 members and more than 4 000 projects involving two or more partners. This portal provides teachers with many online tools available for them and with which they can find partners, they can initiate projects and they can exchange ideas, experiences and examples of good practice. The main goal of the tools offered by the eTwinning portal is to get faster and more effective participation to teachers in collaborative activities. The eTwinning program is a program for both teachers and students as well as the entire community. As far as teachers are concerned, it can be said that the eTwinning program facilitates their access to a virtual environment of collaboration and exchange of experiences, partnerships with other teachers and various professional training activities with other colleagues in the field. European countries. In the case of students, the eTwinning (Online Twinning between Schools) projects aim to enable students to communicate with other students from the countries participating in these projects, with the aim of sharing cultural and educational aspects, learning to at the same time, use new technologies with the potential to improve their foreign language communication skills. Last but not least, eTwinning is also a community-based program because online twinning can also lead to community twinning. Some cities have therefore decided to "twin" and strengthen online communication and cooperation through other projects, visits or cultural activities.

1.3. Numerical skills of school heads, teachers, students

The term competence first appeared in the linguistic domain, where it meant the comprehension and the application of the grammatical rules of the system of the language.

According to N. Chomsky, the one who used this concept for the first time, competence is the ability of a speaker to master an abstract system of generative speech rules.

First of all, the term competence was used in connection with the professional training of teachers in the United States, from the sixties and seventies, and later taken up in many European countries.

Competence is now the main indicator in the validation for a profession, regardless of the field of activity or status-role acquired throughout the career.

In the psychopedagogical literature, the term competence has received different meanings, the attempts to define it being numerous and not very precise; most of these definitions do not clarify the differences between this concept and others that are part of the same sphere of notions (ie the notions of ability and ability) or replace the term competence with that of ability and vice versa.

There are several definitions :

• a capacity to mobilize all types of cognitive resources, including information and knowledge ;

• the acquisition of performance in a certain activity, in a certain field which at the same time presupposes knowledge which, according to Perrenoud's conception, can be declarative, procedural and conditional ; skills, abilities, attitudes, experiences of the learner, gathered in structured sets ; the ability to mobilize resources (mainly cognitive) for the explanation, analysis, solution of a complex or practical situation, but also other internal resources, formed, personality.

The term of competence knows other more or less differentiated definitions:

• "Competence is the ability to perform activities related to an occupation or function to the standards defined by the employers" ;

• "Competence means the possession and development of the knowledge and skills, the appropriate attitudes and experiences necessary for good performance in the assumed roles";

• "Competencies are complex structures, of operational value, instrumental, placed between the knowledge, the attitudes, and the abilities and which have the characteristics to ensure the realization of the assumed roles and responsibilities".

As can be seen, the terms competence and competence are intercalated in all definitions. The ability being considered as "the fact of carrying out with ease, precision, finesse, and efficiency of operations or intellectual / mental actions or practical / motor".

Competence mobilizes declarative (which describes reality), procedural (which prescribe a way forward), and conditional (which shows when to start such an action) skills. The training of skills is more than just a valuation of knowledge, it presupposes anticipation, judgment, creation, approximation, synthesis, appropriation of risk. The training of skills highlights our habits and especially our patterns of perception, thought and mobilization of knowledge, information that we have acquired.

Currently, competencies are interpreted as learning outcomes and represent structured sets of knowledge, habits and values.

It is appreciated that there can be no equivalence between skill formulations and different types of goal expression. These can not be reduced or assimilated reciprocally. Competency is the student's ability to solve a certain situation, based on certain habits and knowledge acquired previously.

In synthesizing, beyond the multiple interpretations granted to the term, most theorists of the paradigm of competence agree with the fundamental characteristics that can be associated with the concept analyzed:

- Competence is associated with an action area ;
- Its components are indivisible (knowledge, habits, circumscribed attitudes are intimately linked) ;
- Skills evolve, change in content and operationality;
- Competencies require a continuous process of learning and development;
- Skills interconnect and are specified according to the context in which they are used;
- Skills are refined through the integration of new knowledge and action experiences, the key to effective skills development programs being the identification of learning experiences that will ensure the ongoing development of knowledge and skills sets. skills associated with the skill.

Ioan Jinga understands by the professional competence of the teachers of the educational system : "a set of cognitive, affective, motivational and managerial abilities that interact with the personality traits of the teacher, conferring on him the qualities necessary for

the realization of a didactic performance ensuring the achievement of the objectives projected by most students, and the performance achieved being close to the maximum level of intellectual potential of each.

In recent years, ICT knowledge has become essential in the teaching-learning process, in the development of technology and the emergence of eLearning products. Many recent studies highlight the importance, for and in the class of students, of valuing ICT skills.

Digital competence is one of eight key competencies, embodied in the safe and critical use of the full range of information and communication technologies for information, communication and problem solving in all areas. areas of life.

The key competences of the European Commission

The European Commission has carried out a study over several years (2002-2006), concretized in a final report on the main elements that result from the implementation of the "Education and Training 2010" program in order to make compatible the educational systems of the countries of the world. 'European Union.

The Commission According to the European Commission, key competences are defined as a transferable and multifunctional amount of knowledge, habits (skills) and attitudes that all individuals need for accomplishment and personal development, for social integration and professional inclusion. These must be developed until the end of compulsory education and serve as a foundation for lifelong learning.

Key competencies have a profoundly theoretical character with a high degree of generality. They are classified by domains that include knowledge, skills (habits / aptitudes), attitudes :

1. Communication in the mother tongue
2. Communication in foreign languages
3. Math, Science and Technology Skills
4. Digital Competence (IST - Information Society Technology)
5. Social and civic skills
6. Learning to learn
7. Initiative and enterprise spirit
8. Sensitivity and cultural expression

Defined as a key competence by the European Commission, digital competence appears to be a necessity in the 21st century, essential for education, working life and active participation in society. Digital competence is the safe and critical use of the full range of information and communication technologies for information, communication and problem solving in all areas of life. By its cross-cutting nature, digital competence can be a starting point in understanding and assimilating other key competencies, namely communication, language skills, or math and science skills.

Each competency corresponds to certain knowledge, skills or aptitudes and attitudes. Thus, the characteristics of numerical competence recommended by the European Commission can be presented in a synthetic way :

Knowledge	Skills / Abilities	Attitudes
-Attitudes-understanding and knowledge of TSI nature, role and opportunities in everyday life -the main functions of the computer -the opportunities and potential risks of the Internet and communication using electronic media -the understanding of how TSI can support creativity and innovation -the awareness of issues of validity and reliability of information	-percher, collect and process information -use information in a critical and systematic way, assessing its relevance and differentiating real information from virtual information by identifying links between them -use techniques for the production, presentation or understanding of complex information -access, explore and use the services of the Internet -use TSI to support critical thinking, creativity and innovation	-critical and reflective attitude toward the information available - responsible employment of interactive means -Interesting involvement in communities and networks for cultural, social and / or professional purposes

To understand better the nature of this competency, the European Commission has designed the European Framework for Digital Skills for Citizens, structured in five areas:

1. Digital and informational literacy
2. Communication and collaboration
3. Creating digital content
4. Security
5. Problem solving

The use of eLearning and ICT technologies reconsiders the teaching process ; studies proposing a European profile of e-skills. The concept of e-skills is defined and explained in the recent specialty literature, as an "open process" that builds its identity, enriched by each development of new information and communication technologies, with each new impact of those on the space of education and training programs, whatever the age of application or the nature of the activity envisaged.

A synthetic e-skills profile, as defined in the specialty literature, could include the following 8 basic classes, each of which presupposes a specific skill set :

1. Instructional Design Skills
2. Competences of realization of the informative process
3. Communication skills
4. Usage skills of various programs and applications
5. Management and organizational skills
6. Information skills
7. Supporting skills

In summary, "education and training systems need to change their priorities to ensure that all European citizens have the knowledge, skills and competences to overcome the challenges and professional demands of modern life".

Thus, at present, the focus is on investigating the profile of teacher-specific competencies involved in new information and communication technologies and eLearning in Romanian schools.

Digital competence is considered a central part of curriculum development. It represents the starting point towards the development of the different dimensions of the competence itself, and of certain key competences and general competences namely :

- evaluation of the benefits and costs of information technology
- the use of computer tools - understanding and using IT tools, including hardware, software and multimedia
- Understanding ICT innovations and making smart decisions about the implementation of new technologies
- communication or publication of information
- the use of ICT tools for research and education

• use of available resources - understanding of the forms and methods of accessing sources of information

• social-structural competence - understanding of the social situation and the production of information.

Digital competence therefore represents a methodological model for all school subjects, as well as for broader areas of social practice or lifelong learning.

CHAPTER 2
EUROPEAN POLICIES AND STRATEGIES IN DIGITAL FIELD

2.1. Education and Formation 2020

Each member state of the European Union is responsible for the education and training systems it adopts, European policies only having the role of supporting certain measures taken at national level and helping, in certain cases, to resolve common problems (aging of the population, lack of skilled workers, technological developments, global competition, etc.) by adapting current public policies or creating new policies. This cooperation framework is called Education and Training 2020.

To provide support to EU Member States, platforms have been set up to inform and exchange best practices and their mutual recognition. Working groups composed of experts appointed by the Member States have been set up to ensure the proper implementation of the Education and Training Policy Framework.

In addition, the Erasmus + program financially and financially supports the policy of states wishing to implement new innovative projects that promote learning, education and vocational training.

In education, the following benchmarks for 2020 have been set :

- at least 95% of children aged 4 to compulsory school age should attend preschool education;
- the share of 15-year-olds who do not have enough reading, mathematics and science knowledge should be less than 15%;
- the share of young people aged 18 to 24 who left school too early should be less than 10%;
- at least 40% of people aged 30 to 34 should complete some form of higher education;
- at least 15% of adults should participate in lifelong learning activities;
- at least 20% of higher education graduates and 6% of 18-34 year olds with an initial vocational qualification should study abroad or be part of the training program abroad;

- the proportion of graduates (those aged 20 to 34, who have at least a high school education 1-3 years ago) should be at least 82%. "

In 2014, the Commission and EU Member States took part in an analysis exercise in which they assessed the progress made since the 2012 Joint Report in preparing the following priorities in the field of education at European level . Thus, contributions were made such as the drafting of the National Reports ET 2020, the independent evaluation of ET 2020 done by the entrepreneur Ecorys, the Forum of Education, Training and Youth etc.

After this exercise, the Commission has proposed new priorities for the period 2016-2020:

- knowledge, relevant high quality skills, developed through lifelong learning, focused on learning outcomes for employment, innovation, active citizenship and well-being;
- inclusive education, equality, equity, the absence of discrimination and the promotion of civic skills;
- education and innovative training, including by fully embracing the digital age;
- strong support for teachers, trainers, school heads and other teachers;
- transparency and recognition of skills and qualifications to facilitate learning and mobility of the workforce;
- sustainable investments, quality and efficiency of education and training systems.

2.1.1. Education and Investment Plan

At the level of the European Union, investments in education play a very important role, not only for the Member States but also for the individuals who benefit from them and who can acquire the necessary skills to look for and find a job, but also to integrate into society.

These investments are also reflected in the Investment Plan for Europe, a program launched by the Commission to remove barriers to investment in education and training by 2014. In addition, by updating the Plan, visibility and Increasing the performance of technical assistance for investment projects is desired, also encouraging the intelligent use of existing and new financial resources.

Today, the EU supports regional and national authorities, as well as educational institutions and civil organizations that want to boost investment in education and training.

The material resources come from different European funds, but also from other programs : Erasmus +, the European Social Fund, the European Fund for Regional Development, etc.

Thus, the Investment Plan for Europe can serve several areas such as the modernization of educational infrastructure, the support of students who will become graduates looking for a job, and the strengthening of the knowledge triangle.

2.1.2 Education and training for economic development and employment.

The current Strategy aims to improve the performance of the market economy and the employment rate at EU level through education and training. In this way, one can identify in the strategy that education and training are essential for economic and social progress. Within the framework of the specific operational objectives, the European Commission has shown its intention to reduce the number of dropouts to less than 10% and increase the graduation rate to 40% (until 2020).

The basis of these objectives is that Europe needs a skilled workforce in order to remain globally competitive in terms of productivity, quality and innovation and that we find a high rate of the working population that is deficient. in reading, writing and mathematics (20%). At the same time, almost everywhere in Europe, studies show a gap between the knowledge / skills acquired in school and those sought in the labor market.

The factors contributing to the rise in the unemployment rate and the limitation of the economic growth of the EU states have been identified in the European Commission's current strategy, which proposes several solutions :

- *The open method of coordination, which is a form of intergovernmental policy making that does not lead to binding European legislative measures and does not require EU countries to introduce new laws or amend their laws.*
- *Through the analysis of each country, the European Union helps the member states to improve the policies that target the field of education and vocational training, through a personalized plan of intervention to identify the material needs of investments and evaluate the progress of each state.*

2.1.3 Skills development

An important point highlighted by the Commission in the Strategy is the importance of developing citizens' skills. As mentioned, education and training of citizens are imperative to adapt to the demands of the labor market.

The Commission has therefore taken "European initiatives for the development of skills :

• *Rethinking education to provide practical advice to help EU countries invest in skills to achieve better socio-economic outcomes ;*

• *Recommendation on Basic Skills for Lifelong Learning, to encourage EU countries to integrate basic skills into their strategies for developing education ;*

• *Partnership in the digital sector to address the ICT skills gap and to address hundreds of thousands of vacancies in this area ;*

• *the Entrepreneurship 2020 Action Plan, which emphasized the need for a profound cultural change in Europe through effective entrepreneurship education. It will boost Europe's entrepreneurial potential, remove existing obstacles and revolutionize the entrepreneurial culture in Europe. "*

There are also other European initiatives in the field of skills development that can serve as examples of good practice :

• "ESCO is the European classification of skills, qualifications and jobs and is part of the Europe 2020 Strategy. The ESCO classification identifies and categorizes skills, qualifications, and occupations relevant to the EU labor market and for education and training at European level. It systematically indicates the relationships between the different concepts. "

• "The EU skills panorama contributes to the regular monitoring of needs anticipation and skills assessment at national and European level. It is a central point of access that provides dates and information on trends in skills in different sectors and professions, at national and EU level. "

Currently, the Strategy aims to support the development of citizens' skills:

• Adapt skills to labor market trends

• Introduce the ESCO in the Europass CV, in EURES and in the EU competences panorama

• Ensure continuous and careful monitoring of trends and demand for skills.

2.1.4 Recognition of skills and qualifications

A problem raised by the Commission in the current Strategy is that of the recognition of the competences and qualifications of Union citizens outside their country of origin; very important for young parties studying abroad or for immigrants. To this end, the European Union has put in place an instrument to support transparency and recognition of knowledge and skills, with the aim of facilitating access for EU citizens in all member countries.

So far, several initiatives have been launched to ensure greater transparency and to simplify the recognition of competences and qualifications in the EU:

• the European Qualifications Framework (EQF), which allows the comparison of qualification systems at European level;

• Validation of non-formal and informal learning; until 2018, EU member states were invited to take the necessary steps to implement this validation system;

• Europass;

• The ECTS credit system for higher education and ECVET for education and vocational training.

These measures were adopted following a study conducted in 2014 on the basis of an online consultation.

"The consultation addressed the problems that Europeans face with regard to the recognition of skills and qualifications in the EU. The conclusion was that there is strong support for measures to simplify European instruments for the recognition of competences and qualifications, so that they are more coherent and user-friendly and to ensure that the focus will be more on needs of students, students, workers and employers.

2.1.5 Open educational systems through new technologies

In order to benefit from an open and flexible learning system, we must fully explore the ICT potential, thus improving the education and vocational training systems, adapting them to the digital world. The purpose of these steps is to effectively improve education by promoting personalized, more beneficial and more effective learning.

As stated in the Strategy, the opening of education could enable everyone to learn at any time, anywhere, with the support of all, using any type of tool. The opening up of education through new technologies as well as the diversification of the educational offer play a very important role in achieving one of the aims of the Strategy : to raise the rate of graduates of higher education to 40%.

As the EU estimates that by the end of 2030, the number of students will reach 414 million, which means that education and vocational training systems must become more flexible to meet the needs of the market.

By also facilitating citizens' access to information and making education more flexible, the number of citizens with gaps in basic skills will be reduced. According to EU estimates, in the future, around 90% of jobs will require digital skills, which means that education and vocational training systems will need to ensure and facilitate the acquisition of digital skills for all students.

"Through the Rethinking Education initiative, educational institutions have the opportunity to analyze their organizational models and see what changes are needed to turn challenges into opportunities. "

"In the same way, another determining factor in the implementation of new European policies in this direction is related to costs. At the EU level, some countries have reduced their level of investment in education so that existing resources are used as efficiently as possible.

In September 2013, the Commission launched the Opening of Education, defining the measures to be implemented by referring to the strategic guidelines funded by the Erasmus + and Horizon 2020 programs. The second step was the launch of the OpenEducationEuropa portal. It has been designed to help students and teachers find the open source open source educational resources they need and to promote many quality resources.

The Commission now sets as future objectives to provide "funds to institutions active in this area, using the Erasmus + and Horizon 2020 programs. Projects funded by Erasmus + will have to meet a need for free access; in other words, all educational material will have to be made available to the public through open licenses. The Commission is

preparing a European summit on ICT education in conjunction with the upcoming Italian Presidency of the Council. "

2.2. The Documents of the Working Group on Digital Learning and online

In 2017, in Hong Kong, the 39th International Conference of Commissioners for the Protection of Personal Data and Confidentiality was held. Thus, 54 members from the 6 most important regions of the world gathered : Europe (31 participants), Africa (8 participants), Asia-Pacific (6 participants), North America (4 participants), Latin America (4 participants) , Middle East or Near East (1 participant).

The main goal of this meeting was to implement the "Marakkech Resolution for the adoption of an international Competence Framework on Privacy Education (October 2016)" in order to protect the personal data of internet users, especially for those who participate training courses or online qualification / requalification.

The three main actions taken during this meeting were the following :

1. Implementation of the Education Competency Framework, with a focus on confidentiality in curricula, including their organization, through the use of educational resources available to people of all ages and also, by the proposal of various means of teacher training.
2. The development of the services and content of the CIRCABC web platform through the sharing of digital resources regarding the protection of personal dates and the presentation of educational resources to the educational community.
3. The development and wide-scale use of e-learning platforms by the educational community, online services and applications aimed at them, particularly with regard to confidentiality issues.

In the first action, the main goal was to ensure appropriate coordination and report its use at national / regional level by DPA. For 2017-2018 the following objectives have been defined :

- Continue the exchange of experiences to build good initiatives and to integrate them in school curricula taking into account the protection of privacy and protection of personal data : DPA (Date Protection Authorities) ;

- offer, on the one hand, didactic assistance for courses, and on the other hand, training courses for teachers, in the field of digital (in the form of e-learning or any teaching method).

To successfully implement the second action, the overall objective was to encourage the sharing of resources between DPA, using the platform CIRCABC, reference platform in the field of online education. For this, the following objectives have been established :

- continue to upload educational resources in the field of personal data protection with on-line educational resources, which can help teachers to better train themselves in their area of didactic competence.

- Create a group composed by the CNIL and the CNPD (Commission Luxembourg) which will conduct a study on alternative education, using digital.

With regard to the third action, no general or specific objective has been specified, the information being of an informative rather than a directive nature.

2.2. The Digital Unique Market

The creation of a digital single market in Europe is one of the top 10 priorities of the European Commission ; a digital single market means fewer obstacles but more opportunities, a space where citizens and businesses can operate, interact and innovate legally, safely and at a reasonable cost, making life much easier. The Digital Single Market is one of Europe's greatest achievements, created to allow the free movement of people, goods, capital and services that also offers opportunities for professionals, consumers and businesses. More specifically, European citizens have rights such as studying, working, living and retiring in any country of the European Union.

The single market also allows consumers to access a wider range of products at competitive prices and to benefit from greater protection when shopping online by making cross-border transactions cheaper and simpler.

Why does Europe need a digital single market ? Because in the future "90% of jobs will soon require digital skills. At the same time, the European Single Market has transformed the way Europeans live, work, travel, do business and study. It has opened opportunities for companies to grow successfully in the global market. "

In 2016, the European Commission estimated that the completion of the Digital Single Market could "contribute € 415 billion a year to the European economy and create hundreds of thousands of new jobs". In addition, the employment of ICT professionals is resilient to economic downturns and ICT professionals are contributing to increased productivity in business. It is estimated that "by 2020, the shortage of ICT professionals will reach 825,000 people if no decisive action is taken."

Due to the fact that the rules of the single market are not very well known or have not been applied or are simply blocked by unjustified obstacles, these opportunities do not always materialize. Thus, the digital single market must continually adapt to illustrate the realities of the present, and innovative ideas and new business models must also find their place in the market.

An extremely important factor in the evolution of the digital single market is the economy of the EU Member States. The economic and financial crisis of 2008-2010 has proved itself in the Member States, generating enormous additional social costs. Even now, the unemployment rate is constantly high in Europe, especially among young people, who are supposed to be the engine of European vitality.

In the coming years, 90% of jobs will require a certain level of digital skills. So far, one third of the EU workforce has insufficient digital skills, 19% have a low level and 14% have no numerical skills.

In addition, insufficient investment levels and barriers to service and product markets have affected the competitiveness and productivity of the European economy, with a direct impact on the rate of economic growth, with most firms feeling affected by obsolete and cumbersome regulations. In fact, novelty and global value chains create new opportunities :

- digital technologies are transforming most industrial sectors into a more efficient system and innovative new business models ;

- production and services are increasingly integrated into environmentally friendly business offers that provide customers with added value and, last but not least, smart business.

But on the other hand, innovation implies evolution and casts doubt on traditional economic models and the existing relationships between economic operators and consumers.

In order to deepen the single market, the European Commission published on 28 October 2015 the European Single Market Strategy entitled "Improving the Single Market : More opportunities for citizens and businesses". This strategy is accompanied by a working document providing a general analysis, as well as economic data underlying the proposed measures, as well as a report on the integration of the single market and competitiveness in the European Union and the European Union. Member States.

The strategy responds to the need to revitalize and modernize the single market in order to improve the functioning of product and service markets and to ensure an adequate level of protection for citizens through three main actions :

a) "Creating opportunities for consumers and businesses by encouraging the development of a collaborative economy, supporting the development of SMEs and start-ups, addressing unwarranted and disproportionate restrictions on professional services and sales by retail ;

(b) Encourage modernization and innovation by modernizing the standardization system, adopting measures to streamline the procurement system and strengthening the legal framework for the protection of intellectual property ;

(c) Ensure effective implementation of Single Market legislation by creating a genuine culture of compliance ".

The strategy focuses on practical measures to support the expansion and development of small and medium-sized enterprises as well as start-ups. Other goals are to promote innovation, stimulate investment and empower consumers.

"The Commission has adopted two proposals : one on the provision of digital content (for example, streaming music) and the other on the sale of online products (for example, the purchase of clothes on the Internet). Both proposals address the main obstacles to cross-border e-commerce in the EU : the legal fragmentation of consumer contract law and its high costs for businesses (especially SMEs) and the low level of consumer confidence in shopping online in another country ".

All these measures complement a series of initiatives in various sectors, such as those aimed at improving the functioning of the single road transport market and ensuring compliance with legislation, and are based on economic data, with emphasis on the most important economic points of view.

At the same time, "the steps of the Single Market Strategy should be seen in conjunction with the Digital Single Market Strategy adopted by the European Commission on 6 May 2015, with the aim of stimulating growth and stimulating job creation while removing the obstacles encountered daily by EU citizens and businesses, such as geographical blocking or inefficient cross-border parcel delivery, the inability to connect to a range of available online services or the limitation of digital services at national borders ".

The Digital Single Market Strategy identifies 16 key actions grouped into three categories, setting out the main areas on which the Commission's work will focus as part of the implementation of a comprehensive Digital Single Market strategy :

1. Ensure better access for consumers and businesses to digital goods and services
2. Create the right conditions for the development of digital networks and services ;
3. Create a European digital economy and society with long-term growth potential.

The main directions on which the actions of the European Commission will be concentrated are :

(a) modernizing public administration with ICTs, using key technologies for digitization and computerization ;

(b) facilitate cross-border mobility through interoperable digital public services.

Online platforms play a key role in the innovation and growth of the digital single market. "They have revolutionized access to information for all individuals who have connected with each other in a more efficient way. Action by the European Union is needed

to establish the appropriate framework to attract, retain and develop new innovative entities in the field of online platforms ".

In conclusion, the strategy for a digital single market in Europe aims to transform European society and ensure that it can face the future with confidence. The Commission invites the European Parliament and the Council to endorse and support this strategy in order to complete the Digital Single Market as quickly as possible and to actively participate in its implementation in cooperation with all interested and interested parties.

2.3. The Action Plan on Digital Education

European education and training systems must respond to the challenges and opportunities brought by the digital transformation of education. Since these digital transformations affect personal, social and professional life, it is necessary for everyone to invest in the acquisition and development of digital skills throughout their lives.

The importance of investment in education and training is the key idea developed in education policy documents at European level. In the context of the Gothenburg Summit of November 2017, the European Commission drew up the vision for a European Education Area and announced the Action Plan for Digital Education.

The digital education action plan builds on the two communications adopted in May 2017 : A new EU strategy for higher education and the development of schools and excellent teaching for good start in life. It supports work on the digital single market and the new skills strategy for Europe.

The action plan focuses on implementation and the need to stimulate, support and enhance the appropriate use of digital and innovative educational practices. It has three priorities :

- Improve the use of digital technology for teaching and learning ;
- Develop digital skills and abilities relevant to digital transformation ;
- Improve education through improved data analysis and foresight techniques.

The action plan will be carried out in the context of the European cooperation process in the field of education and training ("Education and Training 2020"). The Action Plan for Digital Education sets out the ways in which education and training systems can enhance innovation and digital technologies, providing real support for the development of

recognized digital skills needed in life personal and professional. This action plan targets schools, education and training in the professional field and higher education.

The changes due to the digital will affect the social life as well in the relational aspect as on the professional one. To face the challenges of digital transformation, every person must invest in developing their own digital skills throughout their lives.

On the basis of the Digital Education Action Plan are two communications adopted in May 2017: a new EU agenda for higher education and the progress of schools and excellence in quality of life. to teach the premises to start well in life.

The action plan has three priorities:

1. better use of digital technologies in the teaching / learning process;
2. the development of digital skills and attitudes recognized as conducive to digital transformation;
3. Improving education through better data analysis and foresight.

In order for EU Member States to meet the objectives, the Action Plan establishes for each priority a series of measures:

(i) Providing the public with some tools that can help teachers and trainers make better use of technologies, including a better Internet connection;

(ii) Specific activities put in place to develop specific digital skills;

(iii) Sustained efforts, but also new efforts to improve education with some hard data and better analysis.

Priority n° 1 :

• Reduce existing connectivity gaps between EU Member States in European schools with the broadband, high capacity connection.

• Support digital education in all general and vocational schools through the development of their digital infrastructure and using the SELFIE assessment tool: Self-reflection on Effective Learning by Fostering Innovation through Educational Technologies that by the end of 2019 this instrument will be used by approximately 1 million people: teachers, trainers, pupils (in all EU Member States and Western Balkan countries)

• Create an enabling environment to confer certified qualifications in the digital domain and to validate acquired digital skills; real, multilingual and storable skills in the professional profiles sections (Europass CV).

Priority n° 2 :

• Create a European digital platform for higher education for close cooperation.

• Strengthen open science and citizen science initiatives across Europe through testing applied to specific training activities.

• Introduce digital programming courses in all schools in Europe.

• Respond to the challenges of digital transformation by launching an information campaign at EU level, as well as taking the initiative to teach cyber security concepts.

• Support measures taken to reduce the gender disparity in technology and entrepreneurship by promoting the digital and entrepreneurial skills of girls.

Priority n° 3 :

• Publish a baseline study that assesses progress with the integration of ICTs into education.

• Launch pilot projects on artificial intelligence and teaching / learning analytics.

• Anticipate the strategic process that focuses on the key trends that result from digital transformation for the future of education systems.

The action plan sets out the European initiatives that the Commission, in partnership with the Member States, stakeholders and society, will launch until the end of 2020.

EU cooperation through the exchange of good practice, reciprocal learning and data exchange is a sure way of supporting the education or training systems of the Member States. Common frameworks help identify efficient solutions, while instruments such as e Twinning increase efficiency and broaden impact.

CHAPTER 3

DIGITAL STRATEGIES AND POLICIES IMPLEMENTED IN EUROPE AND THE PILOTAGE OF INNOVATIONS THROUGH THE GOVERNANCE OF ESTABLISHMENTS

3.1. Analysis of general aspects (in Europe)

The digital economy and the digital society at European level

The basis of this analysis is represented by the annual public reports by Eurostat in "Eurostat regional yearbook", and also by other reports carried out at European level, relevant for the scientific stage carried out within the framework of this work. The analysis presented in this paragraph is based on data on the use of the internet at the level of the European Union (EU).

Thus, we will begin by defining the term internet user. The internet user is defined as "a person who uses the internet in any circumstance; at home, at work, anywhere for private or professional purposes; through any device (computer, desktop, notebook, tablet, laptop, game console or e-book reader) or the type of connection used. Regular internet users are those who have used the internet at least once a week in the last three months prior to the survey. "

By analyzing the data of the Eurostat Report of 2016, we observe the fact that the number of Internet users in the European Union has increased by 3% increased with 3% compared to the year 2015. England, Germany, Denmark, but also Luxembourg have the highest level of internet use (per household) in the course of 2016. Similarly, about 59% of people aged between 16 and 74 have used a mobile device to browse the internet when they are not at home or at work.

Comparing the use of the internet with the analysis of "users of mobile devices or not", we observe that mobile devices are used relatively little in some regions of Italy or Poland. This observation has led to a more in-depth analysis of this phenomenon, and

information on this region has revealed that, generally, people living in urban areas have more facilities to use mobile devices to surf the Internet when they are not are not at home or at work, compared to people living in the countryside.

When "socialization through the online environment" was analyzed, studies conducted by Eurostat identified the fact that 52% of people in the EU-28 region between the ages of 16-74 used the internet for this purpose during the year 2016 (most users resided in European capitals and in the northern and western regions of Europe). In this area, France has been an exception, with internet users in several regions of this country not displaying socialization as the main purpose of use.

Generally speaking, user participation on online social networking sites has been relatively low in several regions of France, Germany, Belgium, Bulgaria, Hungary, Portugal, Romania, Cyprus and Malta.

When analyzing the degree of use of EU government sites at the state level, Eurostat has identified the following information in the EU-28 states:

• The most frequent interactions of users with these sites have been encountered in Holland and the northern states;

• The rarest user interactions with these sites have been encountered in Bulgaria, Italy and Romania.

In 2016, 55% of people in EU-28 regions between the ages of 16-74 used the internet to buy goods or services. It is a percentage almost equal to that of the use of the internet in general. For example, the frequency of users who used the internet to buy goods or services was quite high in the northern and western parts of Europe and lower in the southern and eastern regions. from Europe.

Likewise, this study (which analyzes the information on users in the last three months before 2016) has identified the fact that 71% of the population of the European Union uses the internet at least once a day , for activities like:

• the exchange of emails (71%);

• seeking information on goods and services (66%).

In addition, the data presented in the Eurostat report reveal that one in seven inhabitants of the European Union (14%) has never used the internet.

3.2. Analysis in the partner countries of the "ANGE" project

BELGIUM

3.2.1. The national digital economy : challenges & perspectives (quantitative & qualitative approaches)

Brussels is one of the largest IT clusters in Europe and is one of the regions of the continent where the service activity has a high added value. The city owes this position to the high concentration of American and European IT multinationals. The numbers speak for themselves: 10% of Brussels GDP comes from IT. 68% of people working in the Belgian IT sector work for a multinational IT company.

More broadly, Wallonia has put at the heart of its action the project Digital Wallonia (which is reminiscent of the model of the French label "French Tech"). This label, which embodies the digital ambition of the region, is a support for political action to help the public authorities in the digital transformation. It is an online platform for networking and promoting digital actors. Today, the project brings together actors working on the themes of massive data, open data or code, cybersecurity, food processing, building, health ...

Flanders, for its part, has a reputation as a pioneer in the high-tech industries. It has been one of the first regions to adopt broadband, wireless and satellite communications. It also excels in strategic digital domains and hosts several big names in the development of advanced technologies. With the support of the government and a tightly knit network of private companies and independent research centers, the ICT sector is very powerful. Flanders has considerable know-how in several strategic digital domains: nanotechnologies, banking solutions, telematics and geolocation services, telecommunications and network equipment, digital audio / video, printing solutions and software.

Flanders has a policy of public aids and subsidies, incentives, or the creation of financing solutions to attract high-tech industries, as well as a policy oriented towards R & D. In this sense, higher education is globally renowned. Engineering courses are among the best in the world, particularly in the fields of electronics and computer science or digital media. The most important project that the region has ever carried out is iMinds: an institute that practices open innovation where university researchers partner with industrialists in

development projects that meet the specific needs of the market. Born in 2016, it is the result of a merger between the IMEC nanoelectronics research center and the iMinds digital research center and incubator. A project that brings together 3500 researchers (1000 from Flemish universities) from 70 countries. This new institute thus becomes the first digital research center in Europe with various research themes such as the Internet of Things or digital security.

3.2.2. Policies & Strategies for National Digital Education

The territorial organization of educational policies

It is not easy to simply answer the question of educational policies, curricula and the autonomy of educational institutions in Belgium without giving some context. Without doing a long course here on the institutions and structuring of Belgian society, we must bear in mind that the term-to-term comparison between Belgium and France is not easy, at least on the institutional level, even if the countries are neighbors and have (at least for part of the Belgian territory) the French language in common.

By its history, Belgium has never been a centralized state, and the educational system (among other things) is the result of this history. There are two major axes of decentralization (and therefore, ultimately, autonomy): on the one hand the linguistic break, with three national languages (Dutch, French and German) today organized in a state federal two-tier (regions deal with economic and land-related matters, communities of people-related subjects such as education or culture); on the other hand, the "pillarisation" of Belgian society, that is to say a social organization resting largely on the three great ideological "pillars" that structured Belgium after its independence in 1830 (social Christian socialist and liberal) and each of which has developed specific social institutions (parties, trade unions, teaching, mutual societies, universities, etc.).

The Belgian education system is therefore rather complex because it is the result of the crossing of these two axes: on the one hand, each language community organizes its teaching autonomously (Flemish community, French community - newly named Wallonia-Brussels Federation - and the German-speaking community - which concerns only about ten municipalities in the east of the country), although all arising from the same model. On the other hand, within each of these educational systems, there are what are called "networks" and who are the heirs (more or less direct) of each great ideological pillar.

For example, in the Wallonia-Brussels Federation (French-speaking Belgium), there are three major educational networks:

- the "official" network (that is to say, organized by public authorities: municipalities, provinces or the government of the Wallonia-Brussels Federation, which represents a small half of the schools),
- the denominational subsidized free network (that is to say, organized by the churches, essentially Catholic, and also representing a small half of the schools) or free subsidized non-denominational (organized by entities that are neither public nor denominational, a few percent),
- and finally the free non-subsidized network (organized by private law entities, which is very marginal).

Caricaturing a bit, if we compare with France: the official is closer to public education, subsidized free networks to private education under contract, and the non-subsidized private non-contract.

These networks are overseen by the Ministry of Education of the Wallonia-Brussels Federation, which defines the organization of studies, tests and diplomas, programs (mainly in the form of topics to be addressed and reference skills by discipline or interdisciplines). In addition, for subsidized official and free networks, it pays teachers and subsidizes all or part of the operation of the institutions. The networks are themselves cupolas that will organize "in their own way" the teaching according to the rules of the ministry. For example, Catholic education (in the free denominational subsidized network) will define its own programs on the basis of the structure, benchmarks and certifying tests defined by the ministry. So we have a complex system where programs and diplomas for a given level / stream are supposed to be equivalent (and are recognized as such by law) because they meet the same "specifications", but different aspects (content, organization, pedagogy) may vary because these "specifications" are operationalized differently according to the networks, and within them, according to the establishments or groups of establishments.

Secondary education in French-speaking Belgium does not correspond to the French model "split" between middle school (12-15 years old) and high school (16-18 years old). In principle, students follow all of their secondary education in the same school. On the other hand, there are different "streams" in secondary education (general, technical, vocational), but all of them constitute "secondary education" and cover in principle the 6

years of the course (from 12 to 18 years old).). The appellations of "college", "high school" or "athenée" do not correspond to different levels of education, but are different ways of designating secondary schools generally resulting from institutional traditions.

Lastly, there is the establishment of the VisaTICE platform in French-speaking Belgium, aimed at developing digital skills for secondary school students who are preparing for higher studies and first-year university students. It is also developed for any teacher who wants to work effectively with ICT tools and anyone who wants them. We can learn basic digital rules such as "produce and layout documents", "create a multimedia presentation", "produce and rework an image", etc.

Future plans

French-speaking Belgium is currently engaged in a broad process of reform at all levels since 2015 (subjects, programs, general organization), which includes an effort on the subject of digital inclusion and pedagogical innovation. For now, aspects of the reform are under debate, programs being written, etc., and its implementation is planned for 2020. An online platform has been opened to expose the main lines of the reform and share with citizens the process: http://www.pactedexcellence.be/.

It is a comprehensive reform of the entire education system, from kindergarten to the end of high school. In particular, it is a question of redefining comprehensively the "specifications" and references that networks will translate into programs, as well as the way of organizing them concretely (definition and place of disciplines, evaluation methods, remediation principles, etc.). .). The reform also concerns the management and coordination of schools (without affecting, however, the constitutionally guaranteed networks and freedom of education), for example by defining common management standards and setting up objective contracts. at the institutional level. The ambition is for the reform to be gradually put in place, year by year, starting in 2019.

The objective of this pact is to increase and improve equipment and promote access to content, to set up training, all to be integrated into a logic of overhauling institutional governance.

As part of the digitization of Walloon policy, an "education" axis is also present in the framework of the "Digital Wallonia" project. The agency finances each year several projects on the "Digital School" axis and on various subjects such as mobile class-type equipment,

digital projection multimedia equipment, audio / video studios, storage and access devices. network, robotics or electronics learning kits, management and supervision software.

3.2.3. Piloting innovation through the governance of institutions (State & companies)

By the very nature of the system, the institutions are quite autonomous, although in principle they are part of the general policy of their network. This is especially true for programs. There is one in each network (which is specific to the network) and which operationalizes the repositories and the basic principles defined by the ministry.

Still, the directorates have a very important weight, especially because they are the ones who recruit the teachers, and the institutions can define a "school project" which can set very different axes such as organization, pedagogy, themes to work in dedicated hours, options organized, teacher autonomy or team work, some cross-curricular or remedial teaching, etc.

It is therefore quite difficult to portray an overview of pedagogical innovations in Belgium that is transversal or has a global scope, each institution developing its specific projects, with or without coordination with other institutions or other actors. of the world of education.

Wallonie

As early as 1998, Cybercoles, then Cyberclasses, and more recently École numérique, allowed the installation of a large number of computers and digital equipment. The first Cyberécoles plan helped equip schools with digital equipment. This project is part of a tripartite cooperation between the Walloon Region, the French community and the German-speaking community. Between 2006 and 2013, this process was extended with the Cyberclasses plan, which enabled the installation of 3360 facilities for 800,000 students.

The Walloon Region then takes care of the equipment, while the communities are in charge of organizing the proper integration of these new technologies. This involves teacher training and the establishment of resource persons.

Since 1998, the Brussels-Capital Region has also put in place a "Multimedia Plan", designed to equip secondary schools with computers, servers, printers, tablets, boards, VPs

or network connections (IRISnet). Between 1999 and 2014, 90% of Brussels schools benefited from this plan, ie 570 facilities involving 195,000 pupils.

In 2013, a new project came to complete this plan: "Fiber to the school" which specifically concerns secondary schools. The goal is a connection of all schools to THD in 2019.

Finally, the "Digital School" plan launched in 2011 made it possible to launch 3 calls for pilot projects around the innovative uses of ICTs that have financed and supported nearly 300 initiatives at all levels.

Today, as part of the digital strategy "Digital Wallonia 2016-2019", the Walloon Government intends to extend and perpetuate the "Digital School" system by regularly launching calls for projects that should support 500 digital projects annually (purchase of equipment , installation of a local network and WiFi, school sites ...).

A sum of investments that has undoubtedly increased connectivity and the number of devices available in schools, but has also helped to contribute to the diversity of digital uses.

What form does it take? The 2017 iRUNE survey (Infrastructure, Resources and Uses of the Digital in Education) (following two previous campaigns in 2010 and 2013) reflects this; the computer and tablet park is 115,000 units today, which means that a school has an average terminal for 5 to 10 students. The results are not so different from the figures collected in the 2013 European survey "Survey of Schools".

The progression of TBI and IPV is clear with a tripling of facilities in 4 years (there are 12 per 1000 students with rates 2 times higher in the German-speaking community that has invested heavily in this equipment). Finally, 97% of secondary schools provide access to the network for their students. In 60% of cases, the flow rates issued seem satisfactory.

The efforts of the "Fiber to School" plan are obvious here. However, there are variations between rural and urban areas.

From the point of view of the heads of institutions, there is an under-utilization of digital technology on the part of the teaching staff. In addition to a lack of motivation, there

are technical barriers that need to be overcome. Where most companies have IT departments in charge of maintenance and user support, teachers are not intended to be technology specialists.

However, the management of equipment is most often left in the hands of teachers-users most committed to the issue and who therefore have a status of resource persons for their colleagues. The numbers indicate that there is a resource person for 200-250 teachers. This type of staff is found in about one out of two institutions. These resource persons are responsible for in-house training (use of hardware, software, integration into learning, scripting and evaluation issues). are in withdrawal), but nearly 40% of establishments still do not offer any training. A situation that very much deplores the heads of institutions.

The Pact for an Education of Excellence provides that each institution has a management plan defining its strategy in various areas, including digital. Until now, each school had to own a school project that could also contain ambitions concerning the use of digital technology for the benefit of learning and the development of specific digital skills. Digital integration is first and foremost favored (by far) for the management of the school and the relationship with the teaching staff.

So there is now a real challenge in terms of digital integration in pedagogy. For this, we must first engage actions and have a policy at the scale of each institution, which is hardly the case. It is necessary to invest in equipment, because the Wallonia region remains very largely under-equipped (15 terminals for 100 pupils where France and the European average is fixed at double, ie about thirty terminals for 100 pupils.

We are also far behind the Flemish neighbor who has a terminal for 2 students in secondary). It is also necessary to go beyond the lack of training of the teaching teams, but also the lack of involvement and motivation (even though most teachers have teaching materials and use them in the preparation of their courses). We still rely heavily on the personal investment of some teachers and a BYOD logic to spread. Some schools (between 15% and 20% of secondary schools) also ask students to bring their terminals to school as much as possible to work with them. But this type of practice, as we can see, is still very marginal.

The numerical skills expected from students are at (1) proficiency in office applications, (2), Internet proficiency, (3) privacy, (4) content production, (5) the code. Skills

that are still unequally distributed, because they are not integrated into the competency frameworks in force of the Wallonia-Brussels Federation. Repositories that will evolve (think tanks are working on it).

Flanders

In Flanders, a number of reforms and adjustments have been made since 1998. They now show concrete effects in the integration of digital technology and position Flanders as a leading educational actor. The progress is much clearer than in Wallonia. They are linked to well-thought-out digital management plans at the school level (good equipment levels and good faculty skills - ½ mastering digital technology thanks to frequent training).

The case of Eastern Belgium

The German-speaking Community of Belgium (in German: Deutschsprachige Gemeinschaft Belgiens), or East Belgium (in German: Ostbelgien), since March 2017, is a federated entity of Belgium whose territory is in the east of the country and which is composed of 9 communes.

Harald Mollers, the Minister of Education and Scientific Research, gave a speech at which he spoke about the changes that the digital induces in learning. It shows on this occasion its commitment to the establishment of a process of digitization of the establishments which does not pass only by purchases in equipments, but that it integrates the teachers in a reflection, while initiating them to the uses of the technology itself.

Digitization must be taken into account at several levels:

3.3. Every secondary school in Eastern Belgium has its own school library with a media library for teachers. These school media libraries in secondary schools are linked to the mediadg.be network. In addition to traditional media (books, newspapers, journals and educational games), digital media is now available. This effort is part of the continuation of the missions of these school media libraries that integrate from their origins the computer / digital issue (installation of PCs, whiteboards, projectors and a network connection). Librarians also receive training. In addition to the technical aspects, the strengths of the approach are based on awareness of the risks and dangers of digitization.

4. The Autonomous University of Eupen offers continuing education in the field of computer science for primary and secondary school teachers. These continuing education measures for teachers are not just for technical training and continuing education, but are also increasingly focusing on the critical side of media literacy and dealing with the responsible use of digital media . In addition, many schools are responsible for organizing continuing education in the field of technology to prepare teachers for the digital challenge. In addition to these trainings, all teachers have the opportunity to participate in training courses offered by external providers such as the Institute of Continuing Education of the French Community.

5. Responsible use of digital media can only take place if technological tools are available and in number. According to the European directive, a terminal for six pupils in schools is necessary at least. This number is well exceeded in most primary schools in eastern Belgium, but much lower in secondary schools; an effort remains to be made at this level.

6. In secondary schools, existing network elements and servers have been replaced by professional equipment. The configuration and management of this equipment is entrusted to external and competent specialists. As a result, every current IT manager in schools has more time to help staff members scan.

7. A learning platform (Fronter) - or LMS - has been deployed for the German-speaking community. Part of the teaching staff in each school must manage it. Trainings are organized at regular intervals.

8. A practical and interactive guide providing concrete examples of integration of digital school has been devised.

9. A broadband Internet connection is made available to all institutions by the German-speaking community, with 60% of costs being covered by hardware investments.

10. In the framework plans, the focus is on the link between subject-related competencies and interdisciplinary skills in teaching work (including

interdisciplinary reflection on / with technologies that is integrated into all repositories skills).

At the level of professional learning, this is reflected in several ways:

● The electronic control work of machine tools for cutting complex metal or wood parts (CNC system for "Computerized Numerical Control").
● Apprentices in the automotive mechatronics sector gain first experience with the "vocanto" e-learning program during the current training year. The learning platform includes detailed 3D animations with interactive control.

● Virtual learning with a welding simulator (at ZAWN St. Vith).

● ZAWM St. Vith is currently a partner in an Erasmus + project "Fit for BIM" ("Building Information Modeling" which is a method for planning, execution and digital management of buildings). Starting from the construction sector, project partners discuss how digitization is changing construction professions and how vocational schools can anchor digital skills and new technologies in training programs.

3.2.4. SWOT : on the national digital education system

Strong points	Weak points
❖ A platform for digital innovation at school http://www.pactedexcellence.be/ with major orientations and projects	❖ Three distinct and autonomous geographical and political areas, corresponding to three regions (Flanders, Wallonia, Brussels-Capital) and three communities (French-speaking, Dutch-speaking and German-speaking) which are not necessarily coordinated in their action (s)
❖ The Digital Wallonia regional project to support innovative actions	❖ Imbalances in terms of equipment: urban areas better equipped than rural areas; Dutch-speaking and German-speaking areas better equipped than the French-speaking area)
❖ A relationship and integration of policies at different levels (national, regional, local)	

Opportunities	Threats or constraints
❖ Central location of the country on the European continent	❖ To enter a logic of global privatization of education through the massive introduction of industrial financing
❖ Brussels, seat of the European institutions	❖ Uncoordinated policies between regions that create inequities in terms of learning
❖ Large investors in Brussels and Flanders	
❖ Development of the VisaTICE training program for teachers and students.	

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BULGARIA

3.2.1 The national digital economy: challenges & perspectives (quantitative & qualitative approaches)

Information and telecommunications technology (ICT), such as the Internet, leads to the creation of a competitive economy based on knowledge and innovation to ensure a superior quality of life for all citizens. ICT sector policy is defined as a horizontal policy, as the effects and impact of its application extend across all socio-economic sectors. It has long been known that Bulgaria has a long and rich tradition in the IT and electronics sectors (dating back to the communist era) and is even today known as the Silicon Valley of South-East Europe. 'Europe.

As far as Bulgaria's digital economy is concerned, there is the fact that there are new opportunities in the ICT sector. This is due to Bulgarian companies making efforts to increase their competitiveness in the EU since the Bulgarian government respects the EU directives and the digital legislation. The ICT sector of Bulgaria between 2016-2017 was characterized as stable, also having a bottom-up character compared to the previous period, demonstrated by the fact that today Bulgaria hosts around 10,000 ICT companies, of which 70% are exporters.

The International Data Company (IDC), which is the largest global provider of market information, advisory services and events for Bulgaria's information technology, telecommunications and consumer markets, indicates the fact that Bulgaria's ICT market

reached around USD 1 billion in 2016, thanks to the good performance of IT services and software - while the hardware segment stagnated.

But Bulgaria's volatile political situation, the transition period between EU funding stages and a diminished ISD level, are aspects that have negatively impacted IT spending by the government and the private sector. Nevertheless, the shift to cloud services, mobility and social affairs have positively influenced the future of Bulgaria's IT domain, with an anticipated annual growth of IT spending of 4.2% in the last 5 years, amplified by a transformation. accelerated digital produced by the new state e-government Agency. Bulgaria's Internet users are among the most intensive users of online video calls (1st place) and social networks (6th place). Yet, Bulgarian Internet users seem to abstain the most from the use of the Internet when they have to do online banking or online shopping.

According to the 2015 Report of the Bulgarian Commission for the Regulation of Communication (CRC), the use of the internet (mobile data) by the population was 80.8%, representing a growth of 22.6% compared to 2013-2015. This significant growth is due to the active pushing of mobile data packets by mobile operators, combined with sales of subsidized devices, namely smartphones and tablets.

Bulgaria has a respected team of IT specialists, highly qualified and not expensive. Nevertheless, the education system has not kept pace with demand, and the number of IT jobs available will soon exceed the number of IT graduates in which the demand for IT specialists is about 3 times greater than can offer educational institutions. On the positive side, the number of graduates in science, technology and mathematics has grown easily.

According to Eurostat, 70.000 people are employed in the ICT sector in Bulgaria, which represents 2.3% of the total number of employees in the country. This is below the EU average of 3.5%. A highly skilled IT specialist in Bulgaria earns 20,000 USD annually, which is two to three times more than the average salary earned by Bulgarians.

It can be said that the 4 main pillars of Bulgaria's ICT sector are the geographical proximity of the major European countries without the problems related to the time zone, the availability of gifted and multilingual people, the reduced costs of the labor force, the favorable macroeconomic and political environment.

3.2.2. Policies & Strategies for National Digital Education

Among the most important documents related to Bulgaria's digital strategy are:

• The National Strategy for the Implementation of Digital in Bulgarian Schools (2005-2007) whose objectives include:

 train teachers using ICTs and digital skills development

 develop educational and software services

 quickly build a unitary network, very useful for schools, teachers and students

 use digital in the didactic activity for the training and / or requalification of teachers, in accordance with their needs

Among the first results of the 2005 Strategy, there are two Bulgarian virtual schools available to students (First Bulgarian School and Elika Virtual School); 18 Internet Learning Centers (ILC) in 18 Bulgarian cities and also the Bulgarian Virtual University (BVU), launched in 2004, which represents a national portal for Bulgarian higher education institutions and their e-learning environments. Already in 2016, 70% of universities in Bulgaria used e-learning environments.

• The Strategy for the Effective Implementation of ICTs in Education and Science (2014-2020). Among the objectives of this Strategy, we can mention:

 Increase students' interest and motivation in the training process by using innovative methods, based on IT solutions to improve the linguistic and mathematical skills of Bulgarian pupils

 Provide opportunities for the success of students living in remote areas and provide them with access to high quality educational resources

 Stimulate the use and creation of digital content

 Reduce the weight of the student's bag (sometimes 12-15 kg)

 Encourage interactive training and critical thinking

 Increase student interest in high technologies, identify learners with IT skills and promote their technological education, including through cooperation with external organizations as a partner in order to facilitate the process

 Implement an education management system

 Achieve centralization and unification / interoperability of all systems related to education

 Contribute to the cause "Green Planet" - ecological effect

1.1. **Priorities for the plan period, which follows the ICT strategy:**

Short Term Objectives (2015-2016)

1. National electronic platform for training and content management, including. digital environment for video training, teleconferencing and development activities

2. Initiation of a normative basis for digital learning and ICT skills

3. Development of a national educational portal and creation of interactive electronic tools for all subjects; centralized access to all existing electronic resources and integration of additional approved funds such as:

- *Electronic manuals in PDF format*
- *Multimedia Lessons*
- *Free sources and other resources with interactive electronic content to support the educational process*
- *Electronic manuals with a special discount for publishers who show interest in participating*
- *Educational portals*
- *Educational applications and games, including those created by pupils and students, results of a series of competitions*
- *Virtual panoramas of known sites of Bulgarian history and culture*

4. Teacher Training and Certification for Innovative Use of ICT in the Classroom

5. Start of a national initiative to supply teachers and students with inexpensive and reliable end devices (laptops, tablets, etc.) in cooperation with large companies, institutions, etc.

6. Provision of software for the management of end-user devices for the purpose of using them for the purposes of the learning process - external evaluation etc.

7. Internet access in the classroom and infrastructure for a smart classroom

8. Wireless infrastructure (Wi-Fi) in educational institutions and scientific institutes

1.2. Medium term objectives (2016-2017)

1. Opening the educational and scientific environment to online learning tools, using technological devices (tablets, notebooks, IPads etc).

- *Implementation of integrated management systems at school level*
- *Optical / broadband connection to educational institutions*

2. Encouragement of cooperation with high-tech companies and educational service providers such as:

- *Content creation and management - cooperation with leading providers of cloud ICT services and educational content*
- *Implementation of new technologies - interactive boards / displays, smart cards or RFID identification, IPTV, technologies for videoconferencing and teamwork*

3. Identification and realization of good ICT practices with measurable social impact (high added value), for example:

• Equipment of a "smart" classroom in an underdeveloped area school

• Preparation, certification and equipment of end devices of more than 1000 teachers and up to 50 educational classes in different regions and agglomerations to work with electronic educational resources and monitoring their impact over time

• Activation of an online educational channel and IPTV

• Management of the Virtual Office Infrastructure (VDI) in the infrastructure cloud of the Ministry of Education

• School competition series for the best electronic lesson, presentation, video or image material, etc.

• Competition for mobile application - for example for the correct grammatical spelling of words of the Bulgarian language

• Centralized management system for hot-spot areas in selected schools

4. Structuring of some major key projects that will trace the main focus of the action plan

• Training of teachers and students (training for and with ICT means)

• Electronic content proposal

• Implementation of management, monitoring and control systems

3.2.3. Piloting innovation through the governance of institutions (State & companies)

Bulgaria, (full member of the European Union) has the obligation to develop national strategic objectives that are in line with the priorities and strategic objectives presented in the EU's core documents, whose implementation will ensure the realization of these.

The aim of the National Program "Digital Bulgaria 2015" is to define the parameters (key actions, responsible institutions, terms, budget) of the development of the Information Society (IS) in Bulgaria, as support for the implementation of guidelines and tasks EU formulated in the Digital Agenda for Europe (DAE) taking into account the social and economic potential of information and communication technologies (ICT) and the Internet until 2015.

The educational system in Bulgaria is mainly supported by the state through the Ministry of Education and Science, a system that is part of the continental European tradition.

The main types of secondary schools in Bulgaria are middle school, vocational schools, high schools and foreign schools. Private schools are also being created which are starting to compete successfully with state schools. School education is compulsory for children between the ages of seven and sixteen. There are 51 institutions of higher education in Bulgaria offering university degrees.

For most universities in Bulgaria, the academic year starts around October with 2 semesters (autumn and spring). The academic year covers up to 30 weeks. Classes last 75 minutes or 2 times 45 minutes, with a break of 15 minutes.

Bulgaria is one of the countries with an innovation performance well below the EU-28 average, but the improvement rate is one of the highest in all countries and is ahead of the near countries.

The relative benefits, compared to the average performance of the country, come from the human resources, finances and support received from the authorities and the economic effects. Relative weaknesses are found in relation to other countries and entrepreneurship.

The Ministry of Education and Science of Bulgaria initiated and implemented the Student Placement Project (2012-2015) within the framework of the Operational Program for the Development of Human Resources financed by the European Social Fund.

Practical activities are open to students aged 16 to 21, for all forms of training in vocational schools, colleges with vocational classes and professional universities in some cases. The contact between students and companies is done on a web platform.

From the beginning to the end of the project, 403 schools were registered, and 13,510 students applied to participate, 15,568 employers were registered.

Practical activities are also offered to students; the training corresponding to the specialization studied in the context of the university. The duration of the practical activities for both groups is 240 hours.

The project provides conditions for a systemic and efficient approach to cooperation between vocational schools and the local business community, for greater autonomy of

educational institutions, for new opportunities for development and implementation of school policies. independent. Conditions are also created for greater flexibility in placement organization within VET (Vocational Education and Training) based on local and regional activities, and the entire VET system, including placement of students. The main objective is to increase the quality of vocational education by improving the professional training of students according to the needs of the labor market, thus using the ICT field. The ICT field is the essence of the digital economy and the so-called knowledge-based society, as it represents the modality of representation, sharing, rapid access to information and the use of knowledge in beyond traditional physical, social, demographic, geographical, economic etc. boundaries.

Digital content is important for strengthening research efforts, studies, education, and lifelong learning, as well as for strengthening local and regional economies through tourism attraction that produces sustainably businesses, jobs and income. Digital content and content availability are the key to unblocking ideas and new applications for the first time in history, including the involvement of everyone (not just businesses).

Thanks to technological transformations and induced social transformations, the EU faces significant challenges in accepting the benefits that digital content brings to society. It is essential that this digital content is created, kept and available for use by all citizens regardless of future technological changes.

3.2. 4 SWOT : on the national digital education system

Strong points	Weak points
❖ Relatively good mobile network.	❖ Decrease in those using mobile broadband.
❖ Solid level of production and availability of local ICT content.	❖ Limited inclusion of ICT in business functions, especially in IMM.
❖ Positive experiences with the "out-of-print" approach to barriers and public domain work that could be used as best practice for other countries.	❖ Reduced level of digitization and local content integration activities ❖ Decreased intensity of mobile application development.
❖ High growth rate of knowledge-based sectors of the economy.	❖ Decreased intensity when reusing PSI open information.

- Growth in demand for broadband connections by citizens and businesses.
- Broadband Internet access quite expensive in the region.
- Strong demand for content services and innovation in the region.
- Decreased awareness and use of PCs by citizens outside urban centers.
- High rate of population with higher education.
- Delays in the development of broadband infrastructures.
- Researchers with high qualifications and trained in the fields of computer technologies.
- Exploiting the digital potential can offer a comparison.
- Rapid growth of science-based economic sectors.
- Government regulations and bureaucracy are not "modern" and do not facilitate developments in the digital domain. Specifically, regulations regarding intellectual property rights, content, privacy and user consumption do not reflect the demands of society
- Regulations Improving living conditions through education and competitive training, creating an environment conducive to the occupation of the workforce and social inclusion of quality.
- The outdated educational infrastructure and the reduced quality of the educational system.
- Reduced investments in research and development in the economy.

Opportunities	Threats or constraints
❖ Better integration of SEE efforts into digitization through the exchange of best practices on the financial, technological, organizational and litigation approach.	❖ The reduction of commercial demand for digital content.
❖ The opening of innovation opportunities through the implementation of an open model of data reuse.	❖ Stopping digitization efforts because of the financial crisis.
❖ The growth in demand for ICT applications and digital content thanks to investments from previous periods of programming concerning public domain infrastructures.	❖ The lack of participation in the mobile content economy, due to the reduced mobile broadband.
❖ The creation of European commercial digital content technology companies that successfully compete with other	❖ The decline in economic development as a result of the unfavorable international situation.

corporations in other countries.

- The wider use of electronic services.
- The development and implementation of an efficient system for monitoring the implementation of policies and legislation.
- Increasing the competitiveness of the economy by creating a favorable business environment, applying innovative solutions and increasing the efficiency of resource use.
- Improving living conditions through education and competitive training, creating an environment conducive to the occupation of labor and quality social inclusion.
- The difficulty for those leaving the education system to enter the labor market because of the reduced quality of the education system.
- The lack of qualified teachers and scientific teaching staff due to the reduced attractiveness of these trades in Bulgaria.

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SPAIN

3.2.1. The national digital economy: challenges & perspectives (quantitative & qualitative approaches)

Education and training are the responsibility of each of the EU member countries, and align with the Education and Training 2020 Strategic Framework. For about two decades, the incorporation of Information Technologies and Communication (ICT) to the education system in Europe in general, and in Spain in particular, is one of the priority lines of educational policies. These policies promoted access to the so-called Information Society for all citizens.

Over time, many plans and projects on this topic have existed and one of the most notable was the e-learning program called eLearning (2004-2006):

"The general objective of the program was to promote the effective use of information and communication technologies (ICT) in European education and training systems through quality education and the adaptation of education and training systems. the needs of a knowledge society and the European model of social cohesion ".

In 2006 the European Commission presented a series of recommendations on lifelong learning (Recommendation 2006/962 / EC of the European Parliament and of the Council, of 18 December 2006, on the 8 key competences for lifelong learning, Daily Quotidien L 394 of 30.12.2006), including numerical competence, which, as indicated on page 4 of the conceptual boundaries, is defined as "the safe and critical use of Information Society Technologies (IST) for work, leisure and communication with basic ICT skills: the use of computers to obtain, evaluate, store, produce, present and exchange information, and communicate and participate in collaborative networks via the Internet ".

The same year, in 2006, is approved the Ley Orgánica de Educación (Organic Law of Education, RENTED) by which Currículo is established the "Treatment of the Information and the Digital Competence". Since then, this skill has been added to the skill group.

The "Rethinking Education" strategy presented by the European Commission in November 2012 stresses the importance of training in the skills needed in 21st century society. Digital competence is a prerequisite for students of all ages to benefit from new technologies for more effective, motivating and inclusive learning (Education and Training Monitor, EU, 2013, p.19).

Thus, in 2013, the Digital Competence Framework for Citizens, also known as DIGCOMP, was published, and implemented by all EU member countries. In addition, according to international reports, including the PISA report, education in Spain was malfunctioning. This report related the insufficient level of Spanish students in reading comprehension and mathematical and scientific competence with a lower average of students than in OECD countries. Spain reacted by the publication of the last Spanish law of education in December 2013, LOMCE (Organic Law for the Improvement of the Educative Quality) that does not replace, but modifies the RENE of 2006.

In its Art.2.bis it is stipulated that the Spanish Educational System must group together all educational Administrations, which are the organs of the General Administration of the State and Administrations of the Autonomous Communities competent in educational matters, the professionals education and other public and private agents to contribute to the maintenance, financing or provision of services for the exercise of the right to education in Spain.

Point VI of its preamble sets out the main objectives pursued:

- reduce the rate of early dropout from education,
- to improve educational outcomes according to international criteria, both in the comparative rate of excellent students and in the case of graduates of compulsory secondary education,
- improve employability,
- stimulate the entrepreneurship of students.

The principles on which the reform is based are therefore fundamentally :

- increasing the autonomy of the centers,
- strengthening the management capacity of the centers' management,
- external evaluations at the end of the internship,
- the rationalization of the educational offer and the flexibility of trajectories.

One of the fundamental principles of this reform of the Education Act is the increased autonomy of school centers granted to design and implement their own teaching methods and to manage the development of quality actions. Thus, the management teams, and more particularly the director, acquire an almost absolute level of control over the functioning of the educational centers and undertake to professionalize the directive function of the teaching centers. Any teacher may be elected head of school, either by the faculty with the approval of the school council, or be directly elected by the administration of the school. After being elected, his position changes from a teaching position, with coordinating responsibilities to a position, primarily of organization and management.

The School Council and the Council of the teachers (Claustro) become consultative organs without the attributions or tie in the decision-making. From then on, the Director will be able to manage curriculum specialization, teacher education programs, ICT resources, improvement programs and management of personal and economic resources.

This educational reform focuses on a curriculum model based on learning by skills. The competency-based learning proposal is intended to promote the link between training and professional development. Relationships between competences, contents and assessment criteria of primary education, compulsory secondary education and the baccalaureate appear legislated in Mandate ECD / 65/2015 of 21 January.

The implementation of the LOMCE is carried out in the school year 2015-2016 for 1º and 3º of CELA and 1º of Baccalaureate (pupils of 13, 15 and 17 years respectively), and

during the school year 2016-2017 for 2º and 4º of CELA and 2º of Baccalaureate (pupils of 14, 16 and 18 years).

The LOMCE mentions personalized learning through skills and lifelong learning, flexibilisation and simplification of curriculum, culture of excellence, development of external evaluation systems and universalization of ICT as the great challenges for educational transformation in order to improve educational quality. The satisfaction of learning non-cognitive skills, attaining attitudes, "learning by doing" and matching different rhythms and learning styles require the intensive use of new technologies requiring acquisition of digital competence.

Digital competence (CD) is defined as: "... is the one that involves the creative, critical and reliable use of information and communication technologies to achieve the objectives related to work, employability, learning, the use of free time, inclusion and participation in society ". This digital skill claims to provide the development of skills to seek, obtain and communicate information and to transform it into knowledge in reflexive, critical, effective and autonomous form. The LOMCE, however, stresses that it is essential that the digitization model of the school for which it is chosen be economically sustainable.

In Article 111.bis on Information Technologies and Communication, the Ministry of Education, Culture and Sport, provides for prior consultation of the Autonomous Communities to establish:

• The information systems used by educational Administrations, as much for academic and administrative management as for support to learning; interoperability standards.

• Promoting virtual learning environments as support resources by the Educational Administrations.

• Formats for tools and support systems for learning in the field of public digital educational content.

• Digital and technological platforms for access to the entire educational community.

• A common frame of reference of digital competence that directs the permanent formation of the professorship to facilitate the development of a digital culture in the classroom.

• The promotion of use by the educational administrations and the guidelines of the centers, information and communication technologies in the classroom, as an appropriate and valuable teaching tool for carrying out the teaching tasks and learning.

• The implementation of different projects and programs at the national level for the effective incorporation of technological environments and tools in schools (besides the organic laws that regulate the Spanish education system, since the end of century XX).

3.2.2. Policies & Strategies for National Digital Education

At the end of the 80s, the Ministry of Education and Science of the time implemented the Atenea Project, later the Mercure Project and, later, the New Information and Communication Technologies Program (PNTIC).) which served as a reference for the various educational administrations of the Autonomous Communities for the incorporation of computers in academic institutions. On the other hand, framed in the Avanza Plan, promoted by the Ministry of Industry, Tourism and Trade, there were initiatives such as the Internet at school and later the Internet in the room. class and the Agrega Project.
These actions were carried out in collaboration with the educational authorities of the Autonomous Communities.

Currently, the INTEF (National Institute of Educational Technologies and Teacher Training), which is under the Ministry of Education, Culture and Sport, is the reference center at the national level, responsible for the integration of ICT in the various levels. non-university educational. It provides training courses for teachers, develops and disseminates curriculum materials in a variety of formats, and facilitates the exchange of experiences and resources among teachers.

Since the 90s, the administration of the Spanish education system has been decentralized from the Spanish Government. The various governments of the Autonomous Communities assume the competitions in education and, consequently, are the last ones responsible for the endowment of resources, both personal and material, to the teaching centers, as well as teacher training programs. This decentralization meant that each Autonomous Community defined different plans and programs for the integration of digital technology in classrooms and that they had no coordination at the national level.

3.2.3. Piloting innovation through the governance of institutions (State & companies)

Since the 21st century, various educational policies have been conducted to provide schools with digital technical resources, improve the infrastructure for the connection of educational centers to the Internet, promote teacher training plans in the ICT sector and produce digital educational materials. .

The most ambitious national program for the integration of digital technologies in classrooms was the École 2.0 program, which began in 2009-2010 and which sought to accelerate the incorporation of the use of new technologies into the classroom. Didactic practice in Castile-Leon. This project was implemented through the strategy "Network of Digital Schools of Castile and Leon Century XXI" (Network XXI).

This project provided for 5 levels of intervention:

1. Transform classrooms into digital classrooms with ICT resources for students and centers.
2. Ensure Internet connectivity in all classrooms
3. Provide training for teachers and ICT managers in educational centers.
4. Generate and facilitate access to digital educational materials.
5. Involve students and their families in the acquisition, development and use of these digital resources.

The first proposal for the resource endowment started at the 5º and 6º levels of Primary Education (10 and 11 years old students) and was abandoned two years later due to lack of funding and lack of planning regarding the maintenance of electronic teams and the lack of programs for initial teacher training. The other actions are still in progress.

There is a stand-alone plan for ongoing teacher training that promotes the improvement and updating of the development of their professional skills. This training can be engaged in a center training plan, a team team plan, individual participation or in groups of teachers.

The training of teachers can be done through INTEF training courses, specific courses of the CFIE (Teacherat Training Centers and Educational Innovation) courses offered by the Cabinet of Education. Currently, there is a specific CFIE: "Resource Center and Teacher Training in ICT" which sets some priority lines of intervention as the "European dimension and communication in education" and "ICT in education".

With the École 2.0 Program, a "Quality Label ÉCOLE 2.0" quality label is awarded to schools in recognition of their commitment to improving the quality of education through the use of ICT.

In Castilla y León, certification for information and communication technology training offered by publicly funded non-university education centers proposes awarding 5 levels of ICT excellence ; level 5 representing the higher level.

3.2.4. SWOT : on the national digital education system

Strong points	Weak points
❖ All secondary education centers have digital devices and more than 90% have an internet connection. ❖ Over the last 10 years, the average number of students per computer (for teaching and learning tasks) has decreased to less than 30% according to Ministry of Education data. ❖ Adapting qualifications to the labor market in line with the objectives of the Europe 2020 strategy. ❖ Digital competition is evaluated in all subjects. ❖ Existence of the Agrega2 Project (digital educational resource center). ❖ Most students who graduate from high school have a satisfactory level of digital literacy. ❖ Teachers attend various training programs.	❖ Changing legislation that does not benefit a strong environment for change. ❖ Investment in education is higher in Spain than in the rest of the EU ❖ Since 2010, the number of secondary school teachers has decreased as has the number of teaching hours and the ratio per classroom has increased. ❖ Little real autonomy of educational centers. ❖ Time regulation without any flexibility without the possibility of alternative methodologies. ❖ Lack of training of teachers who must work and assess all basic skills (LOMCE guidelines). ❖ ICTs are perceived by many teachers as more of a distraction than an effective learning tool. ❖ Proportion 1 computer / 1 student still not applied. ❖ Changes in training curricula that respond more to political ideologies.
Opportunities	**Threats or constraints**
❖ The European Fund for Strategic Investments (FEIE) is helping to finance the installation of broadband and ICT tools in the educational environment. ❖ The real transformation of education in its relationship with technology is likely to foster cultural change. ❖ Improved cooperation between educational centers in the various EU	❖ The difficulty of a good internet connection in some rural areas. ❖ Non-actualization of technological resources. ❖ Lack of coordination and support for continuing education of teachers. ❖ The decrease in the professional esteem of teachers. ❖ Inequality in access to digital technologies

countries.

- Reducing the digital divide between school and the world of work will improve employability.

The promotion of personalized learning.

- The possibility of the use of Artificial Intelligence systems.

and inclusion in society.

- The development of a mercantile spirit of education.

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FINLAND

3.2.1. The national digital economy: challenges & perspectives (quantitative & qualitative approaches)

Since 1968, the Finnish education system has been organized according to the Law of the School System on which the current education system of 2016 is based. This law especially established the free education and the equality of the pupils for all.

During the 1970s, the Council for Vocational Education was created and transformed until the Ministry of Education took office in 1967. During this decade, basics by modifying Primary and Secondary courses. At that time, the Finnish education system was centralized.

At the end of the 1980s, education reform focused on the distribution of students according to their abilities to promote greater growth in terms of skills development and level of learning. a political crisis has allowed the decentralization of education. In this way, the economic cuts of the central administration have been replaced by the intervention of the local administrations. Due to the difficulty of financing, the development of this system has been abandoned.

All these changes in the administration of education and the legislation in force marked the end of the "Single College" Finns. The delegation of education responsibilities to municipalities has led to a considerable closure of educational centers, affecting more the primary level of education than the secondary level.

In 1991, the National Assembly of General Education and the National Council of Professional Education merge to give rise to the National Assembly of Education formed by a group of experts responsible for the development of education policy as well as the decision-making that they made to the national curriculum. However, although the program was of a general nature at the national level, educators were obliged to develop their own programs,

adapting them to the context, so that a more personalized education will be offered and the writing of programs interactive and cooperative. Thus, weaknesses and strengths are easier to identify. The vision of Finnish education is holistic.

1.2.2. Policies & Strategies for National Digital Education

It was not until 1998 for the first large-scale reform of the education system with the Organic Law of Education, as well as the Basic Education Decree, which established the foundations of basic education and secondary education.

This reform, which came into force in 2000, aims to change all educational levels and announces the premises of innovation and training at the local level. It is the central government, especially the Education Council, that provides funding, information, evaluation and support; local councils are solely responsible for coordinating and executing actions.

The effects of globalization and the emergence of new technologies have made the world change rapidly with very significant changes in the social context, the world of work and education.

Thus, the skills and abilities required today are very different from those of yesterday and probably different from those of tomorrow. Hence the absolute necessity of adapting pedagogy and anticipating the pedagogy of the future.

3.2.3. Piloting innovation through the governance of institutions (State & companies)

Then follow the new education reform implemented between 2012 and 2016 for primary education and from 2015 for secondary education.

Responsible, the government is responsible for listing the compulsory subjects and their breakdown as well as the hourly allocation. The Ministry of Education remains the sole administrative manager. This reform was based on educational research, taking into account the results of previous evaluations and estimates.

The main purpose of the educational project is to anticipate the needs of society and each individual for the next few years. This process was seen as a collaborative, interactive

and respectful process of different attitudes and sensitivities and had to take into account the opinions of different groups. Thus, three hundred people belonging to different groups have worked jointly with the National Council of Education to this law in Education currently in force.

This program has a constant feedback that makes it possible to improve it over the years and its constant evaluation makes it possible to take into account all the opinions: those of the students, those of the teachers and those of the families. A consensual educational program with a high degree of consensus and not imposed by higher authorities is born and is based on three fundamental pillars :

a) Central and basic values

- Every child is unique,
- Education is a basic right,
- Education opens the ideas of humanity, democracy, culture and civilization and the richness of multiculturality in society.

b) Education and the educational environment

c) • Active role of the student. Students' experiences, ideas and questions are taken into account.

d) • Consideration of the importance of emotions in the educational project. Working together, sharing and creating ideas promotes learning. The idea of self-learning so that students become aware and responsible for "their" educational project is fundamental.

c) Compétences

• Succeeding in basic subjects is not enough; the student must acquire transversal skills. Competence refers to "knowledge, skills and abilities to use these skills in different contexts" without compromising values, attitudes and motivation.

In this program, 7 areas of transversal educational skills are listed and help the student to develop as a human being and citizen:

1. Think and learn to learn
2. Being responsible
3. Master the cultural or literary skills allowing integration into society

4. Mastering literacy in a multilingual context
5. Mastering ICT
6. Master professional skills
7. Participate actively in building the future

Lulled by the philosophy of transversal skills, Finnish students have the opportunity to learn at least one multidisciplinary module. Learning modules must integrate the skills and contents of various subjects, which implies that teachers must work together. Students will be involved in the planning of these modules.

Although this system tends towards decentralization, it is organized on two levels. The responsibility for education policy lies with the Ministry of Education and Culture, while the implementation of the policy is the responsibility of the National Council of Education. Both organizations are responsible for establishing content, objectives and methodology in a collaborative manner.

In addition, the Local Council is responsible for resource logistics, so it allocates resources, distributes educational plans, and hires staff. This type of action is the autonomy that the central government has transferred to the local council, taking root in decentralization. The student centers are responsible for providing a personalized vision to the center, provided they comply with the legislation established by the ministry.

In this area, the Municipal Councils then delegate their decision-making power to the School Councils and these in turn to the director of the teaching center responsible for selecting and hiring the teaching staff. The School Council, the teachers and the director are in charge of organizing the education, with the freedom to decide on the size of the classes, the grouping of the pupils and the organization of the educational institution.

Thus, we note that one of the most representative figures of a teaching center is the director. Directors in Finland are also called "rectors". These rectors are selected by local councils and must meet the requirements :
- be in possession of a title of higher education,
- have the competence to teach,
- hold a title in educational management,
- to be experienced.

In June 2016, the Finnish government agreed on a "competitiveness pact" with the labor market. In addition, teachers benefit from reduced costs for social insurance and additional holidays etc. Finally, the central government has delegated the funding of educational centers to municipalities.

3.2.4. SWOT: on the national digital education system

Strong points	Weak points
❖ Education laws do not respond to political ideologies and are developed by educational experts. ❖ The type of education is inclusive and individualized for each student. ❖ Teachers are academically prepared and have good pedagogical training. ❖ Education is a social commitment; it is public and free at all levels. ❖ Education budgets are high, so investment in education is one of the bases of the Finnish system. ❖ The teaching profession is highly valued in Finnish society. ❖ Time programs measure times so as not to overload the student. Rest during the day is as important as school hours. ❖ Teachers have time during their work day to prepare their teaching activities. ❖ Thanks to public support, families can reconcile family and work life and are very involved in the school life of the student	❖ Population concentrated on cities to the detriment of the population of rural areas. ❖ In some cases, the school assumes the role of educator who should be assumed by the family. ❖ The evaluation of the content is not taken into account. ❖ Homogeneity of the public because of the rare immigration in the country. ❖ Although the budget is high, teacher training is a priority over the technological equipment of educational centers. ❖ % of suicide and violence are high ❖ Sex education is not part of the curriculum.
Opportunities	**Threats or constraints**

- Cross-curricular subjects that provide students with the skills and competences necessary for social and professional inclusion.
- Possibility of choosing subjects by the students according to the degree of maturity in which they are.
- Inequality of students according to their social environment (decentralization)
- Loss of culture of effort
- The theoretical education remains relegated to a second place.
- ICT is part of basic education, not a discipline that involves technological skills.

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FRANCE

3.2.1. The national digital economy: challenges & perspectives (quantitative & qualitative approaches)

Infrastructural issues

The dominant (not to say exclusive) model of access to digital services in France is the "box" which is entering the market from 2002 onwards. Internet Access (ISP) gives to any structure or person not signing a contract with him. The main French ISPs today are Orange, SFR, Bouygues and Free. The box is, meanwhile, made available in the form of a lease, valid for the time of the contract. This box contains a modem and it provides access to the internet, but also to telephony and television (talking about Triple Play principle).

The first box ADSL are a great success, but the speed of access to the network is limited. Thus, at the turn of the 2010s, France launched actions for the deployment of Ultra High Speed (THD) in the country (for companies, public services and individuals). They are inspired by an article written on August 5, 2008 in the law of modernization of the economy concerning the need for a massive connection of the country to the network and the pooling of connection actions between ISPs.

The goal is to become a leading country in the digital world by promoting an increase in GDP (job creation, increase in market transactions, decompartmentalization of rural areas, emergence of new services such as telemedicine, distance education ...).

The conclusion is clear. The first surveys conducted after the installation of the first THD networks in Paris and Ile-de-France show that there is an intensification, diversification and individualisation of practices at all levels, whether in the fields of leisure or work. Thus, in

2013, the government François Hollande proposes a Very High Speed France Plane aiming to cover the whole territory in THD by 2022. It is a plan that is announced as a priority of the five-year period and which makes collaborate public actors and private (municipalities, departments and regions, but also the ISPs, made to engage massively in the development of the territory).

It is probably one of the specificities and one of the main changes in the French government's policy towards telecommunications since the 1970s, the monopoly public operator France Telecom, first privatized and then renamed Orange in 2013, is now subject to competition from other private operators with divergent and competitive interests (although a rather stable oligopoly has taken shape).

State reports and consultations for the implementation of national digital policies

In France, there is a culture of "state report" making it possible to make recommendations for the implementation of public policies. This is particularly valid in the field of computer technologies and later digital, as well as in the field of education. The way is opened by the highly publicized Nora-Minc report published in 1978 on the theme of "the computerization of French society" desired by the then President of the Republic Valéry Giscard d'Estaing. In this report, the authors urge the public authorities to seize this issue without further delay, particularly around the interweaving of "computers and telecommunications" that he calls a new word: that of "telematics". The Nora-Minc report of 1978 will notably set lines for a school computerization policy that will be repeated and extended in several reports including that of Jean-Claude Simon, "The education and computerization of society", delivered in 1981, all the way to the last of them: the Fourgous report of 2010. All these reports place great emphasis on the need for a national digital education policy that draws on transnational models and supports public collaboration. / private for better results.

On April 29, 2011, the French public authorities decided, by decree, to create an advisory body: the Conseil National du Numérique. This board includes thirty volunteer members chosen because of their skills in the digital field.

They are appointed by the Council of Ministers for a three-year term. It is supposed to be an "independent" body, while being under the tutelage of the secretary of state for digital. CNNum's mission is to "independently formulate and make public opinions and

recommendations on any issue relating to the impact of digital technology on society and the economy".

In its first version, instituted by President Nicolas Sarkozy (2007-2012), CNNum's function is to establish a bridge between the government and the digital industry. A new team is instituted by François Hollande after his election (2012-2017), integrating entrepreneurs more "compatible" with the new government. Among the members of this second version of the CNNum, some will be illustrated by taking critical positions on public debates, particularly in 2015 about possible drift around the protection of private data on the bill "intelligence" (see also assemblee-nationale.fr/14/projets/pl2669.asp) but also when publishing reports in the fields of "economics", "rights and freedoms", the "digital society" and the "Public action" (cf cnnumerique.fr).

Among the main recommendations of the CNNum, here are the ones that the organization will do in the "digital ambition" report published in 2015 after collecting 20,000 contributions via an online collaborative platform for the implementation of major public policy guidelines. , or the report "Jules Ferry 3.0" published on October 3, 2014 in which the CNNum structure its recommendations "to build a creative and fair school in a digital world" according to 8 axes (themselves declined in 40 recommendations):

1. Teach IT: a requirement;
2. Install digital age literacy in school;
3. Dare the HN Tray Humanities Digital;
4. Design the networked school in its territory;
5. Launch a vast research plan to understand the changes in knowledge and inform public policies;
6. Establish a framework of trust for innovation;
7. Take advantage of the dynamism of French start-ups to relaunch our soft power;
8. Listen to the teachers to build together the school of the digital society.

Among these proposals, two relate more particularly and in a massive way to the school curriculum by tackling the question of digital education. On the one hand, there is the introduction of computer programming education in middle school, and on the other, the proposal for a new section of the general baccalaureate called "digital humanities" (a recommendation which has been marked by effects since the French public authorities have decided in 2018 to introduce courses in digital humanities into the curriculum of the high

school.This will consist in providing digital skills, not from a purely technical point of view, but from a cultural point of view: ethical or ethical issues related to digital technology).

A close relationship between the public and private sectors

"Confidence framework", "innovation" or "start-ups" are the key words of French politicians in recent years, since the election of Nicolas Sarkozy in 2007, through that of François Hollande in 2012 and now Emmanuel Macron in 2017 which is also carrying a company project in line with this model. This has led to the development of a particularly fertile ecosystem around a growing number of projects in the form of incubators or start-ups.

We will first think of the creation of the label "French Tech" in 2014 to support the most ambitious French initiatives. We label French cities engaged in innovative projects, but also initiatives of companies or individuals in France and abroad. These initiatives are also being promoted at major events such as SXSW in Austin or the CES in Las Vegas: under the flag of the "French Tech" entrepreneurs can value their products or projects.

In June 2017, Paris inaugurates "Station F" the largest start-up campus in the world. The site is home to nearly a thousand projects in nearly 35,000 m2 of renovated premises on the site Halle Freyssinet, a former railway building located in the southeast of the city. The project is the initiative of Xavier Niel, a rich industrialist of technology and media, creator of the ISP "Free", the school "42" (a school training engineers specializing in computer code) and co-owner of daily Le Monde.

In this giant incubator, there is also a multitude of peripheral services directly accessible to tenants such as investment funds, a fablab, public services, etc.

In the fields of health, safety, entrepreneurship, sport or leisure, there are many initiatives throughout the country. They are carried by young innovators (model of the start-up) or by large groups eager to give a new breath to their projects (through the development of experimental laboratories).

Initiatives that often benefit from public aid: solicitations from the Public Investment Bank (BPI), responses to calls for scientific projects in partnership with universities or schools (FUI projects, Investments for the future ...), etc.

3.2.2. Policies & Strategies for National Digital Education

The introduction of digital at school and the old myth of equality

As early as the 1970s, France is one of the few countries with the United States to embark on the introduction of computers in schools (even, it must be remembered, that microcomputer only in its infancy). During this first wave of French computer experimentation, 58 high schools are equipped with "mini-computers" and the teachers of these schools are trained in programming.

In 1984, the government imagined a program of "computer workshops" around several objectives:

1. To concretely master the tools,
2. To be in a "mediated" environment: to adopt a critical distance,
3. To know audio-scripto-visual language,
4. Discover telematised exchanges to exchange knowledge.

But it was specifically in 1985 that a first major action was launched by Prime Minister Laurent Fabius: the IT Plan for All (IPT). Computer culture is still in its infancy at this time, but it is expanding. The French public authorities are thus singled out by the choice to set up educational programs to allow "a first access to computers for many students and their teachers, a first approach to programming and the use of computers. a computer " . They are turning to easy-to-use technologies (T07, MO5). In parallel, we reflect on the training of teachers who are said to have a general knowledge of computing, its applications and its social implications. We also think of the need to form animation teams, able to produce tutorials.

This plan has allowed a large number of teachers and especially students to have a first contact with computers, but it will leave a bitter memory, because it is also a failure (lack of equipment, training, interest of the projects ...). The IPT plan would thus have a lasting impact on future education policies. One element, however, is the subject of attention: from the very beginning of computer science education, the French public authorities are aiming for a genuine education in technologies that go beyond the mere technical manipulation of tools.

While this period of the 1980s saw the introduction of informatics at school as a way to open up students to future societal challenges, multimedia education in the 1990s is much more

thought of as an immediate necessity, having to move from experimental logic to democratization, under penalty of leaving students at the mercy of new dangers and producing significant inequalities. Institutions, depending on their means, projects and local skills, buy more or less anarchic televisions and VCRs, computers equipped with CD-ROMs, audio or video recording equipment, which often end up "in cupboards", especially for lack of adequate maintenance.

Often mocked for its immobilism or its bureaucratic character, the French education system does not stop to set up experiments. It is therefore the systematization of digital integration projects in the curricula. The French conception of equality (or its obsession with inequalities) is undoubtedly at least partly at the origin of this recurrent desire to standardize tools and practices, which will largely hinder innovation in the French system. .

The other recurring problem facing the French public authorities is the dissociation between practical learning and theoretical learning in curricula. The case of the publication of the Guide for teaching and didactic support of the new technology program in March 2016 by the Ministry is archetypal of this. The teaching of computer science and programming is shared between teachers of mathematics (theory) and those of technology (practice). This type of conception, which dissociates theory and practice by prioritizing the two activities, the disconnection of both apprenticeships and equipment problems are quite characteristic of French policies, despite marginal attempts at multidisciplinary and disruptive work.

Around the 2000s, France undertakes digital training and development programs

The advent of digital and the Internet has catalyzed the rise of educational projects supporting the use of ICTs (Information and Communication Technologies). Indeed, easier access to information through the Internet has accompanied the rise of an ideology within the school; that of a necessary modernization of the educational infrastructures and therefore of their connection to the network. We have seen equipment purchase policies set up in schools - at different scales: computers, tablets, network connection, but also BITs, video projectors, cameras, cameras, educational trolleys, etc.

Three problems remain:

1. There is, first of all, the general lack of training and support for teachers.

2. Then there is the complex relationship that teachers have with computers that often consider that the essential is elsewhere (learning to read, write, count, mastering languages and concepts, etc.).

3. There are doubts about the real pedagogical value of the technical tool, often linked to a lack of knowledge of the possibilities offered by the digital, but also a lack of culture, for example, on the question of free solutions vs. solutions owners.

In this context, it was also decided in 2000 to set up two types of training at national level. The first at the address of teachers (the C2i, computer certificate and Internet). The second for students (the B2i, computer patent and internet).

Today, the objectives of these programs are:

1. Train students in the use of digital tools,
2. Give them the necessary skills for their future professional life,
3. Develop their critical thinking,
4. Encourage the identification of the ethical, legal or social constraints in which the use of technologies takes place.

A 2011 text specifies the profile of teachers to supervise B2i training: "The desired profile will be that of teachers in the scientific disciplines (mathematics, physical and chemical sciences) and technology (science and industrial techniques, etc.)".

The presentation of the B2i by the Ministry is as follows: "At school, college and high school, the computer and internet (B2i) patent responds to the need to provide every future citizen with the training that will ultimately enable him to use reasoned use of information and communication technologies. This training also makes it possible to perceive the possibilities and limits of computerized treatments, to be critical of the results of these treatments. It also gives ways to identify the legal and social constraints in which these uses fit.

Since its inception, B2i's areas of expertise and objectives have evolved somewhat, without radically changing their thinking. The evolutions reflect at the same time the refinement of the pedagogical theories which underpin the ICT, but also the technological evolutions which had quickly rendered obsolete some elements of this first reference (for example, the reference to the CD-Roms, which almost makes more sense in 2016).

The most recent version of the B2i is more general in its formulations and precisely avoids too precise references to technologies per definition quickly perishable:

- Take ownership of a computing environment,
- Adopt a responsible attitude,
- Create, produce, process, exploit data,
- Get information, get information,
- Communicate, exchange.

From 2007, the "master information and communication technologies" competency is integrated into the competency framework of all teachers (primary and secondary). A repository that will guide French policies until the writing of the recent and last "digital plan" of May 7, 2015 "rolled out gradually since the start of 2015 so that youth is on the ground in the digital world. 1,256 schools and 1,510 colleges at least will be equipped with tablets in September 2016. It is nearly a quarter of colleges that join the digital plan. More than 175,000 students will be equipped with digital tablets, co-financed by the state and local authorities. We see how the plan focuses once again on the massive and uniform equipment of determined levels. This time it is to provide "tablets for all".

However, as observers note: "at the end of 2016, the equipment effort still affects only 24% of colleges or, to be more precise, 200,000 middle school students (out of more than 3 million). The ministry promises the transition to 50% in September 2017 before a possible generalization in 2018. A training plan for college teachers is also launched. After 3 days that had more or less taken place, according to the academies, last year, it is still 3 days that are registered this year for all the professors of the colleges. For the vast majority of teachers this will take the form of distance learning.

Lastly, let us recall that from 2005, the computing and the algorithmic are introduced in the new mathematics program for the class of Second, then in the class of Terminale of the scientific series.

Therefore, we consider that there is a series of major structuring concepts that must be mastered:

- know the machines and their language,
- master the techniques of acquisition and circulation of information / resources,
- take a critical look at the technique,
- know what algorithms and programs / software are.

Current digital uses in French high schools and high schools

France is banking on the fact that education represents 4% to 6% of GDP and 15% to 20% of national expenditure in 2030 with a strong rise in a humanistic vision of education (introduction of compulsory courses in Digital Humanities in the autumn of 2018-19 in high schools). The priorities that the French public authorities have set themselves are as follows:

1. equal access and equal opportunities,
2. gender equality,
3. quality of the educational offer,
4. support for lifelong learning.

But where are we today in France? The alarmist speeches are far from reality, even if it is necessary to specify the skills of the teaching teams. Indeed, a survey of the DANE in Paris showed in 2014 that more than 90% of secondary school teachers use digital, even if it may seem marginal and / or anecdotal.

Here are some results on the uses and non-uses of digital in secondary school in France from recent surveys of the Academic Directorate for Digital Education (DANE):

- Teachers use technology to prepare their course: creating materials and research online. It is a well-honed practice.
- Institutional teaching spaces are also well known to teachers who refer to them for 90% of them at least once a month.
- Teachers also use digital technology, including e-mail, to exchange information about their practices (in 85% of cases, they do so at least once a month).
- In their relationship with students, teachers therefore use e-mail (50% of cases): it is this principle of asynchronous writing that dominates teacher / student communication.
- For a large part of them, the realization of collaborative work generally on the ENT of the establishment when there is one becomes commonplace (LMS technologies however remain little widespread in the secondary in France. therefore an intensive use which is concentrated on a small number of establishments).
- On the other hand, there is a good rate of penetration of uses on the digital textbook: 70% of the teachers seized it following the injunctions of the public authorities in 2011 which supported its use.

Teachers also do not have a strategy to circumvent this lack of equipment (blogs, RS ...) ; Only 9% use it for their classes.

• In class, 2/3 of teachers use digital at least once a week in their classroom to show a document or present a resource. The illustration thanks to the VP remains the first practice among teachers (70% of them use it at least once a week). This is also the most popular equipment in France. The use of the VP is combined with the use of the computer which is used in an equivalent proportion.

• The BIT, despite its very high power (much more important than the VP), is much less prevalent in the classrooms, so less well domesticated, and therefore much less used (a quarter of French teachers have already used it) .

• In parallel, the model of the multimedia room tends to disappear.

• Nomadic tools (tablets, portable music players, etc.) are only used by 12% of respondents. Equipment which, again, are not very present in the establishments. The use of students' mobile phones is even more marginal: 4% of teachers do it. Future laws on banning mobile phones at school are not going to fix things.

But difficulties are elsewhere:

• Creative activities with digital are punctual and infrequent.

• Half of teachers never use digital technology to change a top-down teaching practice that is well anchored in their homes and that they do not want to return to.

• Within educational teams, the idea of inequity between students remains strong. O fears that household equipment is not the same between homes and that there are injustices between students.

• The assessment of skills via digital is very marginal (15%).

• The most used software is office tools. The use of specific software recommended by the public authorities (treatment of sound, image, modeling, graphic representation ...) remains marginal.

• Teachers have little taste for discovery, attempt, exploration or diversion. It is a risky practice (pedagogy + safety) and time consuming that they avoid having.

Distance learning: the creation of the FUN platform

One last element needs to be mentioned here. This is the government's policy of encouraging open distance learning. The aim is to offer all educational institutions a technological service that gives them the opportunity to spread their knowledge online (at a nominal cost) and, at will, to follow these courses for free online. Thus, in 2013, the French public authorities, using the American technology of the Edx platform, launched France Digital University (FUN).

FUN is an LMS with editing modules and a marketplace to promote the offer on the platform. Most of the courses that are hosted on FUN are MOOCs, but recently, the service is also open to closed, paid and graduated training (SPOCs).

The model of distance education is expanding in France, particularly for vocational training purposes. Indeed, many companies are trying to increase the skills of their employees by offering online training. These courses are offered by universities, grandes écoles or specialized centers. Service intermediaries have thus positioned themselves in the market, such as Open Classrooms or 360Learning, which offer a range of services enabling online marketing and promotion of training, support for content creation and linking of actors between them.

3.2.3. Piloting innovation through the governance of institutions (State & companies)

new philosophy borrowed from Anglo-Saxon culture has gradually penetrated the French education system: it is the introduction of economic actors in the field of education. In this context, education becomes a market that can be penetrated by a multitude of actors in a sector called "Edtechs".

The EdTech movement is a massive wave that aims to "revolutionize" the education system. The actors of the world of education in charge of questions of governance generally seem to agree on the necessity of the integration of the technologies and on the solutions proposed by the entrepreneurs of the EdTechs. The only questions are the "how", ways to increase the speed of this change, and not to leave aside this or that social group.

The model of EdTechs is based on the implementation of disruptive proposals whose ambition is to upset the education system in a logic inspired by the American model of Silicon Valley very present in recent years in French culture. Still, the development of EdTechs as a paradigm of digital education can not be totally reduced to an attempt to break into the world of private enterprise in the sphere of higher education, as this model represents a credible alternative for the actors of education.

The arrival in 2017 of a new Minister of Education, Jean-Michel Blanquer, particularly favorable to this approach will undoubtedly accelerate these connections. J-M. Blanquer said

at the launch of an investment fund dedicated to EdTechs: "We must encourage the edtech industry and its development in the world by exceeding the public / private divisions."

Faced with this model that tends to impose itself, we see yet emerge an antagonistic view of the digital world: that of "Digital Humanities" (HN) more and more pregnant, until their recent enrollment in educational programs. The education actors in charge of governance missions have indeed the choice to turn towards this model which makes reemerge a question that the public authorities had posed since the establishment of the first computerization operations of the school: the use of technological tools is not limited to a single problem of equipment. There is a relation between technology and culture (that of the human sciences, identified in the Anglo-Saxon world by the word humanity which should be established.
Some advocates of this approach go as far as to base the digital humanities on the prospect of a true "digital humanism" (which Milad Doueihi proposes in particular). It is then a question of touching more broadly the relations between human sciences, education and society.
At the heart of the system, the pedagogue has a position of facilitator in a system using digital in the service of mixed pedagogies and where there is more and more confidence in the equipment of students (BYOD) or we call a culture of "learning by doing" and "Do It Yourself".

3.2.3. SWOT: sur le système éducatif numérique national

Strong points	Weak points
❖ A long history of state reports and the setting up of mechanisms that anchor the reflection on digital education in the long term. ❖ A national will to enter the race for numerical excellence - an interventionism and incentives emanating from public authorities which are engines for an egalitarian development of the digital (in terms of access, territorial coverage ...) ❖ CNNum: an autonomous council that makes recommendations to politicians ❖ Supervision and support of actions at the international level with the label "French Tech" ❖ A political awareness that it is not	❖ A political centrality that harms local developments and singular initiatives ❖ Public policies that may be governed by private interests (industrial, think tanks ...)

enough to know how to use technologies, but also to have a real "digital culture"

Opportunities	Threats or stresses
❖ Motor initiatives like Station F or FUN	❖ To enter a logic of global privatization of education through the massive introduction of industrial financing
❖ More and more successful public / private R & D partnerships	❖ A lack of confidence in innovative experiments conducted at the institutional level (state centralism)
❖ Motor initiatives like Station F or FUN	

ROMANIA

3.2.1. The national digital economy: challenges & perspectives (quantitative & qualitative approaches)

The digital economy takes into account the impact of digital technologies on economic activities. The immense volume of information produces changes in the functioning of the markets and the restructuring of companies. The new economy has the opportunity to embrace digital knowledge in new products and services, increasing the importance of lifelong learning and adapting to new changes, globalization and sustainable development.

The new economy or digital economy, the result of the interaction between the personal computer, telecommunications, the Internet and electronics, is characterized by a series of traits quite different from the traditional economy:

The realization of a new business model (e-business, e-commerce, e-banking, etc.);

a) • Competition and cooperation are two inseparable parts of the digital economy;
b) • Higher consumption of design work, high qualification that creates higher added value, new jobs, virtually unlimited segments of business and creative opportunities;
c) • Decrease of resource consumption, increase of innovative and entrepreneurial spirit, increase of labor productivity, speed of production and change of phenomena and economic processes, increase of added value, represent only a

few economic effects that the digital economy has imposed as a superior form of the economy in general

Only 4 levels are identified in the hierarchical structure of the digital economy with Internet infrastructure, digital economy infrastructure applications, intermediaries, online transactions.

d) The level of the Internet infrastructure

This level is composed by companies whose products and services help in the creation and development of the network infrastructure based on the TCP / IP protocol suite. This category includes telecommunications companies, Internet service providers, those providing support for Internet infrastructure, access to the Internet, and producers of network equipment, computers, Security products and services ... like IBM, Dell, HP, Cisco, GlobalNet, GSM, RDS, EasyNet etc.

e) The level of applications of the digital economy infrastructure

This level includes companies whose products and services enable the optimal use of the infrastructure, with a view to the realization of e-business. At this level, the software products required for direct transactions on the Web are realized. This level of applications also includes consulting and service companies that design, build and maintain all types of websites, from the portal to complete e-commerce sites such as Adobe, Macromedia, Borland, Genesys, etc.

f) The level of intermediaries in the digital economy

Companies operating at this level do not receive income directly from transactions, but earn through advertising, taxes, commissions. Intermediaries can develop only to the extent of the increase in the volume of online acquisitions. In addition, intermediaries such as Yahoo, Travel.com, etc. are subject to aggression that contributes to the uncertainty of their future with hacker attacks that have contributed to the feeling of insecurity of consumers, and the problem of confidentiality. personal data

g) The level of online transactions

This level, also referred to as merchants, includes all categories of participants in the distribution chain that carries out online transactions; producers selling their own products, merchants, banking, tourism, transportation and entertainment providers, virtual universities. The companies included in this level are those that trade on the Web.

The Index measuring the progress made by the member states of the European Union in the economy and digital society (DESI) of a country is based on 5 parameters that result from a mix of current digital policies in Europe:

1. Connectivity: fixed broadband, mobile broadband, speed and broadband prices;
2. Human capital: the use of the Internet, basic digital skills and advanced skills;
3. The use of the Internet: the use of content by citizens, communication and online transactions;
4. The inclusion of digital technology: the digitization of businesses and e-commerce;
5. Digital public services: e-governance.

The interim report on the digital sector of the European Union continues the progress made by the Member States in digitization, combining the quantitative data provided by the Index of the Economy and the Digital Society (Digital Economy and Society DESI Index) with qualitative information about the specific policies of each country. The report is structured around the 5 digital development parameters (DESI). According to the Index of the economy and the digital society (DESI 2017), Romania is in last place in the European Union (Fig. 1).

Romania ranks 28th among the 28 EU Member States (Table 1). Overall, Romania has progressed slowly in recent years, but it is not catching up with other EU countries.

Table n° 1 – ***The index of the economy and the digital society, comparison 2016-2017***

	place	**score**	**score**	**score**
DESI 2017	**28**	**0,33**	**0,41**	**0,52**
DESI 2016[2]	28	0,31	0,38	0,49

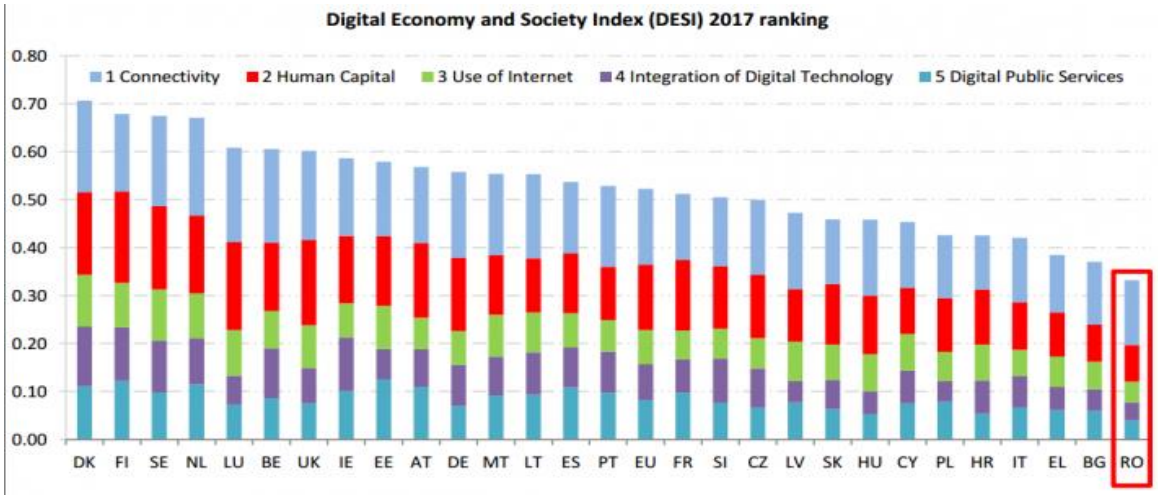

Fig. no. 1. Classification according to the index of the economy and the digital society (DESI 2017)

On the positive side, Romanians benefit from coverage for high-speed broadband connections in urban areas, which translates into the highest proportion of EU subscriptions. Yet the rate of digitization of the economy, including in terms of public services and the level of digital skills has further declined.

Overall, in DESI 2017, Romania is part of the country cluster with poor performance despite some progress in connectivity.

Table n ° 2 - Romania's performance with regard to connectivity

1 Connectivity	Roumanie		Cluster	UE
	place	score	score	score
DESI 2017	**22**	**0,54**	**0,53**	**0,63**
DESI 2016	21	0,50	0,46	0,59

	Romania						EU
	DESI 2017			DESI 2016			DESI 2017
	value		place	value		place	value
1a1 Coverage of fixed broadband services % houses	**89 %** 2016		**26**	**89 %** 2015			**98 %** 2016
1a2 Use of fixed broadband services % houses	**63 %** 2016	↑	**23**	**60 %** 2015		**23**	**74 %** 2016
1b1 Use of mobile broadband services Subscription to ten people	**71**	↑	22 **22**	**59**		**24**	**84**

	june 2016			june 2015		june 2016
				No		**84 %**
1b2 4G broadband % houses (the average of operators)	**45 %** 2016		**28**			2016
1b3 Spectrum % of goal	**75 %** 2016	↑	**9**	**67 %** 2015	**18**	**68 %** 2016
1c1 Coverage of Next Generation Access (NGA) %houses	**72 %** 2016	↑	**24**	**70 %** 2015	**22**	**76 %** 2016
1c2 Subscriptions for High Speed Broadband Services % subscriptions> = 30Mbps	**70 %** June 2016	↑	**2**	**63 %** June 2015	**2**	**37 %** June 2016
1d1 **The price of fixed broadband services** % income	**1,1 %** Price 2016, Income 2015	↑	**10**	**1,2 %** price 2015, Income 2015	**15**	**1,2 %** price 2016, income 2015

From the data presented in Table 2, it follows that Romania records excellent performances in 2017 revealed by some indicators:

• Subscriptions to high-speed broadband services (Romania occupies second place in this case) far exceed the EU average, with almost double the subscriptions;

• 9th place for the spectrum (75% compared to 37% - the average at the EU level);

• Competition is also indicated by the relatively income-related price for fixed broadband services (10th place).

DESI 2017 Romania vs. EU - Basic digital skills in the population of Romania are the lowest in the EU with only 28% of Romanians in 2017 and 26% of Romanians in 2016 with numerical skills beyond basic levels (compared to 56 % in EU).

Table 3 - Romania's results in terms of human capital

2 Human capital	Romania		Cluster	EUR
	place	**score**	**score**	**score**
DESI 2017	**28**	**0,31**	**0,40**	**0,55**
DESI 2016	28	0,28	0,38	0,53

	Romania		EU
	DESI 2017	**DESI 2016**	**DESI 2017**

	valeur	place	valeur		place	valeur		
2a1 Internet users	**56 %**	↑	**28**	**52 %**	**28**	**79 %**		
% people	2016			2015		2016		
2a2 At least basic digital skills	**28 %**	↑	**27**	**26 %**	**28**	**56 %**		
% people	2016			2015		2016		
2b1 TIC specialists	**1,9 %**	↑	**27**	**1,6 %**	**27**	**3,5 %**		
% engaged people	2015			2014		2015		
2b2 STEM graduates	**16**	↓	**17**	**17**	**16**	**19**		
1000 people (aged between 20 and 29 years)	2014			2013		2014		

As can be seen in Table 3:

• Just over half of Romanians (56%) used the Internet regularly, in 2017

• Internet users in Romania have a wide variety of activities (Table 4): read online news (63%), listen to music, watch movies and play games online (67%), use the Internet to communicate by voice or video calls (45%) or social networks (74%).

• Nevertheless, compared to last year, the only category in which there has been an increase in activity is online video calling.

The main challenge facing Romania's digital economy with the use of the internet is the lack of trust of citizens in the online channel. Even though Romanians use social networks and video calls intensively, they are reluctant about online transactions, with Romania recording some of the lowest levels of EU in terms of online shopping and banking services. line.

Table n ° 4 - Results of Romania concerning the use of the Internet

3 Internet use	Romania		Cluster score	EU score
	place	score		
DESI 2017	**28**	**0,29**	**0,39**	**0,48**
DESI 2016	28	0,30	0,37	0,45

	Roumanie				UE
	DESI 2017			**DESI 2016**	**DESI 2017**
	valeur		**place**	**valeur**	**place**	**valeur**
3a1 News	**63 %**	↓	**25**	**67 %**	**22**	**70 %**
% people who have used the Internet in the last 3 months	2016			2015		2016
				No		**78 %**
3a2 Music, video materials and games	**67 %**		**27**			

% people who have used the Internet in the last 3 months	2016					2016
3a3 Video on demand % people who have used the Internet in the last 3 months	**6 %** 2016		**27**	**No**		**21 %** 2016
3b1 Video calls % people who have used the Internet in the last 3 months	**45 %** 2016	↑	**15**	**42 %** 2015	**15**	**39 %** 2016
3b2 Social networks % people who have used the Internet in the last 3 months	**74 %** 2016	↓	**8**	**78 %** 2015	**3**	**63 %** 2016
3c1 Banking services % people who have used the Internet in the last 3 months	**8 %** 2016	↓	**27**	**10 %** 2015	**27**	**59 %** 2016
3c2 Purchases % Internet users (in the previous year)	**18 %** 2016	→	**28**	**18 %** 2015	**28**	**66 %** 2016

• Most Romanians are suspicious of "online" when talking about money. Only 8% use online banking compared to the EU average of 59%, and online purchases by Romanians are only 18% (stagnant) compared with an average of 66% at EU level.

• Companies in Romania continue to be behind those of other member states in terms of enhancing the opportunities offered by digital technology. Romania still ranks last in Europe in terms of including digital technology in business, although some progress has been made.

• The biggest increase over last year's value was recorded at the level of companies using social platforms, which increased from 6% to 8%. Even taking into account this increase, Romania remains in last place with this indicator.

For the following, we will take other data from the 2017 Interim Report on the Digital Sector - Romania:

Table n° 5 – *Romania's results regarding the inclusion of digital technology*

4 Inclusion of digital technology	Romania		Cluster score	UE score
	place	score		
DESI 2017	**28**	**0,19**	**0,27**	**0,37**
DESI 2016	28	0,18	0,25	0,35

	DESI 2017 value		place	DESI 2016 value	place	DESI 2017 value
4a1 Electronic exchange of information % companies	**22 %** 2015		**24**	**22 %** 2015	**24**	**36 %** 2015
4a2 RFID % companies	**4,0 %** 2014		**14**	**4,0 %** 2014	**14**	**3,9 %** 2014
4a3 Electronic invoices % companies	**8 %** 2016	↑	**28**	**6 %** 2015	**28**	**20 %** 2016
4a4 Electronic invoices % companies	**9 %** 2016		**24**	2015		**18 %** 2016
4a5 Cloud % companies	**5 %** 2016	↓	**26**	**6 %** 2015	**26**	**13 %** 2016
4b1 IMM to online sales % IMM	**7 %** 2016	→	**27**	**7 %** 2015	**24**	**17 %** 2016
4b2 Electronic commerce turnover % IMM turnover	**4,3 %** 2016	↓	**26**	**4,9 %** 2015	**24**	**9,4 %** 2016
4b3 Cross-border online sales % IMM	**1,9 %** 2015		**28**	**1,9 %** 2015	**28**	**7,5 %** 2015

As for policies, Romania does not yet have a strategy for the digitization of the industry; components such as cloud computing, open data and e-commerce are included in the National Digital Agenda Strategy for Romania, but the focus seems to be more on support measures for citizens than on the environment. 'business.

Another key aspect is the supply and use of e-governance services that are well below the EU average. For example, only 6% of Romanian citizens are users of digital public services, compared to the EU average of 34%.

Table n° 6 – *Romania's results concerning public services*

5 Digital public services	Romania place	Romania score	Cluster score	UE score
DESI 2017	**28**	**0,27**	**0,43**	**0,55**
DESI 2016	28	0,21	0,42	0,51

	Romania DESI 2017 value		place	DESI 2016 value	place	UE DESI 2017 value
5a1 Users of e-gouvernance solutions % internet users (in the previous year)	**6 %** 2016	↓	**28**	**8 %** 2015	**28**	**34 %** 2016
5a2 Pre-completed forms Score (0-100)	**12** 2016	↑	**27**	**6** 2015	**28**	**49** 2016
5a3 Full service online Score (0-100)	**55** 2016	↑	**28**	**54** 2015	**28**	**82** 2016

5a4 Open Data % maxim score	**63 %** 2016	↑	**11**	**44 %** 2015	**17**	**59 %** 2016

Despite the negative results recorded, the DESI 2017 Report on Romania has positive aspects :

• Romania maintains its level of household coverage by fixed broadband networks, being among the last countries (26th place) in the EU ; 89% of households are covered compared to 96% of average coverage in the EU.

• Romania has relatively good results in science, technology and mathematics (STEM) degrees, 1.7% of Romanian aged between 20 and 29 years with a degree in STEM.

• Romania has made significant progress in the availability of open data.

Summing up, according to statistics recently published by the European Commission, Romania still ranks on the last places in Europe in the Index of Society and the Digital Economy (DESI 2017). Although connectivity has increased in Romania in the last two years, Human Capital, Internet Use, Inclusion of Digital Technology and Digital Public Services still rank it among the lowest in Europe. .

Hai pe NET! is a campaign initiated by the EOS Foundation, in partnership with the National Association of Public Libraries in Romania and APDETIC Association which is part of the pan-European digital inclusion campaign ALL DIGITAL WEEK 2018, in which access to the Internet shows the need for reinforcements.

3.2.2. Policies & Strategies for National Digital Education

In Romania, the relationship between the information society and economic growth is proportional. As an expected result of this change, it appears the need to invest in human capital. The use of information and communication technologies has led to the restructuring of the economy and the accelerated development of electronic commerce.

Digital technologies allow access, processing and transmission of information in an easier and faster way. Electronic information becomes the key resource for the digital economy.

In line with the European Digital Agenda, ICT is a very important instrument for strengthening the process of social inclusion, because it offers the possibility to find new

work, provides information about the rights and obligations of citizens, facilitates professional development, and at the same time, provides a path towards the overall and consistent strengthening of ICT skills at the national level. This process is known as e-Inclusion.

Social inclusion and the fight against poverty are among the objectives of the European Union that lead to economic growth and jobs. Thus, does it offer formal and informal education of citizens for the development of digital skills at all levels of education?

Social inclusion through e-Inclusion and digital literacy is a problem of national interest. The aim is to exclude the benefits of new technologies from certain social categories and certain regions / geographical areas. In other words, the attenuation of the phenomenon "digital dive" becomes an important goal.

In Romania, groups of disadvantaged communities face obstacles in adapting to the demands of today's society and need assistance for their social inclusion. In the field of e-Inclusion, in Romania, a representative project has been "Access to Information and Communication Technology (ICT) and Improving Digital Skills" with the aim of facilitating the development of e-Inclusion. access to ICT services through the provision of ICT equipment and Internet connection, and the promotion and facilitation of access.

At the European level, the European Union has developed the Europe 2020 Digital Agenda with the main objective of developing a Single Digital Market.

The Digital Agenda for Europe 2020 has the following structure:

a) Pillar I - The Digital Single Market - allows free cross-border access to online services and entertainment;

(b) Pillar II - Interoperability and Standards - enables the integration of the devices, applications, data and services needed for cross-border interaction;

(c) Pillar III - Trust and Security - promotes the growth of Internet users' confidence in e-services and online transactions to boost the consumption of ICT services;

(d) Pillar IV - Fast and Fast Internet Access - targets investments in broadband infrastructure to benefit from the latest electronic technologies and services;

(e) Pillar V - ICT Research and Innovation - stimulates adequate funding for increased competitive advantage in the ICT field;

(f) Pillar VI - The growth of digital literacy, skills and inclusion - creates a bridge to combat the digital gap between consumers, so that they also benefit fully from the benefits of ICT services;

g) Pillar VII - ICT benefits for EU society - focuses on the ICT capacity to reduce energy consumption, support the elderly population, revolutionize health services and provide better public services .

One of the objectives set by the European Digital Agenda has been taken up and adapted to the current context in Romania to integrate it into the Single Digital Market of Europe.

Authorized in February 2015 by the Government, the Digital Agenda Strategy of Romania 2020 is the document for the implementation of European objectives at the national level. The Ministry of Communications and Information Society (MCSI) is responsible for coordinating the implementation of the strategy which is divided into 4 areas:

- the modernization and reduction of public administration expenditure through e-governance, interoperability, cybersecurity;
- ICT promotion in the field of education, health and culture;
- the promotion of electronic commerce and innovation;
- broadband and digital services infrastructure.

In Romania, the ICT sector has the largest contribution to GDP (6%) of EU member countries. Based on more than 200 companies, half of which have more than 200 employees and about 80,000 scientists, the IT sector is a growth vector for the Romanian economy. Even if more than 60% of the added value of the IT sector is concentrated in Bucharest; Cluj, Timisoara and Iasi cities have become IT centers. Recently, other cities, including medium-sized towns, have emerged as IT centers (Braşov, Sibiu, Craiova, Târgu Mureş and Galaţi).

The national strategy, based on the priorities established by the European Commission and adopted by Romania concerning ICT education, targeted 3 categories of priorities, according to the specificity of the learning process:

1. Education through ICT-based curricular activity

The OECD-PISA program assesses the extent to which students hold one of the key competencies at the end of compulsory education as well as the basic knowledge and skills essential for continued education, full participation in social life, or integration into the labor market.

PISA research focuses on the key areas of the curriculum, namely science, reading comprehension and mathematics. PISA research is not just about assessing students' ability to reproduce what they have learned, but about how well students are able to extrapolate what they have learned and apply their knowledge in different situations. unfamiliar, whatever the connection with the school. This approach reflects the fact that modern economies value the ability of individuals to use knowledge rather than replicate it.

The International Report published by OECD "Excellence and Equity in Education" (Vol I), includes information on the performance of the Romanian education system in the framework of the OECD-PISA 2015 Program (OECD International Program for the Evaluation of Students). .

The results recorded were as follows:

- In Science (main area in PISA 2015), Romania recorded an average score of 435 points, ranking 48th out of 70 countries / economies with validated databases. From this point of view, Romania is part of the group of 11 countries (among which Colombia, Israel, Portugal and Qatar) whose average performance in Sciences improved considerably between 2006 and 2015; the average OECD Science score is 493 points. The top spots are Singapore (556 points), Japan (538 points), Estonia (534 points), Taipei-China (532 points), Finland (531 points) and Canada (528 points). The results for Romania can be compared to those obtained by countries / economies such as United Arab Emirates, Uruguay, Cyprus, Moldova, Albania and Turkey.
- in Reading (secondary domain in PISA 2015), Romania recorded the average score of 434 points (in increase compared to 2009- 424 points), with performances similar to Uruguay, Bulgaria or Trinidad-Tobago and superior compared to those of Mexico and Thailand.
- in Mathematics (still secondary domain in PISA 2015), Romania recorded the average score of 444 points (445 points in 2012, when Mathematics was the main field), with performances similar to countries like Greece, Bulgaria, Cyprus, or Argentina and Turkey, compared to the results of PISA 2012; on the PISA 2015 Performance Scale, Science has been defined seven levels of pro efficiency. The second level is considered the basic level that a 15-year-old student must attain until the end of compulsory education, in order to

integrate effectively into the knowledge society. According to PISA 2015, 35% of Romanian students are at the second level. Under the second level, ie levels 1a, 1b and under level 1b, 38.6% of students are. Cumulative, at the higher levels - 3, 4 and 5 - place 27.5% of Romanian students; for the 2006-2012 period, there is a decreasing trend in the percentage of students with performances under the second level: 2006 - 46.9%; 2009 - 44.4%; 2012 - 37.3%. For the same period, the percentages of students with high performance, ie at level 5 or above, fluctuated as follows: 2006 - 0.5%; 2009 - 0.4%; 2012 - 0.9% and 2015 - 0.7%.

The results are more visIble in Table 7:

Tableau n° 7 – *Les Résultats obtenus en Sciences, à la Lecture et aux Mathématiques (OECD-PISA 2015)*

Country (by order of ranking)	Science	Reading	Mathematics	Science, Reading and Mathematics	
	Average score at PISA 2015	Average score at PISA 2015	Average score at PISA 2015	Percentage of performing students in at least one subject (level 5 or 6)	Percentage of underperforming students in all three subjects (Below level 2)
Romania	435	434	444	4.3	24.3

Source: OECD, PISA 2015 Database, Tables I.2.4a, I.2.6, I.2.7, I.4.4a and I.5.4a. PISA 2015 Results in Focus, p. 5

Therefore, in the context of ICT-based curriculum-based education, the focus is on OER and Web 2.0 resources for learning and project-based evaluation and e-Portfolio. student results and the creation of content and some original digital interactions.

At the national level, practical models have been developed and successfully implemented towards this direction:

- The Knowledge Based Economy Program - implemented for the development of ICT level in education of disadvantaged communities in Romania;
- The POSDRU Project (ICT key competences in the school curriculum);
- The INSAM Project (Digital Instruments for Improving the Quality of Evaluation in Secondary Education) "Restructuring the School Curriculum in Secondary Education".

1. Education through ICT-based extracurricular activity

The aim is to organize and carry out extracurricular activities (creative activities, exchange of experiences, international study visits and the e-Holidays project) through ICT technologies.

2. Continuing Vocational Training - Life Long Learning through ICTs

The purpose of continuing vocational training is the possession and development of the knowledge and skills necessary for adult volunteers throughout life for personal and / or professional development. In this perspective, the EU supports coalitions for digital skills and jobs in the member states. To date, 17 member countries have launched coalitions, including Romania. The Skills 4 IT Digital Jobs Coalition is a project implemented by APDETIC, supported by IT companies, MCSI and education representatives. Through this project, MCSI proposes to write a memorandum with the Ministry of National Education and the Ministry of Labor and Social Justice to support the development of digital skills.

3.2.3. Piloting innovation through the governance of institutions (State & companies)

The process of reforming the Digital Agenda for Romania has taken a series of steps to stimulate the adoption of the National Strategy for the Digital Agenda for Romania 2020:

• Consultations with the ministries responsible to define the action lines for the Digital Agenda for Romania and have a document setting out all the expected objectives and the parties involved in an agreed space-time;

• Definition of strategic projects with all parties involved in the Action Area;

• The definition of the National Interoperability Framework of Romania;

• Conducting debates and consultations with third parties that can finance the Strategic Lines of Development and reduce the investment gap required: The World Bank, The Ministry of Public Finance, The European Bank for Reconstruction and Development (EBRD);

• The signature of a protocol with all the Ministries for the Enterprise Architecture Government initiative.

Seen the 7 pillars that are the basis of the Digital Agenda for Europe 2020, socio-economic analyzes, consultations with civil society and public institutions of public administration, Romania has defined 4 major areas action plans that will lead to sustainable economic growth and increased competitiveness:

• Action Area I: E-Governance, Interoperability, Cyber Security, Cloud Computing, Open Data, Big Data and Social Media - increasing efficiency and reducing public sector costs in Romania through the modernization of 'administration;

• Action Area II: ICT in Education, Health, Culture and E-Inclusion - intervenes in social challenges at a sectoral level and ensures that ICT investments will create a positive impact in the social context.

The implementation and correlation of Action Areas I and II will generate up to the year 2020 an estimated impact on Romania of 5% GDP growth and 1% job growth.

• Action Area III: eCommerce, Research, Development and ICT Innovation - builds on the comparative advantages of regional Romania and supports economic growth in the private sector. The implementation of Action III measures will, up to the year 2020, have an estimated impact on the Romanian economy of growth of around 3% in GDP and 2% in employment.

• Action Area IV: Broadband and Digital Services Infrastructure - the basis for the implementation of the above action areas and their specific services. Beyond the need to invest in digital equipment, the most important is the development of broadband infrastructure and digital services. Through access to ICT equipment and the Internet, it also facilitates social inclusion, the growth of digital literacy and the enhancement of digital skills.

With regard to Action Area II 2.2 ICT in Education, the National Strategy for Public Health 2014-2020, strategic development lines, as outlined in the National Strategy - the Digital Agenda for Europe 2020, are:
• The provision of ICT infrastructure in schools,
• The development of digital skills of students and teachers:
- Training for teachers in ICT use. Due to the rapid pace of development and improvement of ICT systems and technologies, in order to ensure the adequate education of students, teachers need to be trained regularly on what is new in the ICT-supported educational sector.
- The provision of specific ICT training curricula, directly related to enhancing the quality of the learning process and digital skills.
• ICT use (OER and Web 2.0) as part of the learning process and in the framework of the lifelong learning process (Life-Long-Learning):
- Implementing the use of OER by providing an optimal framework for using Open Educational Resources (OER) and digitizing and archiving educational content;
- The inclusion of Web 2.0 Platforms as part of the teaching-learning process where students will be stimulated to become more involved in the learning process which, over time, will have a positive impact on their academic performance, with the potential to reduce the dropout rate;

- interactive visual materials and additional sources of information provided by the Internet will increase student engagement;
- the use of ICT will also allow the adaptation of the materials taught to the aptitudes of the students, by supporting personalized and individualized learning;
- Encouraging the lifelong learning process, online education platforms and existing materials in a digital format, will encourage distance education, enabling adults of all ages to assimilate knowledge in a certain domain at any moment of their life;
- Ongoing training of the ICT specialty skills of public administration staff.

A particular achievement of 2016 was the GovITHub Program. Launched by Romania on February 24, 2016, this initiative aimed to identify solutions for reducing the bureaucracy of public administration after suggestions received from the public through an online platform (http: //maisimplu.gov.ro/). The Government wants an institution to request information from a citizen once. It is up to the institutions to transfer this information electronically. The initiative is also aimed at eliminating some difficult documents and procedures.

3.2.4. SWOT : on the national digital education system

Strong points	Weak points
❖ Streamlining the educational process through ICT use.	❖ Lack of teacher motivation for ICT use in class.
❖ Student acquisition of basic skills and increased access to technology.	❖ Content based on memorization, large volume of concepts, concepts, reduced capacities.
❖ Library computerization and digital skills training.	❖ The use of Web 2.0 skills is reduced because of insufficient knowledge of them and difficult use due to lack of flexibility and development of teachers.
❖ Promoting active and interactive learning. ❖ Quick access to information.	❖ School infrastructure is inadequate. ❖ Great consumption of time for the realization of softwares.
❖ School staffing of the secondary computer system, as a result of government programs. ❖ ICT is provided as a compulsory (college) and optional (primary) discipline.	❖ The decreasing number of teachers in the secondary education system. ❖ Initial teacher training on the methodical integration of ICT into the teaching process is modest. ❖ The non-acceptance of new

- CT becomes a compulsory discipline in 2005, in secondary and vocational education, for all sectors and specializations / professional qualifications.
- As part of the baccalaureate exam, as of 2009, the numerical skills of all high school graduates are assessed and tested by a (compulsory) exam test.
- The implementation of e-learning platforms (more than 70% of universities).
- Good ICT skills of students, whatever the services provided by universities.

technologies by some of the teachers and managers.

Opportunities	Threats or constraints
❖ Some programs and training courses provide training for teachers in the use of ICT tools in the teaching-learning-evaluation process.	❖ The resistance to change of some teachers.
❖ The development of the Internet access infrastructure in Romania.	❖ The difficulty of including rural areas in the development of digital skills.
❖ The use of OER and WEB 2.0 technologies, educational goals that can offer flexibility to the educational process.	❖ The lack of coherence between initial and continuing teacher training.
❖ E-learning allows students to develop self-management skills in learning, self-assessment.	❖ ICT use is associated with a high risk of subjectivity in appreciation, in the absence of precise evaluation criteria.

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QUEBEC

3.2.1. The national digital economy: challenges & perspectives (quantitative & qualitative approaches)

Information and communication technologies (ICT) are today essential in education. Ham and Cha (2009) noted that the majority of companies share the idea that ICTs are one of the key themes in educational policy when it comes to creating an education system that is able to prepare appropriate future citizens to live in the knowledge or information society.

This position is confirmed in Quebec schools, where ICT occupy a prominent place in the training of students throughout their schooling (Quebec Ministry of Education [MEQ], 2001). The rapid evolution of technology and its impact on teaching and learning practices means that the need for support is great.

As stated in the Ontario Ministry of Education document Achieving Excellence - A Renewed Vision for Education in Ontario, "[...] when the world is more connected and the students, increasingly comfortable with technology, there is still too much variation in the use of technology in the classroom. "

In the same document, two of the targets outlined in the Action Plan to Achieve Success relate to the integration of technologies in the classroom: "Investing in the technology, design and infrastructure needed for classrooms in the classroom. future to meet the needs of communities; invest in innovative, technology-based teaching practices and methods to motivate all students and respond more specifically to their learning needs. "

In Quebec's elementary and secondary schools, ICT and information skills coexist very closely, at least according to their presentation in the Québec Education Program (MEQ, 2001). This repository declines, among other things, the skills that pupils will have to acquire during their training between kindergarten and the end of their secondary education. These skills correspond to generic skills that are deployed in all areas of learning. ICT skills are found in the "Exploiting Information and Communication Technologies" competency. As for information skills, the program incorporates them without explicitly mentioning them in the "Exploit Information" competency. It includes knowing how to take ownership of information, benefit from it, and recognize various sources of information.

In Quebec, ICT skills and information skills are closely related and are recognized as essential across all levels of training.

A pan-Canadian system of French-language college institutions is part of a long-term vision involving all levels of government. Phenomenons

as labor shortages, assimilation, economic upheavals and demographic fluctuations only reinforce the strategic importance of post-secondary education, not only as a bulwark but also as a lever for communities.

Colleges are factors of development and fulfillment insofar as they are led by people of vision and commitment who care about the health of the communities in which they have integrated.

Thus, to fulfill their educational mission, colleges need partners and creative solutions, both pedagogical and technological. These are based on innovation and partnership to provide access, programs and resources as valuable alternatives for high school graduates or adults who need training in a particular field.

In November 2005, the Canadian Parliament passed Bill S-3 on the Federal Government's Obligations Regarding the Development of Official Language Minority Communities.

Even if some services are embryonic, they are so many bridges to an integrated network of post-secondary college training in French. And this can be achieved through innovative partnerships with colleges and CEGEPs who see it as an opportunity to share their knowledge and expertise and also thanks to the Réseau des Cégeps and the Francophone Colleges of Canada (RCCFC), whose action allows For a decade now, many partnerships and collaborations with other Quebec colleges and CEGEPs.

Overall, colleges outside Quebec do not offer pre-university programs, but they do award college diplomas, the equivalent of technical DECs in Quebec. However, some colleges develop joint or credit recognition in collaboration with universities, in order to facilitate the transfer of a student from college to university.

This formula is very popular in Ontario, where there is a Ministry of Education with Primary and Secondary Education and a Ministry of Training, Colleges and Universities that provide vocational training and higher education. . In general, francophone colleges follow the ministerial directives of each province.

3.2.2. Policies & Strategies for National Digital Education

Rapid progress in the digital field, particularly through robotization, automation and artificial intelligence, confirms the need to act to meet the technological, ethical and social

challenges of innovations that will transform our lifestyles, our workplaces and our daily lives.

In addition to technological change, companies around the world are facing three main challenges:

• The evolution of demography: the composition of societies will change considerably over the next decades due to the aging of the population and the migration of populations;

• Climate change: both challenges and risks, climate change is leading to transformations and climate disruptions, which will have an impact on our way of life;

• Changes in the economy: the economic stakes put pressure on public action, particularly in terms of income inequalities and wealth disparities.

Québec must make its educational system an initiator of the "digital revolution", by betting on digital skills and improving our educational practices in order to prepare learners to face the challenges of tomorrow.

This is why the Digital Action Plan for Education and Higher Education is guided by the vision "of effective integration and optimal use of digital technology for the success of all people, enabling them to develop and to maintain their skills throughout their lives. "

The thirty-three measures of the Action Plan were designed to give a new impetus to the digital shift in the education system and to actively contribute to the development of digital skills of Quebec citizens.

These measures are proposed to achieve nine objectives, which respond to eight areas of intervention guided by three major orientations, all centered on the needs of the community:

• The first orientation aims to contribute to the modernization and adaptation of the deployment of training provision, to support the development of digital skills of young people and adults as well as to promote digital literacy.

• The second aims at optimizing the use of digital technology through innovative practices, the pooling of resources and services, and a distance learning offer adapted to the needs and reality of today's and tomorrow's learners.

• Finally, the third focuses on the monitoring of the educational path, on the establishment of an adapted and flexible framework, as well as on accessibility based on equity and security.

The implementation of the actions will take place over a five-year period, from 2018 to 2023, which is also the period covered by the Government of Quebec's Digital Agenda, in close collaboration with stakeholders and partners in the education system.

The movement initiated by this action plan is iterative and continuous, since education must allow the human to reinforce its power of action and reflection, even in a context where technologies evolve rapidly.

The following topics are commonly addressed in the digital strategies of education systems:
• the training of teachers to encourage and accelerate the enrichment of their teaching practice,
• the creation of more digital learning activities and resources, innovation in evaluation, development and dissemination of new uses of digital technology,
• Improving the digital skills of teachers and learners as well as those of citizens in general,
• the deployment of the necessary infrastructure to support all these transformations,
• the development of a culture and conditions conducive to innovation,
• initiating change by relying on the networks and their professionals,
• accelerated support for digital tools.
•

The arrival of La Cité collégiale in Ottawa, Collège Boréal in Sudbury and agricultural training at the Alfred Campus of the University of Guelph caused a real explosion of enrollments. In less than two decades, these three Francophone institutions have made their mark not only in Ontario among Ontario's 24 colleges of applied arts and technology, but also across the country where their leadership has been established through their innate sense of purpose. partnership and innovation in education and training.
Ontario's French-language colleges are a dramatic demonstration that supply is driving demand for post-secondary education.

The Network of CEGEPs and Francophone Colleges of Canada (RCCFC), which saw
the day in 1995, is the voice of pan-Canadian Francophone college education institutions. The RCCFC is primarily a network of mutual aid, promotion, exchange and partnership, whose mission is to support the development of the Canadian Francophonie by placing at

the service of the Canadian Francophonie the expertise of all its institutions. network and by giving visibility to francophone college education with government authorities.

Through its collaborative programs and networking initiatives, the RCCFC makes a significant contribution to the presence of post-secondary education and training in French in all regions of the country.

Thanks to its action, the college has made more and more breakthroughs in a minority community, to the point where it currently serves 7,000 Francophones who study full-time, mainly in Ontario, New Brunswick, Nova Scotia, Manitoba and in British Columbia, and 20,000 Francophones in vocational training and adult education.

The RCCFC thus assumes collaborative leadership in carrying out some fifty interprovincial collaboration projects, including Quebec. The Network has piloted research projects, for example, on the motivation of high school graduates to pursue post-secondary studies in French. He also led the "Far-West" project for the establishment of college training programs in French in British Columbia, Alberta and Saskatchewan. He has also participated in a student mobility project so that young people can have a collegiate experience in another province. And these are just some of the achievements of the RCCFC.

Effective ways to support principals:

• placing the student at the center of learning;

• Aligning messages with Ontario Ministry of Education documents, including:

- Defining 21st Century Skills for Ontario - Issue Paper, Phase 1, 2016;

- Achieving Excellence - A Renewed Vision for Education in Ontario, 2014;

- Effectiveness Framework for the Success of Every Student at the French Language School (M-12), 2013;

- Ontario Leadership Framework, 2013;

- Getting better - Launching the next phase of Ontario's education program;

- Framework Programs.

• taking into account research in the field of technology integration in pedagogy and learning principles in the 21st century, including:

- Digital Pedagogy in Action - Foundational Document for Ontario Schools and School Boards, April 2014;

- Digital Pedagogy in Action - Review of Writings and Virtual Interviews, April 2014;

• examining ways to address the key conditions for integrating technologies:

- participatory pedagogy;
- Culture of systematic engagement;
- Technology that contributes;
• by targeting actions to implement the four areas of intervention:
- Continuing professional development;
- Leadership in action;
- Learning space;
- Integration of ICTs: levers of the new pedagogy.

And it provides practical tools that will help educational leaders in their coaching and collaboration work with principals:

 Slides - For a common vision in the digital age! (This PowerPoint presentation presents an example of how to create a techno-educational vision).

 Foundational Document (The Foundational Document for French-Language Schools and School Boards in Ontario reports an international review of the literature on pedagogy redefined by technology. foundation document proposes an approach and directs concrete actions to bring the education system to make the turn in the digital age).

 Template - Example of a plan for the shift to the digital age

 Template - Inventory of the technological equipment (An example of template is present to compile the technological equipment within the school.The information collected using this template will be added to the data from other sources to create the school's digital profile):

• Excel version of the inventory of technological equipment
• Google version of the technology equipment inventory

 Self Audit Tool - Technology Integration Matrix for Principals

 Self Audit Tool - Technology Integration Matrix for Teachers (The Technology Integration Matrix (MIT) is a self-auditing tool for management tasks designed to help school principals transforming its management practices by providing it with pathways that will enable it to move forward in the digital age)

 Reflection tool - Reflection on the signs of the turn in the digital age in my school (This tool of reflection offers tracks allowing to make the state of the elements of the turn in the digital age which are acquired, those which are in development path and those that have not yet been addressed)

 Survey (These three essential conditions serve as a gateway to ensure an effective turnaround in the digital age.The questions in each survey make it possible to take stock of the current situation within the school):

• Participatory pedagogy

• Technology that contributes

• Systemic commitment culture

 Videos - for example, The Voice of the Active Learner, Education from a Native Digital Perspective (videos show the perspective of a learner who supports his / her learning, and focuses on ways to facilitate student learning in the classroom. digital age).

In the school network, the emergence of innovative pedagogical practices is often the result of local initiatives.

Many educational institutions and their teaching and professional staff have adapted and opened up to new pedagogical approaches and have embarked on a process of change.

CEFRIO's summary report, entitled Usages du numérique in Québec schools, reflects this dynamic that has been well underway in many circles.

As part of the School 2.0 Action Plan: the connected classroom (2011-2016), the vast majority of Quebec classes have been equipped with an interactive digital whiteboard (TNI) or equivalent technological equipment. . In addition, many teachers in the school network now have access to a laptop.

This plan also included the training and support of teachers in the pedagogical integration of these technological tools, as well as the acquisition of digital educational resources (REN), in order to optimize and exploit technologies in the classroom. This measure represented, from the point of view of technological equipment, an important first step.

In recent years, daring and initiative have found their place in schools; indeed, pedagogical-digital leaders have emerged and helped to make things happen.

More and more teachers from Quebec are coming back and engaged in a dynamic of innovation and many high-minded people are today introduced to computer thinking and programming, realize projects on digital tools and work daily in collaboration. in contexts where their creativity is put in the foreground. However, more needs to be done to support these digital-pedagogical leaders.

3.2.3. Piloting innovation through the governance of institutions (State &

companies)

This overview of innovation in the CEGEPs from the point of view of the actors, without pretending to constitute a complete portrait of the innovative practices of the public college network, makes it possible to better understand their role as innovative organizations in Quebec and their contribution to society Knowledge .

The innovations documented in the survey (in all six areas of intervention of the colleges: college pre-university and technical training and lifelong learning, the educational environment and the services offered to the student population , the management of the college (human, financial and material resources), the contribution to regional development and links with the community, openness to the world and internationalization, pedagogical, disciplinary and technological research) illustrate the range of innovative practices that can characterize collegial organization.

They make it possible to observe that innovation in colleges is above all social, then organizational and then technological, the latter being accompanied mostly by organizational or social innovation.

Of the innovations documented, about one out of every five innovations is based on Information and Communication Technologies (ICT).

Telecollaboration in industrial electronics technology as part of the networked CEGEP project:

Cégep de Sept-Îles and Cégep de Thetford have agreed on a telecollaboration in Industrial Electronics Technology within Networked Cégeps, a project technically supported by the Francophone Center for Computerization of Organizations (CEFRIO) and financially by the Ministry of Education, Recreation and Sports (MELS). The Federation of CEGEPs is also a partner.

Cégeps Network, which is both a set of projects and an action research conducted by CEFRIO, will allow students to exchange within their courses using a window of presence and to have virtual TV meetings and activities. Its objective is to promote the maintenance and vitality of the technical training offer in the regions of Quebec, despite population

declines that reduce the size of student groups, by taking advantage of telecollaboration and training tools. virtual exchanges like the software DECclic II and platform Via.

The tele-presence window is used during joint activities at a distance to allow the interaction of the participants. It is a technology that works with fiber optics and high-speed Internet, much simpler and less expensive than videoconferencing systems. It should not be thought that this is traditional distance education. In fact, it is more like telecollaboration tools.

Wireless access to the college network for students with a laptop: Cégep de Levis-Lauzon.

More and more students are using their laptops in the college itself, in the cafeteria, in the library and around the campus.

And it is to allow them to connect to the Internet, its computer network and its various online services that Cégep de Lévis-Lauzon now provides them with wireless access in the most popular strategic sites of the campus.

This project provides students with access to a wealth of information resources, such as the Internet, access to online student repertoire and the Blue Manitou portal. This encourages them to do their schoolwork on campus and promotes teamwork.

It also gives a very positive visibility to the Cégep, perceived in the region as a state-of-the-art institution that promotes the use of new technologies by its student population and staff.

Human, financial and material resources: Cégep de La Pocatière

Innovation in human resource management refers to the development of new practices, approaches or interventions, mainly through the development of policies and programs: teacher evaluation policy, overall human resources management policy, training programs staff recognition, work-family balance, etc.

Some innovations are also associated with the development of online services for students. This is the case of Cégep de La Pocatière, which refers to the computerization and networking (intranet / Internet) of all the teachers' offices of the College.

BYOD "Bring Your Own Device" or WITH "Bring Your Personal Communication Equipment" to School means the use, in the school setting, of personal digital equipment whose responsibility is not the responsibility of the State or the community .

A BYOD project is a project to take into account personal digital equipment in the life of the school or school. A BYOD project:

• Begins as soon as there is a will from the institution;

• Is based on a pedagogical project of establishment;

• Can exist with or without integration into the institution's network infrastructure, both modes (online and offline) are included in the scope;

• Can be part of a territorial project (academy and / or community) proposing devices facilitating the acquisition of equipment and its implementation in institutions: financial assistance to families, framing devices for the purchase of equipment (guide, negotiation ...), infrastructure in institutions.

NASs are web-based platforms that provide features for course management and allow for virtual grouping of students to extend interactions outside the classroom. This system facilitates the management of communication and information sharing between the teacher and his students (messages, news, agenda, lesson plan, teaching materials, work, notebook, etc.). It can offer a variety of assessment, collaboration and learning support tools and access to external tools such as a portfolio, a cloud collaboration environment, a plagiarism management system, and more.

Finally, ENAs can be integrated with other applications of educational institutions, for example for course registration or access to various services such as library or student services. In addition to being used for offering on-campus courses, ENA can also be used for hybrid education and distance learning (FAD). Recall that the most widespread definition of hybrid courses is that 20 to 80% of its sessions are not face-to-face and there is no face-to-face course in the ADF.

New investments under the Digital Action Plan for Education and Higher Education are defined under three headings:

• Support the development of digital skills of young people and adults;

• Exploit digital as a vector of added value in teaching and learning practices;

• Create an enabling environment for digital deployment throughout the education system.

There are also seven defined axes:

• Axis 1: The development of the training offer
• Axis 2: Digital skills and culture
• Axis 3: Innovative practices
• Axis 4: Resources and Services
• Axis 5: Distance training
• Axis 6: The educational path
• Axis 7: Adaptive and flexible coaching

These will be made to 33 measures:

01 Establish a cross-curricular digital skills framework for all levels of education

02 Increase the pedagogical use of computer programming

03 Support inter-institutional concerted action initiatives by setting up innovation clusters in digital-related training areas

04 Produce a new competency framework for the teaching profession to promote the integration of digital technologies into the teaching practices of future teachers

05 Promote continuing education for teaching, professional and support staff in digital pedagogy

06 Maximize current narrative services and support "pedagogic" leadership in educational institutions

07 Maximizing the role of digital education staff in higher education institutions

08 promote innovative pedagogical practices and the potential of digital in an educational context

09 Bring learners to understand the opportunities, issues and impacts of digital use, including those related to the protection of privacy

10 Support institutions in developing lifelong learning and skills development opportunities for people in digital skills

11 Support the acquisition and development of digital educational resources

12 Encourage innovation projects related to digital technologies

13 Develop departmental evaluation tools in digital format

14 Ensure the release of open data and promote their use

15 Develop a National Platform for Digital Learning Resources

16 Support the continued network school deployment

17 Deploying e-books in school libraries and encouraging their transition to learning hubs

18 Implementing a Shared Service Platform for University Libraries

19 Promote the deployment of distance education to primary and secondary education

20 Develop massively open online courses to meet large-scale training needs

21 Consolidate the entire distance learning offer in higher education - eCampus Québec

22 Promote the sharing of expertise in distance learning

23 Put in place the student's unified digital file, which will follow him throughout his educational career

24 Support and supervise the development of management software packages integrated into the education and higher education networks

25 Increase communication and collaboration among school stakeholders, students and parents by harnessing the potential of digital

26 Establishing governance conducive to the deployment of digital technology

27 Strengthen consultation with partners in the education and higher education networks

28 Stimulate collaboration with Québec companies for the development of educational technologies

29 Support the acquisition of digital equipment for educational purposes in institutions;

30 Increase the use of resources and software to support learning for all learners, including students with social maladjustments or learning disabilities

31 Offer support to school users for digital devices dedicated to pedagogy

32 Contribute, for the education system, to the government's digital infrastructure action plan

33 Strengthening Information Security in the Education and Higher Education Networks

The Digital Action Plan for Education and Higher Education has benefits for all:

For learners:

• An educational path related to the needs of the 21st century
• Defined and recognized digital skills
• Educational success fostered by innovative pedagogical approaches
• More autonomy in their learning process
• An accessible and varied distance learning offer
• Responsible citizens in their digital uses

For teachers:

• Digital at the service of pedagogy
• Better equipped and trained professionals
• Support and accompaniment
• Easier access to digital educational resources
• Valorisation and dissemination

For the parents :

• Means to promote communication, monitoring, collaboration and participation

For the establishments:

• Shared leadership and strengthened consultation

• Players sensitized to the potential of educational technologies

• Infrastructures for equitable and safe access

• International influence

For partners and the community:

• The grouped expertises

• Concerted, needs-based actions

• A powerful lever of collaboration

• Open spaces to prepare for the future

• Strengthening Québec's ecosystem of digital educational resources, resources

3.2.4. SWOT *: on the national digital education system

(* Analysis based on the results of an on-line survey conducted by Gabriel Dumouchel and Thierry Karsenti on information skills in relation to the web of future Quebec teachers in 2010 - the exact references, in Bibliography)

Strong points	Weak points
❖ Teachers are very well equipped with computers and the Internet at home, which gives them easy access to online information as part of their studies ❖ Preference for digital information (Teachers massively and primarily use the Internet and general search engines to obtain information as part of their studies. ❖ Teachers generally have a strong sense of self-efficacy in their computer and internet skills. ❖ Teachers also have a strong sense of self-efficacy with respect to their informational skills, whether searching for information on the Internet, using search engines, or even teaching these skills. ❖ The teachers said they checked the information found on the Internet (checking the source, the author, the date and the update of the websites consulted and the	❖ Future teachers in Quebec receive little training in ICT as part of their initial training (usually just giving short workshops on the library's available education resources and teaching basic skills to look for and process information using online search tools, including the catalog). ❖ The responsibility for training students in information skills is often entrusted, in Quebec, to university librarians. Many teachers often or very often use paper books and encyclopedias. ❖ Teachers have to be uncomfortable to use the advanced search functions of search engines. ❖ The vast majority of available functions do not seem to be able to be used by teachers. ❖ Interviewed teachers are divided as to consider information on the Web as trustworthy as that contained in scientific textbooks or periodicals. ❖ The majority of them claim to use the

triangulation of the sources to better match the information found).

- Teachers are increasingly aware of the problem of the quality of information on the Web and the short mandatory training in information skills that some future teachers receive in recent years at the beginning of training.
- Teachers really have adequate information skills on the Web.

Internet first to find information as part of their studies, many would give even more credibility to hard-copy books, yet less used for this purpose.

- The vast majority of available functions do not seem to be able to be used by teachers.
- The majority of them claim to use the Internet first to find information as part of their studies, many would give even more credibility to hard-copy books, yet less used for this purpose

Opportunities	Threats or constraints
❖ The rapid rise in the use of smart phones and social networks like Facebook by young people heralds the arrival of new habits of research and evaluation of information marked by socialization and mobility. ❖ Among the information evaluation strategies teachers have, the most mastered affects the ability to use more than one source to solve a problem or better understand a subject. ❖ Teachers reported being competent or very competent to review the date of the last update of a web page. ❖ In a school context where the information sought and processed by learners is now mainly via the Web, ICT and information skills are undoubtedly necessary to master. ❖ Future teachers generally claim to possess very strong ICT and information skills and be ready to teach them to their students. ❖ The fact that many of the students could not name a scientific search engine or felt that they were not proficient at evaluating a website based on their URL indicates a need for urgent training in information literacy skills. to the Web.	❖ Some of the lessons never use engines to find information in the course of their studies, although this tool may be useful for them. ❖ Québec's future teachers are both poorly trained and often poorly qualified. ❖ Several research habits or feelings of self-efficacy are perceived in relation to their informational skills, which seem to point to important and worrying gaps.

PART II

RESULTS
QUESTIONNAIRES OF APPLIED TRENDS IN PARTNER COUNTRIES "ANGE"

CHAPTER 1
METHODOLOGICAL RESULTS

1.1. Objectives of the research

O1: Describe current school leadership practices and pedagogical, educational and digital practices in the ANGE partner countries.
O2: Imagine piloting practices, the pedagogical practices of the future and the resources needed to adapt to them, in the countries of the ANGE partnership.
O3: Identify examples of good practice among the partner countries of the ANGE project, which can also be taken by other countries, adapting them to their education systems (in general) and to their schools (in particular)

1.2. Methods

The method of work for this quantitative research was the survey method. A Trends Questionnaire (description below) was used which was self-administered by individuals (school heads, teachers, administrators) from 7 countries. The analysis of the data obtained by the Google Doc form was made, at a first level, using the Microsoft Excel software and then, by the SPSS Data Editor software (Statistical Package for Social Sciences 22.0 - trial version).

1.3. Research tools

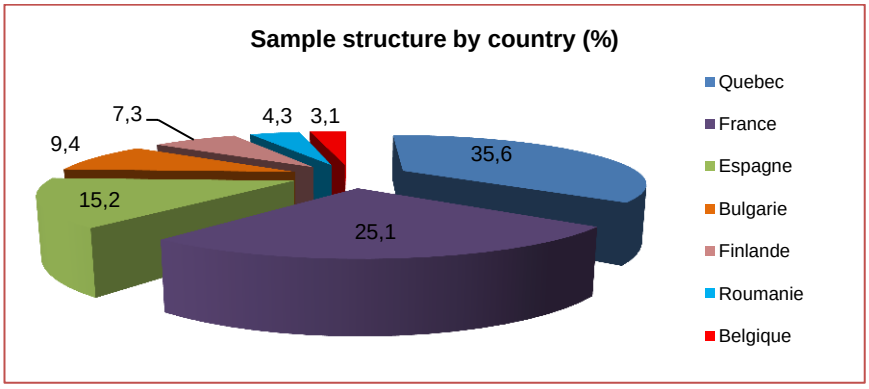
The Trends questionnaire (see Appendix to this study) included 57 questions: identification questions, questions with pre-formulated answers, and open questions. The purpose of the questionnaire was to review the technical, technological and cultural status of the digital piloting of establishments. It deals with the evolutions and mutations, from a forecasting and prospectivist point of view, in society and in the technical and technological fields (in particular ICT), which will result in the necessary innovations in the methods of piloting the digital, teaching and learning. The questionnaire comprising several parts, to be completed by school heads and teachers

1.4. Sample and means of selection of respondents

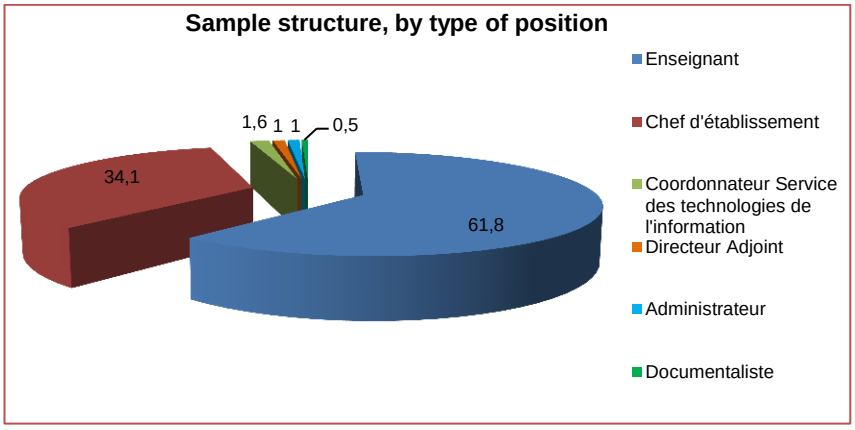
The research sample covered 191 people; school heads, educational executives, teachers, researchers and education staff at secondary and higher education institutions (CEGEPS-Québec). All these categories of respondents came from countries that are part of the Erasmus ANGE strategic partnership project (Belgium, Bulgaria, Spain, Finland, France, Quebec and Romania). Each partner institution sent this questionnaire to a list of institutions in its network. Survey participants received an invitation to complete the questionnaire through a link to the on-line questionnaire.

Each participant had to commit to selection criteria:

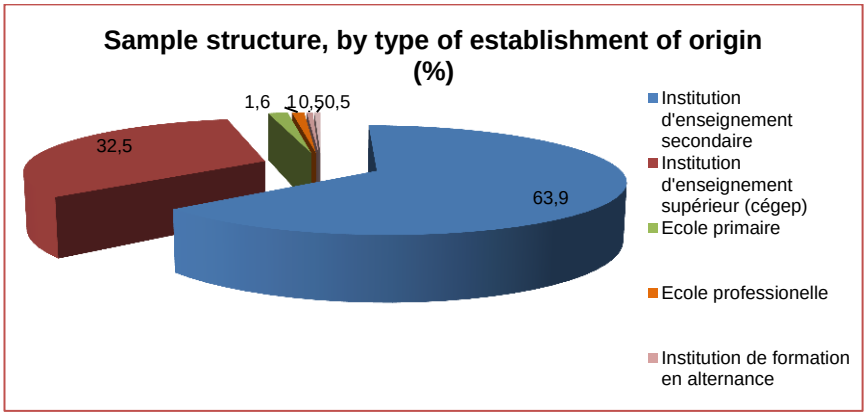
 The respondent should teach at a school in one of the 7 partner countries of the ANGE project



 The respondent should be either head teacher, administrator, teacher, trainer or member of the steering committee



 The respondent should teach at a secondary school (primary / secondary / sandwich / vocational)



1.5. Schedule of quantitative research activities:

- **15/01/2018-31/01/2018** - - Finalization of the questionnaire of the tendencies and its pre-test (carried out by the partner of Quebec)
- **15/02/2018-28/02/2018** - - Send questionnaire to schools (minimum 10 per university / 4 per partner school)
- **15/02/2018-15/03/2018** - - Self administration of questionnaires
- **15/04/2018-30/04/2018** - - Analysis of data obtained in Microsoft Excel (the database in Excel was generated by the Quebec partner)
- **30/04/2018-23/05/2018** - - Analysis of data obtained in SPSS Data Editor (correlations by country)
- **23/05/2018-11/06/2018** - - Final analysis and joint writing (students + tutors of ICP France, UCV-Romania and US-Spain) to the interpretation of the results of the questionnaires (Quantitative Research Report-Part II of the Study corresponding to Output1 of the ANGE project)

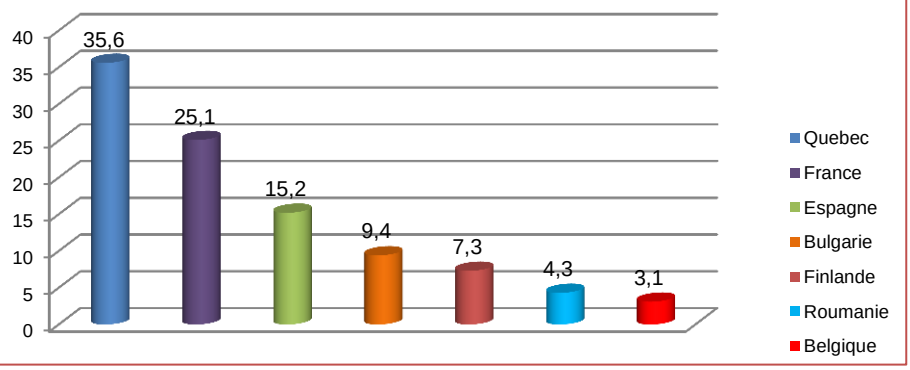
CHAPTER 2
RESULTS OF THE SURVEY

PART 1 - CHARACTERISTICS OF RESPONDENTS

Tableau 1: Pays où se trouve l'établissement d'exercice (%)

		%
1.	Quebec	35,6
2.	France	25,1
3.	Spain	15,2
4.	Bulgaria	9,4
5.	Finland	7,3
6.	Romania	4,3
7.	Belgium	3,1
	TOTAL (n=191)	**100,0**

Figure 2: COUNTRY OR LOCATION OF EXERCISE INSTITUTION (%)



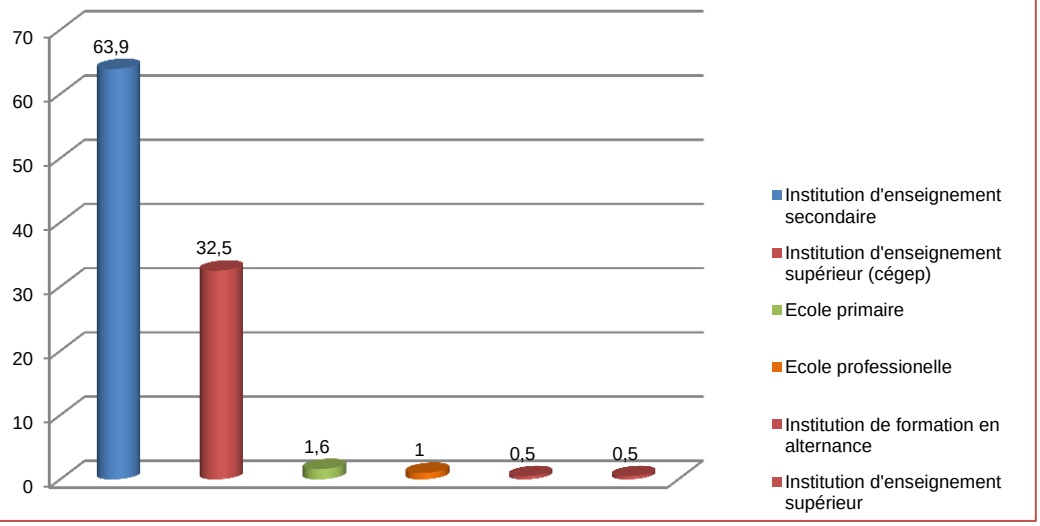
The most numerous questionnaires were completed by school principals and teachers in Quebec, which allowed us to do a good comparative analysis between Quebec and the other ANGE countries, to see how the Quebec model of good practice can be duplicated. by other countries. 25.1% of the respondents were secondary school teachers in France and 15.2% in Spain. Almost 15% of respondents came from three countries Finland, Romania, Belgium.

Table 2: type of establishment (%)

		%
1.	Secondary school institution	63,9
2.	Institution of higher education (CEGEP)	32,5
3.	Primary school	1,6
4.	Vocational School	1,0
5.	Alternate training institution	0,5
6.	Higher education institution	0,5

	TOTAL (n=191)	**100,0**

Figure 2: type of establishment (%)



Two-thirds of survey respondents (63.9%) belong to a secondary school institution; the target audience of our study. The last third of respondents represent people who train students at the level of the superior, notably at CEGEP de La Pocatière, which is a partner of the ANGE project.

When analyzing country-by-country data, most of the participants correspond to our target audience ; they work in a secondary school. The ANGE project, let us recall here, focuses on the problem of digital governance of secondary schools.

Table 2a : Type of establishment
(Cross analysis, by country)

	TYPE OF ESTABLISHMENT						Total
	Primary school	Vocational School	Secondary school institution	Higher education institution	Institution of higher education (CEGEP)	Alternate training institution	
Belgium	-	33,3%	50,0%	-	-	16,7%	100,0%
Bulgaria	-	-	88,9%	-	-	-	100,0%
Quebec	-	-	19,1%	-	80,9%	-	100,0%
Spain	-	-	86,2%	-	13,8%	-	100,0%
Finland	-	-	92,9%	-	7,1%	-	100,0%
France	6,2%	-	93,8%	-	-	-	100,0%
Romania		-	87,5%	-	12,5%	-	100,0%

Almost all respondents who report working in a tertiary institution are from CEGEP La Pocatière (only 20% of Quebec respondents work in secondary education and more specifically target our target audience).

It should also be noted that half of the Belgian respondents (undoubtedly working at ZAWM St-Vith, which is a partner of the ANGE project), say that they are employed in a vocational training institution and / or for work-linked training. This result is not surprising

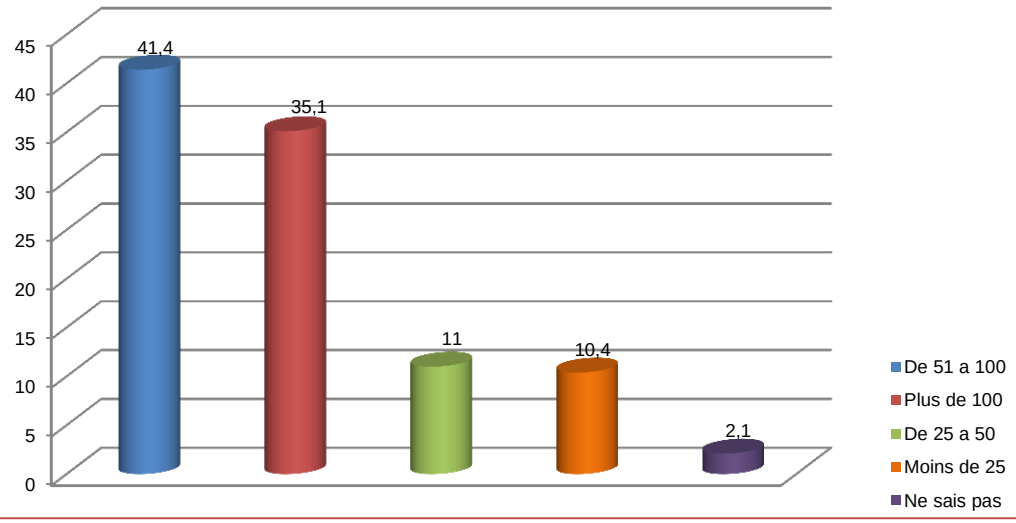
since this establishment trains future professionals who have chosen to follow a short course of studies and not to integrate the university.

There are then some marginal responses from Bulgaria, Spain, Finland, France and Romania that indicate that respondents work in tertiary or primary education.

Table 3 : **NUMBER OF TEACHERS WITHIN THE INSTITUTION**

		%
1.	From 51 to 100	41,4
2.	More than 100	35,1
3.	From 25 to 50	11,0
4.	Less than 25	10,4
5.	Don't know	2,1
	TOTAL (n=191)	**100,0**

Figure 3: NUMBER OF TEACHERS WITHIN THE INSTITUTION (%)



Nearly 80% of respondents belong to an institution with at least 50 employees (40% working in an educational institution with between 50 and 100 teachers, the other 40% working in an educational institution with more than 100 teachers). The other 20% of respondents work in an institution with less than 50 employees.

Respondents who work in institutions with large numbers of teachers are mainly Belgian and Canadian. This is related to the fact that these people work in institutions of higher education or in vocational training.

Table 3a NUMBER OF TEACHERS WITHIN THE INSTITUTION (%)
(cross-country analysis, by country)

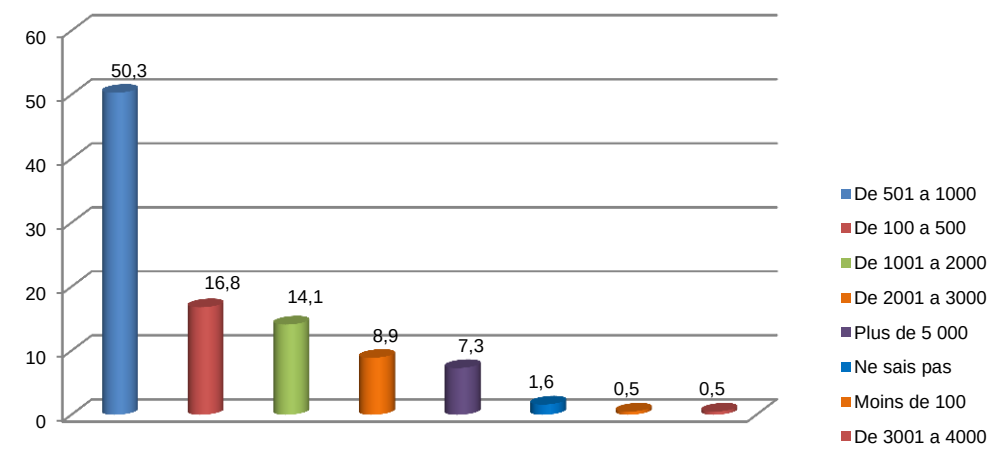
		NOMBRE D'ENSEIGNANTS AU SEIN DE L'INSTITUTION					Total
		From 25 to 50	From 51 to 100	Less than 25	Don't know	More than 100	
	Belgium	16,7%	16,7%	-	-	66,6%	100,0%
	Bulgaria	5,6%	94,4%	-	-		100,0%
	Quebec	1,5%	23,5%	2,9%	4,4%	67,7%	100,0%
	Spain	3,4%	62,1%	3,4%	-	31,1%	100,0%
	Finland	21,4%		78,6%	-	-	100,0%
	France	20,8%	52,1%	10,4%	2,1%	14,6%	100,0%
	Romania	50,0%	25,0%	12,5%	-	12,5%	100,0%

More generally, respondents working in secondary school are employed in smaller institutions (less than 100 employees). It is in Finland that the smallest structural sizes are recorded; 71.4% of respondents work in a school with fewer than 25 employees.

Table 4 : NUMBER OF STUDENTS OR STUDENTS WITHIN THE INSTITUTION (%)

		%
1.	From 501 to 1000	50,3
2.	From 100 to 500	16,8
3.	From 1001 to 2000	14,1
4.	From 2001 to 3000	8,9
5.	More than 5 000	7,3
6.	Less than 100	0,5
7.	From 3001 to 4000	0,5
8.	Don't know	1,6
	TOTAL (n=191)	**100,0**

Figure 4: NUMBER OF STUDENTS OR STUDENTS WITHIN THE INSTITUTION (%)



Half of those surveyed work in establishments with between 500 and 1000 pupils / students. In addition, 30% of respondents work in an establishment with more than 1000

pupils / students. The remaining 20% work in a smaller institution (less than 500 pupils / students).

Tableau 4a : NUMBER OF STUDENTS OR STUDENTS WITHIN THE INSTITUTION (%)
(cross analysis, by country)

	1.4 NUMBER OF STUDENTS OR STUDENTS WITHIN THE INSTITUTION								Total
	From 100 to 500	From 1001 to 2000	From 2001 to 3000	From 3001 to 4000	From 501 to 1000	Less than 100	Don't know	More than 5000	
Belgium	16,7%	-	-	-	83,3%	-	-	-	100,0%
Bulgaria		11,1%	5,6%	-	83,3%	-	-	-	100,0%
Quebec	1,5%	17,6%	17,6%	1,5%	38,2%	-	2,9%	20,6%	100,0%
Spain	10,3%	6,9%	3,4%	-	79,3%	-	-	-	100,0%
Finland	92,9%	-	-	-	7,1%	-	-	-	100,0%
France	25,0%	20,8%	4,2%	-	45,8%	2,1%	2,1%	-	100,0%
Romania	25,0%	12,5%	12,5%	-	50,0%	-	-	-	100,0%

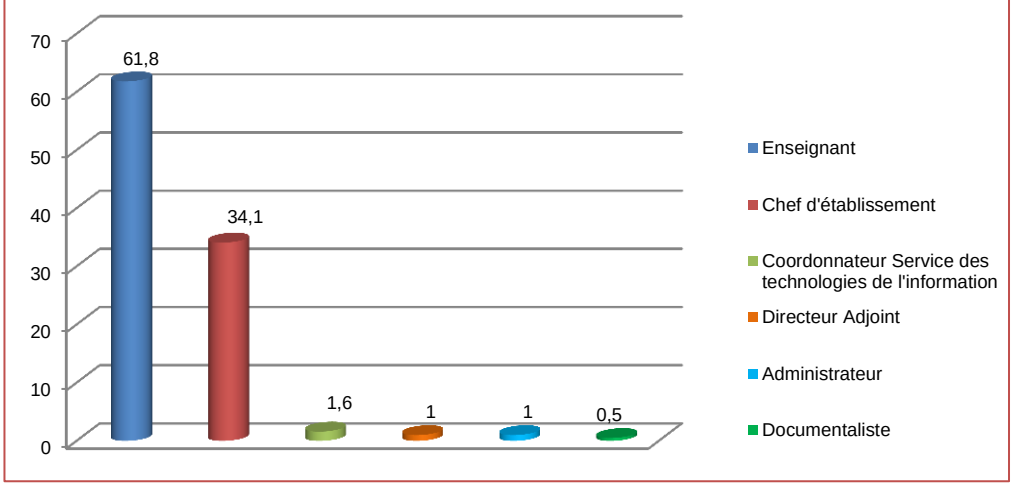
Most respondents from Belgium, Bulgaria, Quebec and Spain report working in an institution with at least 500 students / students or more. A quarter of French and Romanian respondents work in smaller establishments (less than 500 pupils / students).

At the same time, the results obtained for Finland confirm the hypothesis that establishments are smaller there; fewer staff, but also fewer students. In 92.9% of the cases, respondents say they work in a school with fewer than 500 students.

Table 5: RESPONDENT'S POSITION (%)

		%
1.	Teacher	61,8
2.	Headmaster	34,1
3.	Coordinator Information Technology Service	1,6
4.	Deputy Director	1,0
5.	Administrator	1,0
6.	Librarian	0,5
	TOTAL (n=191)	**100,0**

Figure 5: RESPONDENT'S POSITION (%)



Two-thirds of the respondents are teachers. The last third is made up of school heads. At the same time, we also had respondents who were coordinators of the Information Technology Services, Assistant Director or Documentalist.

Table 5a : RESPONDENT'S POSITION
(cross analysis, by country)

	POSTE DU RÉPONDANT						Total
	Administrator	Headmaster	Coordinator Information Technology Service	Deputy Director	Librarian	Teacher	
Belgium	16,7%	50,0%	-	-		33,3%	100,0%
Bulgaria	-		-	-	5,6%	94,4%	100,0%
Quebec	1,5%	22,1%	4,4%	2,9%	-	69,1%	100,0%
Spain	-	20,7%	-	-	-	79,3%	100,0%
Finland	-	21,4%	-	-	-	78,6%	100,0%
France	-	62,5%	-	-	-	37,5%	100,0%
Romania	-	100,0%	-	-	-	-	100,0%

In Romania, only school heads responded to the survey. On the contrary, it is almost only teachers who participated in the survey in Bulgaria. The survey then recorded about as many responses from head teachers as teachers for Belgium and France. For Quebec, Spain and Finland, an average of 20% of school heads participated in the survey and 80% of teaching staff.

Table 6 : YEAR OF APPOINTMENT OR HIRING TO THIS POSITION IN THE EXERCISE ESTABLISHMENT (%)

		%
1.	2011-2015	25,7
2.	2006-2010	18,5
3.	2015 – until now	17,4
4.	1996-2000	12,6
5.	2001-2005	12,0
6.	Between 1985-1990	5,1
7.	1991-1995	3,5
8.	No answer	5,2

	TOTAL (n=191)	**100,0**

It can be seen that 43.1% of the respondents, almost half of them, started working in 2010. We can therefore say that respondents are rather young or, at least, rather new to their field. functions. 30.5% of respondents took office during the first decade of the 2000s and now have between 10 and 20 years of seniority in the trade. The rest have been in education for a longer time (before the 2000s) and have had more than 20 years of professional experience.

Figure 5: YEAR OF APPOINTMENT YEAR OF APPOINTMENT (%)

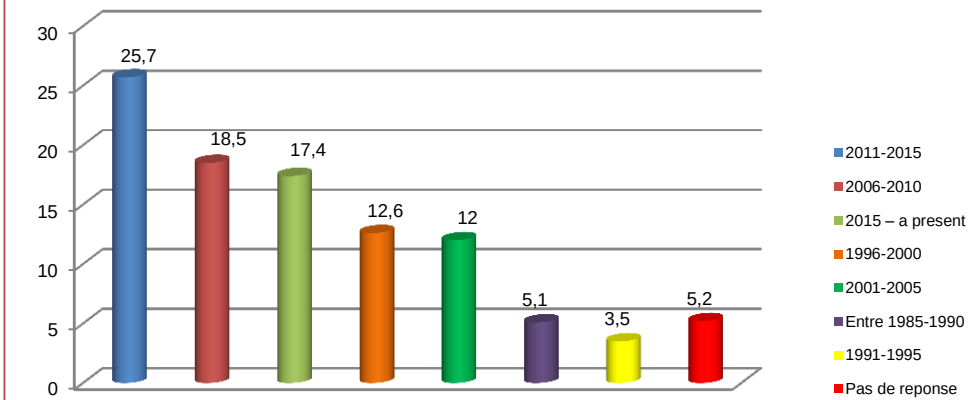
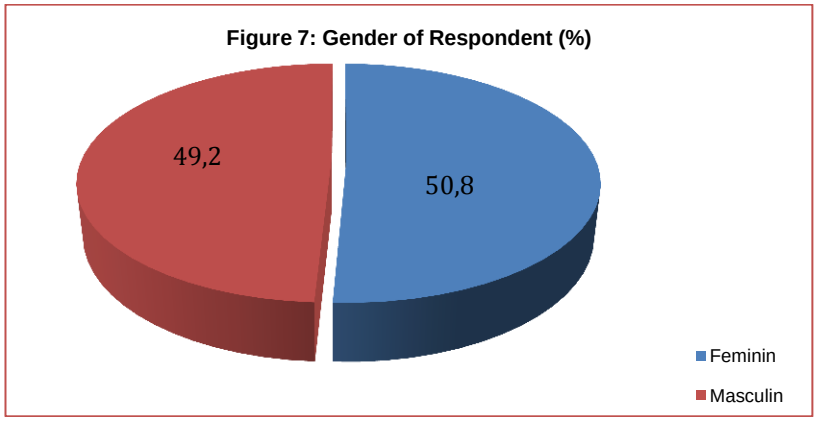


Table 7: Gender of Respondent (%)

		%
1.	Female	50,8
2.	Male	49,2
	TOTAL (n=191)	**100,0**

Figure 7: Gender of Respondent (%)



An almost perfect parity was reached in this survey, as we have almost as many women as men among the participants.

Table 7a: TYPE OF RESPONDENT
(cross analysis, by country)

		GENRE DU RÉPONDANT		Total
		Féminin	Masculin	
	Belgium	16,7%	83,3%	100,0%
	Bulgaria	94,4%	5,6%	100,0%
	Quebec	41,2%	58,8%	100,0%
	Spain	65,5%	34,5%	100,0%
	Finland	35,7%	64,3%	100,0%
	France	43,8%	56,2%	100,0%
	Romania	75,0%	25,0%	100,0%

In Quebec, Finland and France, the balance between women and men who participated in the survey is almost reached. 40% of women participated in the survey for 60% of men. In Bulgaria, Spain and Romania, it was mainly women who participated in the survey (in Bulgaria, respondents are almost exclusively women). Conversely, in Belgium it is mostly men who responded to the survey.

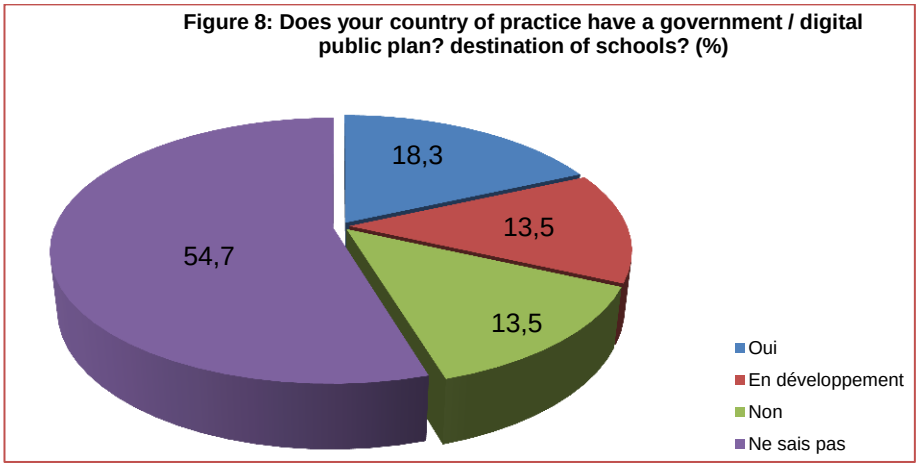
It will be remembered that many participants reported working in vocational training institutions. We can therefore make the assumption that the trades to which they are preparing are essentially male trades (teachers and male-dominated student bodies): mechanics, building, etc.

PART 2 - STATE OF PLAY - School Heads

Observations: In this section, intended for School Headmasters, Bulgaria is not included in the cross-analysis (respondents were not Heads of Schools)

Table 8: Does your country of practice have a government / digital public plan for schools?

		%
1.	Yes	18,3
2.	Processing	13,5
3.	No	13,5
4.	I don't know	54,7
	TOTAL	**100,0**



The participants in this study had differing opinions, the first responding that they did not know that their countries had a government / public plan in the digital domain, the latter representing the highest percentage of participants in the study, 54.8%.
18.3% of the participants said that their country benefited from this plan, followed by those who belonged to institutions in which this plan was developing (13.5%), as well as those who claim that in their institutions this plan did not exist (also 13.5%).

Table 8a: Does Your Country of Practice Have a Government / Digital Public Plan? to schools?
(cross analysis, by country)

		Does your country of practice have a government / digital public plan? destination of schools?				Total
		Processing	I don't know	No	Yes	
	Belgium	-	100,0%	-	-	100,0%
	Quebec	14,3%	74,3%	8,6%	2,8%	100,0%
	Spain	8,7%	43,5%	21,7%	26,1%	100,0%
	Finland	-	45,5%	9,1%	45,4%	100,0%
	France	6,2%	62,5%	18,8%	12,5%	100,0%

As can be seen above, Finland is the country in which the government / digital public plan for schools is the most developed (45.4% of respondents indicated this answer), followed by Spain (26.8%). There are also heads of institutions in France and Romania who indicated that this plan exists in their country of practice, but in not so significant proportions. Quebec partners indicated (14.3% of responses) that this government plan is being developed in their country but at the same time, 74.3% could not appreciate if there is such a plan in their country. The answers to this question do not mean that we can extrapolate and appreciate that in any country it works or it does not work a government / digital public plan, because the purpose of the question was to see if the heads of institutions are well informed about national strategies in the digital domain.

Table 9: In which year the government / digital public plan of your country of exercise been introduced?

		%
1.	2016	33,4
2.	2013	16,7
3.	2014	16,7
4.	2004	8,3
5.	2005	8,3
6.	2010	8,3
7.	2017	8,3
	TOTAL	**100,0**

For 33.4% of respondents the government / digital public plan for their countries of practice was introduced in 2016, which means that we are still "in the beginning" with these digital strategies in several countries, and it is possible For this reason, many school leaders are not very well informed on this subject. In addition, we must not forget that if we want to implement a digital plan / strategy, it must first be disseminated in all education systems, so that school leaders are informed. If we look at the years that have been indicated as answers to Q9 of our Trend Questionnaire, we can observe that the government / digital public plans have been introduced for 13-14 years, but more intensively during the last three years.

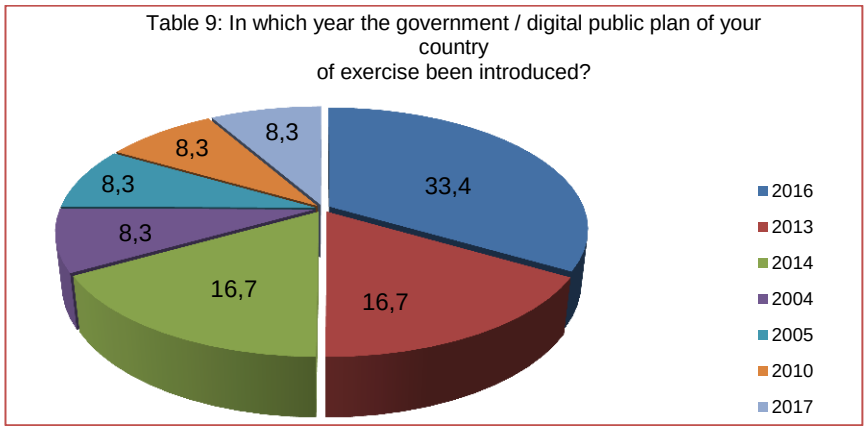


Table 9a: In which year the government / digital public plan of your country of exercise been introduced?
(cross analysis, by country)

		In what year was the government / digital public plan for your country of practice introduced?							Total
		2004	2005	2010	2013	2014	2016	2017	
	Belgium	-	-	-	-	66,7%	-	33,3%	100,0%
	Spain	20,0%	-	20,0%	20,0%	-	40,0%	-	100,0%
	Finland	-	-	-		-	100,0%	-	100,0%
	France	-	50,0%	-	50,0%	-	-	-	100,0%

For Belgium, the government / digital public plan was introduced in 2014 (66.7%) and in 2017 (33.3%), while in Finland there is only one reference year (2016). In France, the heads of institutions who responded to our questionnaire appreciated that the government / public plan on this subject was introduced in 2005 and 2013. Based on the responses recorded, it can be concluded that in Spain the most "Old" digital public plan was introduced in 2004 (20.0%) and the most recent in 2016 (40.0%).

Table 10: How is this plan relayed in your institution?

		%
1.	National trainings	38,9
2.	Departmental / Departmental Services	27,8
3.	School Committee	22,2
4.	Digital referents	5,6
5.	Rectorship	5,5
	TOTAL	**100,0**

With regard to the means of informing schools at the governmental / public level in the digital domain, the most widely used means is "national training" (38.9% of responses), followed by the Ministry of Education. and its services (27.8%). In third place is the School Committee, with 22.2% of the responses recorded.

Figure 10: How is this plan relayed in your institution? (%)

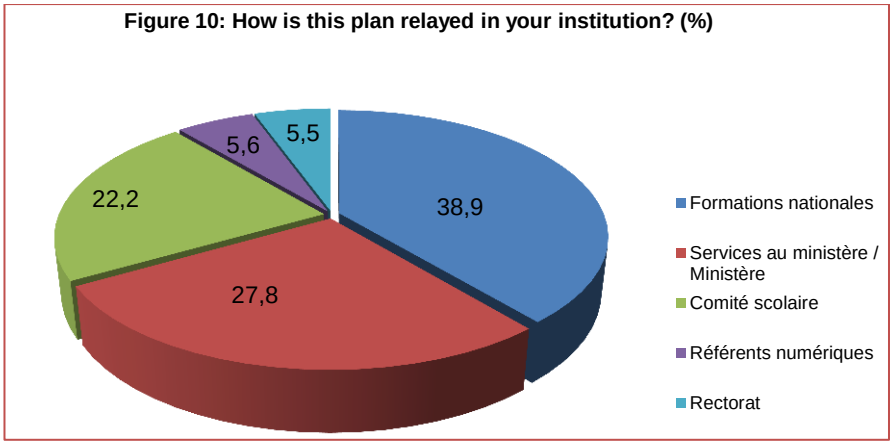


Table 10a: How is this plan relayed in your institution?
(cross analysis, by country)

		How is this plan relayed in your institution?					Total
		School Committee	National Training	We are not entitled	Digital referents	Departmental / Departmental Services	
	Belgium	-	60,0%	-	20,0%	20,0%	100,0%
	Quebec	-	-	-	-	100,0%	100,0%
	Spain	50,0%	16,7%	-	-	33,3%	100,0%
	Finlande	20,0%	60,0%	-	-	20,0%	100,0%
	France	-	-	100,0%	-	-	100,0%

In Quebec, the services of the Ministry are the most used channels (100.0% of responses) to relay the government plan in the digital domain, which means that we can identify here an example of good practice in the activity of disseminate information (inform schools) about the digital plan / strategy. For France, 100.0% of school heads indicated that they "do not have the right" to relay this plan in their schools. In Spain, the most important role is played by the "school committees" (50.0%) and the services of the Ministry (33.3%), while in Belgium the role falls to the "national formations" (60.0%).

Table 11: Does Your Institution Have a Digital Referent (competent person, specialized professional or other)?

		%
1.	Yes	71,0
2.	No	17,7
3.	Processing	11,3
	TOTAL	**100,0**

Another question in our study was to obtain information about schools in relation to the "numerical referent" position. As can be seen from the table below, in 71% of establishments there is a competent, specialized person on a "numerical reference" position. For the 17.7% of the institutions in which this position does not exist, one can think of the fact that these are institutions in countries where the digital plan / strategy is not as well developed - see Cross Analysis, Bottom, or Table 11.a

Figure 11: Does your institution have a digital referent (competent person, specialized professional or other)?(%)

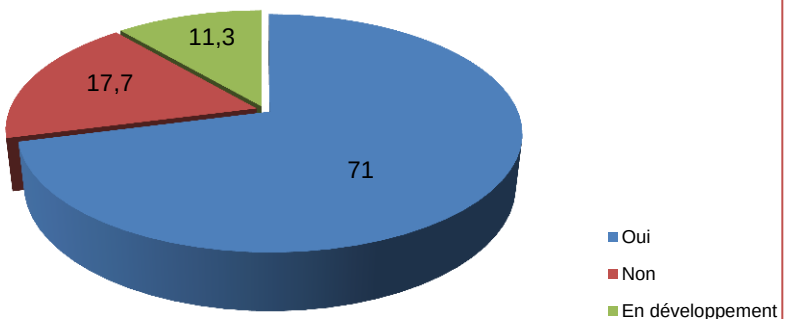


Table 11a: Does your institution have a digital referent (competent person, specialized professional or other)?
(cross analysis, by country)

		Does your institution have a digital referent (competent person, specialized professional or other)?			Total
		Processing	No	Yes	
	Belgium	-	66,7%	33,3%	100,0%
	Quebec	23,1%	-	76,9%	100,0%
	Spain	16,7%	16,7%	66,6%	100,0%
	Finland	-	-	100,0%	100,0%
	France	10,3%	13,8%	75,9%	100,0%
	Romania	-	50,0%	50,0%	100,0%

In Finland, in all the schools that responded to this questionnaire, there is a "digital referent" position, which may represent an example of good practice in Quebec, where such a position is found in 76.9% of schools. who participated in this survey. In France too, the majority of establishments (75.9%) have a numerical reference point in their organizational structure, but there are also cases (13.8% of respondents) where this position is missing in the organization chart. In Belgium the organizational charts of the schools that took part in the survey do not have a "numerical reference" position (66.7% of the answers) as in Romania, or only half of the schools recognize the existence of this position of "digital referent".

Table 12: What are the areas of intervention of the referent (s) digital (competent person, specialized professional or other)? (Many possible responses)

		%
1.	Technical interventions	79,0
2.	Accompaniment and / or teacher training	14,0
3.	Project management	7,0
	TOTAL	**100,0**

Figure 12: What are the areas of intervention of the digital referent (s) (competent person, specialized professional or other)? (%)

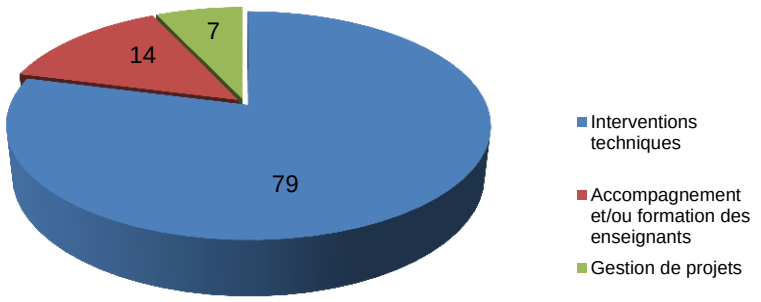


Table 12a: What are the areas of intervention of the digital referent (s) (competent person, specialized professional or other)?
(cross analysis, by country)

	What are the areas of intervention of the digital referent (competent person, specialized professional or other)?			Total
	Accompaniment and / or teacher training	Project management	Technical interventions	
Belgium	-	-	100,0%	100,0%
Québec	10,0%	10,0%	80,0%	100,0%
Spain	-	-	100,0%	100,0%
Finland	-	-	100,0%	100,0%
France	23,8%	9,5%	66,7%	100,0%
Romania	-	-	100,0%	100,0%

Our analysis also aimed at obtaining information on the area (s) of intervention of a numerical reference and it can be observed that in Belgium, where the digital referent exists only in a few establishments, its role is limited only to technical interventions. In fact, this is also the case in Spain, Finland or Romania, where digital referents have attributions only in this field of intervention. In Quebec and France, the role of the digital referent is more extensive, as it also deals with coaching and / or teacher training (10.0% in Quebec and 23.8% in France). The responsibility for managing projects belongs only to the digital referents in Quebec (10.0%) and in France (9.5%), which may lead us to conclude that in these two countries the fields of intervention of the referents are more extensive.

Table 13: Does your institution have a business intelligence system on the use of digital?

		%
1.	No	44,3
2.	Yes	36,1
3.	Processing	18,0
4.	I don't know	1,6
	TOTAL	**100,0**

For 44.3% of the respondents who participated in the research, their home institutions do not have a system of strategic monitoring on the use of digital, compared to 54.1% of establishments where there is such a system standby, or it is in the process of development.

Figure 13: Does your institution have a business intelligence system on the use of digital? (%)

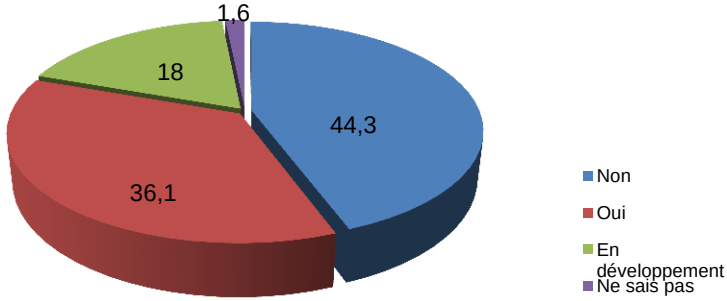


Table 13a: Does your institution have a business intelligence system on the use of digital?
(cross analysis, by country)

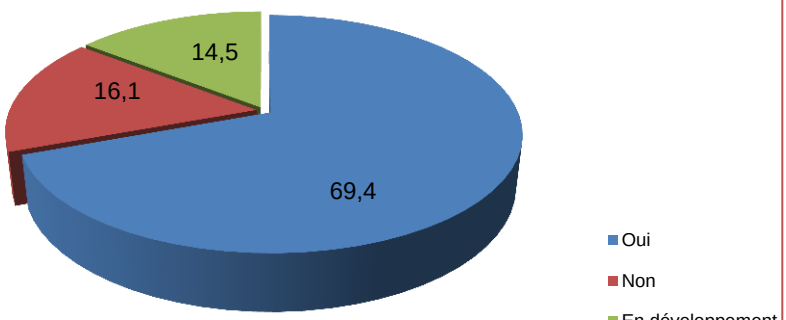
		Does your institution have a business intelligence system on the use of digital?				Total
		Processing	I don't know	No	Yes	
	Belgium	33,3%		33,3%	33,4%	100,0%
	Québec	15,4%	7,6%	38,5%	38,5%	100,0%
	Spain	-	-	50,0%	50,0%	100,0%
	Finland	33,3%	-	-	66,7%	100,0%
	France	25,0%	-	53,6%	21,4%	100,0%
	Romania	-	-	37,5%	62,5%	100,0%

The countries in which there is a process of developing a system of strategic monitoring on the use of the digital are Belgium (33,3%), Finland (33,3%), France (25,0%) and Quebec (15.4%). At the same time, the countries that have indicated the existence and implementation (already achieved) of this system of strategic monitoring on the use of digital are, compared to the value of the percentages, Spain, Finland and Romania.

Table 14: Is your establishment planned for technological and digital investments?

		%
1.	Yes	69,4
2.	No	16,1
3.	Processing	14,5
	TOTAL	**100,0**

Figure 14: Is your facility planned for technological and digital investments? (%)



In 69.4% of the establishments, there is a planning of the technological and digital investments, and also in 14.5% of the cases this planning is in the course of development, which means that the digital one plays an important role in the developments of the institutions. In the case of this indicator, the purpose of this study was to determine whether certain technologies were likely to be implemented in the analyzed countries or to invest in the digital development of the infrastructure of the institutions studied.

Table 14a: Is Your Institution Under Investment Planning? technological and digital?
(cross analysis, by country)

	Votre établissement fait-il l'objet d'une planification des investissements technologiques et numériques?			Total
	Processing	No	Yes	
Belgium	66,7%	-	33,3%	100,0%
Québec	-	7,7%	92,3%	100,0%
Spain	16,7%	-	83,3%	100,0%
Finland	33,3%	-	66,7%	100,0%
France	10,3%	17,2%	72,5%	100,0%
Romania	25,0%	50,0%	25,0%	100,0%

As can be seen in the table above, for Belgium, 66.7% of respondents identified these objectives as being in development, the remaining 33.3% declaring that they will clearly be fixed in the application. In addition, for Quebec, 92.3% answered "yes" to this question, only 7.7% believing that these objectives are not in the institutional development plan.

For Spain, 16.7% identified these investment plans as being in development, and 83.3% have identified that they are already in place or need to be implemented in the near future. Respondents in Finland consider that 33.3% of these investment programs are in development, with 66.7% stating that these institutional objectives are or should be implemented at present.

In the case of France, 10.3% of respondents considered that these investment plans were in development, 17.2% replied negatively, and 72.5% identified that these objectives are already implemented or should to be adopted in the near future. On the other hand, 50% of respondents in Romania note that the institutions do not implement any development program or technology investment planning, only 25.5% assume that these objectives are developing and 25% have identified that at this stage, institution to which they belong has taken steps for the development of this segment.

Table 15: In your institution, who makes purchasing and arbitration decisions regarding digital applications?

		%
1.	Steering Committee	54,8
2.	Choice of Direction only	41,9
3.	Educational Council	3,3
	TOTAL	**100,0**

In general, purchasing and arbitration decisions concerning digital applications are made by the steering committees (54.8%) and the Schools Directorate (419%), which shows us, once again, the very important role of steering committees in the development of digital technology.

Figure 15: In your institution, who makes digital purchasing and arbitration decisions? (%)

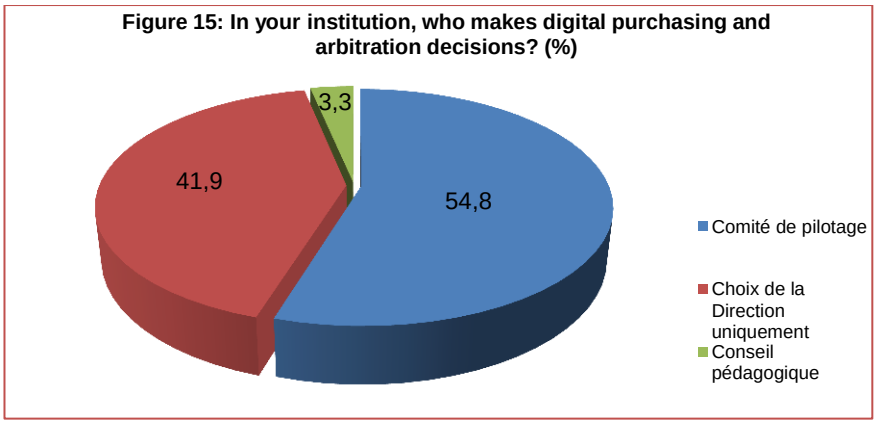


Table 15a: In your institution, which makes purchasing and arbitration decisions regarding digital applications?
(cross analysis, by country)

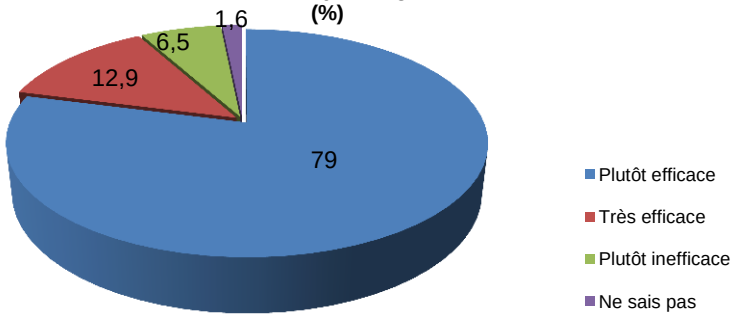
	In your institution, who makes purchasing and arbitration decisions regarding digital applications?			Total
	Choice of Direction only	Steering Committee	Educational Council	
Belgium	66,7%	33,3%	-	100,0%
Québec	30,8%	69,2%	-	100,0%
Spain	33,3%	50,0%	16,7%	100,0%
Finland	33,3%	66,7%	-	100,0%
France	58,6%	41,4%	-	100,0%
Romania	-	87,5%	12,5%	100,0%

This question was intended to determine how and who makes the decision and whether certain investment projects are viable. Thus, in this case, it was desirable to identify who was implementing projects related to the acquisition of digital applications at school level. In analyzing the answers to this question, we can observe that decisions are taken by management in Belgium (66.7%) and France (58.6%). The steering committees are the most important for taking decisions on this subject in Romania (87.5%), Quebec (69.2%) and Finland (66.7%). The educational council does not have a very active role in decision-making concerning investments, this being mentioned only by a few institutions in Spain and Romania.

Table 16: How do you rate the effectiveness of your environment digital and your digital tools?

		%
1.	Rather effective	79,0
2.	Very effective	12,9
3.	Rather ineffective	6,5
4.	Do not know	1,6
	TOTAL	**100,0**

Figure 16: How do you rate the effectiveness of your digital environment and your digital tools? (%)



The development of digital tools is considered very effective in all institutions if one thinks of the fact that 91.9% appreciated it as being "rather efficient" and "very effective".

Only 6.5% of respondents rated it as "somewhat ineffective", as can be seen from Table 16.a being the heads of institutions in Quebec, Romania and France.

Table 16a: How do you rate the effectiveness of your digital environment and of your digital tools?
(cross analysis, by country)

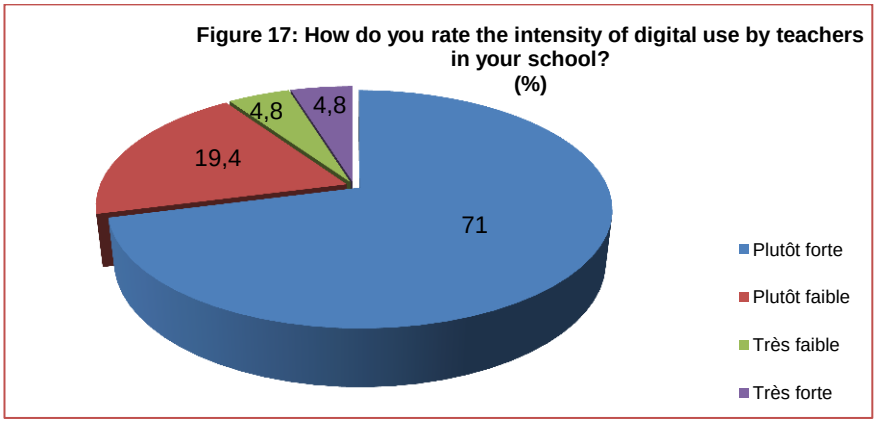
	How do you evaluate the effectiveness of your digital environment and your digital tools?				Total
	Do not know	Rather effective	Rather ineffective	Very effective	
Belgium	-	100,0%	-	-	100,0%
Québec	-	84,6%	7,7%	7,7%	100,0%
Spain	-	66,7%	-	33,3%	100,0%
Finland	-	100,0%	-	-	100,0%
France	-	86,2%	6,9%	6,9%	100,0%
Romania	12,5%	37,5%	12,5%	37,5%	100,0%

This question considered analyzing the effectiveness of current technology - the level of subjective interpretation of the respondent group in each country - to determine whether the investments made to date in each state analyzed extra comfort for the employees of the institution. Thus, the most satisfied respondents are those from Belgium and Finland, who fully appreciated that the current digital environment of the institution in which they operate is quite effective. In addition, respondents from Quebec and France also appreciated that their digital environments in their schools were quite effective.

In Spain, 66.7% believe that the current digital environment is rather efficient, and 33.3% appreciate that it is very effective. In the case of Romania, 37.5% believe that this environment is rather effective, and we observe that we also have the same percentage of respondents who appreciate that it is very effective. Countries that have been able to make a more critical analysis of their digital environments are Quebec, France and Romania, for which we also had responses that indicated that the digital environment was "rather ineffective" (12.5%). % in the case of Romania, 7.7% in Quebec and 6.9% in France)

Table 17: How do you rate the intensity of digital use by teachers in your school?

		%
1.	Rather strong	71,0
2.	Rather weak	19,4
3.	Very weak	4,8
4.	Very strong	4,8
	TOTAL	**100,0**



In 75.8% of schools, the use of digital by teachers is very strong or rather strong, which can lead us to the conclusion that, even if there are many problems or challenges that the development of digital assumes or entails, the intensity of the use of digital by teachers is not too affected.

Table 17a: How do you rate the intensity of digital use by teachers in your establishment ?
(cross analysis, by country)

		How do you rate the intensity of digital use by teachers in your school?				Total
		Rather weak	Rather strong	Very weak	Very strong	
	Belgium	-	66,7%		33,3%	100,0%
	Québec		53,8%	7,7%	38,5%	100,0%
	Spain	33,3%	66,7%	-	-	100,0%
	Finland	-	100,0%	-	-	100,0%
	France	10,3%	82,8%	6,9%	-	100,0%
	Romania	25,0%	50,0%	-	25,0%	100,0%

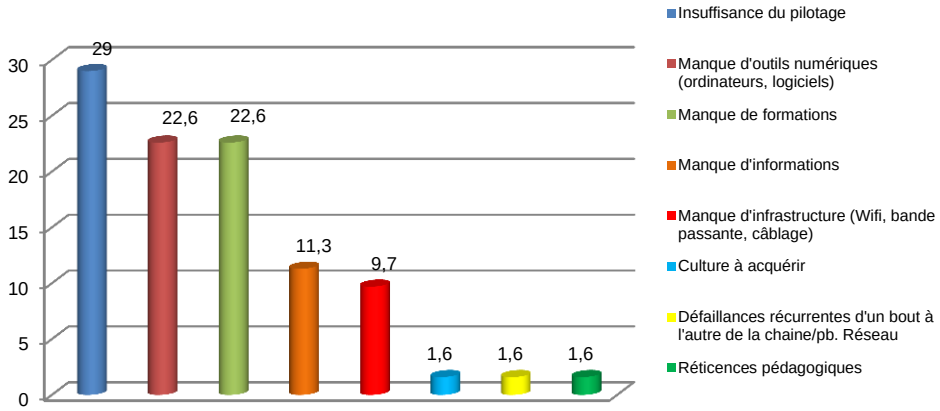
The countries in which the use of digital by teachers is appreciated by our respondents as being "very strong" are Belgium (33.3%) and Romania (25.0%). Moreover, in Belgium and Finland no respondent has identified a weak use (rather weak or very weak) of digital. At the same time, 7.7% of Quebec respondents and 6.9% of French respondents mentioned a very low intensity of digital use by teachers in "your" institution (percentages not significant if we observe that 92.3% of Quebec people enjoy a very strong and fairly strong intensity and in France - 82.8% rate it as rather strong)

Table 18: What do you think are the brakes on the use of digital in your establishment? (Many possible responses)

		%
1.	Insufficient steering	29,0
2.	Lack of digital tools (computers, software)	22,6
3.	Lack of training	22,6
4.	Lack of information	11,3
5.	Lack of infrastructure (Wifi, bandwidth, cabling)	9,7

6.	Culture to acquire	1,6
7.	Recurring failures across the chain / pb. Network	1,6
8.	Pedagogical reluctance	1,6
	TOTAL	**100,0**

Figure 18: What do you think of digital brakes in your school? (%)



At the level of each institution, there are often obstacles to the use of digital technology, most often indicated by our respondents as being "insufficient piloting" (29.0%), "the lack of digital tools (computers, software) "(22.6%) and" lack of training "(22.6%). We could conclude that teachers are interested in using digital technology in their didactic activities (only 1.6% of the responses targeted the "pedagogical hesitations"), but the most important obstacles refer to steering committees and financial aspects (funding schools to buy tools, to develop digital infrastructure or to offer digital training to teachers).

Table 18a: What do you think about the digital brakes in your school? (cross analysis, by country)

	what do you think of the brakes on digital use in your school?								Total
	culture to acquire	Recurrent failures across the chain // pb Network	Insufficient steering	Lack of information	Lack of infrastructure (Wifi, bandwidth, cable)	Manque d'outils numériques (ordinateurs, logiciels)	Manque de formations	pedagogical reluctance	
Belgium	-	-	33,3%	-	-	66,7%	-	-	100,0%
Québec	-	-	46,1%	38,5%	-	7,7%	7,7%	-	100,0%
Spain	-	-	43,4%	-	-	23,3%	33,3%	-	100,0%
Finland	-	-	33,3%	-	-		66,7%	-	100,0%
France	3,4 %	3,4%	13,8%	6,9%	20,7%	17,2%	31,2%	3,4%	100,0%
Romania	-	-	50,0%	-	-	50,0%	-	-	100,0%

The brakes for digital use are different from one country to another. For Belgium and Romania, the main obstacles identified are "lack of steering" (33.3%, 50.0%) and "lack of digital tools" (66.7%, 50.0%) . Heads of institutions in France have identified various and well-structured obstacles (compared to answers), but the most important are "lack of training" (31.2%) and "lack of infrastructure - wifi, band , wiring "(20.7%). For Quebec, the most

significant barriers to the use of digital are "lack of steering" (46.1%) and "lack of information" (38.5%). In Spain and Finland, the most important obstacles are linked to insufficient pilotage (33.3%) and lack of training (66.7%). As can be seen in the table above and even if the percentages were different, in each country respondents indicated among the brakes "insufficient piloting" which means that a good (better) digital strategy should "Starting from" or "focusing on" the activities of the steering committees.

Table 19: Does your team receive ongoing training in the use of digital?

		%
1.	Yes	38,7
2.	No	32,3
3.	Processing	29,0
	TOTAL	**100,0**

A positive aspect that can be identified is that about 67.7% of respondents believe that the institution in which they currently work trains teachers in the use of digital technology (38.7% already do so, 29.0% are institutions where this process is under development). Only 32.3% of respondents believe that the institution does not take any measures concerning the training of teachers in the digital domain.

Figure 19: Does your team have ongoing training in the use of digital? (%)

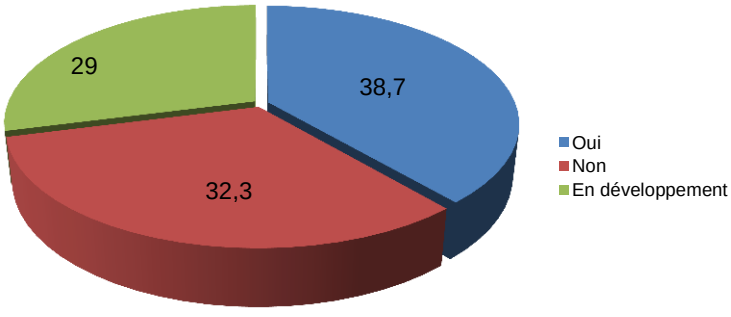


Table 19a: Does your team have ongoing training in use of digital?
(cross analysis, by country)

	Does your team have ongoing training in the use of digital?			Total
	Processing	No	Yes	
Belgium	66,7%	33,3%	-	100,0%
Québec	23,1%	30,7%	46,2%	100,0%
Spain	16,7%	33,3%	50,0%	100,0%
Finland	-	-	100,0%	100,0%
France	37,9%	37,9%	24,2%	100,0%
Romania	12,5%	25,0%	62,5%	100,0%

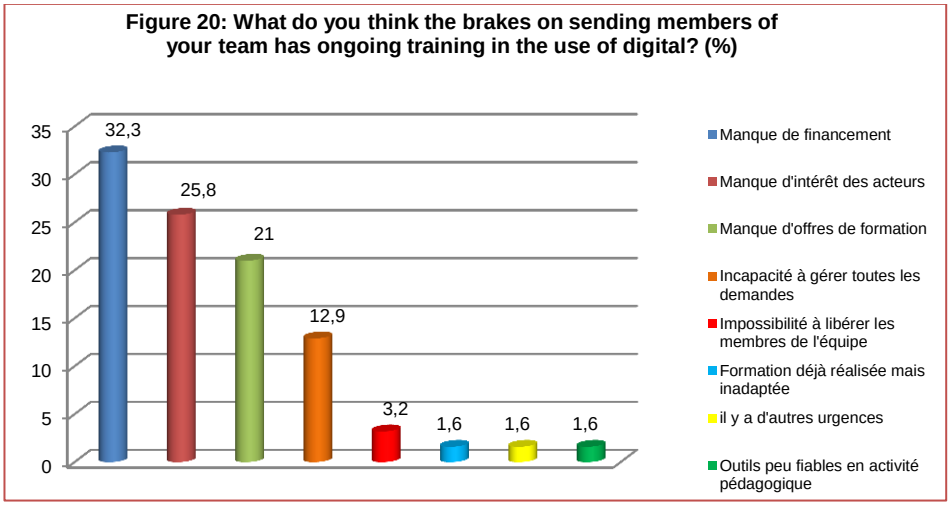
In Belgium, continuing training in the use of digital is, in general (66.7%), a developing process. For Quebec, 69.3% of respondents indicated that continuing education is either already done or is under development.

The example of good practice can be Finland if we think that 100% of the respondents appreciated that in their establishments the steering teams benefit from a continuous training in the use of digital. Percentages indicating the existence of continuing education in the digital sector within school heads exceed 50% in Spain (66.7%), France (62.1%) and Romania (74%).

Table 20: What do you think the brakes on sending members of your team has ongoing training in the use of digital? (Many possible responses)

		%
1.	Lack of funding	32,3
2.	Lack of interest from actors	25,8
3.	Lack of training offers	21,0
4.	Inability to handle all requests	12,9
5.	Unable to release team members	3,2
6.	Training already conducted but unsuitable	1,6
7.	there are other emergencies	1,6
8.	Unreliable tools in educational activity	1,6
	TOTAL	**100,0**

Figure 20: What do you think the brakes on sending members of your team has ongoing training in the use of digital? (%)



According to the heads of the institutions, the most important obstacles that their team members face in the process of continuing training in the use of digital technology are "the lack of funding" (32.3%), "the lack of 'stakeholder interest' (25.8%), but also also 'lack of training opportunities' (21.0%). The most important problem is by far the problem of lack of funding, especially in countries where the financing of education systems (as a% of GDP) is

deficient (this is especially the case in Romania). From the answers to this question, we can conclude that the development of ICT in educational institutions requires the meeting of three criteria: funding, motivation of teachers and development of training agents. Although no significant weightings were recorded, other responses were indicated, such as "Inability to manage all requests" (12.9%) and "the inability to release members of the team "(3.2%). The role of the digital is really important and this may be due to the fact that there are very few respondents who have indicated that it is not useful to develop education on this orientation, because there are other emergencies to solve (1.6%) and that digital instruments are "unreliable" for the educational activity (1.6%).

Table 20a: What do you think the brakes on sending members of your team to continuous training in the use of digital? (cross analysis, by country)

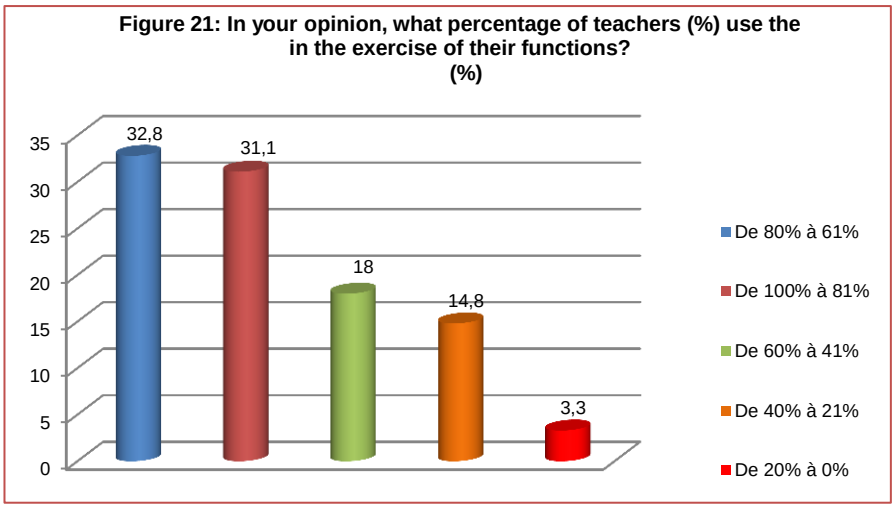
	what do you estimate the brakes? the use of digital in your school?								Total
	1	2	3	4	5	6	7	8	
Belgium	15,0%	-	-	60,0%	-	25,0%	-		100,0%
Québec	4,5%	4,5%	9,0%	45,6%	18,2%	18,2%	-		100,0%
Spain	25,0%	-	25,0%	25,0%	25,0%	-			100,0%
Finland	-	-	-	55,0%	55,0%	-	-	-	100,0%
France	7,7%	7,7%	23,1%	46,1%	15,4%		-		100,0%
Romania	25,0%	15,0%	14,5%	20,0%	-		5,5%	20,0%	100,0%

Legend of the Table Above
1. Lack of funding
2. Lack of stakeholder interest
3. Lack of training offers
4. Inability to handle all requests
5. Impossibility to release team members
6. Training already completed but unsuitable
7. there are other emergencies
8. Unreliable tools in educational activity

As can be seen from the table above, the lack of funding is a major obstacle in Spain (indicated by 25% of respondents), in Romania (indicated by 25% of respondents) and in Belgium (15% of heads of establishments have indicated this brake). For Quebec, Finland and France the most significant barriers are related to "the inability to manage all applications" (45.0%, 55.0%, 46.1%). At the same time, in Spain, school leaders indicated (in equal percentages) as "braking the sending of the members of your team to a continuous training in the use of the digital", the following answers: the lack of funding (25%), lack of training opportunities (25%), inability to handle all requests (25%) and the inability to release team members (25%).

Table 21: In your opinion, what percentage of teachers (%) use the in the exercise of their functions?

		%
1.	From 80% to 61%	32,8
2.	From 100% to 81%	31,1
3.	From 60% to 41%	18,0
4.	From 40% to 21%	14,8
5.	From 20% to 0%	3,3
	TOTAL	**100,0**



For 63.9% of respondents, in their schools teachers use digital in a percentage of 60% to 100%. For 18.0% of heads of institutions, their teachers use digital in a percentage of 60% to 21%. 3.3% of school heads also responded that their teachers use very little (from 20% to 0%) digital in the exercise of their function.

Table 21a: In your opinion, what percentage of teachers (%) use digital in the performance of their duties? (cross analysis, by country)

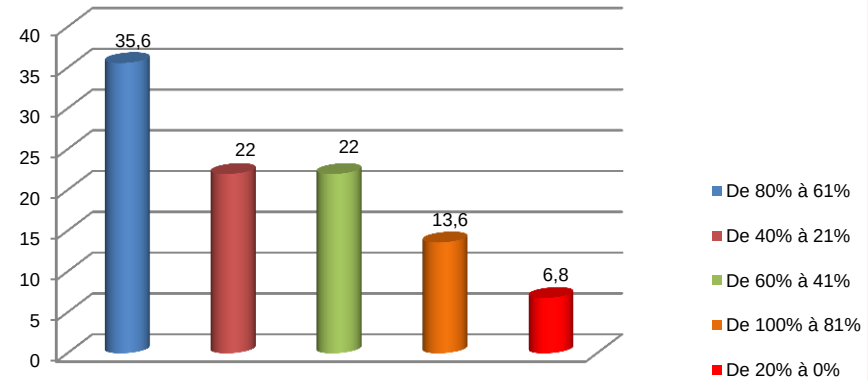
	In your opinion, what percentage of teachers (%) use digital technology in the performance of their duties?						Total
	From 100% to 80%	From 100% to 81%	From 20% to 0%	From 40% to 21%	From 60% to 41%	From 80% to 61%	
Belgium	-	-	-	-	33,3%	66,7%	100,0%
Québec	7,7%	15,4%	7,7%	15,4%	7,7%	46,1%	100,0%
Spain	-	50,0%	-	16,7%	16,6%	16,7%	100,0%
Finland	-	33,3%	-	-	-	66,7%	100,0%
France	-	35,7%	3,6%	14,3%	21,4%	25,0%	100,0%
Romania	-	25,0%	-	25,0%	25,0%	25,0%	100,0%

The use of digital technology in the performance of teachers' duties is very well developed in all partner countries of the ANGE project, with a percentage of 100% to 81%, but with differences between countries; the most developed are Quebec (35.8%), Finland (33.3%) and France (35.7%). In addition, it should be noted that for Finland, there are only two variants of response - from 100% to 81% and from 80% to 61% which indicates a strong digital development.

In your opinion, what percentage of teachers (%) use digital technology in the performance of their duties?...

		%
1.	From 80% to 61%	35,6
2.	From 40% to 21%	22,0
3.	From 60% to 41%	22,0
4.	From 100% to 81%	13,6
5.	From 20% to 0%	6,8
	TOTAL	**100,0**

Figure 22: According to you, among teachers using digital, what percentage (%) of this digital is destined to learning activities? (%)



Digital is not only used for learning activities. The table above shows that only 35.5% of teachers use it in a percentage of 80% to 60% and 22% - in a proportion of 40% to 21%. At the same time, it should be noted that there are also teachers who, even if they use digital and have skills in the digital field, do not use it at all in their learning activities.

Table 22a: According to you, among teachers using digital, what percentage (%) of this digital is intended for learning activities? (cross analysis, by country)

		According to, among teachers using digital, what percentage (%) of this digital is intended? learning activities?					Total
		From 100% to 81%	From 20% to 0%	From 40% to 21%	From 60% to 41%	From 80% to 61%	
	Belgium	-	-	33,2%	43,4%	33,4%	100,0%
	Québec	7,7%	7,7%	23,0%	23,1%	38,5%	100,0%
	Spain	33,3%	-	33,4%	-	43,4%	100,0%
	Finland	33,3%	-	-	-	66,7%	100,0%
	France	7,7%	7,7%	23,0%	30,8%	30,8%	100,0%
	Romania	25,0%	12,5%	12,5%	12,5%	37,5%	100,0%

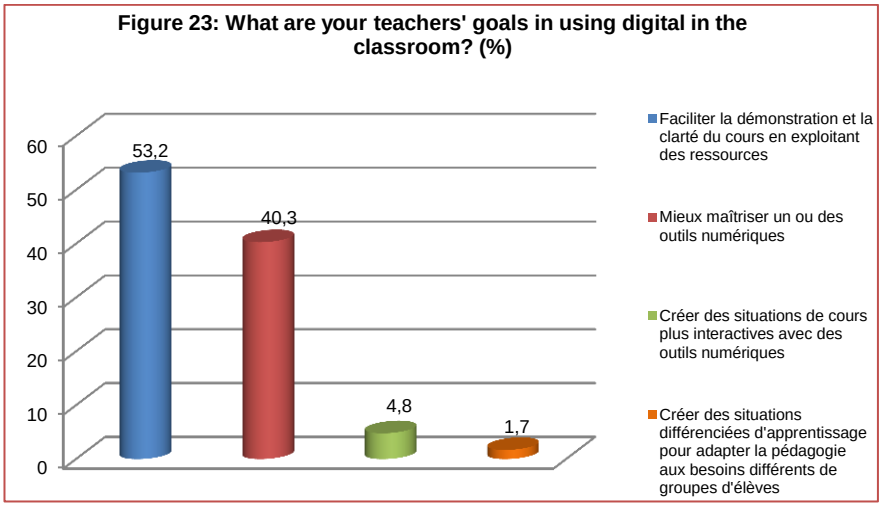
We see that 20% to 0% of the digital used is intended for learning activities in Romania (25%) and in France (7.5%). This does not mean that in these two countries teachers do not use digital at all for didactic activities, but perhaps digital tools are not used at all in learning activities.

In conclusion, it can be observed that in almost all countries (but in different proportions), except Belgium, digital is used in learning activities, in a percentage of 100% to 81%. Finland is still one of the countries in which digital technology is used to a very large extent (from 100% to 61%).

Table 23: What are the goals of your teachers in using digital in class? (Many possible responses)

		%
1.	Facilitate the demonstration and clarity of the course by leveraging resources	53,2
2.	Better master one or more digital tools	40,3
3.	Create more interactive class situations with digital tools	4,8
4.	Create differentiated learning situations to adapt the pedagogy to the different needs of groups of students (individualisation with the digital tool)	1,7
	TOTAL	**100,0**

Figure 23: What are your teachers' goals in using digital in the classroom? (%)



Teachers use mainly digital in didactic activities to facilitate the demonstration and clarity of the course by exploiting resources (52.3% of school principals have indicated this answer) and also for "Better mastering one or more digital tools" (40.3%). The fact that digital technology also makes it possible to create more interactive class situations and that it also promotes individualization to adapt to the needs of different groups of students has also been mentioned by our respondents. The variety of possible answers to this question made it possible to highlight 4 variants mentioned most often.

Table 23a: What are the goals of your teachers in using digital in class? (cross analysis, by country)

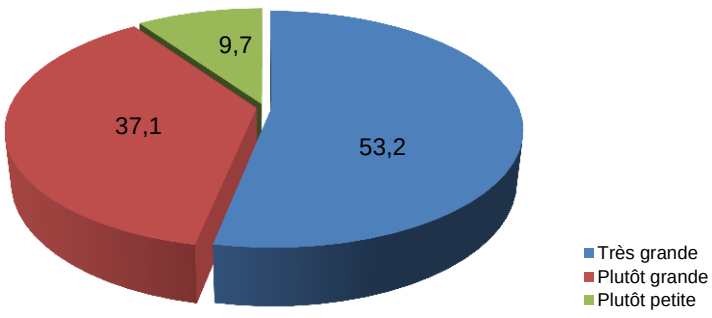
	What are your teachers' goals in using digital in the classroom?				Total
	Create more interactive class situations with digital tools	Create differentiated learning situations to adapt the pedagogy to the different needs of groups of students (individualisation with the digital tool)	Facilitate the demonstration and clarity of the course by leveraging resources	Better master one or more digital tools	
Belgium	-	-	66,7%	33,3%	100,0%
Québec	-	-	69,2%	30,8%	100,0%
Spain	16,7%	16,7%	16,7%	49,9%	100,0%
Finland	-	-	-	100,0%	100,0%
France	6,9%	-	58,6%	34,5%	100,0%
Romania	-	-	50,0%	50,0%	100,0%

The table above informs us that for all countries, digital in didactic activities is important for "better mastering one or more digital tools" (especially for Finland, Spain and Romania). Facilitating the demonstration and clarity of the course by exploiting resources is important for Belgium, Quebec, France and Romania. For Spain, "the creation of more interactive course situations with digital tools" (16.7%) and "the creation of differentiated learning situations to adapt pedagogy to the different needs of groups of students" (16 , 7%) are mentioned objectives.

Table 24: What Place Do You Place on the Protection of Information within the institution?

		%
1.	Very big	53,2
2.	Rather big	37,1
3.	Rather small	9,7
	TOTAL	**100,0**

Figure 24: What place do you place on the protection of personal information within the institution? (%)



For principals, the protection of personal information within the institution is very important (53.2%) and rather large (37.1%), which suggests to us that any digital strategy school must also include specifications on this subject. In addition, 9.7% of respondents to our questionnaire indicated that this topic is of minor importance; perhaps (it can be suggested)

that this is the case of school heads who think, in the first place, of other digital problems (lack of funding, lack of tools, etc.)

Table 24a: What Place Do You Place on Privacy? within the institution? (cross analysis, by country)

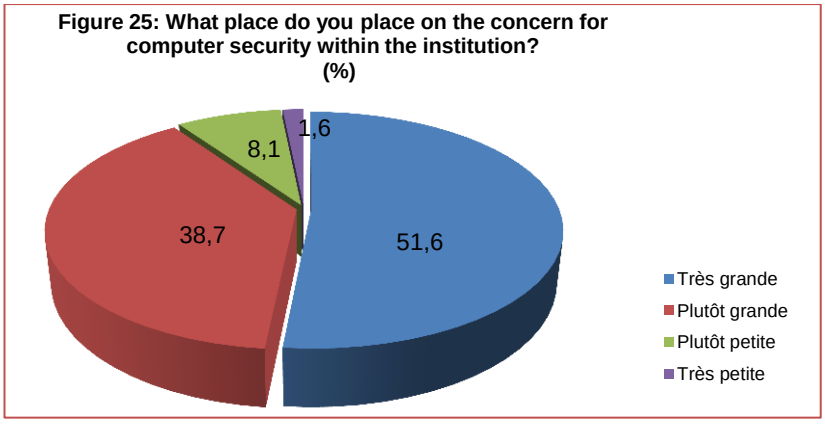
	What place do you grant? the protection of personal information within the institution?			Total
	Rather big	Rather small	Very big	
Belgium	66,7%	-	33,3%	100,0%
Québec	15,4%	-	84,6%	100,0%
Spain	-	16,7%	83,3%	100,0%
Finland	-	66,7%	33,3%	100,0%
France	62,1%	10,3%	27,6%	100,0%
Romania	12,5%	-	87,5%	100,0%

The protection of personal information within the institution is not too important for Finland, 66.7% of respondents said that this aspect was of "rather small" importance. This is also the case for some school leaders from Spain (16.7%) and (10.3%) who indicated this response. It can be concluded that it is not that this issue is not important in Finland but that the protection of staff information is already taken into account elsewhere and that this is a priority for the institution. In general, all the countries that answered this question place a great deal of importance on the protection of personal information within the institution (especially for Quebec, Spain, Finland, Romania).

Table 25: What place do you place on the safety concern computer science within the institution?

		%
1.	Very big	51,6
2.	Rather big	38,7
3.	Rather small	8,1
4.	Very small	1,6
	TOTAL	**100,0**

Figure 25: What place do you place on the concern for computer security within the institution? (%)



With regard to IT security within the institution, school leaders indicate that this is a very important concern that occupies a very large place "(51.6%) and" large "(38.7%). There are also heads of schools who have another list of priorities, a list on which the topic of computer security is of "very small" importance (1.6%). Most often, this is the case of institutions where this problem does not pose difficulties and / or the strategies of digital development are concentrated on other subjects.

Table 25a: What place do you attach to the safety concern computer science within the institution? (cross analysis, by country)

	What place do you grant? the concern for computer security within the institution?				Total
	Rather big	Rather small	Very big	Very small	
Belgium	33,3%	-	66,7%	-	100,0%
Québec	23,1%	7,7%	69,2%	-	100,0%
Spain	16,7%	16,7%	66,6%	-	100,0%
Finland	66,7%		33,3%	-	100,0%
France	55,2%	6,9%	37,9%	-	100,0%
Romania	12,5%	12,5%	62,5%	12,5%	100,0%

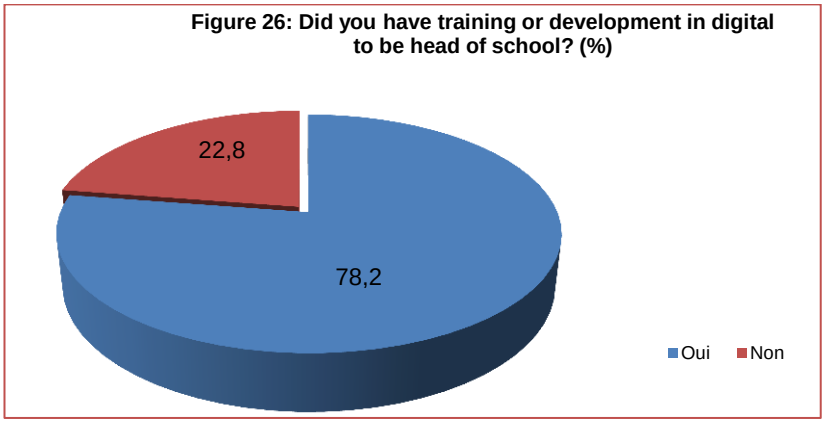
Thus, the importance of computer security within the institution is well recognized by most survey participants as being "very large" (more than 60% in Belgium, Quebec, Spain and Romania) and "rather large "(more than 50% in Finland and France). For Romania (12.5%), France (6.9%), Spain (16.7%) and Quebec (7.7%), some school principals also indicated that IT security could be of "rather small" importance. In general, it can be mentioned that all the representatives of the countries that completed the questionnaire give a very important role to computer security within the institution, especially in a period where risks and computer security are news topics. world.

PART 3: INITIAL AND CONTINUING EDUCATION - School Heads

Observation: In this section, intended for school heads, Bulgaria is not included in the cross-analysis (respondents were not heads of schools)

Table 26: Did you have training or development in digital to be head of school?

		%
1.	Yes	78,2
2.	No	22,8
	TOTAL	**100,0**



78.2% of school principals indicated that they have been trained to improve their digital skills to perform their management duties. At the same time, 22.8% report that they do not have digital training or development to be a headteacher.

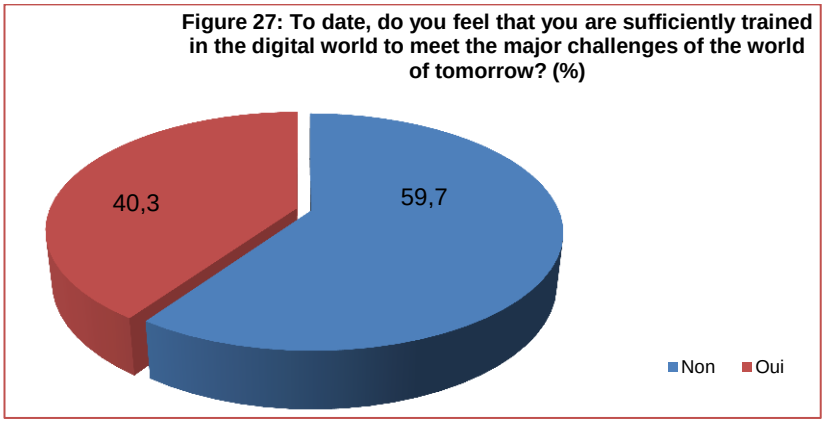
Table 26a: Did you have training or development in digital to be head of school? (cross analysis, by country)

		Did you have digital training or development to be a school principal?		Total
		No	Yes	
	Belgium	100,0%	-	100,0%
	Québec	76,9%	23,1%	100,0%
	Spain	66,7%	33,3%	100,0%
	Finland	33,3%	66,7%	100,0%
	France	93,1%	6,9%	100,0%
	Romania	25,0%	75,0%	100,0%

We observe that this training was received, to a greater extent, by the heads of Romanian schools (75%), followed by the Finns (66.7%). The lowest low percentages of training received are found in France (6.9%), Belgium (23.1%) and Spain (23.1%).

Table 27: To date, do you feel that you are sufficiently trained to digital uses to meet the major challenges of the world of tomorrow?

		%
1.	No	59,7
2.	Yes	40,3
	TOTAL	**100,0**



For example, 59.7% of school leaders do not consider themselves sufficiently trained in the use of technology to meet future societal challenges. This reflects a strong need for training school leaders in this area.

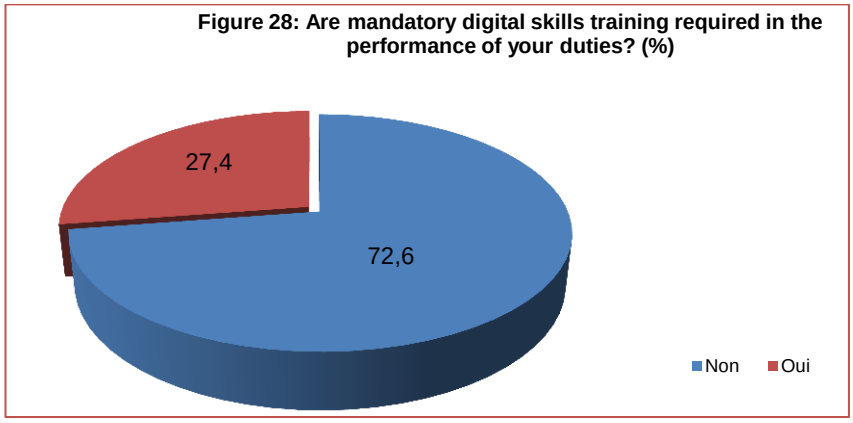
Table 27a: To date, do you feel that you are sufficiently trained to use the digital to meet the major challenges of the world of tomorrow? (cross analysis, by country)

	To date, do you consider that you are sufficiently trained to use digital technology to meet the major challenges of the world of tomorrow?		Total
	No	Yes	
Belgium	66,7%	33,3%	100,0%
Québec	38,5%	61,5%	100,0%
Spain	50,0%	50,0%	100,0%
Finland	-	100,0%	100,0%
France	72,4%	27,6%	100,0%
Romania	75,0%	25,0%	100,0%

Those who are perceived to be the most educated are those in Finnish (100%), Quebec (61.5%) and Spanish (50%) schools. However, the negative perception of training is mentioned by the heads of institutions in Romania (75.0% of responses) and France (72.4% of responses). The example of good practice is in Finland, where 100% of heads of schools consider themselves to be sufficiently trained for digital use.

Table 28: Mandatory Training Time for the Acquisition of Are digital skills provided for in the performance of your duties?

		%
1.	No	72,6
2.	Yes	27,4
	TOTAL	**100,0**



A high percentage of administrators in the sample consider that the acquisition of digital skills is not a planned activity in the performance of their duties, therefore, the administration does not provide for mandatory training in this regard.

Table 28a: Are mandatory digital skills training required in the performance of your duties? (cross analysis, by country)

		Are mandatory digital skills training required in the performance of your duties?		Total
		No	Yes	
	Belgium	100,0%	-	100,0%
	Québec	84,6%	15,4%	100,0%
	Spain	66,7%	33,3%	100,0%
	Finland	-	100,0%	100,0%
	France	86,2%	13,8%	100,0%
	Romania	25,0%	75,0%	100,0%

If we focus on the answers given by the managers of the different countries, it is still in Finland that we estimate this training planned (100%), followed by Romania with 75%. It is important to underline the training received as insufficient in countries such as France (13.8%) and Belgium (15.4%).

PART 3: INITIAL AND CONTINUING EDUCATION Leaders: Training Time for Digital Skills Development

Observation: In this section, intended for heads of schools, Bulgaria is not included in the cross-analysis (respondents were not heads of schools)

Table 29: What are the subjects of these training times?
(Many possible responses)

		%
1.	Team management	73,3
2.	Digital training	26,7
	TOTAL	**100,0**

Only 26.7% of the directors consider that the subjects of training are centered on digital skills, against 73.3% for training on other topics such as team management.

Figure 29: What are the subjects of these training times? (%)

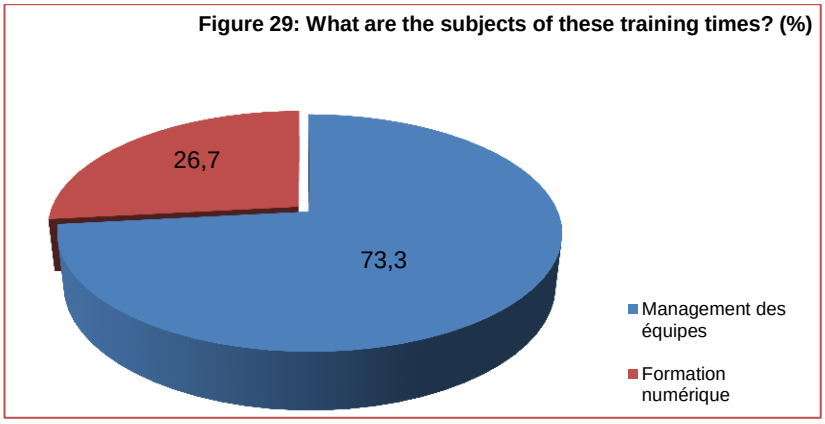


Table 29a: What are the subjects of these training times? (cross analysis, by country)

		What subjects do these training times bear?		Total
		Digital training	Team management	
	Québec	50,0%	50,0%	100,0%
	Spain	-	100,0%	100,0%
	Finland	33,3%	66,7%	100,0%
	France	50,0%	50,0%	100,0%
	Romania	16,7%	83,3%	100,0%

By carrying out a more exhaustive analysis by country, there is an equitable distribution of this training time (in France and Quebec, in both countries, 50% are devoted to digital training and the remaining 50% to the management of equipment). In the rest of the countries, the time devoted to training is focused on team management, as in Spain 100%, in Romania (83.3%) and in Finland (66.7%).

Table 30: On all of your training that you receive Annually, what percentage (%) on average can you link to educational innovations related to digital?

		%
1.	From 20% to 0%	45,0
2.	From 60% to 41%	19,0
3.	From 40% to 21%	16,0
4.	From 80% to 61%	15,0
5.	From 100% to 81%	5,0
	TOTAL	**100,0**

45% of the sample consider that, of the trainings received each year, only 20% or less are related to digital educational innovations. For the rest of the school leaders, the answers vary and 19% say that the total percentage of training received in this direction is between 14% and 60%.

Figure 30: On all of your training that you receive annually, what percentage (%) on average can you link to educational innovations related to digital? (%)

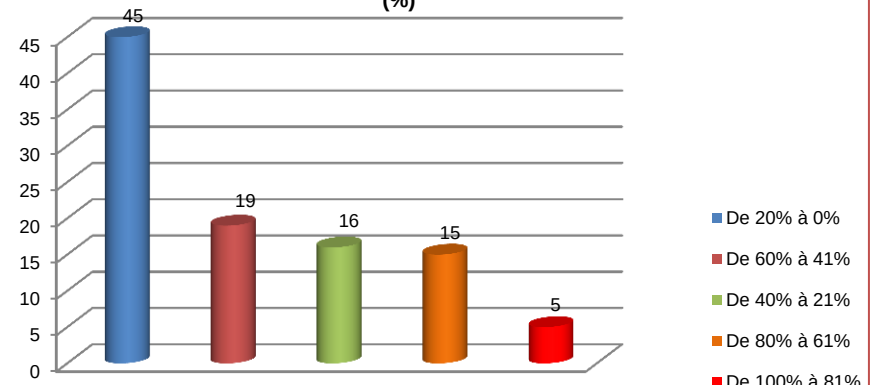


Table 30a: Of all your training courses that you receive annually, what percentage (%) on average can you relate to teaching innovations related to with digital? (cross analysis, by country)

	Of all your training that you receive annually, what percentage (%) on average can you link to educational innovations related to digital?					Total
	From 100% to 81%	From 20% to 0%	From 40% to 21%	From 60% to 41%	From 80% to 61%	
Belgium	-	50,0%	50,0%	-	-	100,0%
Québec	6,1%	63,6%	9,1%	12,1%	9,1%	100,0%
Spain	4,3%	26,1%	17,4%	17,4%	34,8%	100,0%
Finland	-	18,1%	27,3%	27,3%	27,3%	100,0%
France	6,2%	68,8%	6,2%	12,5%	6,3%	100,0%
Romania	6,6%	26,7%	26,7%	40,0%	-	100,0%

Once again, the analysis of the answers to this question shows that most of the training time for digital pedagogical innovations (from 80% to 61%) is in Spain (34.8%). However, there is a minimal percentage of time devoted to this training in Belgium (50%), in Quebec with 63.6% and finally in France with 68.8%. Romania also provides training to its directors with a fairly long time in the total calculation of training received (60% to 41%).

PART 4: PROFESSIONAL USE OF DIGITAL- Heads of Institution**Observation**:

In this section, intended for heads of schools, Bulgaria is not included in the cross-analysis (respondents were not heads of schools)

Table 31: In the exercise of your functions, you use digital for ...: (Many possible responses)

		%
1.	Facilitate the demonstration and clarity of your presentations by leveraging resources	69,4

2.	Create more interactive presentation situations with digital tools	14,6
3.	Promote the establishment	3,2
4.	Create differentiated piloting situations to adapt the steering to the different needs of the members of the team	3,2
5.	Facilitate meetings	3,2
6.	Developing the spirit of initiative and collaboration by creating collaborative work situations around digital tools (research, investigation, production, project)	1,6
7.	Avoid traveling	1,6
8.	To promote to the members of your team the control of the written expression and / or communication in other ways with digital production or editing activities (recording of oral, written, newspaper, web radio, blog, site, etc.)	1,6
9.	Recognize the digital skills of your team members with requests to present collective innovations	1,6
	TOTAL	**100,0**

According to the interviewees, "facilitating the demonstration and clarity of your presentations using different resources" is the activity most often exercised in the performance of their duties (69.4%), followed by "creating presentation situations". more interactive with digital tools "(14.6%). The few remaining percentages vary between "leadership and collaborative development functions that create collective work situations around digital tools" (1.6%) and "avoid travel" (1.6%).

Table 31a: In the performance of your duties, you use the digital to:
(cross analysis, by country)

	In the exercise of your functions, you use the digital for									Total
	1	2	3	4	5	6	7	8	9	
Belgium	-	-	-	-	100,0%	-	-	-	-	100,0%
Québec	7,7%		7,7%		69,2%		15,4%	-	-	100,0%
Spain	-	100,0%	-	-	-	-	-	-	-	100,0%
Finland	-	-	-	-	100,0%	-	-	-	-	100,0%
France	3,4%	10,3%	3,4%	3,4%	69,0%	3,4%		3,4%	3,4%	100,0%
Romania	-	-	-	-	100,0%	-	-	-	-	100,0%

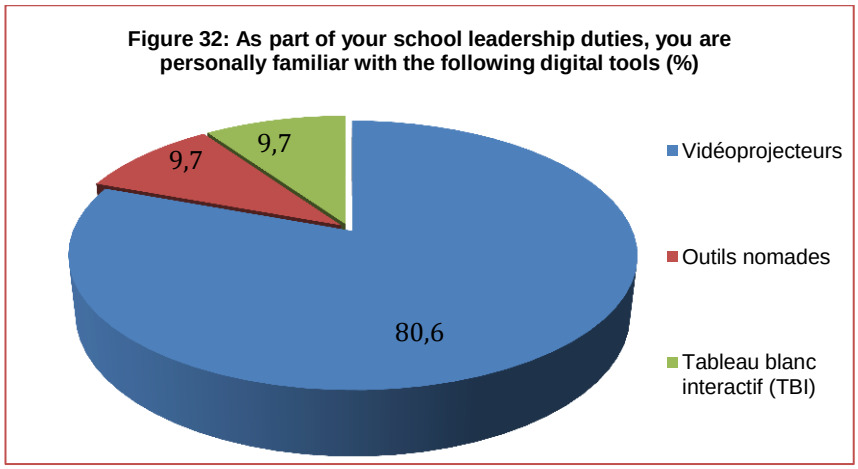
Legend of the Table above:
1. Ensuring the promotion of the establishment
2. Create more interactive presentation situations with digital tools
3. Create differentiated piloting situations to adapt the steering to the different needs of the members of the team
4. Developing the spirit of initiative and collaboration by creating collective work situations around digital tools (research, investigation, production, project)
5. Facilitate the demonstration and clarity of your presentations by leveraging resources
6. Avoid traveling
7. Facilitate the holding of meetings
8. To promote to the members of your team the control of the written expression and / or of communication in other ways with activities of production or digital edition (recording of the oral, writing, newspaper, web radio, blog, site, etc.)
9. Recognize the digital skills of your team members with requests for presentation of collective innovations

Heads of institutions in Belgium, Romania and Finland (100%) use the most technological tools to facilitate the demonstration and clarity of their presentations. The percentages of Quebec (69.2%) and France (69%) also stand out when using digital tools to facilitate these practices. 100% of the Spaniards who participated in the questionnaire use technological tools to create more interactive presentations. Finally, we note that 15.4% of

Quebec heads of institutions consider that the use of digital tools is important to facilitate team meetings.

Table 32: As a school principal, you have a personal command of the following digital tools: (Multiple answers possible)

		%
1.	Projectors	80,6
2.	Nomadic tools (tablets, digital music players for sound and image)	9,7
3.	Interactive whiteboard	9,7
	TOTAL	**100,0**



As can be seen, more than 80% of surveyed principals personally use video projectors, while only 9.7% use tablets, digital audio and video players and the interactive whiteboard as digital tools (TBI). Projectors display a sharper and clearer image than other tools and emit high quality sounds that can be perceived by a larger audience, making them more common among digital tools.

Table 32 a: As a school principal, you personally master the following digital tools (cross analysis, by country)

	As part of your duties as head teacher, you personally master the following digital tools: (Several answers possible)			Total
	Nomadic tools (tablets, digital music players for sound and image)	Interactive whiteboard	Projectors	
Belgium	-	-	100,0%	100,0%
Québec	7,7%	7,7%	84,6%	100,0%
Spain	66,6%	16,7%	16,7%	100,0%
Finland	-	33,3%	66,7%	100,0%
France	-	-	100,0%	100,0%
Romania	12,5%	37,5%	50,0%	100,0%

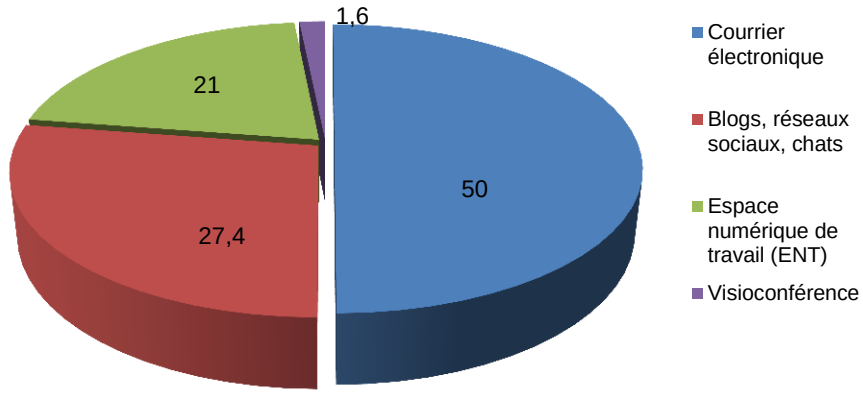
Thus, all heads of institutions in the countries involved in this project (except Spain) have a personal command of video projectors with percentages of 100% for Belgium and

France, 84.6% for Quebec, 66.7% for France. Finland and 50% for Romania. Moreover, Spain has chosen nomadic tools as the most used with a percentage of 66.6%, and 16.7% for video projectors and interactive whiteboard (TBI). In second place on the list of preferences of other countries is the interactive whiteboard (BIT) with percentages of 37.5% for Romania, 33.3% for Finland, and 7.7% for Quebec, while the nomadic tools are the least used, with percentages of 12.5% for Romania and 7.7% for Quebec.

Table 33: To interact with the network of school leaders, you use the following digital tools: (Several answers possible)

		%
1.	Email	50,0
2.	Blogs, social networks, chats	27,4
3.	Numeric workspace (ENT) of the institution	21,0
4.	videoconference	1,6
	TOTAL	**100,0**

Figure 33: To interact with the network of head teachers, you use the following digital tools (%)



Formally, half of school heads use e-mail to interact with other school principals, 27.4% use blogs, social networks or cats, 21% use e-mail. the institution's digital workspace (ENT), while only 1.6% use email videoconferencing. We see that email is the most appropriate means of communication in a more formal environment

Table 33a: To interact with the network of head teachers, you use the following digital tools (cross analysis, by country)

	To interact with the network of school leaders, you use the following digital tools: (Several answers possible)				Total
	Blogs, social networks, chats	Email	Email, Video Conferencing	Numeric workspace (ENT) of the institution	
Belgium	23,2%	33,2%	-	53,6%	100,0%
Québec	23,1%	46,1%	7,7%	23,1%	100,0%
Spain	16,7%	16,7%	-	66,6%	100,0%
Finland	66,7%	-	-	33,3%	100,0%

	France	17,2%	79,3%	-	3,5%	100,0%
	Romania	62,5%		-	37,5%	100,0%

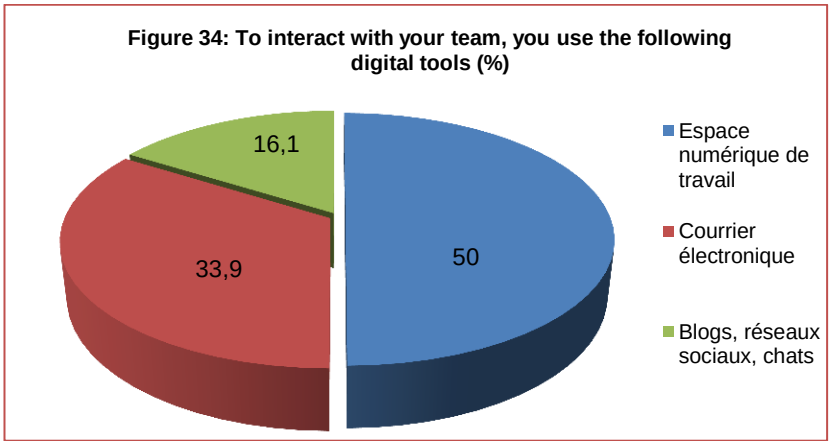
In order to communicate with the network of school principals, similar results were recorded for all response variants, except for e-mail and videoconferencing. For example, Finland and Romania have the highest percentage for the use of blogs, social networks and cats, while Quebec and France have preferred email, while Belgium and Spain prefer to use e-mail. digital workspace (ENT) of the institution.

We therefore have a unitary situation with regard to the digital tools used by school heads to interact with the network of school heads, except for videoconferencing, which requires more careful preparation.

Table 34: To interact with your team, you use the following digital tools: (Multiple answers possible)

		%
1.	Numeric workspace (ENT) of the institution	50,0
2.	Email	33,9
3.	Blogs, social networks, chats	16,1
	TOTAL	**100,0**

Figure 34: To interact with your team, you use the following digital tools (%)



To talk with his team, half of the heads of school chose to use the institution's digital workspace (ENT) (easy access privileged in a private area). As for e-mail, 33.9% of school principals chose it, while 16.1% use blogs, social networks or cats.

Table 34 a: To interact with your team, you use the following digital tools: (cross analysis, by country)

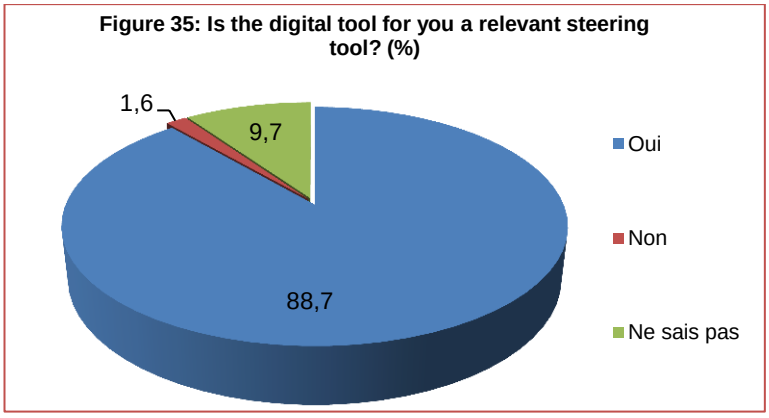
	To interact with your team, you use the tools following numbers			Total
	Blogs, social networks, chats	Email	Numeric workspace (ENT) of the institution	
Belgium	33,3%	-	66,7%	100,0%
Québec	7,6%	46,2%	46,2%	100,0%
Spain	16,7%	33,3%	50,0%	100,0%
Finland		33,3%	66,7%	100,0%
France	6,9%	41,4%	51,7%	100,0%
Romania	62,5%	-	37,5%	100,0%

While most school leaders have given a wide variety of responses to the use of ENT with members of their network, there is consistency in the use of ENT for exchanges with their team members. except Romania, which has again chosen the use of blogs, social networks and cats. Nevertheless, there are average percentages for the use of email. It can be concluded that the establishment's digital workspace (ENT) remains a digital tool that is easier to use thanks to its applicability within the institution.

Table 35: Is the digital tool for you a relevant steering tool?

		%
1.	Yes	88,7
2.	No	1,6
3.	Don’t know	9,7
	TOTAL	100,0

Figure 35: Is the digital tool for you a relevant steering tool? (%)



88.7% of school leaders responded affirmatively to the relevance of the digital tool as a steering tool and 9.7% were unable to answer and 1.6% responded negatively. It can be concluded that most surveyed principals understand the importance and benefits of digital tools in both personal and professional life.

Table 35 a: Is the digital tool for you a relevant steering tool? (cross analysis, by country)

		Is the digital tool for you a relevant steering tool?			Total
		No	Don't know	Yes	
	Belgium	-	33,3%	66,7%	100,0%
	Québec	-	-	100,0%	100,0%
	Spain	-	-	100,0%	100,0%
	Finland	-	-	100,0%	100,0%
	France	1,4%	18,2%	80,4%	100,0%
	Romania	-	-	100,0%	100,0%

From the cross-country analysis presented in the table above, it can be seen that almost all the interviewees recognize the digital tool as a relevant steering tool except for a few marginal answers from respondents in Belgium and France who are not did not know what to answer, either answered negatively. We can therefore see the positive impact of technology on the social life of people who, despite different cultures, have understood the usefulness and importance of digital tools.

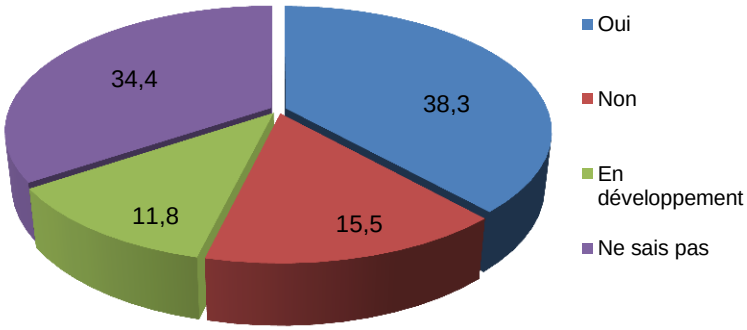
STATE SITUATION – Teachers

Observation: In this section, intended for school heads, Romania is not included in the cross-analysis (respondents were not teachers, only heads of schools - 100%)

Table 36: Does your country of practice have a government / digital public plan for schools?

		%
1.	Yes	38,3
2.	No	15,5
3.	Processing	11,8
4.	Don't know	34,4
	TOTAL	**100,0**

Figure 36: Does your country of practice have a government / digital public plan for schools? (%)



Starting from the table above, we can see that 38.3% of the teachers surveyed answered in the affirmative, 34.4% could not answer, 15.5% answered negatively, and 11.8% answered that 'There was a developing digital government plan. From these responses, it can be deduced that more than a quarter of teachers neglect this subject; at the same time, 50.1% are aware of a public digital government plan for schools.

Table 36a: Does your country of practice have a government / digital public plan for schools? (cross analysis, by country)

	Does your country of practice have a government / public digital plan for schools?				Total
	Processing	Don't know	No	Yes	
Belgium	-	100,0%	-	-	100,0%
Bulgaria	35,3%	23,5%	11,8%	29,4%	100,0%
Quebec	14,3%	74,3%	8,6%	2,9%	100,0%
Spain	8,7%	43,5%	21,7%	26,1%	100,0%
Finland	-	24,5%	9,1%	66,4%	100,0%
France	6,2%	62,5%	18,8%	12,5%	100,0%

From the table above, we can see that most teachers do not understand the existence of a government digital plan for schools, the teachers' responses in each country about the existence of a digital government plan for schools. with high percentages for Belgium (100%), 74.3% for Quebec, 43.5% for Spain and 62.5% for France. Teachers in Finland who answered affirmatively in a percentage of 66.4% and those in Bulgaria with 29.4% show their interest in answering affirmatively and "in development".

From these responses, it can be deduced that today's society is facing neglect and lack of interest on the part of teachers in most countries involved in this project, fact that hinders the progress of technology in schools.

Table 37: In which year was the government / digital public plan for your country of practice introduced?

		%
1.	2015	33,4
2.	2010	13,3
3.	2012	13,3
4.	2016	13,3
5.	2017	13,3
6.	1990	6,7
7.	2014	6,7
	TOTAL	**100,0**

Regarding the period of the introduction of the digital government plan, 33.4% of teachers answered the year 2015, 13.3% answered the years 2010, 2012, 2016 and 2017, and 6.7% have answered the years 1990 and 2014. Of these statistical answers, one summarizes that in the last years were introduced most of the digital governmental plans, except in 2014. One observes, also, the presence of the digital since 1990, date where the technology was undeveloped, and where began its valuation.

Figure 37: In which year was the government / digital public plan for your country of practice introduced? (%)

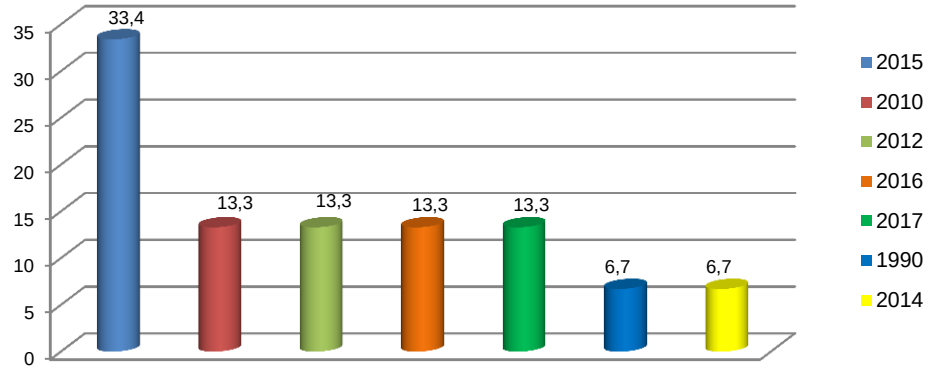


Table 37a: In which year was the government / digital public plan for your country of practice introduced?
(cross analysis, by country)

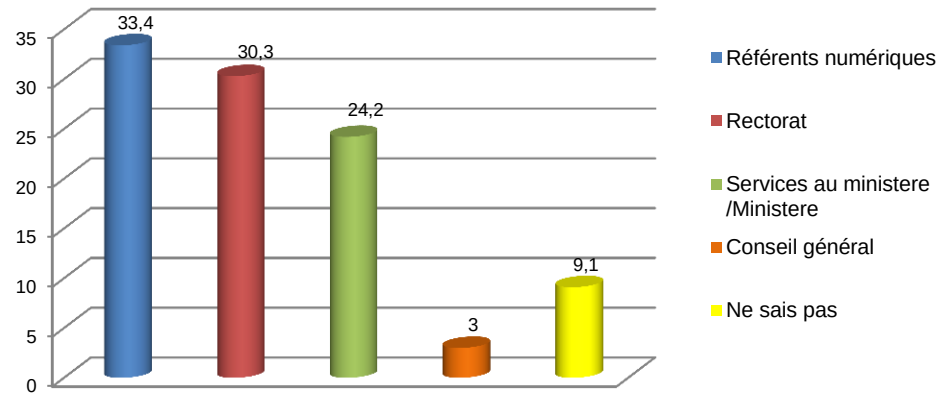
	In what year was the government / digital public plan for your country of practice introduced?							Total
	1990	2010	2012	2014	2015	2016	2017	
Bulgaria	-		50,0%	-	-	-	50,0%	100,0%
Quebec	-	-	-	-	50,0%	-	50,0%	100,0%
Spain	100,0%	-	-	-	-	-	-	100,0%
Finland	-	-	-	-	-	100,0%	-	100,0%
France	-	22,2%	11,1%	11,1%	44,5%	11,1%	-	100,0%

Thanks to the rapid development of technology in the twenty-first century, the digital government plans of each country in the table above have been introduced in the last eight years, except in Spain. It is sometimes observed that for the same country, respondents do not announce the same dates as in Bulgaria and Quebec, whereas in other countries, such as Spain and Finland, respondents were 100% sure of their age. reply. As for France, most of the responses indicate the year 2015. What is surprising is the period when the Spanish government introduced a digital government plan, namely the year 1990, when technology was not accessible to every citizen.

Table 38: How is this plan relayed in your institution?
(Many possible responses)

		%
1.	Digital referents	33,4
2.	rectorship	30,3
3.	Departmental / Departmental Services	24,2
4.	general Council	3,0
5.	Don't know	9,1
	TOTAL	**100,0**

Figure 38: How is this plan relayed in your institution? (%)



For several years now, there has been a major reform movement, aimed at improving education and making it able to meet the aspirations of today's youth and the demands of modern society. Thus, the new higher education institutions will provide, through appropriate pedagogy and involving the collaboration of professionals, a scientific and technical training of a concrete nature, well adapted to contemporary realities.

Table 38 a: How is this plan relayed in your institution? (cross analysis, by country)

	How is this plan relayed in your institution?				Total
	general Council	Don't know	Digital referents	Departmental / Departmental Services	
Bulgaria	-	-	100,0%	-	100,0%
Quebec	-	-	25,0%	75,0%	100,0%
Spain	-	-	66,7%	33,3%	100,0%
Finland	-	20,0%	80,0%	-	100,0%
France	5,9%	11,7%	46,8%	35,6%	100,0%

The structure of the Bulgarian education system is unique, so it is similar to that of other Latin countries and the government plan in the digital domain is relayed by digital referents (100%). In Quebec, there is neither a federal department of education nor an integrated national education system.

Ministries of Education are responsible for the organization, delivery and evaluation of elementary and secondary education, technical and vocational training, and post-secondary education. Some provinces and territories have two ministries, one responsible for elementary-secondary education and the other for post-secondary education and vocational

training. Most education units are headed by ministerial services (75%), and only a quarter of the country has leadership with digital references (25%).

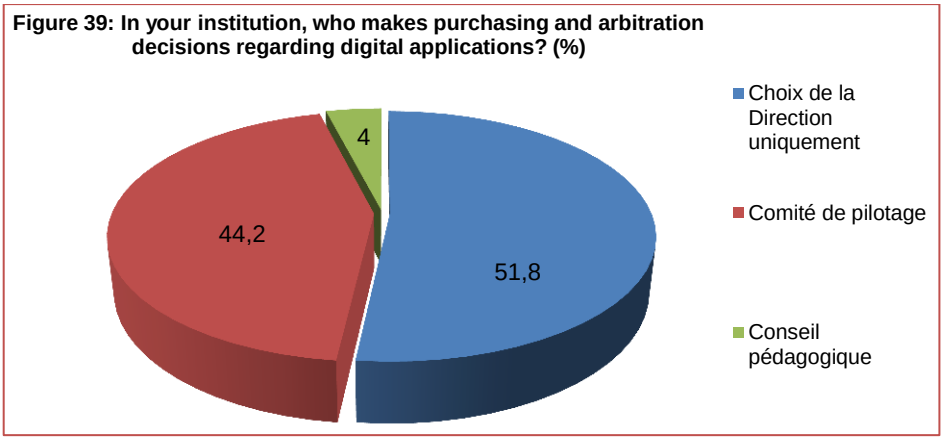
Education policy in Spain is the responsibility of several institutions: the Ministry of Education and the various governments of the 17 Autonomous Communities. It is clear, however, that numerical references (66.7%) go beyond departmental services (33.3%). On the other hand, openness to life and the discovery of the environment are pillars of official programs. The importance of autonomy, of the motivation born of the possibility of carrying out projects, the development of autonomy and creativity, seem essential.

The reference to active pedagogy is clear, it seems unavoidable, while leaving great freedom for the educational choices of teachers. Fairness seems to be aimed, through financial choices allowing free admission, for a very high level of teacher training, including obviously practical training. Schools are mainly run by digital referees (80%), and a significant percentage are not aware of the subject (20%).

Table 39: In your institution, who makes purchasing and arbitration decisions regarding digital applications?
(Many possible responses)

		%
1.	Choice of Direction only	51,8
2.	Steering Committee	44,2
3.	Educational Council	4,0
	TOTAL	**100,0**

Figure 39: In your institution, who makes purchasing and arbitration decisions regarding digital applications? (%)



It seems that most of the respondents attests that in their teaching unit, decisions are made solely by the director (51.8%). But the difference between those who answered that decisions are made by the director and those who answered that they were taken by a

steering committee (44.2%) is not significant; the steering committee is responsible for ensuring the proper functioning of an establishment.

It is a decision-making structure, and a relay of political will. It will stimulate the dynamics to all the actors. It usually consists of a representative of a department, a directorate, a sector of expertise or a trade involved in the project. With regard to pedagogical advice, it is obvious that this way of leading has lost its credibility and is used very little in relation to the other two (only 4% of respondents indicated this variant of answer).

Table 39a: In your institution, who makes purchasing and arbitration decisions regarding digital applications?
(cross analysis, by country)

		In your institution, who makes purchasing and arbitration decisions regarding digital applications?			Total
		Choice of Direction only	Educational Council	Steering Committee	
	Belgium	80,0%	-	20,0%	100,0%
	Bulgaria	20,0%	40,0%	40,0%	
	Quebec	-	25,0%	75,0%	
	Spain	-	100,0%	-	100,0%
	Finland	75,0%	25,0%	-	
	France	21,4%	28,6%	50,0%	100,0%

In Belgium, the highest percentage of decision-makers in schools is registered by Management Choice only (80%), and only 20% of school leaders are represented by a Steering Committee. In Bulgaria, things are divided equally among the three types of leadership: Choice of Management only, which represents 20%, while the Pedagogical Council and the Steering Committee each have 40%. In Quebec, things are a little different because there is the highest percentage of 75% at the Steering Committee, and the remaining 25% is in the Education Council. Spain is the only country with a maximum percentage of 100%, represented by the Pedagogical Council. Finland has a percentage close to Belgium, 75% being represented by Choice of Direction only and the remaining 25%, as in the case of Quebec, are represented by the educational council.

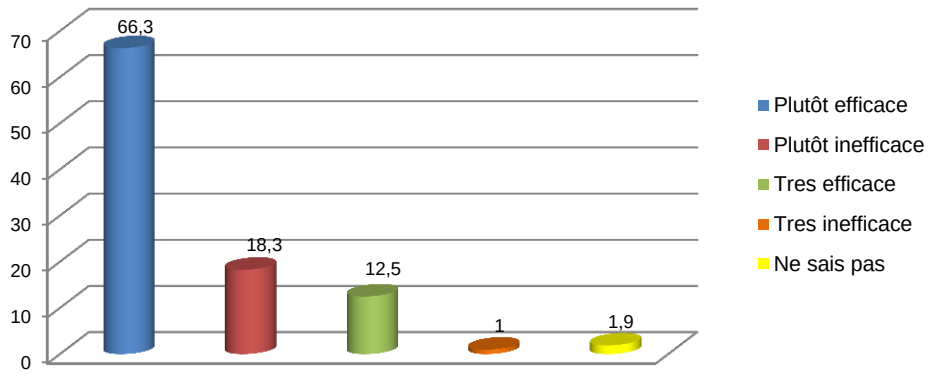
For France, the percentages are divided: Choice of Management only (21.4) and Education Council (28.6) have the percentage relatively close, representing half of 100%, and the other half is represented by the Steering Committee (50%).

Table 40: How do you rate the effectiveness of your digital environment and of your digital tools?

		%
1.	Rather effective	66,3
2.	Rather ineffective	18,3
3.	Very effective	12,5
4.	Very inefficient	1,0
5.	Don’t know	1,9

	TOTAL	**100,0**

Figure 40: How do you evaluate the efficiency of your digital environment and your digital tools ?? (%)



The place of digital technology in educational practices is increasing year by year. The evaluation tools are varied and varied depending on the media used. Digital tools can help the teacher to implement a differentiated pedagogy. This implies that at different stages of the activity, the teacher can measure the skills mobilized within the class. It must therefore take into account the individual understanding of each student but also that of the group at key moments of learning. The use of digital technology allows flexibility in taking into account the different learning rhythms. The diversity of digital media is also potentially an asset for managing heterogeneities.

Table 40a: How do you rate the effectiveness of your digital environment and your digital tools? (cross analysis, by country)

	How do you evaluate the effectiveness of your digital environment and your digital tools?					Total
	Don't know	Rather effective	Rather ineffective	Very effective	Very inefficient	
Belgium	-	50,0%	50,0%	-	-	100,0%
Bulgaria	-	70,6%	29,4%	-	-	100,0%
Quebec	2,8%	74,3%	14,3%	8,6%	-	100,0%
Spain	4,3%	65,3%	8,7%	21,7%	-	100,0%
Finland	-	54,5%	18,2%	27,3%	-	100,0%
France	-	56,3%	25,0%	12,5%	6,2%	100,0%

In terms of the efficiency of the digital environment and digital tools, half of the population in Belgium answered that it is rather efficient and half that it is rather ineffective, the percentages between the two variants being equal. compared to Bulgaria, where the response was oriented towards a positive response, with 70.6% of responses "somewhat effective", and 29.4% of "somewhat ineffective" responses, being the only two countries that have only given these two answers.

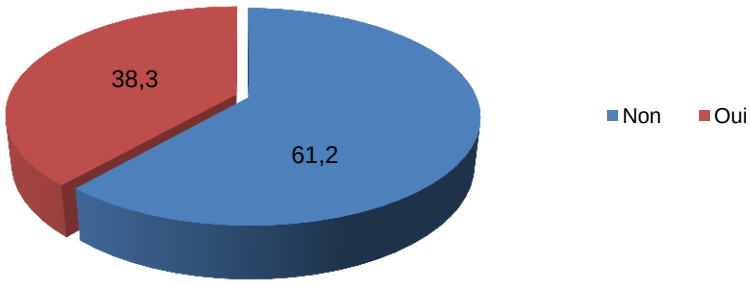
The responses from Quebec and Spain are very similar with 2.8% of "do not know" in Quebec and 4.3% in Spain. In Quebec, 74.3% of respondents said that this measure was "quite effective" and in Spain, 65.3%. The "rather ineffective" responses recorded slightly lower values with 14.3% in Quebec and 8.7% in Spain while the "very effective" responses gave the scores of 8.6% in Quebec and 21.7% in Spain.

As in the previous case, Finland and France are alike; 54.5% in Finland and 56.3% in France answered "Rather effective" the answer "rather ineffective" was given by 18.2% of Finland and 25% in France; "Very effective" was the answer given by 27.3% of the population of Finland and 12.5% of the population of France. At the same time, France is the only country that had a percentage in the last variant: "very inefficient" which recorded 6.2%.

Table 41: Did you have training or development in digital to be a teacher?

		%
1.	No	61,2
2.	Yes	38,8
	TOTAL	**100,0**

Figure 41: Did you have digital training or development to be a teacher? (%)



Question 41 of the Trends Questionnaire revisits the roles of digital education. As can be seen, 61.2% of respondents do not have digital training or development to be a teacher. The solution we can consider is that in the future, digital technology is a teaching discipline and a school subject. But, it is difficult to bring up a discipline in the school universe. We must find the specialists and define the curriculum. Computer science has entered the curricula of the school, college and high school, but with many options and many questions remain about what is actually taught in the classroom.

Table 41a: Did you have training or development in digital to be a teacher? (cross analysis, by country)

		Have you had digital training or development to be a teacher?		Total
		No	Yes	
	Belgium	50,0%	50,0%	100,0%
	Bulgaria	37,4%	62,6%	100,0%
	Quebec	71,4%	28,6%	100,0%
	Spain	69,6%	30,4%	100,0%
	Finland	45,5%	54,5%	100,0%
	France	62,5%	37,5%	100,0%

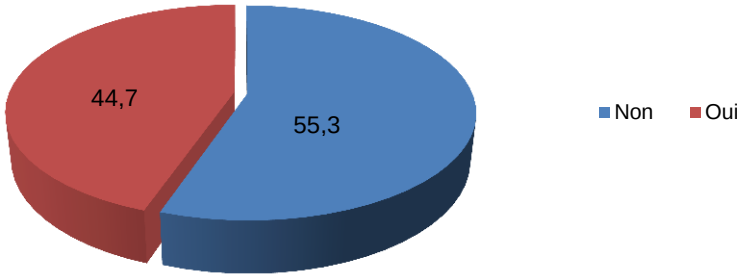
Here, Belgium's YES / NO answers are equal: 50% -50%. In the case of Bulgaria, the "yes" wins (62.6%) against the "no" at 37.4%. Quebec and Spain have similar percentages with 71.4% "no" in Quebec and 69.6% in Spain against 28.6% "yes" in Quebec and 30.4% in Spain.

Finland has fairly close response rates: 45.5% of "no" and 54.5% of "yes", while France has exactly opposite values with 62.5% "no" and 37.5% % of "no". In conclusion, in terms of response to "training or numerical improvement to be a teacher", the responses were balanced, in some cases even or nearly equal.

Table 42: Do you enjoy training time for skills training in digital in the exercise of your functions?

		%
1.	No	55,3
2.	Yes	44,7
	TOTAL	**100,0**

Figure 42: Do you benefit from training time reserved for the acquisition of digital skills in the performance of your duties? (%)



In order to facilitate the development of the use of digital skills, it is necessary to help and support middle and high school teachers to use the full potential of digital tools and resources. The difference between those who answered "yes" (44.7%) and those who answered "no" (55.3%) is not very high, but it is quite obvious, participants lack time to to focus on acquiring new digital skills.

Table 42a: Do you benefit from training time reserved for the acquisition of digital skills in the performance of your duties? (cross analysis, by country)

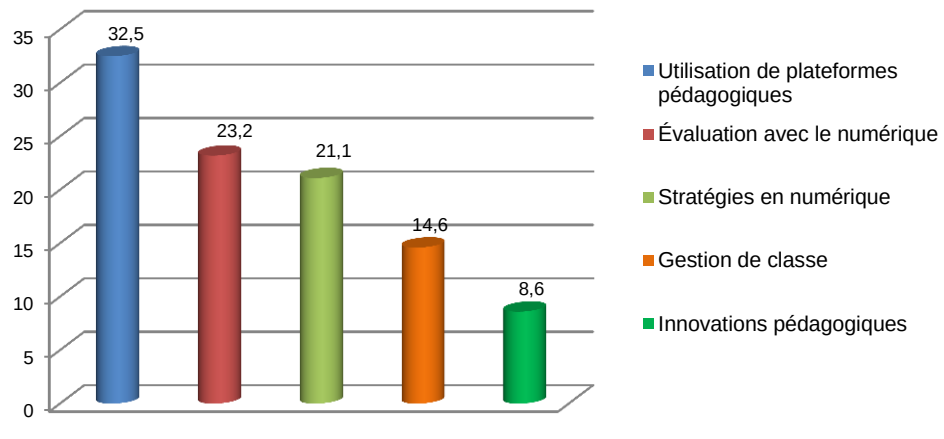
		Do you benefit from reserved training time? acquisition of digital skills in the performance of your duties?		Total
		No	Yes	
	Belgium	100,0%	-	100,0%
	Bulgaria	43,8%	56,2%	100,0%
	Quebec	57,1%	42,9%	100,0%
	Spain	47,8%	52,2%	100,0%
	Finland	63,6%	36,4%	100,0%
	France	62,5%	37,5%	100,0%

Regarding the issue of having the time to acquire digital skills, Belgium's response was "no" to 100%. The responses of Bulgaria, Quebec and Spain are similar in percentage with responses of 43.8% in Bulgaria, 57.1% in Quebec and 47.8% in Spain, and yes responses 56.2% in Bulgaria, 42.9% in Quebec and 52.2% in Spain. And for Finland and France, the answers are about the same with 63.6% in Finland who answered "no" and 62.5% in France while "yes" shows 36.4% in Finland and 37.5%. % in France. In conclusion, most respondents said they did not have the time to train in the line of duty to learn new digital skills.

Table 43: What are the subjects of these training times?

		%
1.	Use of educational platforms	32,5
2.	Evaluation with digital	23,2
3.	Digital strategies	21,1
4.	Class management	14,6
5.	Educational innovations	8,6
	TOTAL	**100,0**

Figure 43: What are the subjects of these training times? (%)



However, these training times are not enough to promote student success and it is important then to design learning moments to develop the required skills. Digital technology is now at the very heart of businesses and our daily lives. Digital and digital are at the service of all sectors of activity. These are sectors that have no limits and offer an infinite range of professions and careers. Constantly changing, future digital and digital professionals must be able to adapt strongly and nurture a taste for innovation. New trades are created every day to meet ever-changing challenges related to networks, design, development (internet and mobile) but also to the organization and security of systems and data recorded each day.

Table 43a: What are the subjects of these training times? (cross analysis, by country)

		Do you benefit from training time reserved for the acquisition of digital skills in the performance of your duties?					Total
		Use of educational platforms	Evaluation with digital	Digital strategies	Class management	Educational innovations	
	Belgium	4,3%	26,1%	17,4%	17,4%	34,8%	100,0%
	Bulgaria	30,6%	13,7%	14,6%	17,0%	24,1%	100,0%
	Quebec	8,7%	33,5%	21,7%	26,1%	10,0%	100,0%
	Spain	14,6%	13,6%	24,0%	17,1%	30,7%	100,0%
	Finland	2,8%	74,3%	14,3%	8,6%	2,8%	100,0%
	France	10,0%	2,8%	64,3%	14,3%	8,6%	100,0%

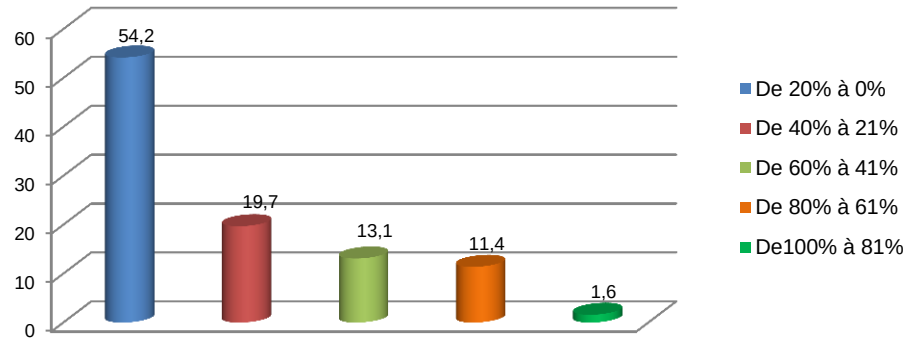
With regard to the most important topics in digital training, it can be seen that in Belgium the highest percentage of educational innovations (34.8%) was met and the lowest percentage was use of educational platforms (4.3%). Bulgaria has the highest percentage of "use of educational platforms" (30.6) and the lowest percentage of "numerical assessment" (13.7). Quebec has the highest percentage of 33.5% in the numerical assessment, and the lowest percentage, 8.7%, "the use of educational platforms".

For Spain, "educational innovations" received 30.7% and use of educational platforms "only 14.6%. Finland has the highest percentages in "numerical assessment" (74.3%) and lowest in "use of pedagogical platforms". France has the highest percentages in the "digital strategy" (64.3%) and the lowest in "numerical assessment" (2.8%). Calculations show that most participants have opted for training time for "digital strategies" to the detriment of "pedagogical innovations".

Table 44: Of all your trainings you receive annually, what percentage (%) on average can you tie to piloting innovations education related to digital?

		%
1.	From 20% to 0%	54,2
2.	From 40% to 21%	19,7
3.	From 60% to 41%	13,1
4.	From 80% to 61%	11,4
5.	From % to 81%	1,6
	TOTAL	**100,0**

Figure 44: Of all your training courses that you receive annually, what percentage (%) on average can you tie to piloting educational innovations related to digital? (%)



Looking at the data in the table above, it can be seen that over half (54.2%) of respondents indicated that they can link their digital education to what they do on the committee. in a very insignificant proportion ("from 20% to 0%"). The answers (especially their structure) of the table above indicate that in the future there will be a strong need for change in the content of training in the digital domain; changes that can help school leaders use digital skills on steering committees.

Table 44a: Of all your trainings you receive annually, what percentage (%) on average can you tie to piloting innovations education related to digital? (cross analysis, by country)

	Of all your training courses that you receive annually, what percentage (%) on average can you tie to piloting educational innovations related to digital?					Total
	From 20% to 0%	From 40% to 21%	From 60% to 41%	From 80% to 61%	From % to 81%	
Bulgaria		37,5%	25,0%	25,0%	12,5%	100,0%
Belgium	66,7%		33,3%			100,0%
Quebec	69,2%	15,4%	15,4%			100,0%
Spain	50,0%	16,7%	16,7%	16,3%		100,0%
Finland			33,3%	66,7%		100,0%
France	67,9%	21,4%	7,1%	3,6%		100,0%

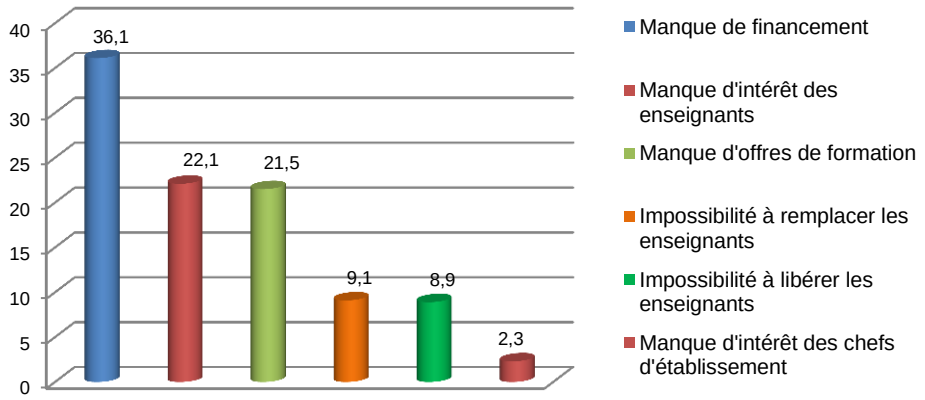
We can observe that teachers from Belgium, Quebec, Spain and France agree that between 0 and 20% of the training they receive helps them to lead innovation projects related to digital technology.. Bulgarian teachers are between 21% and 100%, which represents a homogeneity of about 25% in the percentages between 21% and 61%.

Only 12.5% of Bulgarian respondents recognize the contribution of training in steering digital innovation between 81% and 100%. On the other hand, Finnish teachers are in the middle and 33.3% consider the aid provided in a proportion of 41% to 61%, while 66.7% estimate it in a percentage of 61% to 80%

Table 45: What do you think are the brakes on further training continues in the use of digital for teachers?

		%
1.	Lack of funding	36,1
2.	Lack of interest from teachers	22,1
3.	Lack of training offers	21,5
4.	Inability to replace teachers	9,1
5.	Impossibility to release teachers	8,9
6.	Lack of interest of school leaders	2,3
	TOTAL	**100,0**

Figure 45: In your opinion, what are the obstacles to pursuing continuous training in the use of digital technology for teachers (%)



In general, teachers recognize that the most important obstacles to continued training in digital use are "lack of funding" (36.1%), "lack of interest of teachers" (22.1%) and also "the lack of training offers" (21.5%). At the same time, a low percentage of teachers - of 2.3%, but certainly not very significant - have identified the lack of interest of school leaders as a brake in their continuing education

Table 45a: In your opinion, what are the obstacles to further training Continuing in the use of digital for teachers? (cross analysis, by country)

	In your opinion, what are the obstacles to pursuing continuous training in the use of digital technology for teachers?						Total
	Lack of interest of school leaders	Impossibility to release teachers	Inability to replace teachers	Lack of training offers	Lack of interest from teachers	Lack of funding	
Bulgaria	5,5%			24,0%	45,0%	25,5%	100,0%
Belgium	4,5%	40,0%	20,1%	20,1%	7,2%	8,1%	100,0%
Quebec	10,0%	30,0%	34,3%	14,3%	8,6%	2,8%	100,0%
Spain	10,6%	18,1%	19,6%	17,0%	14,1%	20,6%	100,0%
Finland	4,3%	30,3%	28,7%	11,7%	10,0	15,0%	100,0%
France	3,0%	42,6%	28,1%	8,0%	11,2%	7,1%	100,0%

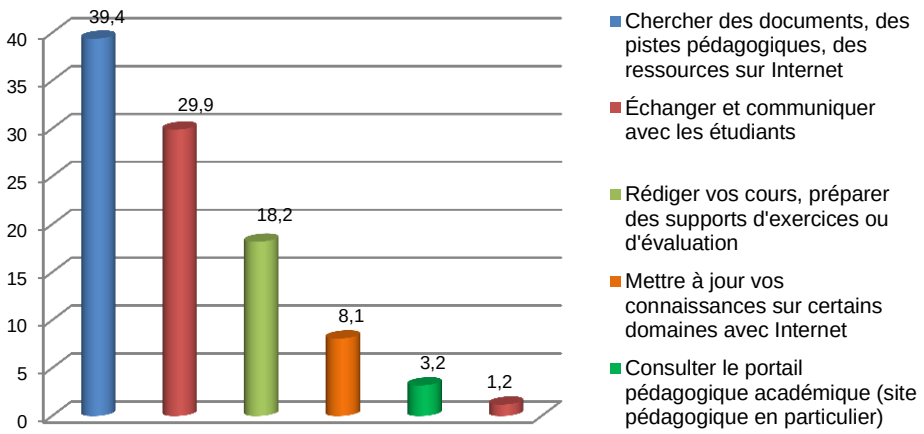
The reasons for the in-service training of teachers in the use of digital technology are diverse, but three factors were assessed at more than 25% in more than two of the countries studied with "the impossibility of finding time for teachers" , "The impossibility of finding a replacement for teachers" and "lack of funds".

The percentage of Belgian (40%) and French (42.6%) teachers who consider the time factor to be the biggest obstacle to their achievement is remarkable. It is necessary to emphasize that the three factors mentioned above, keep a close relationship between them, because there is a lack of time for teachers and that is why it is so difficult. It is possible that this is due to the lack of funds indicated by the teachers and that it can solve the two main problems.

Table 46: When preparing your classes, you use digital for ...

		%
1.	Look for documents, educational leads, resources on the Internet	39,4
2.	Exchange and communicate with students	29,9
3.	Write your courses, prepare exercise or evaluation materials	18,2
4.	Update your knowledge on certain domains with Internet	8,1
5.	Consult the academic educational portal (educational site in particular)	3,2
6.	Exchange and share documents with your colleagues	1,2
	TOTAL	**100,0**

Figure 46: When preparing your courses, you use digital for ..... (%)



The 3 main uses of digital by teachers are those related to the didactic activity with more than 87% to "look for documents, pedagogical tracks", "to exchange with students" or "to write courses, to prepare materials for exercises or evaluation. This means that we can not speak of a lack of interest in digital among teachers and, at the same time, education systems (French, Finnish, Spanish, Quebec, Romanian, Belgian, Bulgarian) give an increasingly important role to digital.

Table 46a: When preparing your classes, you use digital for ....
(cross analysis, by country)

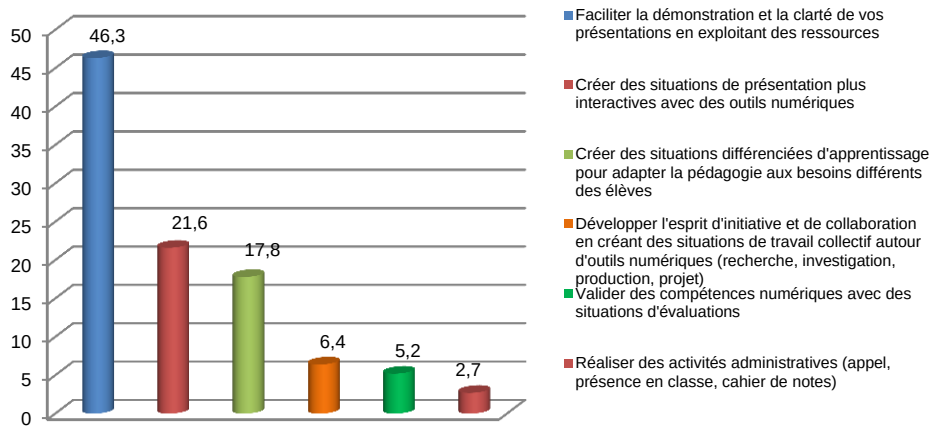
	When preparing your classes, you use digital for						Total
	Exchange and share documents with your colleagues	Consult the academic educational portal (educational site in particular)	Update your knowledge on certain domains with Internet	Write your courses, prepare exercise or evaluation materials	Exchange and communicate with students	Look for documents, educational leads, resources on the Internet	
Bulgaria	8.6%	12.1%	14.2%	8,6%	32.8%	23.7%	100,0%
Belgium	6,3%	10.6%	12.6%	18.1%	15.8%	36.6%	100,0%
Quebec	2.0%	16.0%	22.2%	4.3%	11.1%	44.4%	100,0%
Spain	4.3%	4,2%	23.4%	4.2%	12.8%	51.1%	100,0%
Finland	2.1%	4.3%	10,7%	8.5%	17.0%	57.4%	100,0%
France	8.7%	4.3%	26.2%	21,7%	8.7%	30.4%	100,0%

Most teachers use digital resources to search for documentation and resources in the network, in some cases reaching more than 50% of the total. This is the case for Spain (51.1%) and Finland (57.4%), Quebec (44.4%), Belgium (36.6%), France (30.6%), , 4%) and Bulgaria (23.7%) which also shows a percentage of teachers who use digital resources in this way. The percentages of knowledge sharing in different networks and exchange and communication of information with students are between 15 and 25% of the total, Bulgaria distinguishing with more than 30% of teachers using these resources for communication .

Table 47: During your classes, you master digital skills to:

		%
1.	Facilitate the demonstration and clarity of your presentations by leveraging resources	46,3
2.	Create more interactive presentation situations with digital tools	21,6
3.	Create differentiated learning situations to adapt pedagogy to the different needs of students	17,8
4.	Developing the spirit of initiative and collaboration by creating collaborative work situations around digital tools (research, investigation, production, project)	6,4
5.	Validate digital skills with assessment situations	5,2
6.	To carry out administrative activities (call, presence in class, notebook of notes)	2,7
	TOTAL	**100,0**

Figure 47: During your lessons, you master the digital for ..... (%)



Most often (almost 50% of responses), teachers use digital technology to facilitate the demonstration and clarity of their presentations during didactic activities by leveraging resources. At the same time, 21.6% of teachers use digital to create more interactive presentation situations with digital tools. Creating differentiated learning situations to adapt pedagogy to the different needs of students is important for 17.8% of respondents to our questionnaire, who in fact use digital for this reason.

Table 47a: During your lessons, you master the digital for ..... (cross analysis, by country)

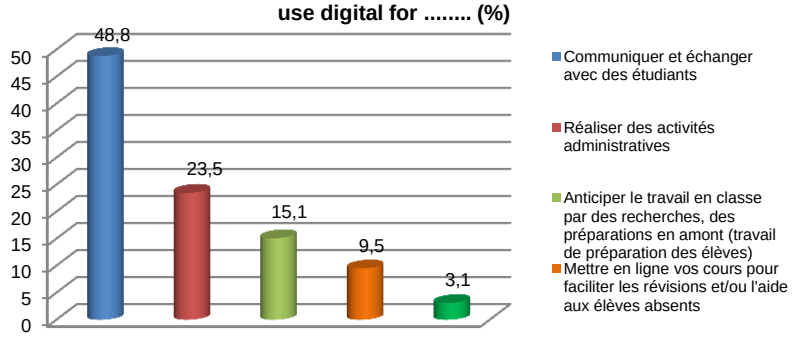
	Table 47a: During your lessons, you master the digital for ..... (cross analysis, by country)...						Total
	Realize administrative activities (call, presence in class, notebook)	Validate digital skills with assessment situations	Developing the spirit of initiative and collaboration by creating collaborative work situations around digital tools (research, investigation, production, project)	Create differentiated learning situations to adapt pedagogy to the different needs of students	Create more interactive presentation situations with digital tools	Facilitate the demonstration and clarity of your presentations by leveraging resources	
Bulgaria	7,9%	9,7%	10.5%	11.7%	19.6%	40.6%	100,0%
Belgium	12.1%	17.3%	14.2%	14.8%	18.5%	23.1%	100,0%
Quebec	3,8%	7,8%	8.6%	11.5%	33.6%	34.7%	100,0%
Spain	1.5%	1.8%	4.1%	7.9%	30.1%	54.6%	100,0%
Finland	3,8%	2,8%	10,0%	17,4%	26,9%	39,9%	100,0%
France	7.3%	6.7%	9.3%	22.0%	24.7%	30.0%	100,0%

The percentages show that teachers use technologies primarily for presentations, both to facilitate the demonstration and clarity of presentations, as indicated by 54.6% of teachers in Spain and 40.6% of teachers in Bulgaria; to create more interactive presentation situations, as for 30.1% of Spanish teachers and 26.9% of Finnish. It is necessary to emphasize, the low percentages noted with regard to the use of these resources for the administrative, with the highest percentage in Belgium (12.1%) and the use of these resources for evaluation in the class varies between 1.8% in Spain and 17.3% in Belgium.

Table 48: Outside of your classes, you use or have students use the digital for ... ..

		%
1.	Communicating and exchanging with students	48,8
2.	Perform administrative activities	23,5
3.	Anticipate classroom work through research, upstream preparation (student preparation work)	15,1
4.	Put your courses online to facilitate revisions and / or help for absent students	9,5
5.	Conduct or correct online evaluations	3,1
	TOTAL	**100,0**

Figure 48: Outside of your classes, you use or have students use digital for ..... (%)



The fact that the digital facilitates the communication recognized by 48.8% of the respondents who answered that outside the courses, they use the digital to communicate and exchange with students. For 23.5% of teachers, digital is very useful for carrying out administrative activities. 15.1% of teachers use digital technology to do research that helps them anticipate classroom work with their students. The online evaluation activity is used by only 3.1% of respondents.

Table 48a: Outside of your classes, you use or have students use the digital for ... .. (cross analysis, by country)

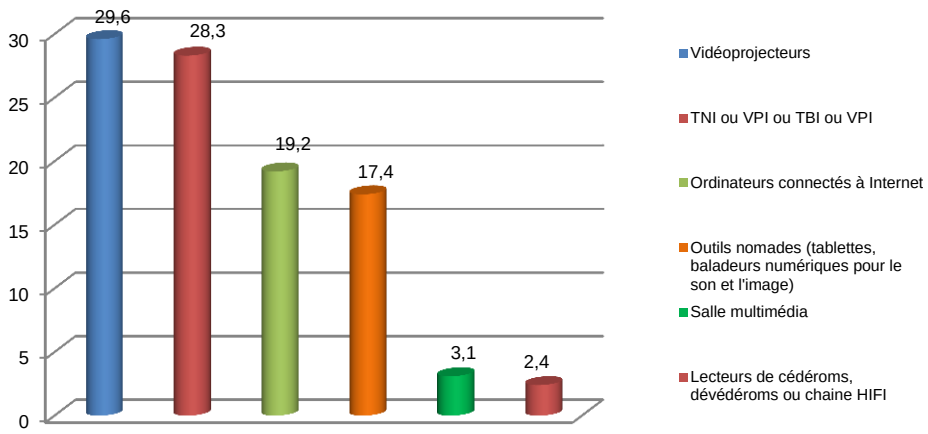
	Outside of your classes, you use or have students use digital for					Total
	Conduct or correct online evaluations	Put your courses online to facilitate revisions and / or help for absent students	Anticipate classroom work through research, upstream preparation (student preparation work)	Perform administrative activities	Communicating and exchanging with students	
Bulgaria		8.1%	14.2%	31.9%	45.8%	100,0%
Belgium	4.6%		13.8%	19.5%	62.1%	100,0%
Quebec	0.8%	0.5%	4.6%	37.1%	57.0%	100,0%
Spain	14.4%	5.6%	15.4%	26.4%	38.2%	100,0%
Finland	8.0%	3.0%	12.5%	38.0%	38.5%	100,0%
France	2,0%	6.9%	20.5%	40.6%	30.0%	100,0%

The vast majority of teachers use technology to communicate and exchange information with out-of-class students, starting with 30% of teachers in France and 62.1% of teachers in Belgium. Although, as noted earlier, there are low percentages of teachers using resources in the classroom for administrative tasks, this is not the case if we leave the classroom. For example, France (40.6%), Finland (38.0%), Quebec (37.1%) and Bulgaria (31.9%) have the highest percentage of teachers who indicated this option. . The least indicated options are those related to completing assessments and using these resources to help students review or retrieve courses online.

Table 49: In class, you use the following numerical tools:

		%
1.	Projectors	29,6
2.	TNI or VPI or TBI or VPI	28,3
3.	Computers connected to the Internet	19,2
4.	Nomadic tools (tablets, digital music players for sound and image)	17,4
5.	Multimedia room	3,1
6.	CD-ROM, DVD or DVD player	2,4
	TOTAL	**100,0**

Figure 49: In class, you use the following numerical tools (%)



The digital tools most often used by teachers are Projectors (23.6% of respondents indicate this tool), Interactive Blackboards (IWBs) or Interactive Whiteboards (IWBs) - with 28.3% teachers. indicated them and Computers connected to the Internet (19.2%).

There are also other types of tools, nomadic, such as tablets, digital music players for sound and image, which were indicated in a percentage of 17.4%. There is also a use, but low compared to recorded responses, multimedia rooms (3.1%) and CD-ROMs, DVDs or HIFI channels (2.4%).

Table 49a: In class, you use the following numerical tools: (cross analysis, by country)

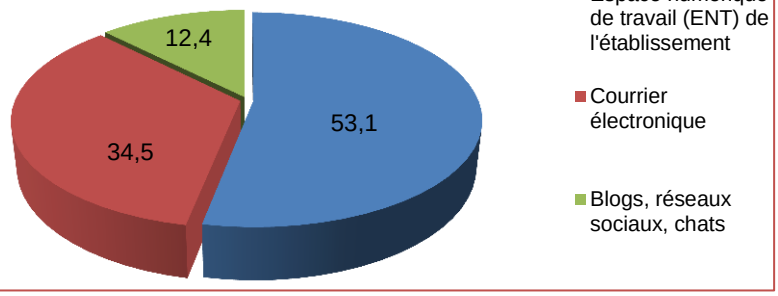
	En classe, vous utilisez les outils numériques suivants						Total
	CD-ROM, DVD or DVD player	Multimedia room	Nomadic tools (tablets, digital music players for sound and image)	Computers connected to the Internet	TNI or VPI or TBI or VPI	Projectors	
Bulgaria		13.4%	23.8%	21.3%		41.5%	100,0%
Belgium		11.2%	5.3%	32.4%	7.0%	44.1%	100,0%
Quebec	4,0%	9.8%	17.8%	18.6%	10,0%	39.8%	100,0%
Spain			9,4%	31,6%	8,0%	51.0%	100,0%
Finland	2,8%	9,9%	13.0%	17.4%	26.9%	30.0%	100,0%
France		8.1%	14.2%	9.3%	22.6%	45.8%	100,0%

The option of video projectors is the most chosen by teachers, especially in Spain (51.0%), France (45.8%) and Belgium (44.1%). It is closely followed by the choice of computers connected to the Internet, chosen by 32.4% of Belgian teachers, followed by Spaniards (31.6%) and Bulgarians (21.3%). It should be noted that the option of CD-ROM players, or Hi-Fi systems, was only used by teachers whose origin is Quebec (4%) and Finland (2.8%) . In addition, it should be noted that Spain is the only country that does not use the multimedia room as a tool, as is Bulgaria, which is also the only country that does not use digital whiteboards as a tool.

Table 50: To interact with students, you use the tools following numbers ...

		%
1.	Numeric workspace (ENT) of the institution	53,1
2.	Email	34,5
3.	EmailBlogs, social networks, chats	12,4
	TOTAL	**100,0**

Figure 50: To interact with students, you use the tools following numbers (%)



In all the countries surveyed (Bulgaria, Belgium, Quebec, Spain, Finland, France), the communication with the pupils is done using the establishment's numeric workspace (ENT) (53.1% of the students). responses). 34.5% of teachers use e-mail to communicate with their students, and 12.4% use blogs, social networks and chats.

Table 50a: To interact with students, you use the following digital tools ... (cross analysis, by country)

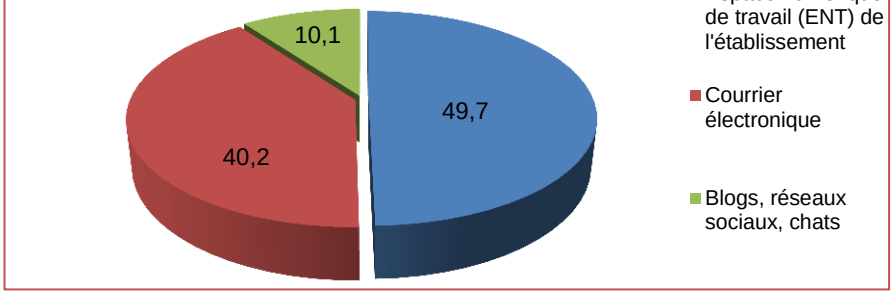
	To interact with students, you use the following digital tools			Total
	Blogs, social networks, chats	Email	Numeric workspace (ENT) of the institution	
Bulgaria	32,8%	62,7%	4,5%	100,0%
Belgium	11,9%	39,6%	48,5%	100,0%
Quebec	5,6%	11,1%	83,3%	100,0%
Spain	32,8%	10,5%	56,7%	100,0%
Finland	11,1%	22,2%	66,7%	100,0%
France	8,7%	55,4%	35,9%	100,0%

If we look at the analysis of the responses by country, we can recognize the preferred means of communication with students. Thus, Bulgarian teachers prefer electronic mail (62.7% of respondents indicate this tool); Belgian teachers are more likely to use the institution's numerical work space (ENT) (48.5% of respondents indicate this tool). This is also the case for Quebec teachers (83.3%), Spain (56.7%) and Finland (66.7%). At the same time, in France, teachers who answered our questionnaire indicated that they prefer email (55.4%), but also the institution's ENT (35.9%).

Table 51: To interact with colleagues, you use the following digital tools ...

		%
1.	Numeric workspace (ENT) of the institution	49,7
2.	Email	40,2
3.	Blogs, social networks, chats	10,1
	TOTAL	**100,0**

Figure 51: To interact with colleagues, you use the tools following numbers (%)



In the case of teacher communication with colleagues, we observe the same hierarchy that indicates the establishment's numeric work space as the most used tool; almost 50% of respondents indicate this response. In second place, the preferred tool for communication is e-mail, this time with a larger percentage (40.2%) than in the case of communication with students. It can be assumed that at a certain age, students do not have an email address.

Table 51a: To interact with colleagues, you use the following digital tools ... (cross analysis, by country)

	To interact with colleagues, you use the following digital tools			Total
	Blogs, social networks, chats	Email	Numeric workspace (ENT) of the institution	
Bulgaria	5,7%	69,8%	24,5%	100,0%
Belgium	22,2%	27,8%	50,0%	100,0%
Quebec	3,7%	30,9%	65,4%	100,0%
Spain	16,5%	47,7%	35,8%	100,0%
Finland	7,5%	49,1%	43,4%	100,0%
France	5,6%	55,5%	38,9%	100,0%

Regarding the communication of teachers with their colleagues, it can be observed that e-mail is the preferred tool of communication by teachers in Bulgaria (69.8%), Spain (47.7%), Finland (49.1%) and France (55.5%), countries in which the institution's ENT is not used in the first place (perhaps because communication with colleagues is more personal). We note the privileged use of ENT in Belgium (50.0%) and in Quebec (65.4%).

A.1 In your opinion, what are the main challenges and opportunities that the future holds for piloting schools from the digital angle?

To this question, 134 people indicated an answer (ie 70.16% of the sample). From the responses recorded, it can be seen that all respondents have understood the role that digital technology may have in the future for the management of institutions and identified challenges and opportunities by adapting their responses to their own institutions. school.

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Therefore, we can see that for BELGIUM (6 people answered this question), the most important challenges indicated are those of a financial nature. The development of digital, and at the same time the lack of funding will encourage "students and teachers to come to school with their own computer", which may represent an obstacle. At the same time, there may also be difficulties in maintenance and maintenance for the digital infrastructure in schools, knowing that the maintenance of digital spaces is also determined by financial means. Another challenge will be to develop digital technology within schools, with one respondent stating that "schools will only provide network, printer and server infrastructure as well as specialized machines such as computer towers. , milling machines, 3D printers etc. "

Regarding the opportunities, the most important mentioned by respondents in Belgium refer to the Diversification of educational tools, the possibility of developing exchanges, research, documentation. Digital technology will facilitate cooperation between teachers with better communication between school leaders, between teachers, between teachers and students.

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For BULGARIA (11 people answered this question), respondents mentioned more challenges than opportunities, which may make us think that digital is not too well developed in this country. Regarding the challenges, we can observe that it is not mainly financial challenges but challenges that target the motivation of the actors, the training of the staff. There is also one respondent who indicated that "The desire of aging teachers to be digitally educated" can be a challenge. There are also barriers that are related to school infrastructure (the education infrastructure), which can question us on the possibility of "getting to embrace the many aspects of governance with the minimum of effective software ". The opportunities are similar to those of the Belgians - and focus on the communication process. Thus, in the future digital technology will be able to develop "faster and more appropriate communication to new trends, and especially communication with students and parents". From there, it can be concluded that digital technology can contribute to strengthening the school-family partnership throughout the community. Other opportunities

refer to the quality of education, because digital technology can provide flexible access to education and scientific information anytime, anywhere.

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Representatives of QUÉBEC institutions who answered this question (58 people) indicated many of the opportunities that digital technology will be able to develop within schools, but also challenges. This means that in Quebec, digital is well developed and its opportunities are well known by our respondents. At the same time, the challenges identified lead us to believe that Quebec's greatest need is to adapt the digital world to current realities: "Technologies evolve rapidly and it is difficult to monitor and ensure the training of stakeholders."

Thus, one of the challenges identified is not to be "quickly overtaken" because in this area there are changes faster than our ability to integrate them. By taking into account the speed of change in the digital world, schools must be able to follow its evolution. As one of the Quebec respondents points out, the important thing is to "give ourselves a clear and effective course of action while considering the highly evolutionary aspect of digital technology and the rapid expiry of digital tools". There are other Quebec respondents who also indicated the lack of funding (for the purchase of equipment or for training, staff development: training - release - replacement), as a challenge that the future holds for the piloting of establishments from the digital angle.

But in addition to the financial aspect, which is also a problem "The ever-increasing cost of its technologies that are becoming a burden for schools," Quebec respondents pointed to a very important challenge that must also be given great importance, " information security ". Because we live in a society in which we are really "conquered" by the abundance of information, we must take into account the risks related to "information security, platform security". Thus, the platforms that offer courses online will have to adapt to and meet the challenges of intellectual property, and it will be increasingly difficult to meet ethical requirements with the retention and transfer of information. At the same time, Quebec respondents indicated that it is a challenge that today and in the future, it will be difficult for schools to choose the best digital tools that can "meet the needs of students and students. employers ". Thus, it will be necessary to make informed choices among the various offers of products and services and not fall into the trap of a sole supplier.

In addition to the financial aspects, it will be necessary to take into account the durability of digital tools (because of the very rapid changes in this field) and to meet the

challenges related to human resources. Therefore, for respondents from Quebec, it will also be necessary to think that, on the one hand, there are few qualified people in this field "The lack of personnel and specifically the IT resources in infrastructure in support and technological development. on the other hand, the confrontation with "reluctance to change does not allow us to supervise the continuous training of all teachers to accompany them in updating their practices". So, for Quebec respondents, teacher training and the availability of key players will also be important challenges.

It is also important to mention a respondent's response to the risk that "the digital world will be able to modify teaching behaviors and, consequently, profoundly change paradigms". The solution would be to appropriately appropriate technology "The important thing is that we continue, as a teacher, to keep control of our subject, our teaching. It must always be borne in mind that this must be technology in the service of the course and not the course that becomes a guinea pig of technology. Also, the offer is wide and sparse. One can easily go astray to always want to use the latest technological find. At the same time, when we adopt a technology, we have to give ourselves room for maneuver, a kind of trial-error and to be able to go backwards if the technology has not given the expected results. "

Regarding the opportunities identified by Quebec respondents, these are very diverse. One of the most mentioned is the possibility of offering "distance learning to meet the need for flexibility of learners with personalized paths and the pooling of training and expertise in digital". Digital technology will also make it possible to develop the quality of didactic activities (through online training), because students will be able to "take full advantage of the cloud and collaborative work". At the same time, digital technology will not only help to develop didactic activity but also communication between school leaders (through remote forums). In fact, in the opinion of our respondents, digital technology will contribute to the improvement of school administration processes, by creating better decision-making tools (BI), by promoting plenaries, discussions between institutions and exchanges of good practices.

But the most important opportunities identified are those that refer to the benefits of students. Thus, the development of digital in the context of schools will provide the opportunity to monitor the academic performance of students during the school period. What one of our respondents told us was a good opportunity: "to have a Quebec cell whose mandate would be to provide online development for teachers so that they feel supported in their learning. digital tools and especially in how to teach online, with digital tools ", with all the challenges

that this implies for students with special needs, allophones, students living in remote areas, the inclusive approach , teamwork in virtual and real, etc. We must give us the means to support teachers, but especially not to reinvent the wheel in all regions of Quebec.Buy the expertise and multiplication of that through online learning communities. "

Digital technology will, no doubt, improve the quality of the skills acquired by students, improve the school's management processes, by making it easier for everyone to access more quality information. It will also provide the opportunity to do research and share with the possibility of working remotely taking full advantage of the cloud and collaborative work, make plenary sessions, exchange between institutions, etc. At the same time, the digital will contribute to the development of artificial intelligence, Big Data accelerating the transfer of knowledge on all management needs and on the development of skills for the entire institution.

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In SPAIN, respondents (24 people answered this question) indicated, in equal proportions, challenges and opportunities. With regard to the challenges of digital education and research, they refer to training and physical infrastructure with the difficulty of providing and updating digital equipment, "because know that it costs a lot to have technology and software that are accessible to all students. "

In addition, "Some families, lack of economic resources, can not access all digital resources. In addition, it will also be a challenge "to generalize the use of information technology in the teaching-learning process. Digital competence should be a priority for educational institutions with the implementation of teacher training plans and improvement of material resources. A major challenge for teachers will be "time" - because teachers will need more time to prepare their didactic activity, to teach students how to work with digital, and, most importantly, to train students to learn. the acquisition of digital skills (which also means changing the curriculum).

It will also require greater autonomy of schools and teachers for the administration of education, good leadership of the management team and solid continuing education of teachers, and finally, ongoing training and ongoing coaching. digital training specialists.

In terms of opportunities, our respondents told us that digital can meet the needs of teachers and students in a changing world where technologies allow us to access a vast amount of

information. School leaders will be drivers of change and will encourage teachers to carry out digital innovation in their teaching and learning processes. At the same time, the digital will improve the communication at all levels (convocations, transmission of information, novelties, qualifications, etc.) and will be done (we already do it, almost) through digital means.

But those who will win the most will be the students who will be able to adapt to the digital society of the future, because digital competence will be more and more integrated into the classroom. Digital technology will enable institutions to provide technology resources to all educational centers so that everyone has the same opportunities for digital learning in the classroom. Then, there will also be opportunities for teachers, in terms of their training in the digital domain, which in the end will improve interaction and participation in the educational community and, above all, improve the organization. of the institution.

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For FINLAND, respondents to this question (5 people answered this question) appreciated that the main challenges will be to respond to the lack of funding and to manage the lack of time on the part of teachers. Some respondents insist that too many different platforms are a challenge and, of course, involve additional costs (it would be best to use a single platform). As far as opportunities are concerned, the most important is to share the programs produced by teachers.

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In FRANCE, among the challenges most indicated by the respondents (24 people answered this question) are those that refer to the idea of remaining human (keep a place for the human) "Tools that do not need us to lose sight of the importance of relationships and human contact. Tools at our service and not the other way around. Digital tools can overtake us and we lose our freedom because in the hands of technicians and engineers. Thus, it will be necessary "the preservation of individual freedoms and the culture of a truly social sociology". There are also a few respondents who indicated lack of funding and lack of equipment. Funding will be needed to maintain digital tools in institutions to maintain and develop them. The training of school leaders and teachers will also be a challenge, because it will be very important, but also difficult to "remove the fear of digital", to change attitudes and remove the brakes to have students actors their learning and lessons, to ensure the "functionality and adherence of actors" as mentioned by one of the respondents "we have no choice ... that to evolve our establishment gradually to digital".

As far as opportunities are concerned, the numerical angle will "simplify the steering" of institutions in administrative tasks and management of education. Digital technology will make it possible to personalize, differentiate and propose other disciplinary approaches, to develop collaborative / participatory work in a completely open space-time and geographical area. All this will lead to better professional interactivity (using a database / resources easily accessible), an exchange of practices / inter-institutional projects.

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In ROMANIA, the challenges most indicated by the respondents (6 people answered this question) refer to the lack of funding and also to the idea of "preparing" the elderly teachers who do not master the digital or they are afraid to use in their didactic activity. For the opportunities, our respondents appreciated the fact that digital can develop better communication between teachers, between schools "A strong link between schools and teachers around the world". It will also give the possibility of videoconferencing with other schools and with the Ministry. Because digital competence is essential for education, working life and active participation in society, digital technology will facilitate effective learning to better develop the skills of a young, creative and easily adaptable to today's society.

A.2 In your opinion, what are the main challenges and opportunities that the future holds for digital education and research?

To this question, 134 people indicated an answer (70.16% of the sample)

In BELGIUM, (3 persons answered this question) the most important challenges that the future holds for digital education and research refer to the changes taking place in the digital domain, also taking into account of the "speed at which the media is changing. At the same time, there are challenges of a financial nature that, in the end, will pose challenges to the access of all students to digital tools. And these financial challenges are already identified in Belgium, right now "the price of licensing office applications, CAD, graphic design, etc. is exorbitant and requires a substantial annual budget. And these challenges must be overcome if we consider the opportunities that digital offers to education systems through "alternative methods to differentiate teaching methods and, above all, the possibility of acquiring a digital culture".

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In BULGARIA, (9 people answered this question) the most important challenges refer to a lack of funding that comes in connection with a state policy that must be adequate. Funding is important for schools because Digital Education can only work if educational institutions have all the necessary technological equipment and unlimited Internet access. Then there are also important challenges that refer to human resources that need to be "motivated" and do not have time to train in the digital world. Regarding the opportunities identified by Bulgarian teachers, they result from the wide variety of digital tools and the ability to choose the most adapted to the specific needs of each structure. Digital education and research allows students to work in their personal learning style, to be more active and initiative. Then, if they have been away from school, using digital they can access the content taught in the class. At the same time, digital technology will "energize learning and communication" between teachers and students and classroom work, because "new technologies in teaching will make courses more interesting and appealing, motivate students and teachers ".

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In QUEBEC, (58 people answered this question) school heads and teachers identified several challenges and many more digital opportunities for teaching and research. If we look at all the answers indicated for the challenges, in first place we can refer to the financial challenges "to ensure development and sustainability (equipment and training). And if we take into account the financial means, in the future, we will arrive at the situation in which private institutions will be more developed from this angle. As indicated by a Quebec respondent, it will be necessary in the future to find "resources to meet the expectations of professors and students in a period of limited funds and staff time to create the content of digital education." There must be a clear digital policy, which must certainly include the training of older teachers "dealing with teachers who are nearing retirement and will not want to get involved" with the Web) and who do not are not used to digital. In short, the will of people to change their habits, to overcome the resistance to change, represent challenges.

This strategy will help to "demystify certain preconceptions" of teachers about digital tools if we take into account that many teachers have no interest or skills at this level. Because we are talking about a country where digital is already very well developed, we can see that respondents have identified other challenges that refer to the security of information, the ethics of research using digital "manage cases of plagiarism", while ensuring that students do not lose their ability to interact and communicate face-to-face. At the same time, it is important to watch carefully any challenge that is related to the training of teachers (who wants and who is interested in learning by and for digital); it will be necessary to "train teachers so that their skills are balanced in order to offer state-of-the-art teaching". At the

same time, we must adequately manage the development of digital, so as not to lose contact with students and, therefore, fall into the trap of "hyper", be rigorous in the analysis of our needs to ensure that technological innovations in teaching and learning are not seen as toys. For some respondents, digital development can also become a trap, and therefore the relevance of the teaching profession will have to be maintained in a context of continuous web-based learning, ensuring that technological tools develop skills effectively. targeted, integrate the "human" aspects, the well-being, despite the digital use. Sand doubts that the digital brings changes in the process of remote socialization "loss of geographical boundaries", and we must learn this type of socialization and then find an adaptation of pedagogy, educational tools, to work with "students who have more and more trouble concentrating, "even face-to-face.

Regarding the identified opportunities, the most important are related to distance learning and openness to the world. For distance learning, the digital will bring "artificial intelligence to better decode the characteristics of the student, and make it" interrelated "with the environment to assess its level of commitment. The disappearance of geographical boundaries will lead to "flexibility of supply for college students". At the same time, digital technology will open the horizons by offering learners (students) a personalized training offer. "For example, it is necessary to allow a student to be able to access on-line diploma training in several institutions".

In addition, students / students are now connected, very early in their academic studies. It is therefore necessary to consider this reality, not as an obligation, but rather as an opportunity to attract their attention and to teach them that digital technology can be used for learning and developing skills. "Navigating" through the multitude of tools available to determine the most effective, efficient and relevant, will allow students to be creators of digital and not just users. In short, accessibility to digital resources will enable more effective and higher-quality teaching or research through the deployment of the necessary financial resources and appropriate training in digital tools.

Because we will have access to ever more efficient and effective technologies, we will also have more effective digital educational platforms (Big Data to better help and support students and teachers), by giving students access to solutions more and more simple to use in their teaching work which will lead to better motivation in the classroom. Digital technology will thus accentuate the authenticity of learning in relation to the contemporary context and, therefore, "lead to the improvement of capacities to advance learning and carry out research on current and developing topics". But, at the same time, it is important to be weighted in the

use of digital, and it is also an opinion firmly rooted in the reality of a Quebec respondents "The possibilities are enormous but we must not rush anything. Moreover, I believe that a teacher must possess his subject solidly (to have given the course 2-3-4 times) before embarking on the digital one to the bottom. It will be able to better assess the real impact that the use of digital technology will have in its class ".

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In SPAIN, (24 people answered this question) respondents indicated more opportunities than challenges for teaching and research from a numerical angle. Thus, because students think differently from those of five years ago thanks to new technologies, the main challenge will be to "adapt the didactic methodology to their ways of thinking influenced by the use of digital resources". And it will be necessary to pay attention to this adaptation, because the risk of a bad adaptation will be "the loss of the communication by the nonverbal language". So, as one of Spain's respondents suggests, we must not forget the analog world and its advantages. Other challenges were mentioned, such as teacher training, the financial allocation to update digital equipment, or digital security.

Regarding the opportunities identified, all are based on the same argument; digital offers teachers and students a new range of tools. Thanks to this new range of tools, we can "prepare students (and teachers) for an increasingly digital and connected world". The constant emergence of new technological resources necessitates constant reflection and, consequently, research into the possibilities of these resources in teaching-learning processes. Therefore, there is a need to intensify action research in the future to see from the classroom and the educational center what technologies bring and how to benefit from them. At the same time, digital technology increases the possibilities of contact and exchange of research in education at the international level, when one thinks of international projects (Erasmus, Horizon2020) that can be developed in partnership. If we know how to take advantage of new technologies to obtain the best possible preparation for the future, we will ultimately be able to "make education more and more personalized and adapted to the needs of each pupil and, therefore, to train students to acquire gradually digital skills at school ". For respondents from Spain, It is important for students to be numerically proficient "One day students and teachers will work

without paper with classroom presentations through the interactive whiteboard, communications via MOODLE or other digital platforms, or e-mail.

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In FINLAND, (5 people answered this question) the most important challenges refer to teachers who are "not trained" in the digital field, "do not have time" to train and train for free on their own. personal time. In addition, we must be attentive to the lack of funding, which is also a challenge for the Finnish system, according to the opinion of one of our respondents. In terms of opportunities, the most important opportunity reported refers to the development of teachers who will develop their digital skills.

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In FRANCE, (29 people answered this question) the most important challenges are related to the need to "understand the impact of new technologies on student learning patterns and to teach students to seek information and information. to use them intelligently without copying and pasting. Thus, the teaching teams must better train students to think critically about the images and the surfing of information and help them to develop their interiority, to take time. Thus, in order not to affect the quality of student learning, "the school must not be out of step with the outside world where digital is fast". Thus, "The place of the teacher must remain central to allow real involvement in learning, but his posture must change. We must develop digital skills to enable everyone to master tools, issues, develop critical thinking and keep their freedom to think and act. With the help of digital technology, teachers must prepare students to solve the problems of tomorrow and the use of digital and artificial intelligences are essential "65% of the professions of tomorrow do not exist today".

At the same time, as for Quebec, a major challenge will be to master digital tools through appropriate training and perhaps for some to "remove the fear of digital". For some respondents it is also important "to individualize the training (differentiated pedagogy, inverse class)", to vary the teaching situations to capture the attention, to solicit different modes of memorization, "to make the initiation to the documentary research more easy and exercise the critical sense of the student by analyzing the information gleaned. Even if we are witnessing a strong development of the digital world, it will be necessary to "keep a place for the human" (writing, for example), to maintain a good relational quality of people, "to preserve the inner freedom" and, well, sure, to "find a balance between the part of writing (manuscript, books) and that of digital". There are also other challenges that are related to the infrastructure of schools - "have rooms dedicated to digital tools in sufficient numbers".

As far as opportunities are concerned, digital is going to bring "an extremely complete virtual toolbox", very varied and more and more simple in the use and the implementation. Also, it will completely change the teaching profession, and even the teaching system, by "inventing new uses more adapted to the transmission of knowledge", closer to students and closer to technology that young people will use in the future in their businesses. Compared to the changes made in education, digital technology will facilitate "support for disability in schools" and lead to the development of teaching adapted to the different needs of students (A personalized education).

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In ROMANIA, (7 persons answered this question) the most important challenges are related to the lack of funding, one of the most urgent problems to be solved within the framework of the national education system. Although digital technology is important for the development of education, lack of funds prevents this process of technology development in schools. Despite the financial difficulties, Romanian heads of institutions who answered this question were able to identify opportunities that the future holds for education and research from the digital angle: "online platforms" that will develop the digital skills of students and teachers. By using these digital skills, teachers will be able to access modern educational software and thus create engaging, interactive lessons.

B. What resources do you think will be needed to support digital change in your school ?

In this question, 143 people indicated an answer (70.16% of the sample)

In BELGIUM, (6 people answered this question) the most important resources that will be needed to support the digital change in the schools to which the respondents belonged are "financial resources (An annual budget able to adapt to changes)" . In addition, there is a need for significant attention to human resources - "teacher training". In third place, it will be necessary to take into account the digital infrastructure that each school has (laptops, PCs, tablets, machine tools with numerical control.

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In BULGARIA, (9 people answered this question) teachers also mentioned Financing, "so that each room is equipped with an IWB, multimedia projector and free Wi-Fi". In each school, it will be necessary to have free WIFI for students and teachers, to allow the

use of students' smartphones for learning purposes, to have video projectors or HD screens. In the second place, it will be necessary to think of the training resources, intended for teachers "continuous training, replacement of teachers, digital devices for each teacher, exchange of good practices, etc. ".

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In QUEBEC, (59 people answered this question) we can classify the needs in several categories:

- infrastructure needs: "more powerful computers, other IPads; access to digital tablets for all; a clear cloud management policy ";

- needs relating to human resources: "techno pedagogical adviser"; presence of a computer analyst to help identify needs; professional specialized in change management, knowledge of collaborative work (teamwork must be redesigned, more effective); expertise of professionals; analysts and trainers for trainers; internal trainer for staff; a change of attitude regarding the use of digital technology with teachers of older generations; resource person available for semi-private training by department or small groups of teachers with special needs; pedagogical and training advisers who master ICTs and the concept of coaching teachers;

- needs related to the Steering Committees (Management): "executives able to understand the changes in the face of new technologies to explain the vision and objectives to be achieved"; people who can quickly pilot and evaluate new technology to minimize energy and resources wasted on unsuitable technology; a higher level of adaptation on the part of the administration; a more up-to-date or aware management of teachers' needs;

- financing requirements: budgetary resources to enable an ICT respondent to work 100% on this issue; budget resources to create and develop online platforms; financial resources, to provide technical, material, but above all human support with effective and relevant supervision; "Funds and expertise" to maintain functionality and keep up with technological advances.

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In SPAIN, (26 people answered this question) respondents most often identified the needs related to teacher training with "a quality training plan for all teachers". The argument comes from the fact that the opportunities are almost endless because digital resources are more and more numerous and versatile and very potential. Thus, with adequate training of teachers in the centers, teaching and research will be

possible. In addition, we must think "economic investment", for maintenance and replacement of computer equipment, software, computers, digital whiteboards, Beamers / Laptops / Tablets in the classroom. In addition, a better Internet connection (Wi-Fi network in classrooms and schools) would be necessary for effective digital work for teachers and students. For the Spaniards, it is therefore important to invest more in new technologies, develop digital platforms for students / teachers, to have appropriate technological resources: computers, tablets, digital whiteboards, projectors. This would ensure that decision-making bodies (ministries, steering or steering committees) would be well aware that "new technology is a useful tool for improving the way of teaching".

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In FINLAND, (5 people answered this question) we can observe that there are no problems with the financing of schools, taking into account that the necessary resources (identified by the respondents) to accompany the change refers to workspaces ("more spaces for small groups to work in school") and teacher training ("teachers need more professional skills and of course digital skills ").

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In FRANCE, the 31 people who answered this question appreciated that the necessary resources are, first and foremost, human resources. In all schools, you have to have a varied steering group: teachers of different subjects, teachers with different approaches and levels in the field of digital (pros and anti-digital), students, parents of students ...). It is necessary to develop everywhere an adequate "training strategy" that will bring down "ideological brakes", a strategy that leaves time to appropriate changes, to experiment, to exchange. In addition to encouraging "self-learning" (through MOOCs and other self-learning tools), it will also be necessary to have qualified people, trainers and technicians in-house (digital referents in institutions) who will be able to provide training and support for teachers in the digital uses, solve daily problems and demonstrate tools. At the same time, changes will be needed in the digital infrastructure of institutions: the replacement of computers in classrooms, notebooks and a tablet in each classroom, ENTbox on all desktops; have rooms dedicated to digital tools in sufficient number. Finally, it would be necessary to develop collaborative work platforms for the pooling of digital resources ("Today digital textbooks are not completed").

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In ROMANIA, (7 people answered this question) school heads reported the most technical resources needed to support digital change; the most important need of schools in this country with more powerful computers connected to the Internet, interactive whiteboards, a better Wi-Fi network. Moreover, what digital skills are not in the possession of all teachers, they are also necessary training courses for staff and it would be useful also to develop the creation of digital referral positions in schools.

C.1 More specifically, what do you think are the skills that school leaders need or need to master in a digital society?

To this question, 128 people indicated an answer (67.02% of the sample)

In BELGIUM, (6 people answered this question) school leaders need to be open to innovation, that is, to be open to new media. Each school head must "learn to take advantage of the means of communication and collaboration, and to understand the security and technical aspects". He will be able to recommend and support the use of digital culture in his own school.

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In BULGARIA, (10 people answered this question) school leaders must be in first place, "good managers" and have a "creative thinking". Familiar with digital technology, they will have the skills to create, process and store documents electronically and will be able to train their teams and benefit from induced impacts. The management team will play a fundamental role in driving digital development into teaching practices. But, this implies upstream a solid training of teams, a good mastery of governance software and adequate equipment.

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In QUEBEC, (56 people answered this question) school heads must understand the digital issues with an "open-mindedness to adapt more quickly to (rapid) digital changes". They must know the different digital options available, have a good knowledge of the tools and, above all, be surrounded by competent staff. Executives must be able to implement changes and have a developer and visionary approach to put in place the necessary environment for their institution to follow the technological wave. Management must promote digital but at the same time, understand that digital must integrate with and not impose "do not take this path at all costs". They will also have new resources to support digital

integration such as training and subsequent experimentation and integration to create real added value. School leaders will have to master digital skills themselves in group management and, above all, communication "they must lead by example". School leaders must be visionaries. They must be aware of advances in technology. They need to know about digital resources in general and their opportunities, persuade them to get adequate funding, motivate staff with training, tools and technology support. At the same time, they will have to have very good technology skills in general, but especially with regard to collaborative tools. In addition, project management, team management and change management should be part of the experience gained.

School leaders must be "open and attentive to the needs of teachers, who are in the best position to determine which tools have pedagogical potential, to test tools before implementing them, to ensure the sustainability of the chosen tools. "(Do not develop short-term tool-related activities). They will have to "be on the lookout" and be close to teachers, share and show what exists, enjoy working in a digital world, do not be afraid to try. At the same time, they must have a "good understanding of cloud computing systems, a sensitivity to digital security" compared to external servers, "the power to distinguish toys from tools" by knowing how to evaluate the added value of a technology . They must not only know the social networks, but also know different platforms (digital portal, Moodle, telelearning tools ...).

They must have the ability to make informed (judicious) choices among the various product and service offerings and a good listening capacity to stay abreast of the needs of students and teachers. Quebec respondents also mentioned other characteristics such as "motivation to contribute to this sharing of data; highly responsible for managing this data; have a foolproof ethic about the management of sensitive data; have a base of technical knowledge, mathematics and critical sense; have the desire to listen to the experts in his establishment; be sensitive to changes and think differently be aware of the opinion of the staff; articulate a vision and constantly adapt it. At the same time, they must be aware of the scope of digital and the speed with which everything changes in the digital world. Finally, they must have a good mastery of digital communication and create networking for the awakening of critical thinking, collaboration, creativity, technological awareness, change management and so on.

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In SPAIN, (24 people answered this question) Heads of institutions must be, first of all, competent on this subject and have a "global vision of the digital world" and specific

knowledge to communicate. Principals need to acquire and maintain "digital skills" to improve the quality of schools, encourage teacher training and strengthen relationships with their environment. They must be able to ensure a well balanced distribution (distribution) of digital tools in schools and to ensure that teachers have the necessary training. They will have to master specific skills such as: competence for teamwork; virtual communication; problem solving the management of information and the protection of personal data. At the same time, they need to know and know how virtual classes, digital tools for evaluation, online educational platforms, social networks work.

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In FINLAND, (3 people answered this question) it is important for school leaders to "know very well the programs that are used in school steering" and, at the same time, to "look at how digitization can help improve pedagogical processes. "

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In FRANCE, (23 people answered this question) heads of establishments must have technical and practical skills or at least rely on competent people to exercise appropriate and informed management that takes into account the constraints but keeps also the purpose of their mission. They must "master the main office software, using them in their management": meeting conduct, use of digital means such as ENT, videoconferencing. It would also be important to "allow the student to differentiate between the use of digital for learning and that of play", and to take into account the interest of these tools in the personalized paths of each student. Even if they must have a "digital culture", "they must remain human, have an anthropological vision where the tool remains in its place", know the evolutions, the impact of digital on the brain, have "prudence and pedagogy »; do not be afraid but have "a humanist discourse and prevention". They must have a good knowledge of new tools and their uses and ensure adequate communication with parents on this subject.

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In ROMANIA, (6 people answered this question) school heads must also have digital skills as important as communication skills (with teachers, other schools) and also skills to motivate students and teachers to use digital. It's important to know how to use digital tools, to value the benefits that online communication brings, to want to learn and learn throughout life. Relational skills are also important for opening up real and virtual communication with other institutions. It is also important to create and maintain a learning environment that responds quickly to employees' development needs, including through the

use of technology. All these skills of the school head will allow the emergence of a leadership to help the school organization meet the new requirements of the company and the need for change.

C.2 Specifically, what do you see as the skills that teachers need or need to master in a digital society?

To this question, 133 people indicated an answer (69,63% of the sample)

In BELGIUM, (5 people answered this question) the most important skill that teachers must have is to know how to learn throughout their life, keep their curiosity about what is done in digital so as not to to be overwhelmed by development and their students. They must also have an open mind (openness to the media), feel comfortable with digital training, seek efficiency and progress and understand the security and technical aspects.

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In BULGARIA, (8 people answered this question) teachers must have continuous training in the use of digital technology, know and use digital tools in their field of teaching. They must have skills to work with eBooks, exercise software, podcasts, simulations or e-learning games as well as word-processing skills, online publishing, online collaboration, use of a online training platform. They must "know the needs of learners and through their creative thinking", adapt digital strategies to their expectations such as the inverted class for example.

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In QUEBEC, (58 people answered this question) teachers and heads of institutions who completed the questionnaire identified a lot of skills. It will be interesting to first present a vision of one of our respondents on this subject: "Our students are born with technology. It's natural for them to learn through digital platforms. A teacher will have to expect it. New teachers will also have learned with technology. For them, it will be normal to use the digital maximum. At the same time, the human link must always exist in the classroom for a better understanding of the subject. But, it is a revolution that awaits us in the coming years! What will remain of the magisterial teaching: a form of education marginalized but used because it will make "change" of the teaching with digital supports? Or will it disappear completely ??? Will we still have classes at regular hours: what will be the relevance of maintaining a course

every week, at a specific time? A citizen listens and informs himself on the platforms he wants and at the times he wants. Why would it be different in education? "

Teachers must first "master digital skills" in communication but also to supervise their class (educational platform, collaborative work tools, diagnostic evaluation applications, but also formative / summative). They will have to offer "varied support", which will lead to the need for teachers to train on multiple digital tools. It must be recognized that "tools are becoming easier to use". They must be at the fingertips of everyone, that is, easily accessible. As for teachers, they will have to "find moments to integrate these tools into their pedagogy by not losing the objective of conveying the content to the learners". They need to know how to use technology pedagogically - more active pedagogy, project-based approach, program approach, allowing students to use their computers in the classroom. This means a greater use in relation to their subject such as "for example computer programming platforms and languages, art image editing platform, databases and statistical tools in sociology and psychology, automatic analysis of measurements in science laboratories ". In short, they must know different platforms (digital portal, Moodle, telelearning tools etc.).

In parallel with digital, the disciplinary skills they must always master and they must adapt to digital and therefore, teachers must train there continuously. They must "know the cloud and collaborative work, be facilitators", without knowing all the technologies, promote their use by students and develop "ethics and collaborative work". At the same time, they will have to orient themselves and take advantage of the technologies used by the market and the students "Students have technological expectations and the evolution of teachers will become a differentiating aspect for the institution.

Other competencies were also mentioned by our respondents as "Use of cloud computing platforms, Use of smart devices (cellular, tablet), Openness, versatility, knowledge of digital tools and computer language, Comfort with experimentation, Ability to evaluate which technology is most appropriate for the desired learning outcome, Imagination, Autonomy, Adaptability, mastery of subject knowledge, pedagogy, didactics ". It is also important to mention that all teachers must have an awareness of the benefits and challenges of the digital place in everyday life, but more particularly in the educational context. It must have "an ability to adapt to change", want to engage in a process of improvement to change the way of teaching, in terms of pedagogy and technology.

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In SPAIN, (23 people answered this question) according to the answers recorded, teachers should know how to use digital educational platforms, virtual classrooms, e-mails, presentations, classroom gamification, digital assessment, video editing, flipped-classrooms, document editing, programming and robotics, concept maps with digital applications. Guiding the learning process of the student is important and requires the use of new methodologies (movil learning, blended learning, e-learning ...), the mastery of various digital resources and new forms of asynchronous communication. One of the participants in the study said "the digital society can not be foreign to the field of education. On the contrary, schools must promote the use of technology in learning processes and enable students to become aware of the risks they may encounter on the Internet and on social networks. "

Teachers must therefore master "cloud storage" systems, communication platforms, virtual classrooms, digital assessment tools, social networks, content creation tools, and device usage. mobile in class. There are also other skills such as digital content creation, communication and collaboration, security, social networks and specific educational platforms, ability to work in changing environments and data analysis etc.

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In FINLAND, (4 people answered this question) teachers need to know basic skills and above all be "able to decide how to use digital equipment effectively". At the same time, they must have enough skills to use the programs to teach and do assessments. The most important thing is to have the courage to change the way you teach (using digital).

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In FRANCE, (29 people answered this question) we can also observe that all the skills refer to the good mastery of the tools (computer training, use of the ENT), understand the digital challenges for our society, without losing sight of the human and spiritual formation of people (relevant use of tools). Use the digital world wisely and remain human; "Dominate the tool and not be dominated by it". We must also have the will to learn digital and understand that the mission of the teacher has changed, understand the operation of digital tools, vary their use, know how to use them in the context of educational differentiation. The teacher must have the capacity to adapt (resilience) to new teaching techniques, to have self-training skills, to innovate, to share, to be in technological watch, etc.

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In ROMANIA, (6 people answered this question) teachers should encourage their students to be more confident using digital tools, to express themselves better and to make friends and partners around the world. They will be able to create and maintain a learning environment that responds quickly to the needs of teacher development using technology. It will also provide the opportunity to create a common culture (values, beliefs, behaviors) in the competitive world of schools. In conclusion, the most important skills that teachers must have are technical skills (use of digital instruments), language skills (in several foreign languages), leadership skills to help their organization meet the new requirements of the business and the speed of change.

Describe an innovative digital project in which you have committed, piloted / worn and are proud of

To this question, 110 people indicated an answer (57.59% of the sample)

To this last question in the questionnaire trend, we were asked to describe an innovative digital project in their school. We had general answers, describing what we have implemented as a project leader or team member.

Pays	Description d'un projet innovant numérique
Belgium	❖ *Farbstift - Student Journal* ❖ *Using online video in class for language skills development* ❖ *Using the mobile phone in lesson design* ❖ *Introduction of a digital learning platform* ❖ *Using Laptops in all classes*
Bulgaria	❖ The creation of a video about high school life in our school (eTwinning project) ❖ A number of Kahoots and Quizizz as well as interactive exercises in a Learning App (LeaningApp) ❖ The project entitled "Let's love school today to love life tomorrow". ❖ Following this project of the Erasmus + program twenty-six teachers and representatives of the administrative team took part in various courses targeted at digital in structured courses offered by several European countries. ❖ The creation of a digital book during a training course and the creation and use of quizzes to test and evaluate students (kahoot) ❖ Training of university teachers in the development of online courses, integration on a distance learning platform and the organization of online training, coaching and

	remote tutoring / TRANSFER training of the AUF
Quebec	❖ Deploying Office 365 as Collaborative Work Tools ❖ Introduction of the laptop for teachers in a BYOD environment. "We hope to introduce and adopt a little more technology by teachers. This project gives them a lot of possibilities to help them organize their time while allowing a more direct communication with our students » ❖ Building Automation System ❖ "I worked with my colleague to develop videos of all the practical professional training of anatomical tracking, to make available online to students enrolled during the fall session, for an improvement of their skills and dexterity in this course" . ❖ The use of Ipad in aircraft with students. ❖ Nursing simulations with high fidelity simulator ❖ Creation of interactive books with content Enric ❖ Hybrid and online course design ❖ "I asked to work on a project of distance learning (FAD) in synchronous mode. I was the first teacher in my institution to apply (Spring 2017). My project was accepted and I started the work in the fall of 2017. Despite an inappropriate allocation (90 hours / year) while maintaining a full-time teaching load, I invested myself totally in this adventure. Supported by a techno-pedagogical advisor and a Quebec association (APOP) this allowed me to realize my project in the winter of 2018. So I just finished my first experience, with a cumulative of more than 150 hours of research, tests, tests, training, meeting ... " ❖ Au "At the end of this new experience, I noticed that students (17 to 24 years old) were not quite prepared for this kind of training. Although we may think, young people use their techno devices a lot, but they have not developed their sense of rigor and perseverance. I think that among our role, to educate youth to develop a form of self-discipline vis-à-vis technos will be added to the other tasks that fall to us. I intend to continue my crusade towards techno-pedagogies because I am convinced that in a few years, a majority of courses and training will be available across the planet. For me, knowledge must be shared and accessible. Education, the educational model is to be rebuilt and I want it to be more open to the world and available to a majority, to those who are eager to learn. " ❖ Portable project that consists in training teachers to use the tools in a pedagogical and adequate way, to adapt their teaching strategies to digital and to support students to maximize their learning through these tools. ❖ Technical training (Physical Rehabilitation Techniques) provided by two colleges with two distinct cohorts at different sites and maximizing technology to optimize resources and provide quality education ❖ "We were the first to enter the cloud world with Google for Education. These tools enabled us to integrate in our practices a transparency necessary for the good functioning of the teams by the simple fact that everyone could collaborate directly on the documents or project in progress. By sticking to these tools the vision of encouraging teamwork and inter-team and inter-project collaboration, the results are quite impressive. " ❖ Program evaluation with digital tools and "Big Data" ❖ Realization of video capsules for the inverted class ❖ The use of Maple to visualize the intersection of 3-dimensional planes, and to make the link with the resolution of systems of linear equations with 3 variables. ❖ Virtual help center. Students can meet an online teacher to ask questions. They can also find information online ❖ Using the Moodle platform and its forums for students to create, share and

	practice problem situations. This has allowed deep and diversified learning, while forming a relatively simple assessment tool to manage. ❖ The development of a virtual clinic that can accommodate different clinical cases / scenarios such as "story in you are the hero", allowing learners to revise concepts and integrate learning (each at their own pace), using existing tools / documents consulted by the labor market actors. ❖ High Fidelity Model Project ❖ The deployment of Git for the centralized and transparent management of course notes, work statements, exercises and exams as well as work assignments for students in my department (computer science). ❖ An institution's documentation management system centralized on a cloud-based platform deemed efficient by avoiding the scattering of content on a multitude of different platforms. Communication and document management with students on an efficient and unique platform. The systematic development of evaluation grids on electronic forms. Use digital examination and less paper when possible. *"The creation of educational activities with the use of a Raspberry Pi in a mathematics course applied to computer science. The use of this type of material in several courses of the Computer Science program was desired by the Department of Computer Science. I first became familiar with the operation of the device itself, with the operating system (Linux) and its use in the digital environment of CEGEP, and with the use of a symbolic computing software . I then designed educational activities relevant to the mathematics course and that students must achieve using the Raspberry Pi.* ❖ *"I am part of CAPTIC, an educational help center for teachers to develop ICT interest and skills. This CAPTIC is made up of teachers who share their expertise with other teachers within the framework of, among other things, a community of practice. CAPTIC also allows these members to have a time to experiment and develop digital skills themselves. Its creator, Mr. Martin Bérubé, educational advisor, has put in place an innovative and malleable structure for the benefit of teachers and the development of ICT skills ".* ❖ *Dans "In the absence of a school platform for ebooks, I have implemented a USB e-book lending system for students who need speech synthesis as part of their high school education. It's not really innovative, but it's better than what is set up by the Ministry of Education, that's nothing! "* ❖ *Deployment of a distance training room and coaching of a teacher in distance learning courses.* ❖ *The use of blended learning (synchronous distance classes) for track and field students who studied / trained in the United States.* ❖ *Equip the College with two digital conference rooms and a portable unit*
Spain	❖ A project for the safe use of the Internet from secondary education for our students (a project focused on the prevention of cyberbullying) ❖ From 2005 to 2015, this institution actively participated in the eTwinning program, obtaining 10 European quality labels, 3 national awards and 1 European prize. The credit goes to the participating teachers and students. Simply, I facilitated participation in these programs and supported the work of its protagonists ❖ A few years ago I started a project for my students to network. Throughout the year, the different teams had to create a business plan and share it on a digital platform (wikispace). We have won several awards over the years. You can watch it on https://atochaemprende.wikispaces.com/Principal ❖ Our center is involved in the achievement of Level 4 ICT, a program proposed by the Ministry of Education. We have our own educational platform via MOODLE, we

	also provide center teachers with the necessary training to work with their students ❖ ICT plan of the center, thanks to which we obtained the ICT certification with a level 5 of Junta de Castilla y León ❖ Installation in specific classrooms (laboratories and workshops) of computer equipment, separators and guns at all times (7 spaces). ❖ "I piloted a project in which students designed and created online brochures and posters to promote the bilingual section of our school" ❖ "I piloted the development of an ICT Center Plan for which we obtained the maximum certification in the use of technology in the classroom. This certification is mainly based on promoting the application of ICT in the areas of curriculum integration, infrastructure and equipment, teacher training, communication and institutional interaction and management and administration ". ❖ Project to implement mobile devices in the classroom, use digital tools, create digital content and promote new assessment methods. ❖ "I piloted a cybersecurity plan at school and a plan in which we develop digital competence from childhood to high school" ❖ "I participate with several student groups at technovationchallenge.org"Mise en œuvre du livre numérique dans la salle de classe en utilisant une plate-forme numérique qui nous permet la communication avec les étudiants ❖ *Several in my different work centers, for example the Etwinning project "AIMNS" awarded by the European Union in 2016.* ❖ *"I piloted a Comenius bilateral association using videoconferences and chat rooms to organize students / teachers in bilateral mixed groups working on social issues and values and producing materials posted on schools' websites for rest of the community ".*
Finland	❖ One of the best ideas was the idea of using digital technology to enhance social learning ❖ "I can not say that I am proud but satisfied. I made questionnaires to get information to organize special programs for the school. (Sport, well-being, further studies ...) »
France	❖ "The setting up of a digital project by 2019 in my school. Steering committee formed since November 2015 and reflection that is moving towards a project "one to one" with iPad. The educational community is regularly informed about the progress of the project, as well as the board of directors ". ❖ Implementation of interactive video projector ❖ Construction of an active web site, note software, online cdi, connected laboratory of modern languages. ❖ Establishment of the mobile classroom, and digital tools for students with learning difficulties (dyslexic, SEGPA, ...). ❖ With the communication service, development of an application for mobile devices specific for the establishment (life of the professional and educational community) ❖ Training on various innovative software (QCM, online correction, flashcode ...) ❖ "To respond to sites as sordid as SAHARAH, we have created a web page where students can anonymously report a situation where another student is in danger (harassment). "It will happen more" ❖ A digital library based on written or illustrative productions made by pupils and whose integration is carried out by students themselves ❖ Have deployed in the establishment digital tablets for all teachers, with training and sharing practices, coaching. For all students of 5th and 4th (coming 3rd). ❖ "I'm in charge of deploying about 1300 iPads in my school. Project started in

	2012. I use the tablet daily with my students in class. ❖ Internal ENT fully integrated with the practices ❖ "We are simply developing ENT, it will be a success if we win the support of teachers and families" ❖ Padlet as a tool of exchange, of revision, where one finds the notions and objectives as well as the plan of the chapters of the themes ❖ Inverted class ❖ Use of Ipad to record students doing an interview ❖ "I involve pupils from 4 primary schools in the calculation rally with 6th graders from my college on computer. My 6th grade students create small animations with the application scratch (pyonkee on tablet) which I plan to add music in partnership with the teacher of music education that uses mixpad to his students. I do not know if we can really say that it is innovative but it is interesting for the students who adhere and take the programming like a je? U. ❖ The establishment in each room of the establishment of a PC connected to the internet with an interactive projector and the training of teachers.
Romania	❖ *"Our school was involved in a project called: Parentnets. As part of this project we tried to promote safety on social networks. To this project, six European schools were engaged for a period of 2 years.* ❖ *An environmental protection cabinet has been built in the school. The computer system allows interconnection with schools in Romania and Bulgaria. Students can learn about the environmental problems of other colleagues and their activities for organic education* ❖ *As part of our school, there have been a lot of projects concerning digital strategies (for example teaching English foreign languages and French using digital tools), projects that I have supported, which have brought a better perspective to teachers* ❖ *Many Erasmus + projects implemented by our school*

CONCLUSION

ACTION TRACKS

The use of ICTs in education is an important part of the European Commission's strategy to ensure the efficiency of European education systems and the competitiveness of the European economy. The opportunities offered by ICTs such as networking, interaction, retrieval, presentation and information analysis are considered fundamental elements in sharpening the skills of the 21st century. The study also called for greater integration of ICTs and their use in teaching curricula for students as well as in teacher training.

The conclusions of the study carried out by representatives of the partner countries are structured on 4 levels :

1. *The digital context in education: ICTs in everyday life - the digital economy*

1.1 The correlation between the availability of computers and the level of GDP decreases as computers become more common

The success of using computers in the educational context depends not only on their availability but also on the ability of users to use them. This also applies to access to the internet. This is the case for Romania and Bulgaria, (in Finland over 95% of households with dependent children report having a computer).

1.2 European countries offer direct public financial support for the purchase of ICT equipment for educational purposes

Belgium grants tax relief for ICT equipment for educational purposes; Romania offers central public financial assistance.

1.3 The internet is increasingly available in households with children

As for the availability of computers in some countries, including Finland, France, Belgium, also Quebec, access is almost total. If in Romania less than 60% of households have access to the internet, the increase since 2006 has been extraordinary.

1.4 Students use the computer more regularly at home than at school

Bulgaria and Romania are slightly behind other countries. Educational institutions should therefore be encouraged to develop a modern technological environment in order to connect students' experience of using these devices at home to their school life, and to equip them with the necessary digital skills, which would be useful to them in their life outside of school.

1.5 All countries have national strategies to encourage the use of digital technology in education

The Commission has adopted a new Digital Agenda that reaffirms and refines a range of challenges for the coming years. They range from electronic public service delivery (eGovernment) to the promotion of fast and ultra-fast broadband internet deployment, better interoperability and better security (Infrastructure and Security). and also aim to provide the population with a high level of ICT skills, including digital and media literacy (e-learning, digital / media literacy, digital skills).

1. New skills and digital learning

2.1 Countries promote a range of innovative teaching methods at primary and secondary levels

- Innovative teaching methods that are based on active and experiential learning that can be enhanced through the use of digital technology can increase student engagement and improve outcomes.
- At the primary and secondary levels, the vast majority of partner countries recommend or suggest several innovative pedagogical approaches.

2.2 The use of computer hardware and software by classroom teachers is widely encouraged

ICT benefits extend beyond the use of computers and the Internet to encompass the use of other technologies, such as digital cameras and mobile phones that can contribute to learning and personal development of students.

2.3 The use of digital technology by teachers is recommended for a wide range of subjects

Recommendations or suggestions for ICT use by teachers at different levels of education are the same as for students.

2.4 The three approaches to student assessment that can take advantage of or be based on digital literacy

- The first approach, self-assessment, is a type of formative assessment in which students judge their own work. ICT can help students self-assess by providing immediate feedback on their performance by enabling information sharing.
- The second approach, which is based on learning outcomes, is a model that has recently emerged in the discourse of education. Here, the focus is on what the student should be able to do at the end of a cycle or level of education rather than the teaching objectives. The assessment of these skills, which may include, for example, digital literacy, can be facilitated by ICT and can be done by the teacher or by other students.
- Finally, e-portfolios are a truly ICT-based evaluation mechanism. These are electronic collections of user achievements that assess their skills.

2.5 Only a few countries issue recommendations at the central level concerning the use of digital technology for the overall assessment of pupils

- Although the use of these new approaches to student assessment is becoming more and more widespread, there is the question of whether and how they will be used in this context.
- Interactive tests automatically adapt questions to students' abilities based on the results of previous answers. Spain and France make central recommendations for on-screen testing, while Finland and Quebec recommend interactive testing.

1. Organization and equipment

3.1 A combination of national objectives and indicators are used to ensure the availability of digital infrastructure

All guidance materials in the project's partner countries contain numerical availability targets and are accompanied by a set of indicators to measure progress.

- 3.2 In education systems, ensuring a sufficient "number of computers per school" is a key goal for policy makers
- In most of these countries / regions, this objective is coupled with an indicator of "number of pupils per computer". In national policies, this combination not only ensures a

reasonable total number of students per computer, but also equitable distribution among schools.

- In Spain, the National ICT Plan Escuela 2.0 aims to equip every fifth year student with a laptop and equip their classes with an interactive whiteboard and a wireless connection.
- In France, the ETIC survey (Information and Communication Technologies Survey) is carried out by the Information and Communication Technologies for Education (SDTICE) Sub-Directorate and the Directorate Assessment, Foresight and Performance (DEPP). This survey aims to collect ICT data from schools that are needed to monitor the implementation of ICT policies and to contribute to the dialogue between the central government and the local authorities responsible for school infrastructure.

3.2 Responsibility for updating ICT equipment is shared between schools and education authorities

In Bulgaria and Spain, schools use their own budgets to maintain their computers and networks, and use the centrally appointed provider or, in some cases, choose an external provider, depending on their needs.

3.3 National information systems for the management of education are being implemented or being developed in the majority of partner countries

- Developing integrated information systems to track student progress, manage teacher information, or provide financial management is one of the ways to achieve a more efficient school administration.

 These systems are often used when students need to be transferred from one school to another and, in some countries, to archive students' diplomas / certificates.

3.5 Digital technologies are generally used by schools to communicate with parents

- In half of the countries / regions, most schools use ICTs to communicate with parents (the case of Belgium and Spain).

 In some of these partner countries, education authorities or private partners have developed school portals where parents can access different types of information about school life (the case of France, Finland, the case of Quebec).

 In other countries / regions, some schools use ICTs to exchange information with parents, but there is no data available at central level about the nature of these exchanges (case of Bulgaria, the case of Romania).

4. Institutional governance

Digital embedding in school governance will contribute to improving the quality of the management system in secondary education institutions through the development and implementation of innovative digital tools that will ensure unitary and consistent management.

For this, changes are needed:

4.1. Review and redesign strategies and organizational cultures

All educational institutions need to improve their adaptability, promote innovation and harness the potential of digital technologies and content. Even though there are many policy and strategy documents aimed at digital development in schools, in fact, in some countries, institutional strategies tend to oppose free access to education, facilitated by digital.

Strengthen the role of the School Steering Committee and educate teachers that digital is part of the learning process, that the computer (or other digital tools) is a teaching and learning tool and not a formal substitute of the textbook or the teacher. The teacher will be a mediator, the one who creates the environment, the framework of the learning process and who formulates the problems or helps them identify them by the students.

As the analysis of country profiles for ANGE project partners shows, the use of new technologies is changing the way schools are run and also the culture of schools. In this regard, learning and innovation are becoming milestones through the support of digitization in school management and culture.

This emphasizes the transformation of education, especially in school management. Digital-based learning, teaching and leadership are gaining importance in facilitating contemporary standards of quality of learning and teaching practices. Digital has a strong social impact and can, no doubt, help school principals to reinforce digital literacy culture in knowledge creation. In this regard, it is essential to review (re-examine) school culture and management as part of the process of adaptation to digital transformation.

4.2. Support teachers to learn digital and support educational transformation

Institutional governance strategies should aim to help teachers acquire a high level of digital skills and adopt innovative teaching practices through flexible training.

School leadership for digital is very important for teachers to implement innovative practices through digital tools. School governance is also essential to encourage digitally competent students, by facilitating the necessary infrastructure and a good working environment, as well as explicit strategies and visions of the use of digital technology in the learning process. .

In addition, the reluctance on digital for some teachers is also linked to the fact that they are not trained in this area; the fear of not being able to meet the requirements of digital education can be eliminated with the support of school governance. It is a question of changing a paradigm of thought and action, which must take place from top to bottom: from school management (Steering Committee, Director, Teachers' Council) to teachers.

4.3. Ensuring the transparency of the educational and decision-making process

The use of digital technology in school management would streamline time (efficiency) and reduce spending. At the same time, it would allow the transparency of the educational process through the creation of electronic registers, the development of digital content, on-line homework, which can be visualized by students and parents. At the same time, this would serve as an example of good practice in the effective use of digital resources.

Finally, there is also a need to streamline the decision-making process for digital infrastructure development with decisions taken both with the Steering Committee, but also with teachers and parents' representatives (distributed leadership).

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ANNEX 1

The ANGE project - a multicultural collaboration experience

Intellectual production Digital policies in secondary education in Europe were produced in joint writing by research partners from three higher education institutions in Europe, from France (Institut Catholique de Paris), Spain (University of Salamanca) and Romania (University of Craiova). The contributors were 17 students enrolled in Masters and 8 tutors from the three countries. Because they were students from three different countries, the writing of this study became a multicultural collaboration experience that presupposed both difficulties, but most importantly, opportunities and new experiences of collaborative work, for each participant.

The collaborative work of the students (with the accompaniment of the tutors) was realized via Skype or Zoom conferences and also on the Twinspace of eTwinning.

After the completion of this study, it is very interesting to read the testimonials on this multicultural collaboration of students and researchers, which is presented below :

„ Collaboratively and in teams, the students of the Catholic Institute of Paris, participating in the seminar "Digital and innovative pedagogical design" contributed to the writing of a part of the deliverable 1 of the ANGE project on European Digital Education Policies. They took charge of all the research on digital policies and digital education policies in France and Belgium. Regarding the French policies, their knowledge, as well as bibliographic or Internet searches allowed the writing of the deliverable. Regarding Belgian policies, they chose to get in touch directly with teacher-researchers to question them. From these interviews, they then enriched this part of the deliverable with online searches.

*This experience was described as enriching by the students at the end of the seminar, as it constituted a long-term exchange point for them, and beyond the seminar itself. Indeed, they had all opened a Twitter account to glean information on this social network they shared with their classmates (either by private message or by mail); opportunity for most of these students to learn how to use this digital service. The main difficulty encountered was to respond to the request for completeness of the deliverable, which the students were quite incapable. Knowing digital policies and digital education requires full and long-term research. Their teacher Michaël Bourgatte therefore had to point them out, point out their leads, and then reorganize their work so that their final output is coherent and logical. In the same way, he had to share his address book with his students to communicate names of contacts "**(Michäel Bourgatte, lecturer, Catholic Institute of Paris, France)***

*"Participation in a European program such as the ANGE can give you a bit of" dizziness "at first, as it involves working with a wide variety of people from different countries. Thanks to this experience, I was able to learn and love working with new technologies and how to do it as a team. It is wonderful to see the organization of this project and see little by little the fruits that it gives us. Without a doubt, I will repeat this experience ". **(Maria Velasco, Master student, University of Salamanca, Spain)***

"My participation in production 01 of our Erasmus + project has been very enriching, both on the human and professional levels. Having meetings on Skype pleased me a lot because I think it made our work very human, while also facilitating the achievement of the proposed objectives. On the other hand, professionally, I found it very refreshing and motivating to work on an unrestrained current issue such as European policies and the development of

digital skills. The realization of joint production seems to me to be the essence of what Europe should be. ***" (Maria Victoria Rivas, Master Student, University of Salamanca, Spain)***

"Throughout this project, I met students and teachers from different cultures and civilizations, from different countries, an experience that helped me develop my relationships and communication skills. Although there are dozens of things that set us apart, I learned something from every student I worked with and it was a great experience. The experience proved to be useful for all participants in this project and, although European countries are linked differently to multiculturalism, I think each of us has learned a little more about the culture of our project colleagues and about us. -Same; we adopted certain cultural values, we discovered new abilities, skills, qualities and disadvantages; we have overcome some fears and have succeeded, together, to study well. ***"(Corina Elena Vasile, Master student, University of Craiova, Romania)***

ANNEX 2

TRENDS QUESTIONNAIRE

INTRODUCTION TO THE QUESTIONNAIRE
This questionnaire is part of the Érasmus ANGE strategic partnership project (digital anchoring in schools) which contributes to the modernization of education systems by setting up a pan-European team (Belgium, Bulgaria, Spain, Finland, France). and Romania) and international (Canada) consisting of school principals, educational leaders, teachers, researchers, trainers and education staff of secondary and higher education institutions. This project aims to support institutions to transform the global configuration of institutions in relation to digital technologies. This survey aims to make the inventory of the technical, technological and cultural premises of the digital control of the establishments. It deals with the evolutions and mutations, from a forecasting and prospectivist point of view, in society and in the technical and technological fields (in particular ICT), which will result in the necessary innovations in the methods of piloting the digital, teaching and learning. Thus, this research has the following objectives: - Describe current school leadership practices and pedagogical, educational and digital practices. - Imagine the piloting practices and pedagogical practices of the future and the resources needed to adapt to them. This questionnaire is therefore addressed to all actors working in secondary and higher education institutions. The estimated time to answer this questionnaire is 20 to 30 minutes. Rest assured that the results will be treated with respect for confidentiality.
DEADLINE FOR COMPLETING THIS QUESTIONNAIRE: March 23, 2018

Go to question 1.

PART 1 - CHARACTERISTICS OF RESPONDENTS

1.1 COUNTRIES WHERE THE EXERCISE ESTABLISHMENT IS
*** Mark a single oval.**
o Belgium
o Bulgaria
o Canada
o Spain
o Finland
o France
o Romania

2.
1.2 TYPE OF ESTABLISHMENT
*** Mark a single oval.**
o Secondary school institution
o Higher education institution (CEGEP)
o University institution
o Other:

3.
1.3 NUMBER OF TEACHERS WITHIN THE INSTITUTION
*** Mark a single oval.**
o Less than 25
o From 25 to 50
o From 51 to 100
o More than 100
o Do not know

4.
1.4 NUMBER OF STUDENTS OR STUDENTS WITHIN THE INSTITUTION *
Mark a single oval
o Less than 100
o 100 to 500
o 501 to 1000
o 1001 to 2000
o 2001 to 3000
o 3001 to 4000
4001 to 5000
o More than 5,000
o Do not know

5.
1.5 RESPONDENT'S POSITION
Mark a single oval
o Head of school After answering the last question in this section, go to question 8.
o Teacher After answering the last question in this section, go to question 36.
o Trainer and / or Researcher After completing the last question in this section, go to question 52.
o Education or Professional Staff After completing the last question in this section, go to question 52.
o Other: After completing the last question in this section, go to question 52.

6.
1.6 YEAR OF APPOINTMENT OR HIRING TO THIS POST IN THE EXERCISE ESTABLISHMENT: _____

7.
1.7 TYPE OF RESPONDENT *
Mark a single oval
o Female
o Male
Go to question 52.

PART 2 - STATE OF PLAY

Headmasters
8.
2.1 Does your country of practice have a government / digital public plan for schools?
Mark a single oval
o Yes Go to question 9.
o No Go to question 11.
o In development Go to question 11.
o Do not know Go to question 11.

Go to question 11.
PART 2 - STATE OF PLAY
Heads of School: Government Plan / Digital Public

9.
2.1.1 In which year was the government / digital public plan for your country of practice introduced? _____

10.
2.1.2 How is this plan relayed in your establishment? (Many possible responses)
Check all that apply.
o Departmental / Departmental Services
o Rectory
o National training
o Digital referents
o Do not know
o Other:

Go to question 11.

PART 2: STATE OF THE PLACE
Heads of institutions: continuation of the questionnaire

11.
2.2 Does your institution have a digital referent (competent person, specialized professional or other)?
Mark a single oval
- o Yes Go to question 12.
- o No Go to question 13.
- o In development Go to question 13.
- o Do not know

Passez à la question 13.

PART 2: STATE OF THE PLACE
Heads of schools: digital referents

12.
2.2.1 What are the areas of intervention of the digital referent (s) (competent person, specialized professional or other)? (Many possible responses)
Check all that apply.
o Technical interventions
o Project management
o Accompaniment and / or teacher training
o Intervention with students
o Guidance on digital guidelines
o Other:

Go to question 13.

PART 2 - STATE OF PLAY
Heads of establishment: continuation of the questionnaire

13.
2.3 Does your institution have a business intelligence system on the use of digital?
Mark a single oval
o Yes
o No
o In development
o Do not know

14.
2.4 Is your establishment planning technology and digital investments?
Mark a single oval
o Yes
o No
o In development
o Do not know

15.
2.5 In your institution, who makes purchasing and arbitration decisions regarding digital applications? (Many possible responses)
Check all that apply.
o Steering Committee
o Choice of Management only
o Manager / steward
o Educational advice
o Do not know

16.
2.6 How do you evaluate the effectiveness of your digital environment and your digital tools?
Mark a single oval
o Very effective
o Mostly effective
o Rather ineffective
o Very inefficient
o Do not know

17.
2.7 How do you rate the intensity of digital use by teachers in your school?
Mark a single oval
o Very strong
o Rather strong
o Rather weak
o Very weak
o Do not know

18.
2.8 À quoi estimez-vous les freins à l'usage du numérique dans votre établissement ?(Plusieurs réponses possibles)
Cochez toutes les réponses qui s'appliquent.
- Insuffisance du pilotage
- Manque d'outils numériques (ordinateurs, logiciels)
- Manque d'infrastructure (Wifi, bande passante, câblage)
- Manque d'informations
- Manque de formations
- Autre :

19.
2.9 Does your team have ongoing training in the use of digital?
Mark a single oval
o Yes
o No
o In development
o Do not know

20.
2.10 What do you think of the obstacles to sending members of your team to continuous training in the use of digital? (Many possible responses)
Check all that apply.
o Lack of stakeholder interest
o Lack of training offers
o Lack of funding
o Inability to handle all requests

o Unable to release team members
o Impossibility to replace teachers
o Other:

21.
2.11 In your opinion, what percentage of teachers (%) use digital technology in the performance of their duties?4
Mark a single oval
o From 100% to 81%
o From 80% to 61%
o 60% to 41%
o From 40% to 21%
o From 20% to 0%

22.
2.12 According to digital teachers, what percentage (%) of this digital is for learning activities?
Mark a single oval
o From 100% to 81%
o From 80% to 61%
o 60% to 41%
o From 40% to 21%
o From 20% to 0%

23.
2.13 What are the goals of your teachers in using digital in the classroom? (Many possible responses)
Check all that apply.
o Better master one or more digital tools
o Facilitate the demonstration and clarity of the course by exploiting resources
o Create more interactive class situations with digital tools
o Create differentiated learning situations to adapt the pedagogy to the different needs of groups of students (individualisation with the digital tool)
o Develop initiative and collaboration by creating collaborative work situations around digital tools (research, investigation, production, project)
o Reinforce the control of written expression and / or communication in other ways with digital production or editing activities (recording of oral, written, newspaper, web radio, blog, site, etc.)
o Validate digital skills with assessment situations
o Other:

24.
2.14 What place do you place on the protection of personal information within the institution?
Mark a single oval
o Very large
o Rather big
o Rather small
o Very small
o Do not know

25.
2.15 What place do you attach to the concern for computer security within the institution?
Mark a single oval
o Very large
o Rather big
o Rather small
o Very small
o Do not know

Go to question 26.

PART 3: INITIAL AND CONTINUING TRAINING
Headmasters
26.
3.1 Did you have digital training or development to be a school principal?
Mark a single oval
o Yes
o No

27.
3.2 To date, do you feel that you are sufficiently trained to use digital technology to meet the major challenges of the world of tomorrow?
Mark a single oval
o Yes
o No

28.
3.3 Are mandatory digital skills training required in the performance of your duties?
Mark a single oval
o Yes Go to question 29.
o No Go to question 30.

Go to question 30.

PART 3: INITIAL AND CONTINUING TRAINING
Headmasters : Training time reserved for the acquisition of digital skills

29.
3.3.1 What are the subjects of these training times? (Many possible responses)
Check all that apply.
o Team management
o Networking
o Digital training
o Piloting educational innovations
o Risk training
o Promotion of training programs
o Other:

Go to question 30.

PART 3: INITIAL AND CONTINUING TRAINING
Headmasters : continuation of the questionnaire

30.
3.4 Of all your training courses you receive each year, what percentage (%) on average can you tie to piloting educational innovations related to digital?
Mark a single oval
o From 100% to 81%
o From 80% to 61%
o 60% to 41%
o From 40% to 21%
o From 20% to 0%
Go to question 31.

PART 4: PROFESSIONAL USE OF DIGITAL
Headmasters

31.
4.1 In the exercise of your functions, you use digital for: (Several answers possible)
Check all that apply.
o Facilitate the demonstration and clarity of your presentations by leveraging resources
o Create more interactive presentation situations with digital tools
o Create differentiated piloting situations to adapt the steering to the different needs of the members of the team
o Develop initiative and collaboration by creating collaborative work situations around digital tools (research, investigation, production, project)
o Promote to members of your team the control of written expression and / or communication in other ways with digital production or editing activities (recording of oral, written, newspaper, web radio, blog , site, etc.)
o Recognize the digital skills of your team members with requests to present collective innovations
o Facilitate meetings
o Avoid traveling
o Promote the establishment
o Other:

32.
4.2 As part of your duties as a school principal, you personally master the following digital tools: (Several answers possible)
Check all that apply.
o Projectors
o Interactive whiteboard (IWB), interactive digital whiteboard (IWT), interactive video projector (IPV)
o Nomadic tools (tablets, digital music players for sound and image)
o Computers connected to the Internet
o Multimedia Room
o Phone / Cell
o CD-ROM, DVD or DVD player
o Generalized bureaucratic software
o Software dedicated to management
o Other:

33.
4.3 To interact with the network of head teachers, you use the following digital tools: (Several answers possible)
Check all that apply.
o Numerical workspace (ENT) of the institution
o Blogs, social networks, chats
o Email
o Videoconference
o Other:

34.
4.4 To interact with your team, you use the following digital tools: (Several answers possible)
Check all that apply.
o Numerical workspace (ENT) of the institution
o Blogs, social networks, chats
o Email
o Videoconference
o Other:

35.
4.5 Is the digital tool for you a relevant steering tool?
Mark a single oval
o Yes
o No
o Do not know
Passez à la question 52.

PART 2 - STATE OF PLAY
Teachers

36.
2.1 Does your country of practice have a government / digital public plan for schools?
Mark a single oval
o Yes Go to question 37.
o No Go to question 39.
o In development Go to question 39.
o Do not know Go to question 39.

Go to question 39

PART 2: STATE OF THE PLACE
Teachers: Government Plan / Digital Public

37.
2.1.1 In which year was the government / digital public plan for your country of practice introduced? _____

38.
2.1.2 How is this plan relayed in your establishment? (Many possible responses)
Check all that
o Departmental / Departmental Services
o Rectory
o National training
o Digital referents
o Other:
Go to question 39

PART 2: STATE OF THE PLACE
Teachers: continuation of the questionnaire

39.
2.2 In your institution, who makes purchasing and arbitration decisions regarding digital applications? (Many possible responses)
Check all that apply
o Steering Committee
o Choice of Management only
o Manager / steward
o Educational advice
o Do not know

40.
2.3 How do you evaluate the effectiveness of your digital environment and your digital tools?
Mark a single oval

- o Very effective
- o Mostly effective
- o Rather ineffective
- o Very inefficient
- o Do not know

Go to question 41.

PART 3: INITIAL AND CONTINUING TRAINING
Teachers: continuation of the questionnaire

41.
3.1 Did you have digital training or development to be a teacher?
Mark a single oval

- o Yes
- o No

42.
3.2 Do you benefit from training time reserved for the acquisition of digital skills in the performance of your duties?
Mark a single oval

- o Yes Go to question 43.
- o No Go to question 44.

Go to question 44.

PART 3: INITIAL AND CONTINUING TRAINING
Teachers: Training Time Reserved for Digital Skills Training

43.
3.2.1 What are the subjects of these training times? (Many possible responses)
Check all that apply

- o Classroom management
- o Use of computer software or tools
- o Use of educational platforms
- o Digital strategies
- o Educational innovations and digital uses
- o Evaluation with digital
- o Other:

Go to question 44.

PART 3: INITIAL AND CONTINUING TRAINING
Teachers: continuation of the questionnaire

44.
3.3 Of all your training courses that you receive annually, what percentage (%) on average can you link to educational innovations related to digital?
Mark a single oval

- o From 100% to 81%
- o From 80% to 61%
- o 60% to 41%
- o From 40% to 21%
- o From 20% to 0%

45.
3.4 In your opinion, what are the obstacles to pursuing continuous training in the use of digital technology for teachers? (Many possible responses)
Check all that apply

- o Lack of interest of teachers
- o Lack of interest of school heads
- o Lack of training offers
- o Lack of funding
- o Impossibility to release teachers
- o Impossibility to replace teachers
- o Other

Go to question 46.

PART 4: PROFESSIONAL USE OF DIGITAL
Teachers: continuation of the questionnaire

46.
4.1 During the preparation of your courses, you use digital for: (Several answers possible)
Check all that apply
o Exchange and communicate with students, students
o Write courses, prepare exercise or assessment materials
o Find documents, educational leads, resources on the Internet
o Consult the academic pedagogical portal (educational website in particular)
o Update your knowledge on certain domains with Internet
o Share information about the discipline and their curriculum with colleagues
o Exchange and share documents with your colleagues
o Develop collaboratively with other teachers course materials, exercises, and assessment or review topics
o Other:

47.
4.2 During your lessons, you master the digital for: (Several answers possible)
Check all that apply
o Realize administrative activities (call, presence in class, notebook)
o Facilitate the demonstration and clarity of your presentations by leveraging resources
o Create more interactive presentation situations with digital tools
o Create differentiated learning situations to adapt pedagogy to the different needs of students
o Develop initiative and collaboration by creating collaborative work situations around digital tools (research, investigation, production, project)
o Reinforce the control of written expression and / or communication in other ways with digital production or editing activities (recording of oral, written, newspaper, web radio, blog, site, etc.)
o Validate digital skills with assessment situations
o Other:

48.
4.3 Outside of your classes, you use or have students use digital for: (Multiple answers possible)
Check all that apply
o Perform administrative activities
o Communicate and interact with students
o Anticipate work in the classroom through research, preparation upstream (student preparation work)
o Continue and / or complete the work started in class (productions, exercises done by students)
o Upload your courses to facilitate revisions and / or help for absent students
o Accompany students individually (help with homework, advice, remediation, etc.)
o Conduct or correct assessments online
o Other:

49.
4.4 In class, you use the following numerical tools: (Several answers possible)
Check all that apply
o Projectors
o Interactive whiteboard (IWB), interactive digital whiteboard (IWT), interactive video projector (IPV)
o Nomadic tools (tablets, digital music players for sound and image)
o Computers connected to the Internet
o Multimedia Room
o Phone / Cell
o CD-ROM, DVD or DVD player
o Other:

50.
4.5 To interact with students, you use the following digital tools: (Multiple answers possible)
Check all that apply
o Numerical workspace (ENT) of the institution
o Blogs, social networks, chats
o Email
o Digital textbook
o Specific tools for students far from the classroom (virtual classroom, videoconferencing)
o Other:

51.
4.6 To interact with colleagues, you use the following digital tools: (Multiple answers possible)
Check all that apply
o Numerical workspace (ENT) of the institution
o Blogs, social networks, chats
o Email
o Disciplinary sites (with a "members" space)
Go to question 52.

LATEST PART: FORECAST FORECASTING AND ANALYSIS

52.
A.1 In your opinion, what are the main challenges and opportunities that the future holds for piloting schools from the digital angle?

53.
A.2 In your opinion, what are the main challenges and opportunities that the future holds for digital education and research?

54.
B. What resources do you think will be needed to support digital change in your school?

55.
C.1 More specifically, what do you think are the skills that school leaders need or need to master in a digital society?

56.
C.2 Specifically, what do you see as the skills that teachers need or need to master in a digital society?
Go to question 57.

AS A CONCLUSION...

57.
Describe an innovative digital project in which you have committed yourself, which you have piloted / worn and of which you are proud:

End of the questionnaire
Go to "THANKS".

THANKS
Thank you for taking the time to answer this questionnaire. Your participation will certainly contribute to the success of this research.
If you are interested in continuing your participation in the reflection on the subject covered by the ANGE project (webinars, class-lab, experimentation, etc.), consult the project website (www.classlab-ange.eu) and send your details to the following address: contact@classlab-ange.eu.